

SIEMENS



Safety Technology for Factory Automation

Safety Integrated

Catalog
SI 10

Edition
2014

Answers for industry.

Verwandte Kataloge

Industrial Controls SIRIUS E86060-K1010-A101-A4-7600	IC 10 	Motion Control SIMOTION, SINAMICS S120 & SIMOTICS Equipment for Production Machines E86060-K4921-A101-A3-7600	
SIMATIC Products for Totally Integrated Automation E86060-K4670-A101-B4-7600	ST 70 	SINAMICS G130 Drive Converter Chassis Units SINAMICS G150 Drive Converter Cabinet Units E86060-K5511-A101-A5-7600	
SIMATIC HMI / PC-based Automation Human Machine Interface Systems PC-based Automation E86060-K4680-A101-C1-7600	ST 80/ST PC 	SINAMICS G110/SINAMICS G120 Standard Inverters SINAMICS G120D Distributed Inverters E86060-K5511-A111-A6-7600	
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Process Automation Process Analytical Instruments PDF/e-book (E86060-K3501-A101-A9-7600)	PA 01 	Motion Control SINUMERIK 840D sl Type 1B Equipment for Machine Tools E86060-K4462-A101-A1-7600	
SITOP Power supply SITOP E86060-K2410-A111-A9-7600	KT 10.1 	Products for Automation and Drives Interactive Catalog, DVD E86060-D4001-A510-D3-7600	
SITRAIN Training for Industry Only available in German E86060-K6850-A101-C4	ITC 	Industry Mall Information and Ordering Platform in the Internet: www.siemens.com/industrymall	

Safety Integrated Safety Technology for Factory Automation

Catalog SI 10 · 2014



The products and systems described in this catalog are manufactured/distributed under application of a certified quality management system in accordance with DIN EN ISO 9001. The certificate is recognized by all IQNet countries.

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Catalog News SI 10 N · 2012

Refer to the Industry Mall for current updates of this catalog:

www.siemens.com/industrymall

The products contained in this catalog can also be found in the Interactive Catalog CA 01.

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Please contact your local Siemens branch

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Functional safety of machines and plants
Safety Integrated
Efficient Engineering with TIA Portal

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Detecting

Detecting devices
Commanding and signaling devices
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Fail-safe communication via PROFIBUS and PROFINET with SIMATIC fail-safe controllers and distributed I/O
Fail-safe communication via ASIsafe
Conventional design with SIRIUS 3SK1, 3RK3 and SIMOCODE

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Reacting

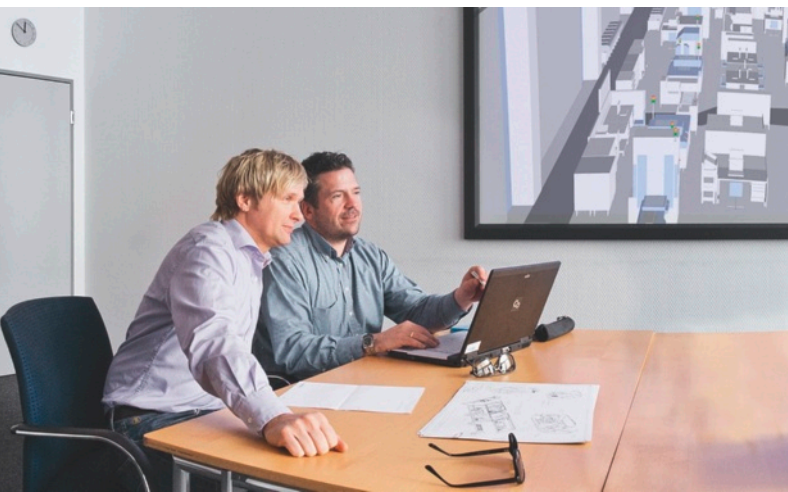
SIRIUS industrial controls
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SINAMICS drive family
SIMOTION motion control system
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SIDOOR door control systems

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Safety characteristics
Training, education
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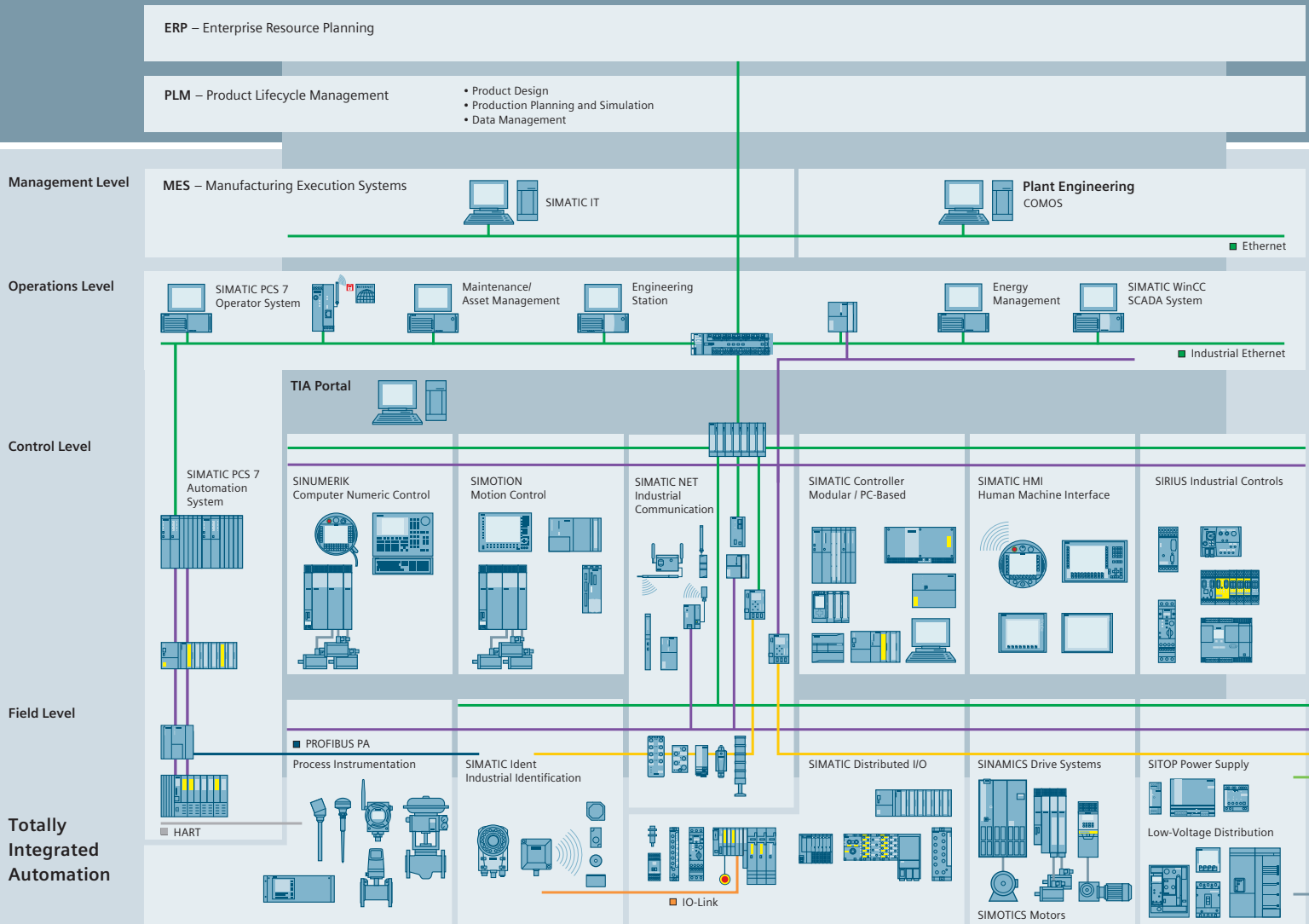
Answers for industry.

Integrated technologies, vertical market expertise and services for greater productivity, energy efficiency, and flexibility.

The Siemens Industry Sector is the world's leading supplier of innovative and environmentally friendly products and solutions for industrial companies. End-to-end automation technology and industrial software, solid market expertise, and technology-based services are the levers we use to increase our customers' productivity, efficiency and flexibility. With a global workforce of more than 100 000 employees, the Industry Sector comprises the Industry Automation, Drive Technologies, and Customer Services divisions, as well as the Metals Technologies Business Unit.

We consistently rely on integrated technologies and, thanks to our bundled portfolio, we can respond more quickly and flexibly to our customers' wishes. With our globally unmatched range of automation technology, industrial control and drive technology as well as industrial software, we equip companies with exactly what they need over their entire value chain – from product design and development to production, sales and service. Our industrial customers benefit from our comprehensive portfolio, which is tailored to their market and their needs.

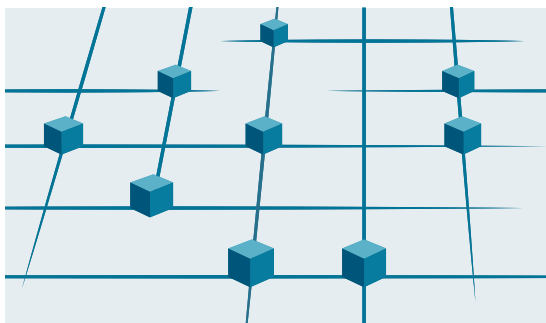
Market launch times can be reduced by up to 50% due to the combination of powerful automation technology and intelligent industrial software from Siemens Industry. At the same time, the costs for energy or waste water for a manufacturing company can be reduced significantly. In this way, we increase our customers' competitive strength and make an important contribution to environmental protection with our energy-efficient products and solutions.



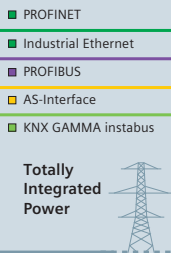
Efficient automation starts with efficient engineering.

Totally Integrated Automation: Efficiency driving productivity.

Efficient engineering is the first step toward better production that is faster, more flexible, and more intelligent. With all components interacting efficiently, Totally Integrated Automation (TIA) delivers enormous time savings right from the engineering phase. The result is lower costs, faster time-to-market, and greater flexibility.



Totally Integrated Automation
Efficient interoperability of all automation components



A unique complete approach for all industries

As one of the world's leading automation suppliers, Siemens provides an integrated, comprehensive portfolio for all requirements in process and manufacturing industries. All components are mutually compatible and system-tested. This ensures that they reliably perform their tasks in industrial use and interact efficiently, and that each automation solution can be implemented with little time and effort based on standard products. The integration of many separate individual engineering tasks into a single engineering environment, for example, provides enormous time and cost savings.

With its comprehensive technology and industry-specific expertise, Siemens is continuously driving progress in manufacturing industries – and Totally Integrated Automation plays a key role.

Totally Integrated Automation creates real value added in all automation tasks, especially for:

- **Integrated engineering**
Consistent, comprehensive engineering throughout the entire product development and production process
- **Industrial data management**
Access to all important data occurring in productive operation – along the entire value chain and across all levels
- **Industrial communication**
Integrated communication based on international cross-vendor standards that are mutually compatible
- **Industrial security**
Systematic minimization of the risk of an internal or external attack on plants and networks
- **Safety Integrated**
Reliable protection of personnel, machinery, and the environment thanks to seamless integration of safety technologies into the standard automation

Making things right with Totally Integrated Automation

Totally Integrated Automation, industrial automation from Siemens, stands for the efficient interoperability of all automation components. The open system architecture covers the entire production process and is based on end-to-end shared characteristics: consistent data management, global standards, and uniform hardware and software interfaces.

Totally Integrated Automation lays the foundation for comprehensive optimization of the production process:

- Time and cost savings due to efficient engineering
- Minimized downtime due to integrated diagnostic functions
- Simplified implementation of automation solutions due to global standards
- Better performance due to interoperability of system-tested components

Introduction



Siemens received the Frost & Sullivan Award 2013 for Global Smart Machine Safety Networks

Our customers - machine manufacturers and plant operators - benefit especially from particularly innovative safety products and services and the best and most cost-effective solution on the market. According to Frost & Sullivan, trendsetter Siemens also offers a wealth of know-how and experience, creating flexible solutions for a wide range of different applications.

Read more about this in "Best practice research" at www.siemens.com/safety-integrated

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Introduction

Functional safety of machines and plants

1

Overview

Basic safety requirements in the production industry

Functional safety

In many different application areas (machine and conveyor technology, the process industry, building technology, etc.), automation systems and components have to handle safety-relevant tasks. This means that the health and safety of persons - as well as intact plant assets and the environment - depend on the correct functioning of systems and components. Nowadays the correct functioning of systems and components is handled internationally using the term "Functional safety".

With the introduction of the uniform European Single Market, national standards and regulations affecting the technical realization of machines were consistently harmonized. This involved defining basic safety requirements which address, on the one hand, machine manufacturers in terms of the free movement of goods (Article 95) and, on the other hand, machine operators in terms of industrial safety (Article 137).

Safe machines are compulsory in Europe and many other countries

In Europe, machine manufacturers (product safety) and machine operators (occupational safety) are required by law to ensure the safety of people and the environment. Awareness for this issue is continuously increasing in many other countries which currently do not have corresponding statutory provisions.

Machines manufactured, converted or imported in Europe must be safe - regardless of whether they are new or used.

The fundamental demands placed on machine manufacturers or machine operators who significantly modernize or modify their machines themselves are set out in European Directives - for example in the Machinery Directive, EMC Directives, etc.

Risk assessment

Any machinery manufacturer is obliged to perform a risk assessment to identify all the hazards associated with his machinery, to assess and evaluate the risks and to design and construct the machinery taking such hazards into account.

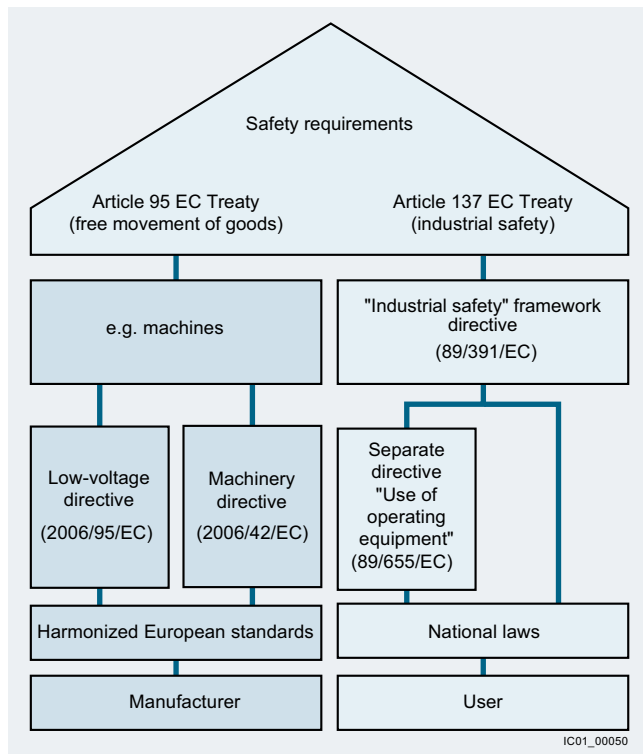


Compliance with directives

By applying the EN ISO 13849-1 and IEC 62061 standards, machine manufacturers comply with the new Machinery Directive and thus also achieve export capability and liability security. These standards have introduced quantitative aspects as well as qualitative considerations.

Protective measures for risk reduction are derived from the risk assessment process, and are described by safety functions.

The machine manufacturer uses the CE marking to document the compliance with all relevant directives and regulations in the free movement of goods. As the European directives are recognized worldwide, their use is of great help when exporting to other countries.



Safety requirements imposed on machines and plants

The EN 62061 standard

The EN 62061 standard "Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems" defines comprehensive requirements. It includes recommendations for the development, integration and validation of safety-related electrical, electronic and programmable electronic control systems (SRECS) for machines. With the implementation of EN 62061, for the first time, one standard covers the entire safety chain, from the sensor to the actuator.

Requirements placed on the performance of non-electrical - e.g. hydraulic, pneumatic, or electromechanical - safety-related control elements for machines are not specified by the standard.

**The EN ISO 13849-1 standard**

EN ISO 13849-1 "Safety of machines - Safety-related components of controls - Part 1: General principles" replaced EN 954-1 at the end of 2011. It considers the complete range of safety functions with all the devices that are involved in their performance. EN ISO 13849-1 also makes a quantitative analysis of the safety functions. The standard describes how to determine the performance level (PL) for safety-relevant parts of control systems on the basis of architectures specified for the intended service life.

When several safety-relevant parts are combined to form a single complete system, the standard explains how to determine the resulting PL. It can be applied to safety-related parts of control systems (SRP/CS) and all types of machines, regardless of the technology and energy used, e.g. electrical, hydraulic, pneumatic or mechanical.

Our commitment toward global harmonization of standards

In order to make the path toward safer machines simpler and faster in the future, and to promote the free movement of goods on global markets even further, we have been consistently committed to the standardization of safety-relevant standards for many years. The success of this commitment is demonstrated by the growing acceptance of European directives far beyond Europe or the harmonization of international safety standards which makes it easier for both machine manufacturers and machine operators to satisfy safety demands more efficiently.

Our offering

As a partner for all safety issues, we not only support you with the relevant safety-related products and systems, but also consistently provide you with the most up-to-date knowledge on international standards and regulations. We offer machine manufacturers and operators a comprehensive training portfolio as well as services for the entire lifecycle of safety-related systems and machines.

- A uniform, certified product range
- Courses on standards and regulations:
www.siemens.com/sitrain-safetyintegrated
(You can find a summary of our training courses on safety technology in the appendix)
- Brochure on functional safety with step-by-step instructions, available at www.siemens.com/safety-infomaterial
- Reference Manual on functional safety
- Advice from your representative and support for verification and validation
- Siemens Solution Partner for safety systems
- Worldwide service and support
<http://support.automation.siemens.com>

You can find more information at
www.siemens.com/safety-integrated

Safety Evaluation Tool

The Safety Evaluation Tool for the IEC 62061 and ISO 13849-1 standards provides rapid and safe assistance when evaluating the safety functions of machines. Users receive a standard-compliant report that can be integrated into the documentation as a safety verification.

The TÜV-approved online tool includes numerous examples of safety functions and of course all data on safety products from Siemens. Product data from other manufacturers can be read in manually or via an interface as an XML file in accordance with the format defined in VDMA specification 66413.

The Safety Evaluation Tool is available free of charge at:
www.siemens.com/safety-evaluation-tool



Introduction

Safety Integrated

1

Overview

Integrating safety technology, saving costs

Safety Integrated is the consistent implementation of safety systems in accordance with Totally Integrated Automation. This means, on the one hand, that we integrate safety-related functions directly in our standard products and, on the other hand, offer uniform and easy integration into standard automation applications. This offers numerous advantages for both machine manufacturers and operators, particularly in terms of economic value. Machine manufacturers can achieve a decisive competitive edge by applying integrated safety technology. The argument: significantly simpler engineering. The result: machines and plants which can be implemented significantly faster and adapted simply to new requirements.

Machine operators also benefit, in that they are provided with safer and more productive machines and plants within a shorter time as a result. This is because a consistent complete system comprising safety technology and standard automation reduces downtimes and increases availability thanks to improved diagnostics.

Compared to conventional safety technology, Safety Integrated also facilitates conversion and modernization. Existing machines and plants can be upgraded to state-of-the-art technology at much better value thanks to flexible and expandable modular concepts - an advantage which pays dividends throughout the complete service life.

Integrated safety technology from a single source

Safety Integrated is a unique, complete, and consistent range of safety products covering all safety-related tasks - from detecting and evaluating to reacting, from sensors and controllers to drives.

Our products comply with current industrial safety standards, e.g. the Machinery Directive, IEC 61508, IEC 62061 or EN ISO 13849-1.

In this catalog, you can find everything concerning our comprehensive product range, helpful links to documentation, and safety services.

You can always find the most up-to-date information on the Internet at:

www.siemens.com/safety-integrated.

Fail-safe communication ¹⁾

For fail-safe communication, Safety Integrated applies the proven AS-Interface and PROFIBUS fieldbus systems as well as PROFINET, the innovative Industrial Ethernet standard. The latter enables new solution approaches for safe and economical machines and plants - such as wireless, fail-safe communication over IWLAN.

Functional safety: a success factor for machine manufacturers and operators

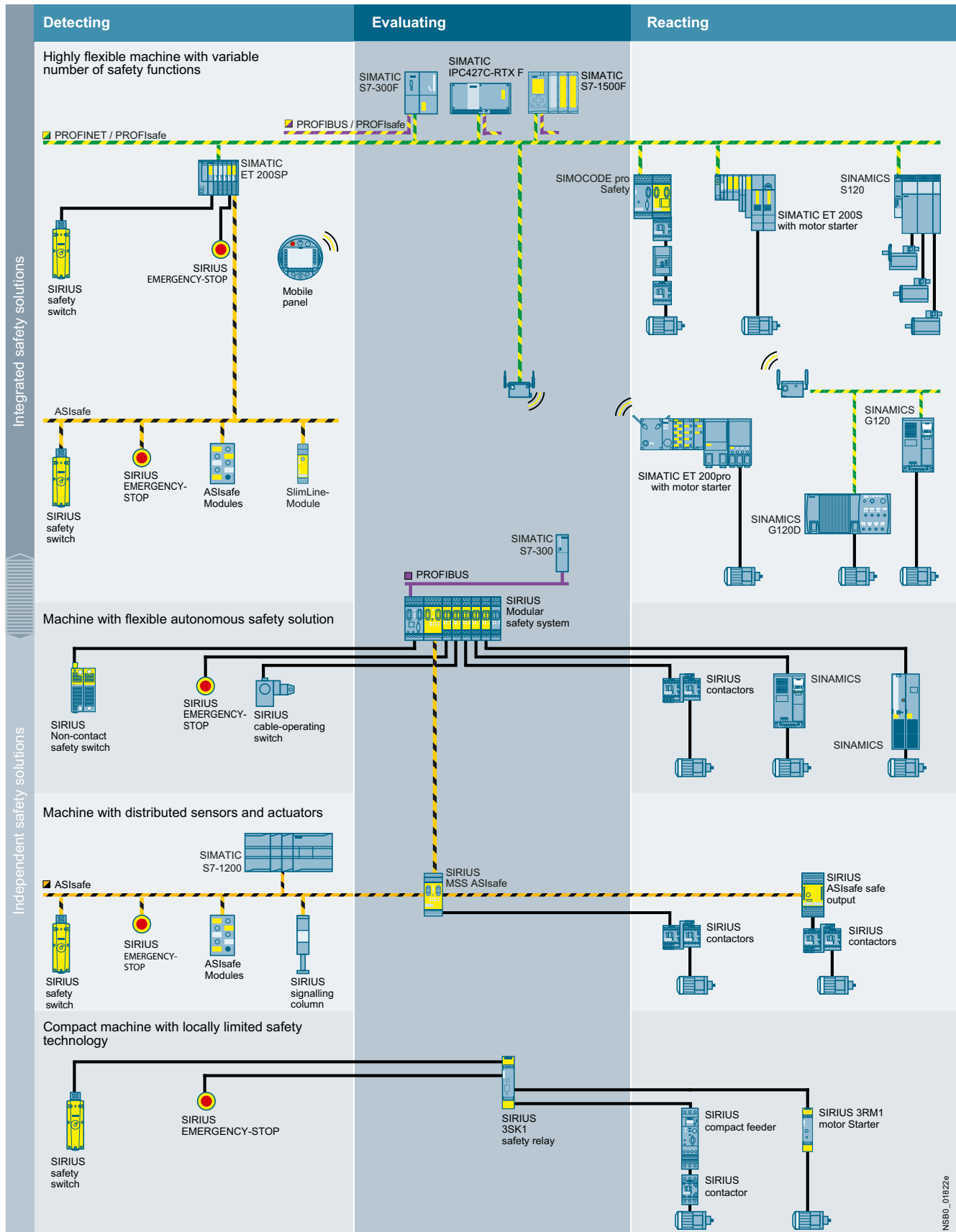
- Increased productivity thanks to improved machine availability: fewer unplanned downtimes and smoother production operations
- Longer plant service lives
- Avoidance of direct consequential costs from personal injuries (for medical treatment, wages, and compensation)
- Avoidance of indirect consequential costs from injuries (e.g. fines because of unobserved regulations or repair costs)
- Improvement in global competitiveness thanks to increase in export capability of machines



1) For the safe operation of a system or machine, suitable protective measures must be taken and the automation and drive components must be integrated in a holistic, state-of-the-art industrial security concept. Information can be found at:

www.siemens.com/industrialsecurity

Overview(continued)



Introduction

Efficient Engineering with TIA Portal

1

Overview

Safety engineering made simple

Ranging from SIMATIC controllers and HMI to SINAMICS drives and fail-safe communication over PROFINET and AS-Interface - with the TIA Portal, only one engineering environment is required for configuration and programming. This makes integration of safety into production machines even simpler.

Modern machines and plants are characterized by significantly higher productivity levels, since freely programmable controllers and distribution are specifically used for demanding applications. Where safety-related tasks are concerned, different products and systems were frequently used in previous applications. But with complex safety tasks, the efficiency of an automation solution can be significantly increased if the safety-related functions are integrated seamlessly into the standard functions.

Intuitive programming with blocks

This also applies to engineering in the TIA Portal with STEP 7 Safety Advanced. All configuration and programming tools required for creating a safety-related program are integrated in the STEP 7 HMI and use a joint project infrastructure. Whether a controller has to be programmed, an HMI screen designed, or network configurations configured - the TIA Portal provides support for both new and experienced users to enable them to work as productively as possible. In the TIA Portal, users are intuitively guided through every engineering step. The modules are clearly divided according to topics in the right-hand hardware catalog, and the structured tree offers all parameters directly in the program editor.

Users can apply the SIMATIC STEP 7 Safety Advanced V13 option to implement all the advantages of the TIA Portal for their fail-safe automation functions. Intuitive operation and the same operating concept as with standard programs enable users to rapidly understand the creation of fail-safe programs. The safety-related programs are generated using the LAD and FBD languages. Users do not need additional engineering expertise, because the programming is done in the traditional STEP 7 environment. Furthermore, there is a library with pre-configured, TÜV-approved blocks for simple implementation of safety-related functions. The library concept supports company-internal standardization and simplifies the validation of safety-related applications.

Last but not least, fault detection functions and safety tests are supported when generating the safety program, as is the comparison of safety programs. Apart from the safety program, a standard program can also run simultaneously on a CPU.

Migration of STEP 7 Distributed Safety possible

Safety-related programs can also be created as previously using STEP 7 and Distributed Safety. Using the Distributed Safety engineering tool, safety-related automation applications can be written in LAD or FBD with STEP 7 V5.5. The safety program is called from the standard user program via the so-called F-CALL (e.g. from a cyclic interrupt OB such as OB 35). Programs generated using STEP 7 Distributed Safety can be migrated into the TIA Portal at any time.

Safety for drive technology

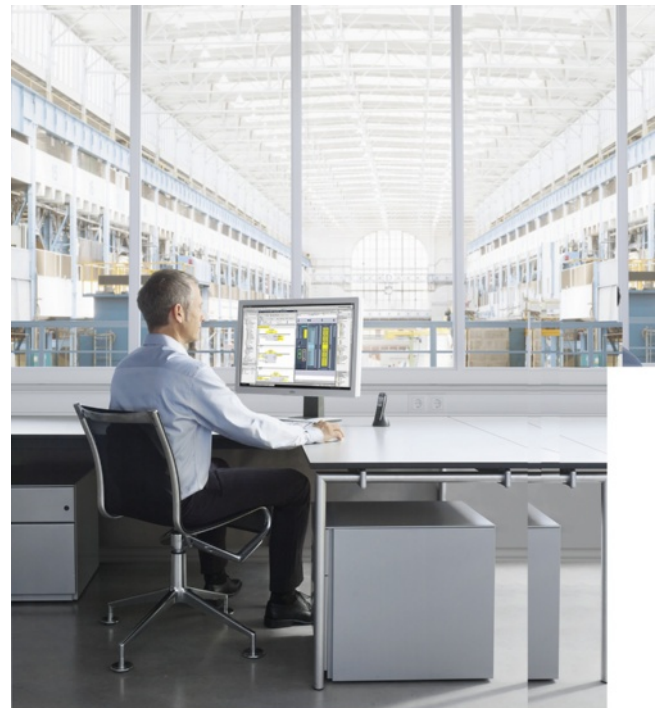
TIA Portal also permits engineering of fail-safe drive technology: relevant drive safety-related functions can be configured in graphic screen forms using Startdrive. This guarantees perfect interaction between converter and controller.

Benefits of STEP 7 Safety Advanced V13

- Same configuration method for fail-safe system and standard automation system
- LAD or FBD programming language for generation of safety program
- Integrated library with TÜV-approved function blocks
- Safety Administration Editor provides support for management, display and modification of safety-relevant parameters
- Uniform and consistent identification of all safety-relevant resources
- Increased performance thanks to optimized autonomous compiler prioritization
- Timing options for fail-safe sequence groups
- Expansion of protection level concept regarding own protection level for safety configuration
- Unique signature of the fail-safe user program

Info and contact

www.siemens.com/tia-portal



Detecting



2/2 Detecting devices

2/2 Position and safety switches overview

2/4 3SE5 mechanical position switches

2/13 3SE5, plastic enclosures
 2/13 Enclosure width 31 mm
 2/19 Enclosure width 40 mm
 2/23 Enclosure width 50 mm
 2/27 Ambient temperature up to -40 °C

2/31 3SE5, metal enclosures
 2/31 Enclosure width 31 mm
 2/35 Enclosure width 40 mm
 2/39 Enclosure width 56 mm
 2/43 Enclosure width 56 mm, XL

2/46 Ambient temperature up to -40 °C

2/51 Compact design

2/53 3SE5, open-type design

2/54 Accessories and spare parts

2/57 3SE5, 3SE2 mechanical safety switches

2/57 With separate actuator
 2/62 3SE5, plastic enclosures
 2/64 3SE5, metal enclosures
 2/66 Accessories

2/67 3SE2, plastic enclosures
 2/68 With solenoid interlocking
 2/72 3SE5, plastic enclosures
 2/73 3SE5, metal enclosures
 2/74 Accessories

2/75 Hinge switches

2/77 3SE5, plastic enclosures

2/78 3SE5, metal enclosures

2/79 3SE2, plastic enclosures

2/81 3SF1 mechanical safety switches for AS-Interface

2/83 Plastic enclosures

2/87 Metal enclosures

2/89 With separate actuator

2/90 Plastic enclosures

2/91 Metal enclosures

2/92 Accessories

2/93 With solenoid interlocking

2/94 Plastic enclosures

2/95 Metal enclosures

Hinge switches

2/96 Plastic enclosures

2/97 Metal enclosures

2/98 3SE6 non-contact safety switches

2/98 Magnet

2/98 3SE66, 3SE67 magnetically operated switches

2/100 RFID

2/100 RFID 3SE63 safety switches

2/104 Commanding and signaling devices

2/106 3SB2 pushbuttons and indicator lights, 16 mm

2/110 3SB3 pushbuttons and indicator lights, 22 mm

2/122 AS-Interface F adapters for EMERGENCY-STOP devices

2/126 Enclosures

2/130 Enclosures for AS-Interface

2/133 3SB3 two-hand operation consoles

2/134 SIRIUS 3SE7, 3SF2 cable-operated switches

2/134 3SE7 with metal enclosures

2/138 3SF2 for AS-Interface

2/139 3SE2, 3SE3 foot switches

2/141 8WD4 signaling columns

2/144 8WD42 signaling columns, 50 mm diameter

2/146 8WD44 signaling columns 70 mm diameter

2/149 8WD5 integrated signal lamps

2/149 8WD53 integrated signal lamps, 70 mm diameter

2/150 Operator control devices

2/150 Key panels

2/150 SIMATIC HMI KP8/KP8F/KP32F

2/156 Mobile panels

2/156 SIMATIC mobile panel 277(F) IWLAN

2/165 Sensor systems

2/166 Process instrumentation

2/167 Process analytics

Delivery time class (DT)

► Preferred type	Preferred types are available immediately from stock, i.e. are dispatched within 24 hours.
A 2 working days	
B 1 week	
C 3 weeks	Normal quantities of the products are usually delivered within the specified time following receipt of your order at our branch.
D 6 weeks	In exceptional cases, the actual delivery time may differ from that specified.
X On request	The standard transport time for Germany is 1 day.
	The delivery times specified here represent the situation in October 2013.

Position and safety switches

Introduction

Overview

2



	Position switches, standard					Safety hinge switches	
Enclosure							
Plastic	✓	✓	✓	--	--	✓	✓
Metal	✓	--	✓	✓	✓	✓	✓
Dimensions (W x H x D) in mm	31 × 68 × 33	50 × 53 × 33	40 × 78 × 38	56 × 78 × 38	56 × 100 × 38	31 × 68 × 33	40 × 78 × 38
Degree of protection	IP65, IP66/IP67	IP66/IP67	IP66/IP67	IP66/IP67	IP66/IP67	IP65, IP66/IP67	IP66/IP67
Standards							
IEC 60947-5-1	Mounting and operating points acc. to EN 50047	Operating points acc. to EN 50047	Mounting and operating points acc. to EN 50041	Operating points acc. to EN 50041	Operating points acc. to EN 50047	Mounting and operating points acc. to EN 50047	Mounting and operating points acc. to EN 50041
Approvals	CE, UL, CSA, CCC		CE, UL, CSA, CCC			CE, UL, CSA, CCC	
Contact blocks							
2 slow-action contacts	1 NO + 1 NC, 2 NC		1 NO + 1 NC, 2 NC		2 × (1 NO + 1 NC)	--	
2 snap-action contacts	1 NO + 1 NC		1 NO + 1 NC		2 × (1 NO + 1 NC)	1 NO + 1 NC	
• Short stroke	1 NO + 1 NC		✓		--	--	
• With 2 × 2 mm contact gap	1 NO + 1 NC		✓		--	--	
3 slow-action contacts	1 NO + 2 NC; 2 NO + 1 NC		1 NO + 2 NC; 2 NO + 1 NC		--	--	
• With make-before-break	1 NO + 2 NC		1 NO + 2 NC		2 × (1 NO + 2 NC)	--	
3 snap-action contacts	1 NO + 2 NC		1 NO + 2 NC		--	1 NO + 2 NC	
Special features							
LED status display	✓		✓		--	✓	
Increased corrosion protection	✓		✓		✓	✓	
ASIsafe integrated	✓		✓		--	✓	
Electrical specifications							
Insulation voltage U_i	400 V		400 V			400 V	
Conventional thermal current I_{the}	6 A/10 A (3-/2-pole)		6 A/10 A (3-/2-pole)			6 A/10 A (3-/2-pole)	
Connections							
Cable entry	1 × M20 × 1.5	2 × M20 × 1.5	1 × M20 × 1.5	3 × M20 × 1.5	3 × M20 × 1.5	1 × M20 × 1.5	1 × M20 × 1.5
M12 connector socket, 4-, 5- or 8-pole	✓	✓	✓	✓	✓	✓	✓
Connector socket, 6-pole + PE	--	--	✓	✓	--	--	--
Actuators							
Rounded plungers and roller plungers	✓		✓		✓	--	
Roller levers and angular roller levers	✓		✓		✓	--	
Spring rod	✓		✓		--	--	
Twist levers and rod actuators	✓		✓		✓	--	
Fork lever	--		✓		--	--	
Hinge switches	--		--		--	✓	
Page							
Complete units	2/13, 2/31	2/23	2/19, 2/35	2/39	2/43	2/77	2/78
Modular system	2/17, 2/33	2/25	2/21, 2/37	2/41	2/44	--	--
Ambient temperature -40 °C	2/27, 2/47	2/27	2/30, 2/48	2/49	2/49	--	--
ASIsafe	2/83, 2/85	2/83	2/87	2/87	--	2/96	2/97

✓ Available

-- Not available



	Compact design	Open-type	Safety switches with separate actuator		Safety switches with solenoid interlocking	RFID safety switches
Enclosure						
Plastic	--	✓	✓	✓	✓	✓
Metal	✓		✓	✓	✓	--
Dimensions (W x H x D) in mm	30 x .. x .., 40 x .. x ..	30 x 48.5 x 20	31 x 68 x 33, 50 x 53 x 33	40 x 78 x 38, 56 x 78 x 38	54 x 185 x 44	25 x 91 x 22
Degree of protection	IP66/IP67	IP10 or IP20	IP65, IP66/IP67	IP66/IP67	IP66/IP67	IP69K
Standards	--	Mounting and operating points acc. to EN 50047	Mounting acc. to EN 50047	Mounting acc. to EN 50041	EN 1088	Category 4 acc. to ISO 13849-1, PL e acc. to ISO 13849-1, SIL 3 acc. to IEC 61508
IEC 60947-5-1						
Approvals	CE, UL, CSA, CCC	--	CE, TÜV, UL, CSA, CCC		CE, TÜV, UL, CSA, CCC	CE, TÜV, UL, CSA (CCC not required for voltages < 36 V, not required)
Contact blocks / outputs						
2 slow-action contacts	--	1 NO + 1 NC	1 NO + 1 NC, 2 NC		--	--
2 snap-action contacts	1 NO + 1 NC	1 NO + 1 NC	--		--	--
• Short stroke	--	✓				
• With 2 x 2 mm contact gap	--	✓				
3 slow-action contacts	--	1 NO + 2 NC; 2 NO + 1 NC	1 NO + 2 NC		2 x (1 NO + 2 NC)	--
• With make-before-break	--	1 NO + 2 NC				
3 snap-action contacts	--	1 NO + 2 NC	--		--	--
Electron. safety outputs	--	--	--		--	2
Special features						
LED status display	--	--	✓		✓	✓
Increased corrosion protection	--	--	✓		✓	✓
ASIsafe integrated	--	--	✓		✓	--
Electrical specifications						
Insulation voltage U_i	400 V	400 V	400 V		400 V	--
Conventional thermal current I_{the}	6 A	6 A	6 A		6 A	--
Connections						
Cable entry	--	--	1 x M20 x 1.5, 2 x M20 x 1.5	1 x M20 x 1.5, 3 x M20 x 1.5	3 x M20 x 1.5	--
M12 connector socket, 4-, 5- or 8-pole	✓	--	✓	✓	✓	✓
Molded cables	✓	--	--	--	--	--
AS-Interface	--	--	✓	✓	✓	--
Actuators						
Plungers, twist levers	✓	✓	--		--	--
Separate actuators	--	--	✓		✓	--
Page						
Complete units	2/51	2/53	2/62, 2/64	2/63, 2/65	2/72, 2/73	--
Modular system	--	--	--	--	--	2/100
ASIsafe	--	--	2/90	2/91	2/94, 2/95	--

✓ Available
-- Not available

Note:
Safety characteristics [see chapter 5 "Appendix".](#)

SIRIUS 3SE5 mechanical position switches

General data

Overview

The innovative SIRIUS 3SE5 position switches are modern in design, compact, modular and simple to connect. They save time and increase flexibility during installation of a whole range of switch variants. In principle it is possible to combine any enclosure with any operating mechanism, paying due consideration to the EN 50041 and EN 50047 standards where necessary.

Complete units

Popular versions of the position switches in standard enclosures are available as complete units.



3SE5 position switches with plastic and metal enclosures

Modular system

The 3SE5 series features a new modular system comprising different sizes of the basic switch and an actuator which must be ordered separately. Thanks to the modular design of the switch the user can select the right solution for his application from numerous versions and install it himself in a very short time.

An easy plug-in method enables fast replacement of the actuator heads.



Examples of selection options in the modular system

Design

All enclosure variants have an integrated chlorinated rubber diaphragm (high functional safety in cold and aggressive environments).

Enclosure sizes

The 3SE5 switches are available in five different enclosure sizes with 2 or 3 contacts and with the XL enclosure:

- Open-type position switch IP20 or IP10
- Plastic enclosures according to EN 50047, 31 mm wide, IP65, 1 cable entry
- Metal enclosures according to EN 50047, 31 mm wide, IP66/IP67, 1 cable entry
- Plastic and metal enclosures according to EN 50041, 40 mm wide, IP66/IP67, 1 cable entry
- Plastic enclosures, 50 mm wide, IP66/IP67, 2 cable entries
- Metal enclosures, 56 mm wide, IP66/IP67, 3 cable entries
- XL metal enclosures with 4 to 6 contacts, 56 mm wide, IP66/IP67, 3 cable entries

Enclosure variants

Various basic switches can be selected for the enclosures of the 3SE5 series:

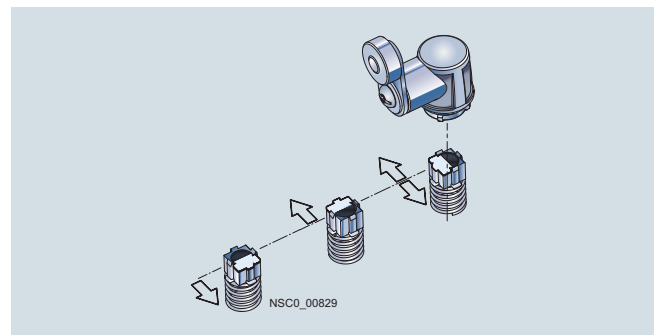
- With contact blocks with two or three contacts (screw terminals) designed as slow-action or snap-action contacts; the slow-action contacts also with make-before-break
- Optional LED status display
- With mounted four- or five-pole M12 connector socket (available for the wide enclosures as an accessory for self-assembly)
- With 6-pole connector socket + PE on the metal enclosures
- Versions with increased corrosion protection
- Versions for operating temperature up to -40°C
- AS-Interface version with integrated ASIsafe electronics for all enclosure designs (see page 2/81)

Actuator variants

All operating mechanisms can be rotated around the axis in increments of 22.5° . The following actuator variants are available:

- Standard, rounded and roller plungers
- Roller levers and angular roller levers
- Spring rod
- Twist levers and rod actuators with twist actuator
- Fork levers with twist actuator

The actuator rollers are available with various materials and diameters.



Twist actuator for twist levers and rod levers, with setting of switching direction to right, left or right/left (standard for all twist actuators except fork levers)

SIRIUS 3SE5 mechanical position switches

General data

Optional LED indicators

LED indicators
available for all enclosure sizes except for XL.



The enclosures are supplied with an LED signaling indicator (1 × green + 1 × yellow). This is the first time that optical signaling equipment is also available for small standard enclosures according to EN 50047. The LED signaling indicators are implemented in 24 V DC and 230 V AC.

Many different contact types

Exchangeable two and three-pole contact blocks for all enclosure sizes



The three-pole contact block with snap-action or slow-action contacts is regularly available for all enclosure forms. The same installation space is required as for a two-pole block. The version with 1 NO + 2 NC offers for example more safety through redundant shutdowns (2 NC contacts) with simultaneous signaling (NO contact). The three-pole blocks are also available with make-before-break and with 2 NO + 1 NC.

Contact reliability

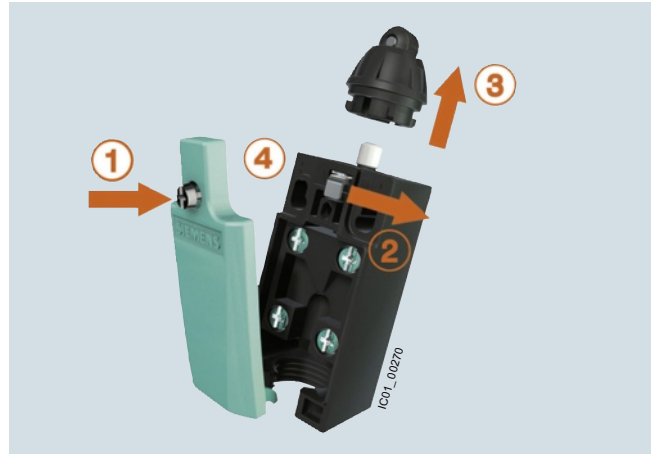
The contact blocks ensure an extremely high contact stability. This applies even when the devices are switching low voltages and currents, e.g. 1 mA at 5 V DC.

Positive opening ➞

The NC contacts of the switch are forced open mechanically, positively-driven and reliably by the plunger. This is referred to as "positive opening".

Mounting

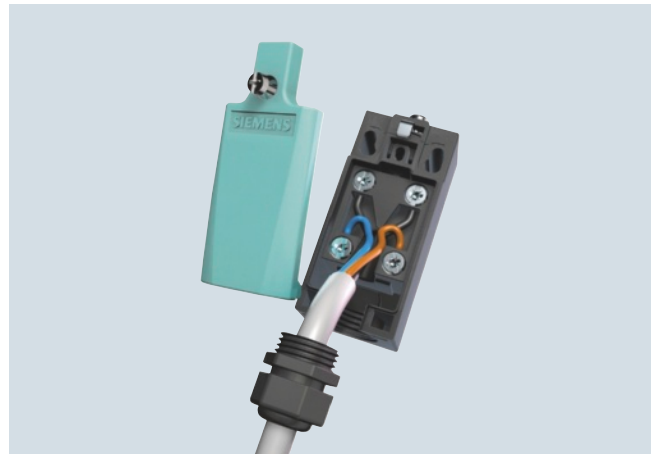
Easy plug-in method
for fast replacement of the actuator heads



Open the cover (1)
Actuate the locking lever (2)
Replace the head (turnable by 16 x 22.5°) (3)
Lock and close the cover (4)

Quick-connect technology

For plastic enclosures with a width of 31 mm



These position switches can be wired quickly and easily as an added customer benefit. The connecting cable is first connected to the terminals of the contact block and then guided through a slit into the cable gland opening. The time saved through this new connection method is approx. 20 to 25 %.

A cable gland with seal must be used with the quick-connect method.

SIRIUS 3SE5 mechanical position switches

General data

Benefits

The 3SE5 position switches differ from the previous series through the following new characteristics:

- The modular design of the product range allows a number of versions with a smaller number of bearing types for enclosures and operating mechanisms.
- All actuators can be turned around the axis in increments of 22.5° (see picture, page 2/5).
- Rounded and roller plungers according to EN 50041 with 3 mm overtravel (total travel 9 mm) for greater tolerance when switching.
- All enclosure sizes – now also including the small enclosure 31 mm wide – are optionally available with an LED signaling indicator (see picture, page 2/5).
- All enclosure variants have an integrated chlorinated rubber diaphragm (high functional safety in cold and aggressive environments).
- All contact blocks are replaceable (see page 2/55).
- The three-pole contact blocks are available for all enclosure sizes (see picture, page 2/5).
- Elements with 1 NO + 2 NC slow-action contacts with make-before-break and 2 NO + 1 NC.
- The short-stroke contact block 1 NO + 1 NC improves the precision of the switching operation through a reduced actuation path.
- The contact block with 1 NO + 1 NC snap-action contacts with 2 x 2 mm contact opening is suitable for simultaneous disconnection and signaling, particularly in the elevator industry.
- XL metal enclosures for accommodating two 2- or 3-pole contact blocks.
- The plastic enclosure with a width of 31 mm has simple and fast wiring equipment which makes it possible to save from approx. 20 to 25 % of the time when connecting (see picture, page 2/5).
- The ASIsafe electronic component is integrated in the enclosure for the versions with AS-Interface connection (see page 2/81); an additional adapter is not required.

Application

With the standard position switches, mechanical positions of moving machine parts are converted into electrical signals. Through their modular and uniform design and large number of variants, the devices can comply with practically all requirements in industry.

Devices are available with enclosure versions to suit the particular ambient conditions. Different control tasks can be performed with the best contact blocks suited for the particular purpose. And many different actuator variants are available to match the mechanical configuration of the moving machined parts. Dimensions, fixing points and characteristics are largely in accordance with the EN 50041 or EN 50047 standards.

The devices are suitable for use in any climate.

Standards


IEC 60947-5-1 or EN 60947-5-1



The protective measure of "total insulation" by the molded-plastic enclosure is guaranteed by the use of molded-plastic screw glands.

Safety position switches

For controls according to IEC 60204-1 or EN 60204-1 the devices can be used as a safety position switch. To secure position switches against changes in their position, keyed techniques must be employed on installation.

Safety circuits

IEC 60947-5-1 and EN 60947-5-1 require positive opening of the NC contacts, i.e. for the purposes of personal safety, the assured opening of NC contacts is expressly stipulated for the electrical equipment of machines in all safety circuits and marked according to the IEC standard 60947-5-1 with the symbol .

Category 2 according to EN ISO 13849-1 can be attained with 3SE5 position switches with , and category 3 or 4 when using an additional position switch, if the corresponding fail-safe evaluation units are selected and correctly installed, e.g. the 3SK1 or 3TK28 safety relays or matching devices from the ASIsafe, SIMATIC or SINUMERIK product ranges. The operating mechanisms (actuators) must also be connected to the enclosure by keyed techniques. The corresponding operating mechanisms are marked in the catalog with .

Contacts for each application

- **Snap-action contacts:** NC and NO contacts switch simultaneously – regardless of the actuating speed ($v_{\min} = 0.01 \text{ m/s}$) and contact erosion.
- **Slow-action contacts:** Difference in travel between "NC contact opens" and "NO contact closes"; the switching speed is the same as or proportional to the actuating speed ($v_{\min} = 0.4 \text{ m/s}$).
- **Slow-action contacts with make-before-break:** e.g. suitable for adding a second function to a sequence control.

Operating mechanisms for each application

Standard, rounded and roller plungers

- Operation in direction of the plunger axis or in case of roller plunger with bar at right angles to the plunger axis.
- The roller plunger is recommended for lateral actuation and relatively long overtravel.

Roller levers and angular roller levers

- For actuators made of finely ground steel in the form of cams, straight-edges (approach angle 30°) or cam disks

Spring rod

- Can be used for undefined actuations and changing starting conditions
- Starting from any direction is possible

Twist levers and rod actuators

- For a high starting speed ($v = 1.5 \text{ m/s}$)
- Variety of starting options
- Insensitive to oil, grinding dust and coarse-grained material
- Adjustment of the lever in increments of 10°
- Can be adjusted with left or right switching

Fork lever

- Switchable in two directions
- Latching actuator
- For reciprocating movements

SIRIUS 3SE5 mechanical position switches

General data

Technical specifications

Type		3SE51.., 3SE52..	3SE541.	3SE542.
General data				
Standards		IEC 60947-5-1, EN 60947-5-1		
Rated insulation voltage U_i	V	400 ¹⁾	400	
Pollution degree acc. to IEC 60664-1		Class 3	Class 3	
Rated impulse withstand voltage U_{imp}	kV	6	4	
Rated operational voltage U_e	V	400 V AC, over 300 V AC only for equal potential ²⁾		300 AC
Conventional thermal current I_{th}	A	10	6	10
Rated operational current I_e		2-pole	3-pole	2-pole
• With alternating current 50/60 Hz		$I_e/AC-15$	$I_e/AC-15$	$I_e/AC-15$
- At 24 V	A	6	6	6
- At 120 V	A	6	3	6
- At 240 V	A	3	1.5	3
• For direct current		$I_e/DC-13$	$I_e/DC-13$	$I_e/DC-13$
- At 24 V	A	3	3	3
- At 125 V	A	0.55	0.55	0.55
- At 250 V	A	0.27	0.27	0.27
Short-circuit protection³⁾				
• With DIAZED fuse links, operational class gG	A	6	10	
• With miniature circuit breaker, Char. C	A	1	3	
Mechanical endurance				
• Basic switch		15 × 10 ⁶ operating cycles	30 × 10 ⁶ operating cycles	30 × 10 ⁶ operating cycles
• With spring rod, 3SE5...-R..		10 × 10 ⁶ operating cycles	--	--
• With fork lever, 3SE51...-T..		1 × 10 ⁶ operating cycles	--	--
Electrical endurance				
• With 3RH.1, 3RT contactors in size S00, S0		10 × 10 ⁶ operating cycles	10 × 10 ⁶ operating cycles	5 × 10 ⁶ operating cycles
• For utilization category AC-15 when switching off $I_e/AC-15$ at 240 V		0.1 × 10 ⁶ operating cycles	--	--
• With utilization category DC-12/DC-13		For direct current depending on the loading of the switch		
Switching frequency With 3RH.1, 3RT contactors in size S00, S0		6 000 operating cycles/h	1 800 operating cycles/h	
Switching accuracy For repeated switching, measured at the plunger of the contact block	mm	0.05	0.05	
• With twist actuators		1°	1°	
Rated data according to ☐, ☐ and ☐				
• Rated voltage	V	300	300	
• Uninterrupted current	A	6	10	
• Switching capacity		Heavy duty, A 300 / B 300 / Q 300	A 300 / Q 300	

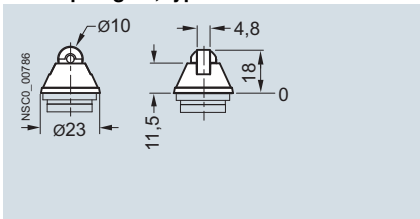
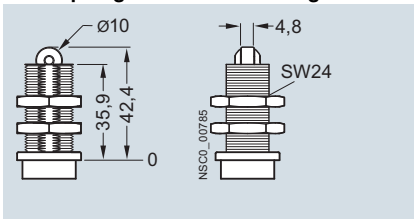
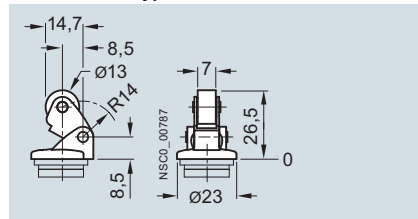
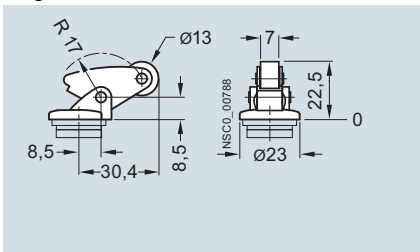
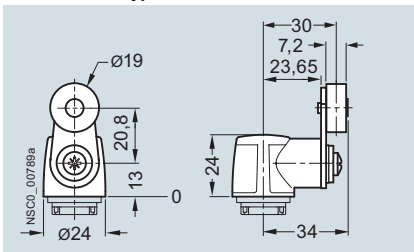
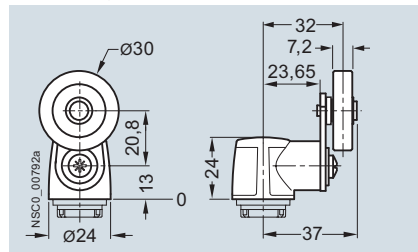
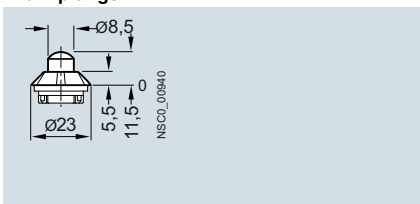
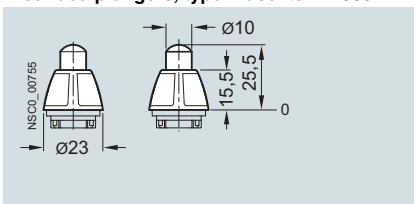
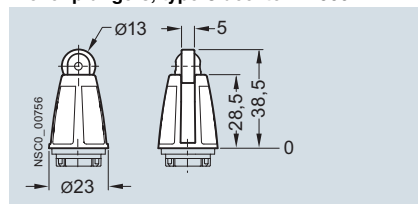
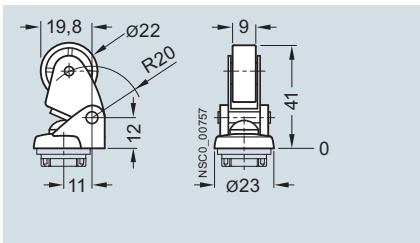
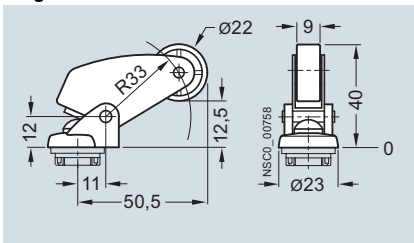
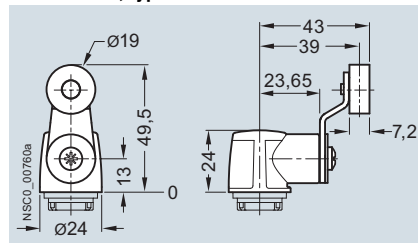
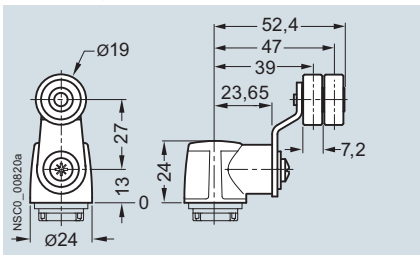
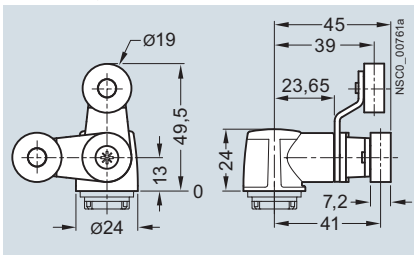
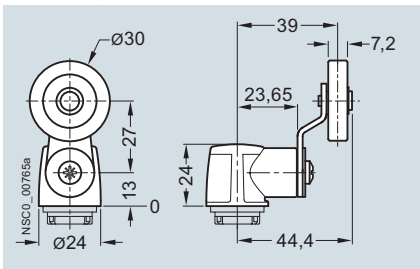
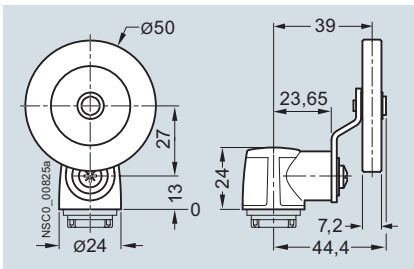
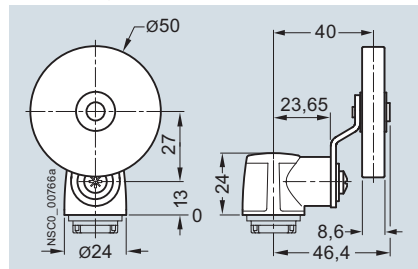
¹⁾ For slow-action contacts 1 NO + 2 NC with make-before-break ("M") and 2 NO + 1 NC ("P") the following applies: 250 V.

²⁾ For slow-action contacts 1 NO + 2 NC with make-before-break ("M") and 2 NO + 1 NC ("P") the following applies: over 250 V AC only equal potential.

³⁾ Without any welds according to IEC 60947-5-1.

Type		3SE523.	3SE513.	3SE524.	3SE521.	3SE511.	3SE512., 3SE516.	3SE54..	3SE525.	
Enclosure										
Enclosure										
• Material		Ultramid A3X2G7			Zinc diecasting GD Zn Al4 Cu1			Zn/Al	--	
• Width	mm	31	40	50	31	40	56	30 / 40	30	
Degree of protection acc. to IEC 60529		IP65	IP66/IP67 ¹⁾					IP67	IP20, IP10	
Ambient temperature										
• During operation	°C	-25 ... +85							-25 ... +85	-25 ... +85
• In operation, switch with LEDs	°C	-25 ... +60							--	--
• Storage, transport	°C	-40 ... +90							-40 ... +90	-40 ... +90
Mounting position		Any								
Connection										
Cable entry		1 x (M20 x 1.5)		2 x (M20 x 1.5)	1 x (M20 x 1.5)		3 x (M20 x 1.5)	--	--	
Conductor cross-sections										
• Solid	mm²	1 x (0.5 ... 1.5), 2 x (0.5 ... 0.75)								
• Finely stranded with end sleeve	mm²	1 x (0.5 ... 1.5), 2 x (0.5 ... 0.75)								
• AWG cables	AWG	1 x (AWG 20 ... 16), 2 x (AWG 20 ... 19)								
Tightening torque , contact block		Nm								
		0.8 ... 1.0								
Protective conductor connection inside enclosure					M3.5			--	--	

¹⁾ For twist actuators with spring rod and rod actuators: IP65/IP67.

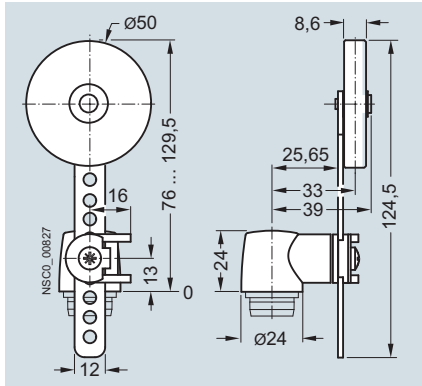
Operating mechanisms for enclosure width 31 mm and 50 mm**Roller plungers, type C acc. to EN 50047****Roller plunger with central fixing****Roller levers, type E acc. to EN 50047****Angular roller lever****Twist levers, type A acc. to EN 50047****Twist lever, roller 30 mm****Operating mechanisms for enclosure width 40 mm and 56 mm****Plain plunger****Rounded plungers, type B acc. to EN 50041****Roller plungers, type C acc. to EN 50041****Roller lever****Angular roller lever****Twist levers, type A acc. to EN 50041****Twist lever, 2 rollers 19 mm****Fork lever, roller 19 mm****Twist lever, roller 30 mm****Twist lever, roller 50 mm****Twist lever, rubber roller 50 mm**

SIRIUS 3SE5 mechanical position switches

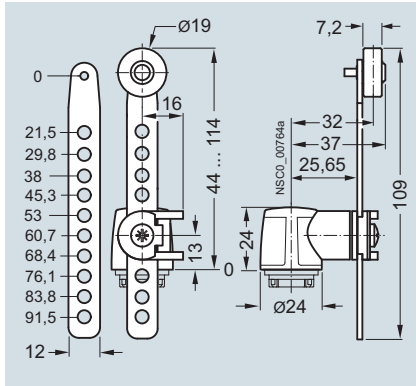
General data

Operating mechanisms for all enclosure widths

Twist lever, adjustable length,
with grid hole, rubber roller 50 mm



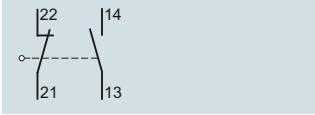
Twist lever, adjustable length,
with grid hole, roller 19 mm



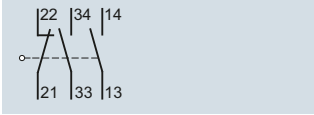
Circuit diagrams

Enclosure widths 31, 40, 50 and 56 mm

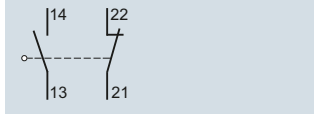
Slow-action contacts
1 NO + 1 NC
3SE5...-B..., -R...



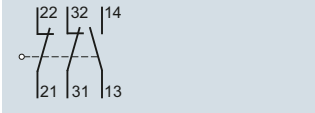
Slow-action contacts
2 NO + 1 NC
3SE5...-P...



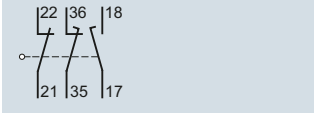
Snap-action contacts
1 NO + 1 NC
3SE5...-C..., -F..., -G..., -H..., -N...



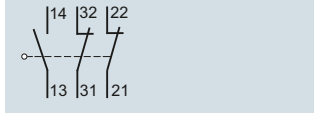
Slow-action contacts
1 NO + 2 NC
3SE5...-K..., -Q...



Slow-action contacts
1 NO + 2 NC with make-before-break, 3SE5...-M...

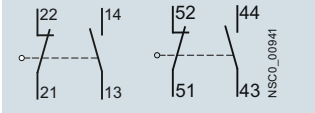


Snap-action contacts
1 NO + 2 NC
3SE5...-L...

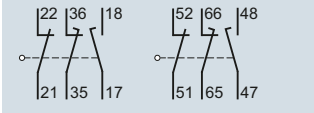


XL enclosures, width 56 mm

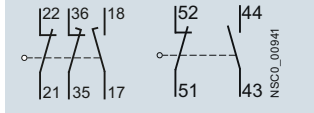
Slow-action contacts
2 x (1 NO + 1 NC)
3SE5162-0B...



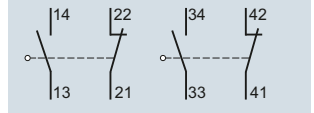
Slow-action contacts
2 x (1 NO + 2 NC) with make-before-break, 3SE5162-0D...



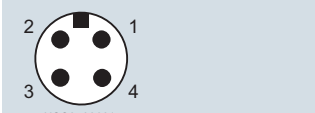
Slow-action contacts
1 NO + 2 NC with make-before-break, 1 NO + 1 NC, 3SE5162-0E...



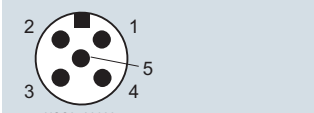
Snap-action contacts
2 x (1 NO + 1 NC)
3SE5162-0C...

**3SE5 connector assignment**

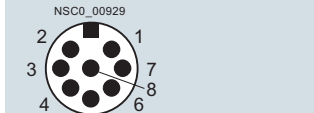
M12 connector socket, 4-pole
3SY3127



M12 connector socket, 5-pole
3SY3128



M12 connector socket, 8-pole
3SY3134



Connector sockets, 6-pole + PE
3SY3131



Article No.	Connector sockets	Contacts	LEDs	Connections									
	Type	Version	Version	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	PE	
M12 connector sockets (4-, 5- or 8-pole)													
3SE5..4-0.....1AC4	3SY3127	1 NO + 1 NC	--	21	22	13	14	--	--	--	--	--	
3SE5..4-0.....1AC5	3SY3128	1 NO + 1 NC	--	21	22	13	14	PE	--	--	--	--	
3SE5..4-0.....1AE0	3SY3127	2 NC	--	21	22	31	32	--	--	--	--	--	
3SE5..4-0.....1AE1	3SY3128	2 NC	--	21	22	31	32	PE	--	--	--	--	
3SE5..4-1C...-1AF3	3SY3128	1 NO + 1 NC snap-action	2 LEDs	21	22	13 / LED gn	14 / LED ye	Ground LED	--	--	--	--	
3SE5..4-1B...-1AF3	3SY3128	1 NO + 1 NC slow-action	2 LEDs	21	22	14 / LED gn	13 / LED ye	Ground LED	--	--	--	--	
3SE5..4-1L...-1AD4	3SY3134	1 NO + 2 NC snap-action	2 LEDs	21	22	13 / LED gn	14 / LED ye	31	32	Ground LED	PE	--	
3SE5..4-1K...-1AD4	3SY3134	1 NO + 2 NC slow-action	2 LEDs	21	22	14 / LED gn	13 / LED ye	31	32	Ground LED	PE	--	
Connector sockets, 6-pole + PE													
3SE5..5-0.....1AD0	3SY3131	1 NO + 1 NC	--	21	22	13	14	--	--	--	--	--	✓
3SE5..5-0.....1AD1	3SY3131	1 NO + 2 NC	--	21	22	13	14	31	32	--	--	--	✓
3SE5..5-.C...-1AF2	3SY3131	1 NO + 1 NC snap-action	2 LEDs	21	22	13 / LED gn	14 / LED ye	--	Ground LED	--	--	--	✓
3SE5..5-.B...-1AF2	3SY3131	1 NO + 1 NC slow-action	2 LEDs	21	22	14 / LED gn	13 / LED ye	--	Ground LED	--	--	--	✓
3SE5..5-.L...-1AD2	3SY3131	2 NC snap-action	2 LEDs	21	22	31	32	13 / LED gn	Ground LED	--	--	--	✓
3SE5..5-.K...-1AD2	3SY3131	2 NC slow-action	2 LEDs	21	22	31	32	14 / LED gn	Ground LED	--	--	--	✓

gn Green
ge Yellow

✓ Connected
-- Not available

SIRIUS 3SE5 mechanical position switches

General data

Options

On the following pages you will find selection tables for complete units as well as components of the modular system.

- ☐ Complete units
- ☒ Modular system

The differences between the units are indicated in the selection and ordering data by the symbols shown on orange backgrounds.

Using the modular system you can assemble switch variants which are not available as complete units. Each complete unit can also be supplied as a module.

A basic switch for the modular system comprises an enclosure with a contact block and a cover. Among the basic switches the following versions, for example, can be selected:

- Basic enclosure with teflon plunger
- Version with increased corrosion protection
- Version with M12 connector socket and/or with 2 LEDs
- Version with M12 connector socket or 6-pole + PE

Support function

The 3SE5/3SF1 position and safety switches can also be ordered using an online configurator.

 Configurator available in the Industry Mall

The online configurator is indicated in the corresponding tables by the symbol shown on an orange background.

This also enables a complete documentation to be prepared:

- Product data sheets
- Dimensional drawings
- Operating travel diagrams
- CAD data in 2D and 3D model images
- Ordering data
- Product photos

For more information, see www.siemens.com/sirius/configurators.


Complete units

Ordering example

Required:

- Position switch according to EN 50047 in a plastic enclosure
- Contact block with slow-action contacts 1 NO + 1 NC
- Angular roller lever, metal lever and plastic roller

To be ordered:

Version	Complete units <input type="checkbox"/>
Article No.	
Complete units • Enclosure width 31 mm	
 Angular roller lever With metal lever and plastic roller 13 mm Slow-action contacts 1 NO + 1 NC	3SE5232-0BF10



Modular system

Ordering example 1

Required:

- Position switch according to EN 50047 in a plastic enclosure
- Contact block with slow-action contacts 1 NO + 1 NC
- Angular roller lever, metal lever and plastic roller

To be ordered separately:



Version	Modular system <input checked="" type="checkbox"/>
Article No.	
Basic switches • Enclosure width 31 mm	
 With teflon plunger Slow-action contacts 1 NO + 1 NC	3SE5232-0BC05
+	
Operating mechanisms	
 Angular roller lever Metal lever, plastic roller	3SE5000-0AF10

Ordering example 2

Required:

- Position switch according to EN 50047 in a plastic enclosure
- Contact block with slow-action contacts 1 NO + 1 NC
- Twist levers, high-grade steel lever and plastic roller

To be ordered separately:

Version	Modular system <input checked="" type="checkbox"/>
Article No.	
Basic switches • Enclosure width 31 mm	
 With teflon plunger Slow-action contacts 1 NO + 1 NC	3SE5232-0BC05
+	
Twist actuators	
 Twist actuator	3SE5000-0AK00
 Twist levers High-grade steel lever, plastic roller	3SE5000-0AA31


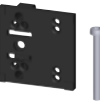
SIRIUS 3SE5 mechanical position switches

3SE5, plastic enclosures
Enclosure width 31 mm according to EN 50047

Selection and ordering data

Complete units for installation in control cabinets

2 contacts · Degree of protection IP40 · Cable entry by means of a locking plug with Ø 6 mm

Version	Contacts	LEDs	DT	Complete units	Article No.
Complete units¹⁾ · Enclosure width 31 mm					
<i>Control cabinet type, IP40, rounded plungers, type B, acc. to EN 50047</i>					
 Rounded plunger, flat cover	Flat cover Snap-action contacts, integrated ²⁾	1 NO + 1 NC --	⊙ B	3SE5232-0HC05-1AB1	
	Flat cover with mounting plate and screws for attachment profile Snap-action contacts, integrated ²⁾	1 NO + 1 NC --	⊙ B	3SE5232-0HC05-1AB2	
	Standard cover Snap-action contacts, integrated ²⁾	1 NO + 1 NC --	⊙ B	3SE5232-0HC05-1AB3	
	Standard cover with mounting plate and screws for attachment profile Snap-action contacts, integrated ²⁾	1 NO + 1 NC --	⊙ B	3SE5232-0HC05-1AB4	
Accessories					
 Mounting plate	Mounting plate Suitable for 3SE523. and 3SE521. position switches with a width of 31 mm	--	--	B	3SX5100-1A

⊙ Positive opening according to IEC 60947-5-1, Appendix K.

¹⁾ The control cabinet types are not basic switches for the modular system.

²⁾ Subsequent replacement of contact blocks is not possible.

SIRIUS 3SE5 mechanical position switches

3SE5, plastic enclosures Enclosure width 31 mm according to EN 50047

Complete units

2 or 3 contacts · Degree of protection IP65 · Cable entry M20 × 1.5¹⁾

Version	Contacts	LEDs	DT	Complete units
				Configurator
				Article No.

Complete units²⁾ · Enclosure width 31 mm

Rounded plungers, type B, according to EN 50047

With teflon plunger

Slow-action contacts	1 NO + 1 NC --	⊙ ▶	3SE5232-0BC05
Snap-action contacts	1 NO + 1 NC --	⊙ B	3SE5232-0CC05
Snap-action contacts, integrated ³⁾	1 NO + 1 NC --	⊙ ▶	3SE5232-0HC05
Snap-action contacts • Short stroke, integrated ³⁾	1 NO + 1 NC --	⊙ B	3SE5232-0FC05
Snap-action contacts • 2 × 2 mm contact gap	1 NO + 1 NC --	⊙ B	3SE5232-0GC05
Slow-action contacts	1 NO + 2 NC --	⊙ ▶	3SE5232-0KC05
Snap-action contacts	1 NO + 2 NC --	⊙ ▶	3SE5232-0LC05
Slow-action contacts with make-before-break	1 NO + 2 NC --	⊙ A	3SE5232-0MC05
Slow-action contacts	2 NO + 1 NC --	⊙ A	3SE5232-0PC05

With increased corrosion protection

Slow-action contacts	1 NO + 1 NC --	⊙ B	3SE5232-0BC05-1CA0
Snap-action contacts	1 NO + 1 NC --	⊙ B	3SE5232-0CC05-1CA0
Slow-action contacts	1 NO + 2 NC --	⊙ B	3SE5232-0KC05-1CA0
Snap-action contacts	1 NO + 2 NC --	⊙ B	3SE5232-0LC05-1CA0
Slow-action contacts with make-before-break	1 NO + 2 NC --	⊙ B	3SE5232-0MC05-1CA0
Slow-action contacts	2 NO + 1 NC --	⊙ B	3SE5232-0PC05-1CA0

With M12 connector socket, 4-pole (250 V, 4 A)

Slow-action contacts	1 NO + 1 NC --	⊙ B	3SE5234-0BC05-1AC4
Snap-action contacts, integrated ³⁾	1 NO + 1 NC --	⊙ A	3SE5234-0HC05-1AC4
Slow-action contacts	2 NC --	⊙ B	3SE5234-0KC05-1AE0
Snap-action contacts	2 NC --	⊙ A	3SE5234-0LC05-1AE0

With 2 LEDs, yellow/green

Slow-action contacts	1 NO + 2 NC 24 V DC	⊙ B	3SE5232-1KC05
Snap-action contacts	1 NO + 2 NC 24 V DC	⊙ B	3SE5232-1LC05
Slow-action contacts	1 NO + 2 NC 230 V AC	⊙ B	3SE5232-3KC05
Snap-action contacts	1 NO + 2 NC 230 V AC	⊙ B	3SE5232-3LC05

With M12 connector socket, 5-pole (125 V, 4 A), and 2 LEDs

Slow-action contacts	1 NO + 1 NC 24 V DC	⊙ B	3SE5234-1BC05-1AF3
Snap-action contacts	1 NO + 1 NC 24 V DC	⊙ B	3SE5234-1CC05-1AF3

⚙ For online configurator see www.siemens.com/sirius/configurators.

⊙ Positive opening according to IEC 60947-5-1, Appendix K.

¹⁾ A cable gland with seal must be used with the quick-connect method.

²⁾ Popular versions.

³⁾ Subsequent replacement of contact blocks is not possible.





SIRIUS 3SE5 mechanical position switches

3SE5, plastic enclosures
Enclosure width 31 mm according to EN 50047

2 or 3 · contacts · Degree of protection IP65 · Cable entry M20 × 1.5¹⁾

Version	Contacts	LEDs	DT	Complete units	<input type="checkbox"/>
				Configurator	
				Article No.	

Complete units²⁾ · Enclosure width 31 mm

	Roller plungers, type C, acc. to EN 50047				
	With plastic roller 10 mm				
	Slow-action contacts	1 NO + 1 NC --	⊙ B	3SE5232-0BD03	
	Snap-action contacts • Integrated ³⁾	1 NO + 1 NC --	⊙ ►	3SE5232-0HD03	
	Snap-action contacts • Short stroke, integrated ³⁾	1 NO + 1 NC --	⊙ B	3SE5232-0FD03	
	Slow-action contacts	1 NO + 2 NC --	⊙ B	3SE5232-0KD03	
	Snap-action contacts	1 NO + 2 NC --	⊙ B	3SE5232-0LD03	
	Actuator head rotated by 90°				
	Snap-action contacts	1 NO + 2 NC --	⊙ B	3SE5232-0LD03-1AH0	
	With M12 connector socket, 4-pole (250 V, 4 A)				
	Snap-action contacts, integrated ³⁾	1 NO + 1 NC --	⊙ B	3SE5234-0HD03-1AC4	
	Roller plungers with central fixing				
	With plastic roller 10 mm				
	Snap-action contacts, integrated ³⁾	1 NO + 1 NC --	⊙ B	3SE5232-0HD10	
	Slow-action contacts	1 NO + 2 NC --	⊙ B	3SE5232-0KD10	
	Roller levers, type E acc. to EN 50047				
	With metal lever and plastic roller 13 mm				
	Slow-action contacts	1 NO + 1 NC --	⊙ A	3SE5232-0BE10	
	Snap-action contacts, integrated ³⁾	1 NO + 1 NC --	⊙ ►	3SE5232-0HE10	
	Slow-action contacts	1 NO + 2 NC --	⊙ B	3SE5232-0KE10	
	Snap-action contacts	1 NO + 2 NC --	⊙ B	3SE5232-0LE10	
	With increased corrosion protection (ICP), with high-grade steel lever and plastic roller 13 mm				
	Snap-action contacts	1 NO + 1 NC --	⊙ B	3SE5232-0CE12-1CA0	
	With M12 connector socket, 4-pole (250 V, 4 A)				
	Snap-action contacts, integrated ³⁾	1 NO + 1 NC --	⊙ B	3SE5234-0HE10-1AC4	
	With high-grade steel lever and plastic roller 13 mm				
	Snap-action contacts	1 NO + 2 NC --	⊙ B	3SE5232-0LE12	
	Angular roller lever				
	With metal lever and plastic roller 13 mm				
	Slow-action contacts	1 NO + 1 NC --	⊙ B	3SE5232-0BF10	
	Snap-action contacts, integrated ³⁾	1 NO + 1 NC --	⊙ A	3SE5232-0HF10	
	Slow-action contacts	1 NO + 2 NC --	⊙ B	3SE5232-0KF10	
	Snap-action contacts	1 NO + 2 NC --	⊙ B	3SE5232-0LF10	

For online configurator see www.siemens.com/sirius/configurators

⊙ Positive opening according to IEC 60947-5-1, Appendix K.

¹⁾ A cable gland with seal must be used with the quick-connect method.

²⁾ Popular versions.

³⁾ Subsequent replacement of contact blocks is not possible.

SIRIUS 3SE5 mechanical position switches

3SE5, plastic enclosures Enclosure width 31 mm according to EN 50047

2 or 3 contacts · Degree of protection IP65 · Cable entry M20 × 1.5¹⁾

Version	Contacts	LEDs	DT	Complete units
				Configurator
				Article No.

Complete units²⁾ · Enclosure width 31 mm



Twist levers

Twist levers, type A acc. to EN 50047

With metal lever 21 mm and plastic roller 19 mm

Slow-action contacts	1 NO + 1 NC --	⤵ A	3SE5232-0BK21
Snap-action contacts, integrated ³⁾	1 NO + 1 NC --	⤵ B	3SE5232-0HK21
Slow-action contacts	1 NO + 2 NC --	⤵ B	3SE5232-0KK21
Snap-action contacts	1 NO + 2 NC --	⤵ B	3SE5232-0LK21

With M12 connector socket, 4-pole (250 V, 4 A)

Snap-action contacts, integrated ³⁾	1 NO + 1 NC --	⤵ B	3SE5234-0HK21-1AC4
--	----------------	-----	--------------------

With metal lever 35 mm and plastic roller 19 mm

Snap-action contacts, integrated ³⁾	1 NO + 1 NC --	⤵ B	3SE5232-0HK15
--	----------------	-----	---------------

Twist levers, adjustable length

With metal lever with grid hole and plastic roller 19 mm

Snap-action contacts, integrated ³⁾	1 NO + 1 NC --	⤵ A	3SE5232-0HK60
--	----------------	-----	---------------



Twist levers,
adjustable
length,
with grid hole

⚙ For online configurator see www.siemens.com/sirius/configurators

⤵ Positive opening according to IEC 60947-5-1, Appendix K.

¹⁾ A cable gland with seal must be used with the quick-connect method.

²⁾ Popular versions.

³⁾ Subsequent replacement of contact blocks is not possible.

Note:

If the device you require is not available as a complete unit, see ["Modular System", page 2/17](#).

SIRIUS 3SE5 mechanical position switches






3SE5, plastic enclosures
Enclosure width 31 mm according to EN 50047

Modular system

2 or 3 contacts · Degree of protection IP65 · Cable entry M20 × 1.5¹⁾

Version	Contacts	LEDs	DT	Modular system	
				Configurator	
				Article No.	

Basic switches • Enclosure width 31 mm (with rounded plunger¹⁾)

	With teflon plunger				
	Slow-action contacts	1 NO + 1 NC --	⊙ ▶		3SE5232-0BC05
	Snap-action contacts	1 NO + 1 NC --	⊙ B		3SE5232-0CC05
	Snap-action contacts, integrated ³⁾	1 NO + 1 NC --	⊙ ▶		3SE5232-0HC05
	Snap-action contacts • Short stroke, integrated ³⁾	1 NO + 1 NC --	⊙ B		3SE5232-0FC05
	Snap-action contacts • 2 × 2 mm contact gap	1 NO + 1 NC --	⊙ B		3SE5232-0GC05
	Slow-action contacts	1 NO + 2 NC --	⊙ ▶		3SE5232-0KC05
	Snap-action contacts	1 NO + 2 NC --	⊙ ▶		3SE5232-0LC05
	Slow-action contacts with make-before-break	1 NO + 2 NC --	⊙ A		3SE5232-0MC05
	Slow-action contacts	2 NO + 1 NC --	⊙ A		3SE5232-0PC05
	With increased corrosion protection⁴⁾				
	Slow-action contacts	1 NO + 1 NC --	⊙ B		3SE5232-0BC05-1CA0
	Snap-action contacts	1 NO + 1 NC --	⊙ B		3SE5232-0CC05-1CA0
	Slow-action contacts	1 NO + 2 NC --	⊙ B		3SE5232-0KC05-1CA0
	Snap-action contacts	1 NO + 2 NC --	⊙ B		3SE5232-0LC05-1CA0
	Slow-action contacts with make-before-break	1 NO + 2 NC --	⊙ B		3SE5232-0MC05-1CA0
	With M12 connector socket, 4-pole (250 V, 4 A)				
	Slow-action contacts	1 NO + 1 NC --	⊙ B		3SE5234-0BC05-1AC4
	Snap-action contacts, integrated ³⁾	1 NO + 1 NC --	⊙ A		3SE5234-0HC05-1AC4
	Slow-action contacts	2 NC --	⊙ B		3SE5234-0KC05-1AE0
	Snap-action contacts	2 NC --	⊙ A		3SE5234-0LC05-1AE0
	With 2 LEDs, yellow/green				
	Slow-action contacts	1 NO + 2 NC 24 V DC	⊙ B		3SE5232-1KC05
	Snap-action contacts	1 NO + 2 NC 24 V DC	⊙ B		3SE5232-1LC05
	Slow-action contacts	1 NO + 2 NC 230 V AC	⊙ B		3SE5232-3KC05
	Snap-action contacts	1 NO + 2 NC 230 V AC	⊙ B		3SE5232-3LC05
	With M12 connector socket, 5-pole (125 V, 4 A), and 2 LEDs				
	Slow-action contacts	1 NO + 1 NC 24 V DC	⊙ B		3SE5234-1BC05-1AF3
	Snap-action contacts	1 NO + 1 NC 24 V DC	⊙ B		3SE5234-1CC05-1AF3

For online configurator see www.siemens.com/sirius/configurators

⊙ Positive opening according to IEC 60947-5-1, Appendix K, or positively driven actuator, necessary in safety circuits.

¹⁾ A cable gland with seal must be used with the quick-connect method.

²⁾ For enclosures with widths of 31 mm, the basic switch is a complete unit with rounded plungers.

³⁾ Subsequent replacement of contact blocks is not possible.








⁴⁾ Use corresponding high-grade steel lever.

Note:

Selection aid see page 2/12.

SIRIUS 3SE5 mechanical position switches

3SE5, plastic enclosures Enclosure width 31 mm according to EN 50047

Version		Diameter	DT	Modular system	
		mm		Article No.	
Operating mechanisms					
 Roller plunger	Roller plungers, type C acc. to EN 50047				
	Plastic rollers	10	⤵ A	3SE5000-0AD03	
	High-grade steel rollers	10	⤵ B	3SE5000-0AD04	
 With central fixing	Roller plungers with central fixing				
	Plastic rollers	10	⤵ B	3SE5000-0AD10	
	High-grade steel rollers	10	⤵ B	3SE5000-0AD11	
 Roller lever	Roller levers, type E acc. to EN 50047				
	Metal lever, plastic roller	13	⤵ A	3SE5000-0AE10	
	Metal lever, high-grade steel roller	13	⤵ B	3SE5000-0AE11	
	High-grade steel lever, plastic roller	13	⤵ B	3SE5000-0AE12	
	High-grade steel lever, high-grade steel roller	13	⤵ B	3SE5000-0AE13	
 Ang. roller lever	Angular roller levers				
	Metal lever, plastic roller	13	⤵ A	3SE5000-0AF10	
	Metal lever, high-grade steel roller	13	⤵ B	3SE5000-0AF11	
	High-grade steel lever, plastic roller	13	⤵ A	3SE5000-0AF12	
	High-grade steel lever, high-grade steel roller	13	⤵ B	3SE5000-0AF13	
Twist actuators					
 Twist actuator	Twist actuators, plastic (without lever)				
	Switching right and/or left, adjustable		⤵ A	3SE5000-0AK00	
 Twist levers	Levers				
	Twist levers 21 mm, straight, type A according to EN 50047				
	Metal lever, plastic roller	19	⤵ A	3SE5000-0AA21	
	Metal lever, high-grade steel roller	19	⤵ B	3SE5000-0AA22	
	Metal lever, high-grade steel roller with ball bearing	19	⤵ B	3SE5000-0AA23	
	Metal lever, plastic roller	30	⤵ B	3SE5000-0AA25	
	High-grade steel lever, plastic roller	19	⤵ B	3SE5000-0AA31	
	High-grade steel lever, high-grade steel roller	19	⤵ B	3SE5000-0AA32	
 Twist lever, adjust. length	Twist levers 30 mm, straight¹⁾				
	Metal lever, plastic roller	19	⤵ B	3SE5000-0AA24	
	Metal lever, plastic roller	30	⤵ B	3SE5000-0AA26	
	Twist levers, adjustable length, with grid hole				
	Metal lever, plastic roller	19	⤵ B	3SE5000-0AA60	
	Metal lever, high-grade steel roller	19	⤵ B	3SE5000-0AA61	
	Metal lever, plastic roller	50	⤵ B	3SE5000-0AA67	
	Metal lever, rubber roller	50	⤵ B	3SE5000-0AA68	
	High-grade steel lever, plastic roller	19	⤵ B	3SE5000-0AA62	
	High-grade steel lever, high-grade steel roller	19	⤵ B	3SE5000-0AA63	

⤵ Positively driven actuator, necessary in safety circuits.

¹⁾ Can be clinch mounted (turned through 180°, rear of lever).

Selection and ordering data

Complete units

2 or 3 contacts · Degree of protection IP66/67 · Cable entry M20 × 1.5

Version	Contacts	LEDs	DT	Complete units	
				Configurator	
				Article No.	

Complete units¹⁾ · Enclosure width 40 mm

Plain plunger

Plain plungers

With high-grade steel plunger

Slow-action contacts	1 NO + 1 NC --	⊕ B	3SE5132-0BB01
Snap-action contacts	1 NO + 1 NC --	⊕ B	3SE5132-0CB01
Slow-action contacts	1 NO + 2 NC --	⊕ B	3SE5132-0KB01
Snap-action contacts	1 NO + 2 NC --	⊕ B	3SE5132-0LB01
Slow-action contacts	2 NO + 1 NC --	⊕ B	3SE5132-0PB01



Rounded plungers

Rounded plungers, type B according to EN 50041

With plastic plunger

Slow-action contacts	1 NO + 1 NC --	⊕ B	3SE5132-0BC03
Snap-action contacts	1 NO + 1 NC --	⊕ A	3SE5132-0CC03
Slow-action contacts	1 NO + 2 NC --	⊕ B	3SE5132-0KC03
Snap-action contacts	1 NO + 2 NC --	⊕ B	3SE5132-0LC03
Slow-action contacts	2 NO + 1 NC --	⊕ B	3SE5132-0PC03



Roller plungers

Roller plungers, type C acc. to EN 50041

With plastic roller 13 mm

Slow-action contacts	1 NO + 1 NC --	⊕ B	3SE5132-0BD05
Snap-action contacts	1 NO + 1 NC --	⊕ A	3SE5132-0CD05
Slow-action contacts	1 NO + 2 NC --	⊕ B	3SE5132-0KD05
Snap-action contacts	1 NO + 2 NC --	⊕ B	3SE5132-0LD05
Slow-action contacts	2 NO + 1 NC --	⊕ B	3SE5132-0PD05



Roller lever

Roller levers

With metal lever and plastic roller 22 mm

Slow-action contacts	1 NO + 1 NC --	⊕ B	3SE5132-0BE05
Snap-action contacts	1 NO + 1 NC --	⊕ A	3SE5132-0CE05
Slow-action contacts	1 NO + 2 NC --	⊕ B	3SE5132-0KE05
Snap-action contacts	1 NO + 2 NC --	⊕ B	3SE5132-0LE05
Slow-action contacts	2 NO + 1 NC --	⊕ B	3SE5132-0PE05



Angular roller lever

Angular roller lever

With metal lever and plastic roller 22 mm

Slow-action contacts	1 NO + 1 NC --	⊕ B	3SE5132-0BF05
Snap-action contacts	1 NO + 1 NC --	⊕ B	3SE5132-0CF05
Snap-action contacts	1 NO + 2 NC --	⊕ B	3SE5132-0LF05

 For online configurator see www.siemens.com/sirius/configurators

⊕ Positive opening according to IEC 60947-5-1, Appendix K.

¹⁾ Popular versions.

SIRIUS 3SE5 mechanical position switches

3SE5, plastic enclosures Enclosure width 40 mm acc. to EN 50041

2 or 3 contacts · Degree of protection IP66/IP67 · Cable entry M20 × 1.5

Version	Contacts	LEDs	DT	Complete units
				Configurator
				Article No.

Complete units¹⁾ · Enclosure width 40 mm



Twist levers

Twist levers, type A acc. to EN 50041

With metal lever 27 mm and plastic roller 19 mm

Slow-action contacts	1 NO + 1 NC --	⤵ A	3SE5132-0BJ01
Snap-action contacts	1 NO + 1 NC --	⤵ A	3SE5132-0CJ01
Slow-action contacts	1 NO + 2 NC --	⤵ B	3SE5132-0KJ01
Snap-action contacts	1 NO + 2 NC --	⤵ B	3SE5132-0LJ01
Slow-action contacts	2 NO + 1 NC --	⤵ B	3SE5132-0PJ01



Twist levers,
adjustable
length,
with grid hole

Twist levers, adjustable length

With metal lever with grid hole and plastic roller 19 mm

Snap-action contacts	1 NO + 1 NC --	⤵ B	3SE5132-0CJ60
Snap-action contacts	1 NO + 2 NC --	⤵ B	3SE5132-0LJ60

⚙ For online configurator see www.siemens.com/sirius/configurators

⤵ Positive opening according to IEC 60947-5-1, Appendix K.

¹⁾ Popular versions.

Note:

If the device you require is not available as a complete unit, see "Modular System", page 2/21.

SIRIUS 3SE5 mechanical position switches

3SE5, plastic enclosures
Enclosure width 40 mm acc. to EN 50041

Modular system

2 or 3 contacts · Degree of protection IP66/IP67 · Cable entry M20 × 1.5

Version	Contacts	LEDs	DT	Modular system	
				Configurator	
				Article No.	

Basic switches • Enclosure width 40 mm



With M20 × 1.5 connecting thread

Slow-action contacts	1 NO + 1 NC --	⊕ B	3SE5132-0BA00
Snap-action contacts	1 NO + 1 NC --	⊕ B	3SE5132-0CA00
• Gold-plated contacts		⊕ B	3SE5132-0CA00-1AC1
Slow-action contacts	1 NO + 2 NC --	⊕ B	3SE5132-0KA00
Snap-action contacts	1 NO + 2 NC --	⊕ B	3SE5132-0LA00
Slow-action contacts with make-before-break	1 NO + 2 NC --	⊕ B	3SE5132-0MA00
Slow-action contacts	2 NO + 1 NC --	⊕ B	3SE5132-0PA00



With increased corrosion protection¹⁾

Slow-action contacts	1 NO + 1 NC --	⊕ B	3SE5132-0BA00-1CA0
Snap-action contacts	1 NO + 1 NC --	⊕ B	3SE5132-0CA00-1CA0
Slow-action contacts	1 NO + 2 NC --	⊕ B	3SE5132-0KA00-1CA0
Snap-action contacts	1 NO + 2 NC --	⊕ B	3SE5132-0LA00-1CA0
Slow-action contacts with make-before-break	1 NO + 2 NC --	⊕ B	3SE5132-0MA00-1CA0
Slow-action contacts	2 NO + 1 NC --	⊕ B	3SE5132-0PA00-1CA0



With M12 connector socket, 4-pole (250 V, 4 A)

Slow-action contacts	1 NO + 1 NC --	⊕ B	3SE5134-0BA00-1AC4
Snap-action contacts	1 NO + 1 NC --	⊕ B	3SE5134-0CA00-1AC4
Slow-action contacts	2 NC --	⊕ B	3SE5134-0KA00-1AE0
Snap-action contacts	2 NC --	⊕ B	3SE5134-0LA00-1AE0

With M12 plug



With 2 LEDs, yellow/green

Slow-action contacts	1 NO + 2 NC 24 V DC	⊕ C	3SE5132-1KA00
Snap-action contacts	1 NO + 2 NC 24 V DC	⊕ C	3SE5132-1LA00
Slow-action contacts	1 NO + 2 NC 230 V AC	⊕ C	3SE5132-3KA00
Snap-action contacts	1 NO + 2 NC 230 V AC	⊕ C	3SE5132-3LA00

With 2 LEDs

For online configurator see www.siemens.com/sirius/configurators

⊕ Positive opening according to IEC 60947-5-1, Appendix K, or positively driven actuator, necessary in safety circuits.








¹⁾ Use corresponding high-grade steel lever.

Note:

Selection aid see page 2/12.

SIRIUS 3SE5 mechanical position switches

3SE5, plastic enclosures Enclosure width 40 mm acc. to EN 50041

Version		Diameter	DT	Modular system	
		mm		Article No.	
Operating mechanisms					
	Plain plungers High-grade steel plungers	10	⤵ A	3SE5000-0AB01	
Plain plunger					
	Rounded plungers, type B according to EN 50041 Plastic plungers	10	⤵ B	3SE5000-0AC03	
Plunger					
	Roller plungers, type C acc. to EN 50041 Plastic plunger, plastic roller	13	⤵ B	3SE5000-0AD05	
	Plastic plunger, high-grade steel roller	13	⤵ B	3SE5000-0AD06	
Roller lever					
	Roller levers Metal lever with plastic roller, plastic base	22	⤵ B	3SE5000-0AE05	
Roller lever					
	Angular roller levers Metal lever with plastic roller, plastic base	22	⤵ B	3SE5000-0AF05	
Ang. roller lever					
Twist actuators					
	Twist actuators, plastic (without lever) • For twist levers and rod actuators, switching right and/or left, adjustable		⤵ B	3SE5000-0AJ00	
Twist actuator					
	Levers Twist levers, offset, type A according to EN 50041 Metal lever 27 mm, plastic roller	19	⤵ A	3SE5000-0AA01	
Twist lever	Metal lever 27 mm, high-grade steel roller	19	⤵ A	3SE5000-0AA02	
	Metal lever 27 mm, high-grade steel roller with ball bearing	19	⤵ B	3SE5000-0AA03	
	Metal lever 27 mm, 2 plastic rollers	19	⤵ B	3SE5000-0AA04	
	Metal lever 27 mm, plastic roller	30	⤵ B	3SE5000-0AA05	
	Metal lever 27 mm, rubber roller	50	⤵ B	3SE5000-0AA08	
	High-grade steel lever 27 mm, plastic roller	19	⤵ B	3SE5000-0AA11	
	High-grade steel lever 27 mm, high-gr. steel roller	19	⤵ B	3SE5000-0AA12	
	Metal lever 35 mm, plastic roller	19	⤵ B	3SE5000-0AA15	
	High-grade steel lever 35 mm, plastic roller	19	⤵ B	3SE5000-0AA16	
	Twist levers 30 mm, straight¹⁾ Metal lever, plastic roller	19	⤵ B	3SE5000-0AA24	
	Metal lever, plastic roller	30	⤵ B	3SE5000-0AA26	
Twist lever, adjustable length					
	Twist levers, adjustable length, with grid hole Metal lever, plastic roller	19	⤵ B	3SE5000-0AA60	
	Metal lever, high-grade steel roller	19	⤵ B	3SE5000-0AA61	
	Metal lever, rubber roller	50	⤵ B	3SE5000-0AA68	
	High-grade steel lever, plastic roller	19	⤵ B	3SE5000-0AA62	
	High-grade steel lever, high-grade steel roller	19	⤵ B	3SE5000-0AA63	

⤵ Positively driven actuator, necessary in safety circuits.

¹⁾ Can be clinch mounted (turned through 180°, rear of lever).

Selection and ordering data

Complete units

2 or 3 contacts · Degree of protection IP66/IP67 · Cable entry 2 × (M20 × 1.5)

Version	Contacts	LEDs	DT	Complete units	
				Configurator	
				Article No.	

Complete units¹⁾ • Enclosure width 50 mm

Rounded plunger

Rounded plungers

With teflon plunger

Slow-action contacts	1 NO + 1 NC --	⊙ A	3SE5242-0BC05
Snap-action contacts	1 NO + 1 NC --	⊙ B	3SE5242-0CC05
Snap-action contacts, integrated ²⁾	1 NO + 1 NC --	⊙ ►	3SE5242-0HC05
Snap-action contacts • Short stroke, integrated ²⁾	1 NO + 1 NC --	⊙ B	3SE5242-0FC05
Snap-action contacts • 2 × 2 mm contact gap	1 NO + 1 NC --	⊙ B	3SE5242-0GC05
Slow-action contacts	1 NO + 2 NC --	⊙ B	3SE5242-0KC05
Snap-action contacts	1 NO + 2 NC --	⊙ B	3SE5242-0LC05
Slow-action contacts with make-before-break	1 NO + 2 NC --	⊙ A	3SE5242-0MC05
Slow-action contacts	2 NO + 1 NC --	⊙ A	3SE5242-0PC05



With increased corrosion protection

With increased corrosion protection

Slow-action contacts	1 NO + 1 NC --	⊙ B	3SE5242-0BC05-1CA0
Snap-action contacts, integrated ²⁾	1 NO + 1 NC --	⊙ B	3SE5242-0HC05-1CA0
Slow-action contacts	1 NO + 2 NC --	⊙ B	3SE5242-0KC05-1CA0
Snap-action contacts	1 NO + 2 NC --	⊙ B	3SE5242-0LC05-1CA0
Slow-action contacts with make-before-break	1 NO + 2 NC --	⊙ B	3SE5242-0MC05-1CA0
Slow-action contacts	2 NO + 1 NC --	⊙ B	3SE5242-0PC05-1CA0



With 2 LEDs

With 2 LEDs, yellow/green

Slow-action contacts	1 NO + 2 NC 24 V DC	⊙ B	3SE5242-1KC05
Snap-action contacts	1 NO + 2 NC 24 V DC	⊙ B	3SE5242-1LC05
Slow-action contacts	1 NO + 2 NC 230 V AC	⊙ B	3SE5242-3KC05
Snap-action contacts	1 NO + 2 NC 230 V AC	⊙ B	3SE5242-3LC05



Roller plunger

Roller plungers

With plastic roller 10 mm

Slow-action contacts	1 NO + 1 NC --	⊙ B	3SE5242-0BD03
Snap-action contacts, integrated ²⁾	1 NO + 1 NC --	⊙ B	3SE5242-0HD03
Snap-action contacts	1 NO + 2 NC --	⊙ B	3SE5242-0LD03

 For online configurator see www.siemens.com/sirius/configurators

⊙ Positive opening according to IEC 60947-5-1, Appendix K.

1) Popular versions.

2) Subsequent replacement of contact blocks is not possible.

SIRIUS 3SE5 mechanical position switches

3SE5, plastic enclosures Enclosure width 50 mm

2 or 3 contacts · Degree of protection IP66/IP67 · Cable entry 2 × (M20 × 1.5)

Version	Contacts	LEDs	DT	Complete units
				Configurator
				Article No.

Complete units¹⁾ · Enclosure width 50 mm



Roller lever

Roller levers

With metal lever and plastic roller 13 mm

Slow-action contacts	1 NO + 1 NC	--	⤵ B	3SE5242-0BE10
Snap-action contacts, integrated ²⁾	1 NO + 1 NC	--	⤵ A	3SE5242-0HE10
Snap-action contacts	1 NO + 2 NC	--	⤵ B	3SE5242-0LE10

With M12 connector socket, 4-pole right (250 V, 4 A)

Snap-action contacts	2 NC	--	⤵ B	3SE5244-0LE10-1AE0
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Twist levers

With metal lever 21 mm and plastic roller 19 mm

Slow-action contacts	1 NO + 1 NC	--	⤵ B	3SE5242-0BK21
Snap-action contacts, integrated ²⁾	1 NO + 1 NC	--	⤵ B	3SE5242-0HK21
Snap-action contacts	1 NO + 2 NC	--	⤵ B	3SE5242-0LK21



Twist lever

⚙ For online configurator see www.siemens.com/sirius/configurators

⤵ Positive opening according to IEC 60947-5-1, Appendix K.

¹⁾ Popular versions.

²⁾ Subsequent replacement of contact blocks is not possible.

Note:

If the device you require is not available as a complete unit, see ["Modular System"](#), page 2/25.

SIRIUS 3SE5 mechanical position switches

3SE5, plastic enclosures
Enclosure width 50 mm

Modular system

2 or 3 contacts · Degree of protection IP66/IP67 · Cable entry 2 × (M20 × 1.5)

Version	Contacts	LEDs	DT	Modular system
				Configurator
				Article No.

Basic switches • Enclosure width 50 mm (with rounded plunger¹⁾)



Basic switch

With teflon plunger

Slow-action contacts	1 NO + 1 NC --	⊕ A	3SE5242-0BC05
Snap-action contacts	1 NO + 1 NC --	⊕ B	3SE5242-0CC05
Snap-action contacts, integrated ²⁾	1 NO + 1 NC --	⊕ ►	3SE5242-0HC05
Snap-action contacts • Short stroke, integrated ²⁾	1 NO + 1 NC --	⊕ B	3SE5242-0FC05
Snap-action contacts • 2 × 2 mm contact gap	1 NO + 1 NC --	⊕ B	3SE5242-0GC05
Slow-action contacts	1 NO + 2 NC --	⊕ B	3SE5242-0KC05
Snap-action contacts	1 NO + 2 NC --	⊕ B	3SE5242-0LC05
Slow-action contacts with make-before-break	1 NO + 2 NC --	⊕ A	3SE5242-0MC05
Slow-action contacts	2 NO + 1 NC --	⊕ A	3SE5242-0PC05



With increased
corrosion
protection

With increased corrosion protection³⁾

Slow-action contacts	1 NO + 1 NC --	⊕ B	3SE5242-0BC05-1CA0
Snap-action contacts, integrated ²⁾	1 NO + 1 NC --	⊕ B	3SE5242-0HC05-1CA0
Slow-action contacts	1 NO + 2 NC --	⊕ B	3SE5242-0KC05-1CA0
Snap-action contacts	1 NO + 2 NC --	⊕ B	3SE5242-0LC05-1CA0
Slow-action contacts with make-before-break	1 NO + 2 NC --	⊕ B	3SE5242-0MC05-1CA0
Slow-action contacts	2 NO + 1 NC --	⊕ B	3SE5242-0PC05-1CA0



With 2 LEDs

With 2 LEDs, yellow/green

Slow-action contacts	1 NO + 2 NC	24 V DC	⊕ B	3SE5242-1KC05
Snap-action contacts	1 NO + 2 NC	24 V DC	⊕ B	3SE5242-1LC05
Slow-action contacts	1 NO + 2 NC	230 V AC	⊕ B	3SE5242-3KC05
Snap-action contacts	1 NO + 2 NC	230 V AC	⊕ B	3SE5242-3LC05

⚙ For online configurator see www.siemens.com/sirius/configurators

⊕ Positive opening according to IEC 60947-5-1, Appendix K, or positively driven actuator, necessary in safety circuits.

1) For enclosures with widths of 50 mm, the basic switch is a complete unit with rounded plungers.

2) Subsequent replacement of contact blocks is not possible.

3) Use corresponding high-grade steel lever.

Note:

Selection aid see page 2/12.

Version	Diameter	DT	Modular system
	mm		Article No.

Operating mechanisms



Roller plunger

Roller plungers, type C acc. to EN 50047

Plastic rollers	10	⊕ A	3SE5000-0AD03
High-grade steel rollers	10	⊕ B	3SE5000-0AD04



With central
fixing






Roller plungers with central fixing

Plastic rollers	10	⊕ B	3SE5000-0AD10
High-grade steel rollers	10	⊕ B	3SE5000-0AD11

⊕ Positively driven actuator, necessary in safety circuits.

SIRIUS 3SE5 mechanical position switches

3SE5, plastic enclosures Enclosure width 50 mm

Version		Diameter	DT	Modular system	
		mm		Article No.	
Operating mechanisms					
 Roller lever	Roller levers, type E acc. to EN 50047				
	Metal lever, plastic roller	13	⤵ A	3SE5000-0AE10	
	Metal lever, high-grade steel roller	13	⤵ B	3SE5000-0AE11	
	High-grade steel lever, plastic roller	13	⤵ B	3SE5000-0AE12	
 Angular roller lever	High-grade steel lever, high-grade steel roller	13	⤵ B	3SE5000-0AE13	
	Angular roller levers				
	Metal lever, plastic roller	13	⤵ A	3SE5000-0AF10	
	Metal lever, high-grade steel roller	13	⤵ B	3SE5000-0AF11	
	High-grade steel lever, plastic roller	13	⤵ A	3SE5000-0AF12	
	High-grade steel lever, high-grade steel roller	13	⤵ B	3SE5000-0AF13	
Twist actuators					
 Twist actuator	Twist actuators, plastic (without lever)				
	Switching right and/or left, adjustable		⤵ A	3SE5000-0AK00	
 Twist lever	Levers				
	Twist levers 21 mm, straight, type A according to EN 50047				
	Metal lever, plastic roller	19	⤵ A	3SE5000-0AA21	
	Metal lever, high-grade steel roller	19	⤵ B	3SE5000-0AA22	
 Twist lever, adjustable length	Metal lever, high-grade steel roller with ball bearing	19	⤵ B	3SE5000-0AA23	
	Metal lever, plastic roller	30	⤵ B	3SE5000-0AA25	
	High-grade steel lever, plastic roller	19	⤵ B	3SE5000-0AA31	
	High-grade steel lever, high-grade steel roller	19	⤵ B	3SE5000-0AA32	
	Twist levers 30 mm, straight¹⁾				
	Metal lever, plastic roller	19	⤵ B	3SE5000-0AA24	
	Metal lever, plastic roller	30	⤵ B	3SE5000-0AA26	
	Twist levers, adjustable length, with grid hole				
	Metal lever, plastic roller	19	⤵ B	3SE5000-0AA60	
	Metal lever, high-grade steel roller	19	⤵ B	3SE5000-0AA61	
	Metal lever, plastic roller	50	⤵ B	3SE5000-0AA67	
	Metal lever, rubber roller	50	⤵ B	3SE5000-0AA68	
	High-grade steel lever, plastic roller	19	⤵ B	3SE5000-0AA62	
	High-grade steel lever, high-grade steel roller	19	⤵ B	3SE5000-0AA63	

⤵ Positively driven actuator, necessary in safety circuits.

¹⁾ Can be clinch mounted (turned through 180°, rear of lever).

Selection and ordering data

Complete units

2 or 3 contacts · Degree of protection IP65 or IP66/IP67 · Cable entry M20 × 1.5

Version	Contacts	LEDs	DT	Complete units
				<input type="checkbox"/>
				Configurator
				Article No.

Complete units¹⁾ • Enclosure width 31 mm

Roller plunger

Roller plungers, type C, acc. to EN 50047

With plastic roller 10 mm,
With M12 connector socket, 4-pole (250 V, 4 A)

Snap-action contacts 1 NO + 1 NC -- B 3SE5234-0CD03-1AJ1

Roller plunger
with central
fixing

Roller plungers with central fixing

Snap-action contacts 1 NO + 1 NC -- B 3SE5232-0CD10-1AJ0



Twist lever

Twist levers, type A acc. to EN 50047

With high-grade steel lever 21 mm and plastic roller 19 mm

Snap-action contacts 1 NO + 1 NC -- A 3SE5232-0CK31-1AJ0

Twist levers,
adjustable
length,
with grid hole

Twist levers, adjustable length

With high-grade steel lever with grid hole
and plastic roller 19 mm

Snap-action contacts 1 NO + 1 NC -- A 3SE5232-0CK62-1AJ0

Snap-action contacts 1 NO + 2 NC -- B 3SE5232-0LK62-1AJ0

Complete units¹⁾ • Enclosure width 50 mmTwist levers,
adjustable
length,
with grid hole

Twist lever

With metal lever 21 mm and plastic roller 19 mm

Snap-action contacts, integrated²⁾ 1 NO + 1 NC -- B 3SE5242-0HK21-1AJ0

Twist levers, adjustable length

With high-grade steel lever with grid hole
and plastic roller 19 mmSnap-action contacts, integrated²⁾ 1 NO + 1 NC -- B 3SE5242-0HK62-1AJ0 For online configurator see www.siemens.com/sirius/configurators

Positive opening according to IEC 60947-5-1, Appendix K, or positively driven actuator, necessary in safety circuits.

¹⁾ Popular versions.²⁾ Subsequent replacement of contact blocks is not possible.

Note:

If the device you require is not available as a complete unit, see "Modular System", page 2/28.

SIRIUS 3SE5 mechanical position switches

3SE5, plastic enclosures
Ambient temperature up to –40 °C

Modular system

2 or 3 contacts · Degree of protection IP65 or IP66/IP67 · Cable entry M20 × 1.5

Version	Contacts	LEDs	DT	Modular system	
				Configurator	
				Article No.	

Basic switches • Enclosure width 31 mm (with rounded plunger¹⁾)



With teflon plunger

Snap-action contacts	1 NO + 1 NC --	⊕ B	3SE5232-0CC05-1AJ0
Slow-action contacts	1 NO + 2 NC --	⊕ B	3SE5232-0KC05-1AJ0
Snap-action contacts	1 NO + 2 NC --	⊕ B	3SE5232-0LC05-1AJ0

Basic switch

Basic switches • Enclosure width 50 mm (with rounded plunger¹⁾)



With teflon plunger

Slow-action contacts	1 NO + 1 NC --	⊕ B	3SE5242-0BC05-1AJ0
Snap-action contacts, integrated ²⁾	1 NO + 1 NC --	⊕ B	3SE5242-0HC05-1AJ0

Basic switch

⚙ For online configurator see www.siemens.com/sirius/configurators

⊕ Positive opening according to IEC 60947-5-1, Appendix K, or positively driven actuator, necessary in safety circuits.

¹⁾ For enclosures with widths of 31 and 50 mm, the basic switch is a complete unit with rounded plungers.







²⁾ Subsequent replacement of contact blocks is not possible.

Note:

Selection aid see page 2/12.

SIRIUS 3SE5 mechanical position switches

3SE5, plastic enclosures
Ambient temperature up to –40 °C

Version	Diameter	DT	Modular system	Article No.
	mm			
Operating mechanisms				
 Roller plunger	Roller plungers, type C acc. to EN 50047			
	Plastic rollers	10	☞ B	3SE5000-0AD03-1AJ0
 Roller lever	Roller levers, type E acc. to EN 50047			
	Metal lever, plastic roller	13	☞ B	3SE5000-0AE10-1AJ0
	High-grade steel lever, plastic roller	13	☞ B	3SE5000-0AE12-1AJ0
 Angular roller lever	Angular roller lever			
	Metal lever, plastic roller	13	☞ B	3SE5000-0AF10-1AJ0
	High-grade steel lever, plastic roller	13	☞ B	3SE5000-0AF12-1AJ0
Twist actuators				
 Twist actuator	Twist actuators, plastic (without lever)			
	Switching right and/or left, adjustable		☞ B	3SE5000-0AK00-1AJ0
Levers				
 Twist lever	Twist levers straight, 21 mm, type A acc. to EN 50047			
	Metal lever, plastic roller	19	☞ B	3SE5000-0AA21-1AJ0
	High-grade steel lever, plastic roller	19	☞ B	3SE5000-0AA31-1AJ0
 Twist lever, adjustable length	Twist levers, adjustable length, with grid hole			
	Metal lever, plastic roller	19	☞ B	3SE5000-0AA60-1AJ0
	High-grade steel lever, plastic roller	19	☞ B	3SE5000-0AA62-1AJ0

☞ Positively driven actuator, necessary in safety circuits.

SIRIUS 3SE5 mechanical position switches

3SE5, plastic enclosures
Ambient temperature up to -40 °C

Modular system

2 or 3 contacts · Degree of protection IP66/IP67 · Cable entry M20 × 1.5

Version	Contacts	LEDs	DT	Modular system	
				Configurator	
				Article No.	

Basic switches • Enclosure width 40 mm



Basic switch

With M20 × 1.5 connecting thread

Snap-action contacts	1 NO + 1 NC --	⤵ B	3SE5132-0CA00-1AJ0
Slow-action contacts	1 NO + 2 NC --	⤵ B	3SE5132-0KA00-1AJ0
Snap-action contacts	1 NO + 2 NC --	⤵ B	3SE5132-0LA00-1AJ0

For online configurator see www.siemens.com/sirius/configurators

⤵ Positive opening according to IEC 60947-5-1, Appendix K, or positively driven actuator, necessary in safety circuits.

Note:

Selection aid see page 2/12.

Version	Diameter	DT	Modular system	
	mm		Article No.	

Operating mechanisms



Rounded plunger

Rounded plungers, type B according to EN 50041

Plastic plungers	10	⤵ B	3SE5000-0AC03-1AJ0
------------------	----	-----	--------------------



Roller plunger

Roller plungers, type C acc. to EN 50041

Plastic plunger, plastic roller	13	⤵ B	3SE5000-0AD05-1AJ0
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Roller lever

Roller levers

Metal lever with plastic roller, plastic base	22	⤵ B	3SE5000-0AE05-1AJ0
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Twist actuators



Twist actuator

Twist actuators, plastic (without lever)

• For twist levers and rod actuators, switching right and/or left, adjustable	⤵ B	3SE5000-0AJ00-1AJ0
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Twist lever

Levers

Twist levers, type A acc. to EN 50041

Metal lever, plastic roller	19	⤵ B	3SE5000-0AA01-1AJ0
High-grade steel lever, plastic roller	19	⤵ B	3SE5000-0AA11-1AJ0



Twist lever, adjustable length

Twist levers, adjustable length, with grid hole

Metal lever, plastic roller	19	⤵ B	3SE5000-0AA60-1AJ0
High-grade steel lever, plastic roller	19	⤵ B	3SE5000-0AA62-1AJ0

⤵ Positively driven actuator, necessary in safety circuits.






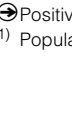
Selection and ordering data

Complete units

2 or 3 contacts · Degree of protection IP66/IP67 · Cable entry M20 × 1.5

Version	Contacts	LEDs	DT	Complete units	
				Configurator	
				Article No.	

Complete units¹⁾ • Enclosure width 31 mm

Rounded plungers, type B, according to EN 50047					
 Rounded plunger	With plunger				
	Slow-action contacts	1 NO + 1 NC --	⊙ A	3SE5212-0BC05	
	Snap-action contacts	1 NO + 1 NC --	⊙ A	3SE5212-0CC05	
	Slow-action contacts	1 NO + 2 NC --	⊙ A	3SE5212-0KC05	
	Snap-action contacts	1 NO + 2 NC --	⊙ A	3SE5212-0LC05	
	Slow-action contacts with make-before-break	1 NO + 2 NC --	⊙ A	3SE5212-0MC05	
	Slow-action contacts	2 NO + 1 NC --	⊙ A	3SE5212-0PC05	
 With increased corrosion protection	With increased corrosion protection				
	Slow-action contacts	1 NO + 1 NC --	⊙ B	3SE5212-0BC05-1CA0	
	Snap-action contacts	1 NO + 1 NC --	⊙ B	3SE5212-0CC05-1CA0	
	Slow-action contacts	1 NO + 2 NC --	⊙ B	3SE5212-0KC05-1CA0	
	Snap-action contacts	1 NO + 2 NC --	⊙ B	3SE5212-0LC05-1CA0	
	Slow-action contacts with make-before-break	1 NO + 2 NC --	⊙ B	3SE5212-0MC05-1CA0	
	Slow-action contacts	2 NO + 1 NC --	⊙ B	3SE5212-0PC05-1CA0	
 With 2 LEDs	With M12 connector socket, 5-pole (125 V, 4 A)				
	Slow-action contacts	1 NO + 1 NC --	⊙ B	3SE5214-0BC05-1AC5	
	Snap-action contacts	1 NO + 1 NC --	⊙ B	3SE5214-0CC05-1AC5	
	Slow-action contacts	2 NC --	⊙ B	3SE5214-0KC05-1AE1	
	Snap-action contacts	2 NC --	⊙ B	3SE5214-0LC05-1AE1	
	With 2 LEDs, yellow/green				
 With 2 LEDs	Slow-action contacts	1 NO + 2 NC 24 V DC	⊙ B	3SE5212-1KC05	
	Snap-action contacts	1 NO + 2 NC 24 V DC	⊙ A	3SE5212-1LC05	
	Slow-action contacts	1 NO + 2 NC 230 V AC	⊙ B	3SE5212-3KC05	
	Snap-action contacts	1 NO + 2 NC 230 V AC	⊙ B	3SE5212-3LC05	
	With M12 connector socket, 5-pole (125 V, 4 A), and 2 LEDs				
	Slow-action contacts	1 NO + 1 NC 24 V DC	⊙ B	3SE5214-1BC05-1AF3	
	Snap-action contacts	1 NO + 1 NC 24 V DC	⊙ B	3SE5214-1CC05-1AF3	
Plain plungers					
 Plain plunger	With high-grade steel plunger				
	Slow-action contacts	1 NO + 1 NC --	⊙ B	3SE5212-0BB01	
	Snap-action contacts	1 NO + 1 NC --	⊙ B	3SE5212-0CB01	
	Slow-action contacts	1 NO + 2 NC --	⊙ B	3SE5212-0KB01	
	Snap-action contacts	1 NO + 2 NC --	⊙ B	3SE5212-0LB01	
Roller plungers, type C, acc. to EN 50047					
 Roller plunger	With plastic roller 10 mm				
	Slow-action contacts	1 NO + 1 NC --	⊙ A	3SE5212-0BD03	
	Snap-action contacts	1 NO + 1 NC --	⊙ B	3SE5212-0CD03	
	Slow-action contacts	1 NO + 2 NC --	⊙ A	3SE5212-0KD03	
	Snap-action contacts	1 NO + 2 NC --	⊙ B	3SE5212-0LD03	

For online configurator see www.siemens.com/sirius/configurators

⊙ Positive opening according to IEC 60947-5-1, Appendix K.

¹⁾ Popular versions.

SIRIUS 3SE5 mechanical position switches

3SE5, metal enclosures Enclosure width 31 mm acc. to EN 50047

2 or 3 contacts · Degree of protection IP66/IP67 · Cable entry M20 × 1.5

Version	Contacts	LEDs	DT	Complete units
				Configurator
				Article No.

Complete units¹⁾ · Enclosure width 31 mm



Roller plunger
with central
fixing

Roller plungers with central fixing

With plastic roller 10 mm

Slow-action contacts 1 NO + 2 NC -- → B 3SE5212-0KD10



Roller lever

Roller levers, type E acc. to EN 50047

With metal lever and plastic roller 13 mm

Slow-action contacts 1 NO + 1 NC -- → A 3SE5212-0BE10

Snap-action contacts 1 NO + 1 NC -- → B 3SE5212-0CE10

Slow-action contacts 1 NO + 2 NC -- → B 3SE5212-0KE10

Snap-action contacts 1 NO + 2 NC -- → B 3SE5212-0LE10



Angular roller
lever

Angular roller levers

With metal lever and plastic roller 13 mm

Slow-action contacts 1 NO + 1 NC -- → B 3SE5212-0BF10

Snap-action contacts 1 NO + 1 NC -- → B 3SE5212-0CF10

Slow-action contacts 1 NO + 2 NC -- → B 3SE5212-0KF10

Snap-action contacts 1 NO + 2 NC -- → B 3SE5212-0LF10



Twist lever

Twist levers, type A acc. to EN 50047

With metal lever 21 mm and plastic roller 19 mm

Slow-action contacts 1 NO + 1 NC -- → B 3SE5212-0BK21

Snap-action contacts 1 NO + 1 NC -- → B 3SE5212-0CK21

Slow-action contacts 1 NO + 2 NC -- → B 3SE5212-0KK21

Snap-action contacts 1 NO + 2 NC -- → B 3SE5212-0LK21



Twist levers,
adjustable
length,
with grid hole

Twist lever, adjustable length

With metal lever with grid hole and plastic roller 19 mm

Snap-action contacts 1 NO + 1 NC -- → B 3SE5212-0CK60

Slow-action contacts 1 NO + 2 NC -- → B 3SE5212-0KK60

Snap-action contacts 1 NO + 2 NC -- → B 3SE5212-0LK60

For online configurator see www.siemens.com/sirius/configurators

→ Positive opening according to IEC 60947-5-1, Appendix K.

¹⁾ Popular versions.

Note:






If the device you require is not available as a complete unit, see "Modular System", page 2/33.

SIRIUS 3SE5 mechanical position switches

3SE5, metal enclosures
Enclosure width 31 mm acc. to EN 50047

Modular system

2 or 3 contacts · Degree of protection IP66/IP67 · Cable entry M20 × 1.5

Version	Contacts	LEDs	DT	Modular system
				Configurator
				Article No.
Basic switches • Enclosure width 31 mm (with rounded plunger¹⁾)				
	With plunger			
	Slow-action contacts	1 NO + 1 NC --	⊙ A	3SE5212-0BC05
	Snap-action contacts	1 NO + 1 NC --	⊙ A	3SE5212-0CC05
	Slow-action contacts	1 NO + 2 NC --	⊙ A	3SE5212-0KC05
	Snap-action contacts	1 NO + 2 NC --	⊙ A	3SE5212-0LC05
	Slow-action cont. with make-before-break	1 NO + 2 NC --	⊙ A	3SE5212-0MC05
	With increased corrosion protection²⁾			
	Slow-action contacts	1 NO + 1 NC --	⊙ B	3SE5212-0BC05-1CA0
	Snap-action contacts	1 NO + 1 NC --	⊙ B	3SE5212-0CC05-1CA0
	Slow-action contacts	1 NO + 2 NC --	⊙ B	3SE5212-0KC05-1CA0
	Snap-action contacts	1 NO + 2 NC --	⊙ B	3SE5212-0LC05-1CA0
	Slow-action cont. with make-before-break	1 NO + 2 NC --	⊙ B	3SE5212-0MC05-1CA0
	With M12 connector socket, 5-pole (125 V, 4 A)			
	Slow-action contacts	1 NO + 1 NC --	⊙ B	3SE5214-0BC05-1AC5
	Snap-action contacts	1 NO + 1 NC --	⊙ B	3SE5214-0CC05-1AC5
	Slow-action contacts	2 NC --	⊙ B	3SE5214-0KC05-1AE1
	Snap-action contacts	2 NC --	⊙ B	3SE5214-0LC05-1AE1
	With 2 LEDs, yellow/green			
	Slow-action contacts	1 NO + 2 NC 24 V DC	⊙ B	3SE5212-1KC05
	Snap-action contacts	1 NO + 2 NC 24 V DC	⊙ A	3SE5212-1LC05
	Slow-action contacts	1 NO + 2 NC 230 V AC	⊙ B	3SE5212-3KC05
	Snap-action contacts	1 NO + 2 NC 230 V AC	⊙ B	3SE5212-3LC05
	With M12 connector socket, 5-pole (125 V, 4 A), and 2 LEDs			
	Slow-action contacts	1 NO + 1 NC 24 V DC	⊙ B	3SE5214-1BC05-1AF3
	Snap-action contacts	1 NO + 1 NC 24 V DC	⊙ B	3SE5214-1CC05-1AF3

For online configurator see www.siemens.com/sirius/configurators



⊙ Positive opening according to IEC 60947-5-1, Appendix K, or positively driven actuator, necessary in safety circuits.

¹⁾ For enclosures with widths of 31 mm, the basic switch is a complete unit with rounded plungers.

²⁾ Use corresponding high-grade steel lever.

Note:








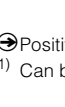
Selection aid see page 2/12.

Version	Diameter	DT	Modular system
			Article No.
Operating mechanisms			
	Plain plungers		
	High-grade steel plungers	10 ⊙ A	3SE5000-0AB01
	Roller plungers, type C acc. to EN 50047		
	Plastic roller	10 ⊙ A	3SE5000-0AD03
	High-grade steel rollers	10 ⊙ B	3SE5000-0AD04

⊙ Positively driven actuator, necessary in safety circuits.

SIRIUS 3SE5 mechanical position switches

3SE5, metal enclosures Enclosure width 31 mm acc. to EN 50047

Version		Diameter	DT	Modular system
		mm		Article No.
Operating mechanisms				
	Roller plungers with central fixing			
	Plastic roller	10	⤵ B	3SE5000-0AD10
	High-grade steel rollers	10	⤵ B	3SE5000-0AD11
With central fixing				
	Roller levers, type E acc. to EN 50047			
	Metal lever, plastic roller	13	⤵ A	3SE5000-0AE10
	Metal lever, high-grade steel roller	13	⤵ B	3SE5000-0AE11
	High-grade steel lever, plastic roller	13	⤵ B	3SE5000-0AE12
	High-grade steel lever, high-grade steel roller	13	⤵ B	3SE5000-0AE13
	Angular roller lever			
	Metal lever, plastic roller	13	⤵ A	3SE5000-0AF10
	Metal lever, high-grade steel roller	13	⤵ B	3SE5000-0AF11
Ang. roller levers	High-grade steel lever, plastic roller	13	⤵ A	3SE5000-0AF12
	High-grade steel lever, high-grade steel roller	13	⤵ B	3SE5000-0AF13
Twist actuators				
	Twist actuators, plastic (without lever)			
	Switching right and/or left, adjustable		⤵ A	3SE5000-0AK00
Levers				
	Twist levers, straight, type A according to EN 50047			
	Metal lever 21 mm, plastic roller	19	⤵ A	3SE5000-0AA21
	Metal lever 21 mm, high-grade steel roller	19	⤵ B	3SE5000-0AA22
	Metal lever 21 mm, high-grade steel roller with ball bearing	19	⤵ B	3SE5000-0AA23
	Metal lever 21 mm, plastic roller	30	⤵ B	3SE5000-0AA25
	High-grade steel lever 21 mm, plastic roller	19	⤵ B	3SE5000-0AA31
	High-grade steel lever 21 mm, high-grade steel roller	19	⤵ B	3SE5000-0AA32
	Twist levers 30 mm, straight¹⁾			
	Metal lever, plastic roller	19	⤵ B	3SE5000-0AA24
	Metal lever, plastic roller	30	⤵ B	3SE5000-0AA26
	Twist levers, adjustable length, with grid hole			
	Metal lever, plastic roller	19	⤵ B	3SE5000-0AA60
	Metal lever, high-grade steel roller	19	⤵ B	3SE5000-0AA61
	Metal lever, plastic roller	50	⤵ B	3SE5000-0AA67
	Metal lever, rubber roller	50	⤵ B	3SE5000-0AA68
	High-grade steel lever, plastic roller	19	⤵ B	3SE5000-0AA62
	High-grade steel lever, high-grade steel roller	19	⤵ B	3SE5000-0AA63

⤵ Positively driven actuator, necessary in safety circuits.

¹⁾ Can be clinch mounted (turned through 180°, rear of lever).

Selection and ordering data

Complete units

2 or 3 contacts · Degree of protection IP66/IP67 · Cable entry M20 × 1.5

Version	Contacts	LEDs	DT	Complete units	
				Configurator	
				Article No.	

Complete units¹⁾ • Enclosure width 40 mm

Plain plunger

Plain plungers

With high-grade steel plunger

Slow-action contacts	1 NO + 1 NC --	⊙ A	3SE5112-0BB01
Snap-action contacts	1 NO + 1 NC --	⊙ A	3SE5112-0CB01
Slow-action contacts	1 NO + 2 NC --	⊙ B	3SE5112-0KB01
Snap-action contacts	1 NO + 2 NC --	⊙ B	3SE5112-0LB01



Rounded plunger

Rounded plungers, type B according to EN 50041

With high-grade steel plungers, with 3 mm overtravel

Slow-action contacts	1 NO + 1 NC --	⊙ B	3SE5112-0BC02
Snap-action contacts	1 NO + 1 NC --	⊙ ⊕	3SE5112-0CC02
Slow-action contacts	1 NO + 2 NC --	⊙ B	3SE5112-0KC02
Snap-action contacts	1 NO + 2 NC --	⊙ B	3SE5112-0LC02



Roller plunger

Roller plungers, type C acc. to EN 50041

With high-grade steel roller 13 mm, with 3 mm overtravel

Slow-action contacts	1 NO + 1 NC --	⊙ B	3SE5112-0BD02
Snap-action contacts	1 NO + 1 NC --	⊙ ►	3SE5112-0CD02
Slow-action contacts	1 NO + 2 NC --	⊙ B	3SE5112-0KD02
Snap-action contacts	1 NO + 2 NC --	⊙ B	3SE5112-0LD02

With M12 connector socket, 5-pole (125 V, 4 A) and 2 LEDs

Snap-action contacts	1 NO + 1 NC 24 V DC	⊙ B	3SE5114-1CD02-1AF3
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Roller lever

Roller levers

With metal lever and plastic roller 22 mm

Slow-action contacts	1 NO + 1 NC --	⊙ B	3SE5112-0BE01
Snap-action contacts	1 NO + 1 NC --	⊙ ►	3SE5112-0CE01
Slow-action contacts	1 NO + 2 NC --	⊙ B	3SE5112-0KE01
Snap-action contacts	1 NO + 2 NC --	⊙ B	3SE5112-0LE01



Ang. roller lever

Angular roller lever

With metal lever and plastic roller 22 mm

Slow-action contacts	1 NO + 1 NC --	⊙ B	3SE5112-0BF01
Snap-action contacts	1 NO + 1 NC --	⊙ A	3SE5112-0CF01
Snap-action contacts	1 NO + 2 NC --	⊙ B	3SE5112-0LF01

 For online configurator see www.siemens.com/sirius/configurators

Positive opening according to IEC 60947-5-1, Appendix K.

¹⁾ Popular versions.

SIRIUS 3SE5 mechanical position switches

3SE5, metal enclosures Enclosure width 40 mm acc. to EN 50041

2 or 3 contacts · Degree of protection IP66/IP67 · Cable entry M20 × 1.5

Version	Contacts	LEDs	DT	Complete units
				Configurator
				Article No.

Complete units¹⁾ · Enclosure width 40 mm



Twist lever

Twist levers, type A acc. to EN 50041

With metal lever 27 mm and plastic roller 19 mm

Slow-action contacts	1 NO + 1 NC --	⊙ B	3SE5112-0BH01
Snap-action contacts	1 NO + 1 NC --	⊙ ⊕	3SE5112-0CH01
Slow-action contacts	1 NO + 2 NC --	⊙ B	3SE5112-0KH01
Snap-action contacts	1 NO + 2 NC --	⊙ B	3SE5112-0LH01

With M12 connector socket, 5-pole (125 V, 4 A)

Snap-action contacts	1 NO + 1 NC --	⊙ A	3SE5114-0CH01-1AC5
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With M12 connector socket, 5-pole (125 V, 4 A), and 2 LEDs

Snap-action contacts	1 NO + 1 NC 24 V DC	⊙ B	3SE5114-1CH01-1AF3
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With metal lever 27 mm and high-grade steel roller 19 mm

Slow-action contacts	1 NO + 1 NC --	⊙ B	3SE5112-0BH02
Snap-action contacts	1 NO + 1 NC --	⊙ A	3SE5112-0CH02

With M12 connector socket, 5-pole (125 V, 4 A), and 2 LEDs

Snap-action contacts	1 NO + 1 NC --	⊙ B	3SE5114-1CH02-1AF3
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With metal lever 30 mm and plastic roller 19 mm

Snap-action contacts	1 NO + 1 NC --	⊙ ►	3SE5112-0CH24
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Twist lever, adjustable length

With metal lever with grid hole and plastic roller 19 mm

Slow-action contacts	1 NO + 1 NC --	⊙ B	3SE5112-0BH60
Snap-action contacts	1 NO + 1 NC --	⊙ ►	3SE5112-0CH60
Snap-action contacts	1 NO + 2 NC --	⊙ B	3SE5112-0LH60



Twist levers, adjustable length, with grid hole



Fork lever

Fork levers, latching

With metal lever and 2 plastic rollers 19 mm

Snap-action contacts	1 NO + 1 NC --	⊙ B	3SE5112-0CT11
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⚙ For online configurator see www.siemens.com/sirius/configurators

⊙ Positive opening according to IEC 60947-5-1, Appendix K.

¹⁾ Popular versions.

Note:








If the device you require is not available as a complete unit, see "Modular System", page 2/37.

SIRIUS 3SE5 mechanical position switches

3SE5, metal enclosures
Enclosure width 40 mm acc. to EN 50041

Modular system

2 or 3 contacts · Degree of protection IP66/IP67 · Cable entry M20 × 1.5

Version	Contacts	LEDs	DT	Modular system	
				Configurator	
				Article No.	
Basic switches • Enclosure width 40 mm					
 Basic switch	With M20 × 1.5 connecting thread				
	Slow-action contacts	1 NO + 1 NC --	⊙ B	3SE5112-0BA00	
	Snap-action contacts	1 NO + 1 NC --	⊙ A	3SE5112-0CA00	
	• Gold-plated contacts		⊙ B	3SE5112-0CA00-1AC1	
	Slow-action contacts	1 NO + 2 NC --	⊙ A	3SE5112-0KA00	
	Snap-action contacts	1 NO + 2 NC --	⊙ A	3SE5112-0LA00	
 With increased corrosion protection	Slow-action contacts with make-before-break	1 NO + 2 NC --	⊙ A	3SE5112-0MA00	
	Slow-action contacts	2 NO + 1 NC --	⊙ A	3SE5112-0PA00	
	With increased corrosion protection¹⁾				
	Slow-action contacts	1 NO + 1 NC --	⊙ B	3SE5112-0BA00-1CA0	
	Snap-action contacts	1 NO + 1 NC --	⊙ B	3SE5112-0CA00-1CA0	
	Slow-action contacts	1 NO + 2 NC --	⊙ B	3SE5112-0KA00-1CA0	
 With M12 plug	Snap-action contacts with make-before-break	1 NO + 2 NC --	⊙ B	3SE5112-0LA00-1CA0	
	Slow-action contacts with make-before-break	1 NO + 2 NC --	⊙ B	3SE5112-0MA00-1CA0	
	Slow-action contacts	2 NO + 1 NC --	⊙ B	3SE5112-0PA00-1CA0	
	With M12 connector socket, 5-pole (125 V, 4 A)				
	Slow-action contacts	1 NO + 1 NC --	⊙ B	3SE5114-0BA00-1AC5	
	Snap-action contacts	1 NO + 1 NC --	⊙ B	3SE5114-0CA00-1AC5	
 With connector socket, 6-pole + PE (250 V, 10 A)	Slow-action contacts	2 NC --	⊙ B	3SE5114-0KA00-1AE1	
	Snap-action contacts	2 NC --	⊙ B	3SE5114-0LA00-1AE1	
	With connector socket, 6-pole + PE (250 V, 10 A)				
	Slow-action contacts	1 NO + 2 NC --	⊙ B	3SE5115-0KA00-1AD1	
	Snap-action contacts	1 NO + 2 NC --	⊙ B	3SE5115-0LA00-1AD1	
	With connector socket, 6-pole + PE (250 V, 10 A) and quick-release device				
 With plug, 6-pole + PE	Snap-action contacts	1 NO + 1 NC --	⊙ B	3SE5115-0CA00-1AD0	
	With 2 LEDs, yellow/green				
	Slow-action contacts	1 NO + 2 NC 24 V DC	⊙ B	3SE5112-1KA00	
	Snap-action contacts	1 NO + 2 NC 24 V DC	⊙ B	3SE5112-1LA00	
	Slow-action contacts	1 NO + 2 NC 230 V AC	⊙ B	3SE5112-3KA00	
	Snap-action contacts	1 NO + 2 NC 230 V AC	⊙ B	3SE5112-3LA00	
 With 2 LEDs	With M12 connector socket, 5-pole (125 V, 4 A), and 2 LEDs				
	Slow-action contacts	1 NO + 1 NC 24 V DC	⊙ B	3SE5114-1BA00-1AF3	
	Snap-action contacts	1 NO + 1 NC 24 V DC	⊙ B	3SE5114-1CA00-1AF3	
	With M12 connector socket, 8-pole (30 V, 2 A) and 2 LEDs				
	Snap-action contacts	1 NO + 2 NC 24 V DC	⊙ B	3SE5114-1LA00-1AD4	
	With connector socket, 6-pole + PE (10 A), and 2 LEDs				
 With M12 plug and 2 LEDs	Slow-action contacts	1 NO + 1 NC 24 V DC	⊙ B	3SE5115-1BA00-1AF2	
	Snap-action contacts	1 NO + 1 NC 24 V DC	⊙ B	3SE5115-1CA00-1AF2	
	Snap-action contacts	2 NC 24 V DC	⊙ B	3SE5115-1LA00-1AD2	
	With plug, 6-pole PE, and 2 LEDs				

⚙ For online configurator see www.siemens.com/sirius/configurators

⊙ Positive opening according to IEC 60947-5-1, Appendix K, or positively driven actuator, necessary in safety circuits.






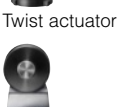
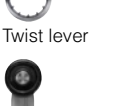



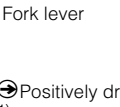
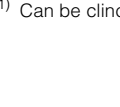





¹⁾ Use corresponding high-grade steel lever.

Note:

Selection aid see page 2/12.

SIRIUS 3SE5 mechanical position switches

3SE5, metal enclosures Enclosure width 40 mm acc. to EN 50041

Version		Diameter	DT	Modular system	
		mm		Article No.	
Operating mechanisms					
	Plain plunger				
	High-grade steel plunger	10	⊞ A	3SE5000-0AB01	
	Rounded plungers, type B according to EN 50041				
	High-grade steel plungers, with 3 mm overtravel	10	⊞ B	3SE5000-0AC02	
	Roller plungers, type C acc. to EN 50041				
	High-grade steel roller, with 3 mm overtravel	13	⊞ B	3SE5000-0AD02	
	Roller lever				
	Metal lever, plastic roller	22	⊞ A	3SE5000-0AE01	
	Metal lever, high-grade steel roller	22	⊞ B	3SE5000-0AE02	
	High-grade steel lever, plastic roller	22	⊞ B	3SE5000-0AE03	
	High-grade steel lever, high-grade steel roller	22	⊞ B	3SE5000-0AE04	
	Angular roller lever				
	Metal lever, plastic roller	22	⊞ A	3SE5000-0AF01	
	Metal lever, high-grade steel roller	22	⊞ B	3SE5000-0AF02	
	High-grade steel lever, plastic roller	22	⊞ B	3SE5000-0AF03	
	High-grade steel lever, high-grade steel roller	22	⊞ B	3SE5000-0AF04	
Twist actuators					
	Twist actuators, metal (without lever)				
	• For twist levers and rod actuators, switching right and/or left, adjustable		⊞ A	3SE5000-0AH00	
	• For fork levers, latching		⊞ B	3SE5000-0AT10	
Levers					
	Twist levers, offset, type A according to EN 50041				
	Metal lever 27 mm, plastic roller	19	⊞ A	3SE5000-0AA01	
	Metal lever 27 mm, high-grade steel roller	19	⊞ A	3SE5000-0AA02	
	Metal lever 27 mm, high-gr. steel roller with ball bearing	19	⊞ B	3SE5000-0AA03	
	Metal lever 27 mm, 2 plastic rollers	19	⊞ B	3SE5000-0AA04	
	Metal lever 27 mm, plastic roller	30	⊞ B	3SE5000-0AA05	
	Metal lever 27 mm, rubber roller	50	⊞ B	3SE5000-0AA08	
	High-grade steel lever 27 mm, plastic roller	19	⊞ B	3SE5000-0AA11	
	High-grade steel lever 27 mm, high-grade steel roller	19	⊞ B	3SE5000-0AA12	
	Metal lever 35 mm, plastic roller	19	⊞ B	3SE5000-0AA15	
	High-grade steel lever 35 mm, plastic roller	19	⊞ B	3SE5000-0AA16	
	Twist levers 30 mm, straight¹⁾				
	Metal lever, plastic roller	19	⊞ B	3SE5000-0AA24	
	Metal lever, plastic roller	30	⊞ B	3SE5000-0AA26	
	Twist levers, adjustable length, with grid hole				
	Metal lever, plastic roller	19	⊞ B	3SE5000-0AA60	
	Metal lever, high-grade steel roller	19	⊞ B	3SE5000-0AA61	
	Metal lever, rubber roller	50	⊞ B	3SE5000-0AA68	
	High-grade steel lever, plastic roller	19	⊞ B	3SE5000-0AA62	
	High-grade steel lever, high-grade steel roller	19	⊞ B	3SE5000-0AA63	
	Fork levers (for switches with snap-action contacts only)				
	2 metal levers, 2 plastic rollers	19	⊞ B	3SE5000-0AT01	
	2 metal levers, 2 high-grade steel rollers	19	⊞ B	3SE5000-0AT02	
	2 high-grade steel levers, 2 plastic rollers	19	⊞ B	3SE5000-0AT03	

⊞ Positively driven actuator, necessary in safety circuits.

¹⁾ Can be clinch mounted (turned through 180°, rear of lever).

Selection and ordering data

Complete units

2 or 3 contacts · Degree of protection IP66/IP67 · Cable entry 3 × (M20 × 1.5)

Version	Contacts	LEDs	DT	Complete units	
				Configurator	
				Article No.	

Complete units¹⁾ • Enclosure width 56 mm

Plain plunger

Plain plungers

With high-grade steel plunger

Slow-action contacts	1 NO + 1 NC --	⤵ B	3SE5122-0BB01
Snap-action contacts	1 NO + 1 NC --	⤵ B	3SE5122-0CB01
Slow-action contacts	1 NO + 2 NC --	⤵ B	3SE5122-0KB01
Snap-action contacts	1 NO + 2 NC --	⤵ B	3SE5122-0LB01
Slow-action contacts	2 NO + 1 NC --	⤵ B	3SE5122-0PB01



Rounded plunger

Rounded plungers

With high-grade steel plungers, with 3 mm overtravel

Slow-action contacts	1 NO + 1 NC --	⤵ B	3SE5122-0BC02
Snap-action contacts	1 NO + 1 NC --	⤵ ► B	3SE5122-0CC02
Slow-action contacts	1 NO + 2 NC --	⤵ B	3SE5122-0KC02
Snap-action contacts	1 NO + 2 NC --	⤵ B	3SE5122-0LC02
Slow-action contacts	2 NO + 1 NC --	⤵ B	3SE5122-0PC02



Roller plunger

Roller plungers

With high-grade steel roller 13 mm, with 3 mm overtravel

Slow-action contacts	1 NO + 1 NC --	⤵ B	3SE5122-0BD02
Snap-action contacts	1 NO + 1 NC --	⤵ A	3SE5122-0CD02
Slow-action contacts	1 NO + 2 NC --	⤵ B	3SE5122-0KD02
Snap-action contacts	1 NO + 2 NC --	⤵ B	3SE5122-0LD02



Roller lever

Roller levers

With metal lever and plastic roller 22 mm

Slow-action contacts	1 NO + 1 NC --	⤵ B	3SE5122-0BE01
Snap-action contacts	1 NO + 1 NC --	⤵ A	3SE5122-0CE01
Slow-action contacts	1 NO + 2 NC --	⤵ B	3SE5122-0KE01
Snap-action contacts	1 NO + 2 NC --	⤵ B	3SE5122-0LE01
Slow-action contacts	2 NO + 1 NC --	⤵ B	3SE5122-0PE01

With metal lever and high-grade steel roller 22 mm

Snap-action contacts	1 NO + 1 NC --	⤵ B	3SE5122-0CE02
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Angular roller lever

Angular roller levers

With metal lever and plastic roller 22 mm

Slow-action contacts	1 NO + 1 NC --	⤵ B	3SE5122-0BF01
Snap-action contacts	1 NO + 1 NC --	⤵ B	3SE5122-0CF01
Slow-action contacts	2 NO + 1 NC --	⤵ B	3SE5122-0PF01

 For online configurator see www.siemens.com/sirius/configurators

Positive opening according to IEC 60947-5-1, Appendix K.

¹⁾ Popular versions.

SIRIUS 3SE5 mechanical position switches

3SE5, metal enclosures Enclosure width 56 mm

2 or 3 contacts · Degree of protection IP66/IP67 · Cable entry 3 × (M20 × 1.5)

Version	Contacts	LEDs	DT	Complete units
				Configurator
				Article No.

Complete units¹⁾ · Enclosure width 56 mm



Twist lever

Twist levers

With metal lever 27 mm and plastic roller 19 mm

Slow-action contacts	1 NO + 1 NC --	⤵ B	3SE5122-0BH01
Snap-action contacts	1 NO + 1 NC --	⤵ A	3SE5122-0CH01
Slow-action contacts	1 NO + 2 NC --	⤵ B	3SE5122-0KH01
Snap-action contacts	1 NO + 2 NC --	⤵ B	3SE5122-0LH01
Slow-action contacts	2 NO + 1 NC --	⤵ B	3SE5122-0PH01

With metal lever 27 mm and high-grade steel roller 19 mm

Snap-action contacts	1 NO + 1 NC --	⤵ B	3SE5122-0CH02
Snap-action contacts	1 NO + 2 NC --	⤵ B	3SE5122-0LH02



Twist levers,
adjustable
length,
with grid hole

Twist lever, adjustable length

With metal lever with grid hole and plastic roller 19 mm

Slow-action contacts	1 NO + 1 NC --	⤵ B	3SE5122-0BH60
Snap-action contacts	1 NO + 1 NC --	⤵ B	3SE5122-0CH60
Snap-action contacts	1 NO + 2 NC --	⤵ B	3SE5122-0LH60



Fork lever

Fork levers, latching

With metal lever and 2 plastic rollers 19 mm

Snap-action contacts	1 NO + 1 NC --	⤵ B	3SE5122-0CT11
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⚙ For online configurator see www.siemens.com/sirius/configurators

⤵ Positive opening according to IEC 60947-5-1, Appendix K.

¹⁾ Popular versions.

Note:

If the device you require is not available as a complete unit, see "Modular System", page 2/41.

SIRIUS 3SE5 mechanical position switches

3SE5, metal enclosures
Enclosure width 56 mm

Modular system

2 or 3 contacts · Degree of protection IP66/IP67 · Cable entry 3 × (M20 × 1.5)

Version	Contacts	LEDs	DT	Modular system
				Configurator
				Article No.

Basic switches • Enclosure width 56 mm



Basic switch

With 3 x M20 x 1.5 connecting thread

Slow-action contacts	1 NO + 1 NC --	⤵ A	3SE5122-0BA00
Snap-action contacts	1 NO + 1 NC --	⤵ A	3SE5122-0CA00
Slow-action contacts	1 NO + 2 NC --	⤵ B	3SE5122-0KA00
Snap-action contacts	1 NO + 2 NC --	⤵ A	3SE5122-0LA00
Slow-action cont. with make-before-break	1 NO + 2 NC --	⤵ A	3SE5122-0MA00
Slow-action contacts	2 NO + 1 NC --	⤵ A	3SE5122-0PA00



With increased corrosion protect.

With increased corrosion protection¹⁾

Slow-action contacts	1 NO + 1 NC --	⤵ B	3SE5122-0BA00-1CA0
Snap-action contacts	1 NO + 1 NC --	⤵ B	3SE5122-0CA00-1CA0
Slow-action contacts	1 NO + 2 NC --	⤵ B	3SE5122-0KA00-1CA0
Snap-action contacts	1 NO + 2 NC --	⤵ B	3SE5122-0LA00-1CA0
Slow-action cont. with make-before-break	1 NO + 2 NC --	⤵ B	3SE5122-0MA00-1CA0
Slow-action contacts	2 NO + 1 NC --	⤵ B	3SE5122-0PA00-1CA0



With 2 LEDs

With 2 LEDs, yellow/green

Slow-action contacts	1 NO + 2 NC 24 V DC	⤵ B	3SE5122-1KA00
Snap-action contacts	1 NO + 2 NC 24 V DC	⤵ B	3SE5122-1LA00
Slow-action contacts	1 NO + 2 NC 230 V AC	⤵ B	3SE5122-3KA00
Snap-action contacts	1 NO + 2 NC 230 V AC	⤵ B	3SE5122-3LA00

For online configurator see www.siemens.com/sirius/configurators

⤵ Positive opening according to IEC 60947-5-1, Appendix K, or positively driven actuator, necessary in safety circuits.

¹⁾ Use corresponding high-grade steel lever.

Note:

Selection aid see page 2/12.

Version	Diameter	DT	Modular system
	mm		Article No.

Operating mechanisms



Rounded plungers, roller plungers

Plain plunger

High-grade steel plunger	10	⤵ A	3SE5000-0AB01
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Rounded plungers, type B according to EN 50041

High-grade steel plungers, with 3 mm overtravel	10	⤵ B	3SE5000-0AC02
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Roller plungers, type C acc. to EN 50041

High-grade steel roller, with 3 mm overtravel	13	⤵ B	3SE5000-0AD02
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Roller lever

Roller levers

Metal lever, plastic roller	22	⤵ A	3SE5000-0AE01
Metal lever, high-grade steel roller	22	⤵ B	3SE5000-0AE02
High-grade steel lever, plastic roller	22	⤵ B	3SE5000-0AE03
High-grade steel lever, high-grade steel roller	22	⤵ B	3SE5000-0AE04







Ang. roller lever

Angular roller levers

Metal lever, plastic roller	22	⤵ A	3SE5000-0AF01
Metal lever, high-grade steel roller	22	⤵ B	3SE5000-0AF02
High-grade steel lever, plastic roller	22	⤵ B	3SE5000-0AF03
High-grade steel lever, high-grade steel roller	22	⤵ B	3SE5000-0AF04

SIRIUS 3SE5 mechanical position switches

3SE5, metal enclosures Enclosure width 56 mm

Version		Diameter	DT	Modular system	
		mm		Article No.	
Twist actuators					
	Twist actuators, metal (without lever)				
	<ul style="list-style-type: none">For twist levers and rod actuators, switching right and/or left, adjustableFor fork levers, latching				
Levers					
	Twist levers 27 mm, offset, type A according to EN 50041				
	Metal lever, plastic roller	19	➡ A	3SE5000-0AA01	
	Metal lever, high-grade steel roller	19	➡ A	3SE5000-0AA02	
	Metal lever, high-grade steel roller with ball bearing	19	➡ B	3SE5000-0AA03	
	Metal lever, 2 plastic rollers	19	➡ B	3SE5000-0AA04	
	Metal lever, plastic roller	30	➡ B	3SE5000-0AA05	
	Metal lever, plastic roller	50	➡ B	3SE5000-0AA07	
	Metal lever, rubber roller	50	➡ B	3SE5000-0AA08	
	High-grade steel lever, plastic roller	19	➡ B	3SE5000-0AA11	
	High-grade steel lever, high-grade steel roller	19	➡ B	3SE5000-0AA12	
	Twist levers 35 mm, offset				
	Metal lever, plastic roller	19	➡ B	3SE5000-0AA15	
	High-grade steel lever, plastic roller	19	➡ B	3SE5000-0AA16	
	Twist levers 30 mm, straight ¹⁾				
	Metal lever, plastic roller	19	➡ B	3SE5000-0AA24	
	Metal lever, plastic roller	30	➡ B	3SE5000-0AA26	
	Twist levers, adjustable length, with grid hole				
	Metal lever, plastic roller	19	➡ B	3SE5000-0AA60	
	Metal lever, high-grade steel roller	19	➡ B	3SE5000-0AA61	
Metal lever, plastic roller	50	➡ B	3SE5000-0AA67		
Metal lever, rubber roller	50	➡ B	3SE5000-0AA68		
High-grade steel lever, plastic roller	19	➡ B	3SE5000-0AA62		
High-grade steel lever, high-grade steel roller	19	➡ B	3SE5000-0AA63		
	Fork levers (for switches with snap-action contacts only)				
	2 metal levers, 2 plastic rollers	19	➡ B	3SE5000-0AT01	
	2 metal levers, 2 high-grade steel rollers	19	➡ B	3SE5000-0AT02	
	2 high-grade steel levers, 2 plastic rollers	19	➡ B	3SE5000-0AT03	
	2 high-grade steel levers, 2 high-grade steel rollers	19	➡ B	3SE5000-0AT04	

⤵ Positively driven actuator, necessary in safety circuits.

¹⁾ Can be clinch mounted (turned through 180°, rear of lever).

SIRIUS 3SE5 mechanical position switches

Metal enclosures
Enclosure width 56 mm, XL

Selection and ordering data

Complete units

4 or 5 contacts · Degree of protection IP66/IP67 · Cable entry 3 × (M20 × 1.5)

Version	Contacts	LEDs	DT	Complete units	
				Configurator	
				Article No.	

Complete units¹⁾ • Enclosure width 56 mm, XL



Plain plunger

Plain plungers

With high-grade steel plunger

Snap-action contacts 2 × (1 NO + 1 NC) -- B **3SE5162-0CB01**



Rounded plungers

Rounded plungers

With high-grade steel plungers, with 3 mm overtravel

Slow-action contacts 1 NO + 1 NC and -- B **3SE5162-0EC02**
 Slow-action contacts with make-before-break 1 NO + 2 NC
 2 mm travel difference



Roller plungers

Roller plungers

With high-grade steel roller 13 mm, with 3 mm overtravel

Slow-action contacts 2 × (1 NO + 1 NC) -- B **3SE5162-0BD02**
 Snap-action contacts 2 × (1 NO + 1 NC) -- A **3SE5162-0CD02**



Roller lever

Roller levers

With metal lever and plastic roller 22 mm

Slow-action contacts 2 × (1 NO + 1 NC) -- B **3SE5162-0BE01**
 Snap-action contacts 2 × (1 NO + 1 NC) -- A **3SE5162-0CE01**

With metal lever and high-grade steel roller 22 mm

Snap-action contacts 2 × (1 NO + 1 NC) -- B **3SE5162-0CE02**



Angular roller lever

Angular roller lever

With metal lever and plastic roller 22 mm

Snap-action contacts 2 × (1 NO + 1 NC) -- B **3SE5162-0CF01**



Twist levers

Twist levers

With metal lever 27 mm and plastic roller 19 mm

Snap-action contacts 2 × (1 NO + 1 NC) -- A **3SE5162-0CH01**

For online configurator see www.siemens.com/sirius/configurators

Positive opening according to IEC 60947-5-1, Appendix K.

¹⁾ Popular versions.

Note:

If the device you require is not available as a complete unit, see "Modular System", page 2/44.

SIRIUS 3SE5 mechanical position switches

Metal enclosures Enclosure width 56 mm, XL

Modular system

4 or 6 contacts · Degree of protection IP66/IP67 · Cable entry 3 × (M20 × 1.5)

Version	Contacts	LEDs	DT	Modular system	
				Configurator	
				Article No.	

Basic switches • Enclosure width 56 mm, XL



Basic switch

With 3 x M20 x 1.5 connecting thread

Slow-action contacts	2 × (1 NO + 1 NC) --	⊙ A	3SE5162-0BA00
Snap-action contacts	2 × (1 NO + 1 NC) --	⊙ A	3SE5162-0CA00
Slow-action contacts with make-before-break	2 × (1 NO + 2 NC) --	⊙ A	3SE5162-0DA00

With increased corrosion protection¹⁾

Slow-action contacts	2 × (1 NO + 1 NC) --	⊙ B	3SE5162-0BA00-1CA0
Snap-action contacts	2 × (1 NO + 1 NC) --	⊙ B	3SE5162-0CA00-1CA0
Slow-action contacts with make-before-break	2 × (1 NO + 2 NC) --	⊙ B	3SE5162-0DA00-1CA0

⊙ For online configurator see www.siemens.com/sirius/configurators

⊙ Positive opening according to IEC 60947-5-1, Appendix K, or positively driven actuator, necessary in safety circuits.

¹⁾ Use corresponding high-grade steel lever.

Note:

Selection aid see page 2/12.

Version	Diameter	DT	Modular system	
	mm		Article No.	

Operating mechanisms



Plain plunger

Plain plungers

High-grade steel plunger	10	⊙ A	3SE5000-0AB01
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Rounded plunger

Rounded plungers, type B according to EN 50041

High-grade steel plungers, with 3 mm overtravel	10	⊙ B	3SE5000-0AC02
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Roller plungers

Roller plungers, type C acc. to EN 50041

High-grade steel roller, with 3 mm overtravel	13	⊙ B	3SE5000-0AD02
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Roller lever

Roller levers

Metal lever, plastic roller	22	⊙ A	3SE5000-0AE01
Metal lever, high-grade steel roller	22	⊙ B	3SE5000-0AE02
High-grade steel lever, plastic roller	22	⊙ B	3SE5000-0AE03
High-grade steel lever, high-grade steel roller	22	⊙ B	3SE5000-0AE04



Angular roller lever




Angular roller lever

Metal lever, plastic roller	22	⊙ A	3SE5000-0AF01
Metal lever, high-grade steel roller	22	⊙ B	3SE5000-0AF02
High-grade steel lever, plastic roller	22	⊙ B	3SE5000-0AF03
High-grade steel lever, high-grade steel roller	22	⊙ B	3SE5000-0AF04

⊙ Positively driven actuator, necessary in safety circuits.

SIRIUS 3SE5 mechanical position switches

Metal enclosures
Enclosure width 56 mm, XL

Version		Diameter	DT	Modular system	
			mm	Article No.	
Twist actuators					
	Twist actuators , metal (without lever)				
	• For twist levers and rod actuators, switching right and/or left, adjustable		→ A	3SE5000-0AH00	
	• For fork levers, latching		→ B	3SE5000-0AT10	
Levers					
	Twist levers 27 mm, offset, type A according to EN 50041				
	Metal lever, plastic roller	19	→ A	3SE5000-0AA01	
	Metal lever, high-grade steel roller	19	→ A	3SE5000-0AA02	
	Metal lever, high-grade steel roller with ball bearing	19	→ B	3SE5000-0AA03	
	Metal lever, 2 plastic rollers	19	→ B	3SE5000-0AA04	
	Metal lever, plastic roller	30	→ B	3SE5000-0AA05	
	Metal lever, plastic roller	50	→ B	3SE5000-0AA07	
	Metal lever, rubber roller	50	→ B	3SE5000-0AA08	
	High-grade steel lever, plastic roller	19	→ B	3SE5000-0AA11	
	High-grade steel lever, high-grade steel roller	19	→ B	3SE5000-0AA12	
	Twist levers 35 mm, offset				
	Metal lever, plastic roller	19	→ B	3SE5000-0AA15	
High-grade steel lever, plastic roller	19	→ B	3SE5000-0AA16		
Twist levers 30 mm, straight¹⁾					
Metal lever, plastic roller	19	→ B	3SE5000-0AA24		
Metal lever, plastic roller	30	→ B	3SE5000-0AA26		
	Twist levers, adjustable length, with grid hole				
	Metal lever, plastic roller	19	→ B	3SE5000-0AA60	
	Metal lever, high-grade steel roller	19	→ B	3SE5000-0AA61	
	Metal lever, plastic roller	50	→ B	3SE5000-0AA67	
	Metal lever, rubber roller	50	→ B	3SE5000-0AA68	
	High-grade steel lever, plastic roller	19	→ B	3SE5000-0AA62	
	High-grade steel lever, high-grade steel roller	19	→ B	3SE5000-0AA63	
	Fork levers (for switches with snap-action contacts only)				
	2 metal levers, 2 plastic rollers	19	→ B	3SE5000-0AT01	
	2 metal levers, 2 high-grade steel rollers	19	→ B	3SE5000-0AT02	
2 high-grade steel levers, 2 plastic rollers	19	→ B	3SE5000-0AT03		
2 high-grade steel levers, 2 high-grade steel rollers	19	→ B	3SE5000-0AT04		

⤵ Positively driven actuator, necessary in safety circuits.

¹⁾ Can be clinch mounted (turned through 180°, rear of lever).

SIRIUS 3SE5 mechanical position switches

3SE5, metal enclosures
Ambient temperature up to $-40\text{ }^{\circ}\text{C}$

Selection and ordering data

Complete units

2 or 3 contacts · Degree of protection IP66/IP67 · Cable entry M20 × 1.5

Version	Contacts	LEDs	DT	Modular system
				Configurator
				Article No.

Complete units • Enclosure width 31 mm

Rounded plungers, type B, according to EN 50047

Snap-action contacts	1 NO + 1 NC --	→ B	3SE5212-0CC05-1AJ0
Slow-action contacts	1 NO + 2 NC --	→ B	3SE5212-0KC05-1AJ0
Snap-action contacts	1 NO + 2 NC --	→ B	3SE5212-0LC05-1AJ0



Rounded plungers

Twist levers, type A acc. to EN 50047

With metal lever 21 mm and high-grade steel roller 19 mm, twist actuator in metal version

Snap-action contacts	1 NO + 1 NC --	→ B	3SE5212-0CH22-1AJ0
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Twist levers

⚙ For online configurator see www.siemens.com/sirius/configurators

→ Positive opening according to IEC 60947-5-1, Appendix K, or positively driven actuator, necessary in safety circuits.

Note:

If the device you require is not available as a complete unit, see "Modular system".

SIRIUS 3SE5 mechanical position switches

3SE5, metal enclosures
Ambient temperature up to -40 °C

Modular system

2 or 3 contacts · Degree of protection IP66/IP67 · Cable entry M20 × 1.5

Version	Contacts	LEDs	DT	Modular system	
				Configurator	
				Article No.	

Basic switches • Enclosure width 31 mm (with rounded plunger¹⁾)



Basic switch

With plunger

Snap-action contacts	1 NO + 1 NC --	⤵ B	3SE5212-0CC05-1AJ0
Slow-action contacts	--	⤵ B	3SE5212-0KC05-1AJ0
Snap-action contacts	1 NO + 2 NC --	⤵ B	3SE5212-0LC05-1AJ0

For online configurator see www.siemens.com/sirius/configurators

⤵ Positive opening according to IEC 60947-5-1, Appendix K, or positively driven actuator, necessary in safety circuits.

¹⁾ For enclosures with widths of 31 mm, the basic switch is a complete unit with rounded plungers.

Note:

Selection aid see page 2/12.

Version	Diameter	DT	Modular system	
	mm		Article No.	

Operating mechanisms



Roller plungers

Roller plungers, type C acc. to EN 50047

Plastic roller	10	⤵ B	3SE5000-0AD03-1AJ0
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Roller lever

Roller levers, type E acc. to EN 50047

Metal lever, plastic roller	13	⤵ B	3SE5000-0AE10-1AJ0
High-grade steel lever, plastic roller	13	⤵ B	3SE5000-0AE12-1AJ0



Angular roller lever

Angular roller lever

Metal lever, plastic roller	13	⤵ B	3SE5000-0AF10-1AJ0
High-grade steel lever, plastic roller	13	⤵ B	3SE5000-0AF12-1AJ0

Twist actuators



Twist actuator

Twist actuators, plastic (without lever)

Switching right and/or left, adjustable		⤵ B	3SE5000-0AK00-1AJ0
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Levers



Twist levers

Twist levers straight, 21 mm, type A acc. to EN 50047

Metal lever, plastic roller	19	⤵ B	3SE5000-0AA21-1AJ0
High-grade steel lever, plastic roller	19	⤵ B	3SE5000-0AA31-1AJ0



Twist lever, adjustable length

Twist levers, adjustable length, with grid hole

Metal lever, plastic roller	19	⤵ B	3SE5000-0AA60-1AJ0
High-grade steel lever, plastic roller	19	⤵ B	3SE5000-0AA62-1AJ0

⤵ Positively driven actuator, necessary in safety circuits.

SIRIUS 3SE5 mechanical position switches

3SE5, metal enclosures
Ambient temperature up to –40 °C

Complete units

2 or 3 contacts · Degree of protection IP66/IP67 · Cable entry M20 × 1.5

Version	Contacts	LEDs	DT	Complete units
				Configurator
				Article No.

Complete units • Enclosure width 40 mm



Rounded plungers

Rounded plungers, type B according to EN 50041

With high-grade steel plungers, with 3 mm overtravel

Snap-action contacts 1 NO + 1 NC -- ⤴ B **3SE5112-0CC02-1AJ0**



Twist lever

Twist levers, type A acc. to EN 50041

With high-grade steel lever 27 mm and plastic roller 19 mm

Snap-action contacts 1 NO + 2 NC -- ⤴ B **3SE5112-0LH11-1AJ0**



Twist levers, adjustable length, with grid hole

Twist lever, adjustable length

With high-grade steel lever with grid hole and plastic roller 19 mm

Snap-action contacts 1 NO + 1 NC -- ⤴ B **3SE5112-0CH62-1AJ0**

Complete units • Enclosure width 56 mm, XL



Twist levers, adjustable length, with grid hole

Twist lever, adjustable length

With metal lever with grid hole and plastic roller 19 mm

Snap-action contacts 1 NO + 1 NC -- ⤴ B **3SE5162-0CH60-1AJ0**

⚙ For online configurator see www.siemens.com/sirius/configurators

⤴ Positive opening according to IEC 60947-5-1, Appendix K or positively driven actuator, necessary in safety circuits.

Note:

If the device you require is not available as a complete unit, see "Modular system".

SIRIUS 3SE5 mechanical position switches

3SE5, metal enclosures
Ambient temperature up to −40 °C

Modular system

2, 3 or 4 contacts · Degree of protection IP66/IP67 · Cable entry M20 × 1.5

Version	Contacts	LEDs	DT	Modular system	
				Configurator	
				Article No.	

Basic switches • Enclosure width 40 mm



With M20 × 1.5 connecting thread

Snap-action contacts	1 NO + 1 NC	--	⤵ B	3SE5112-0CA00-1AJ0
Slow-action contacts	1 NO + 2 NC	--	⤵ B	3SE5112-0KA00-1AJ0
Snap-action contacts	1 NO + 2 NC	--	⤵ B	3SE5112-0LA00-1AJ0

Basic switch

Basic switches • Enclosure width 56 mm



With 3 x M20 x 1.5 connecting thread

Snap-action contacts	1 NO + 1 NC	--	⤵ B	3SE5122-0CA00-1AJ0
Slow-action contacts	1 NO + 2 NC	--	⤵ B	3SE5122-0KA00-1AJ0
Snap-action contacts	1 NO + 2 NC	--	⤵ B	3SE5122-0LA00-1AJ0

Basic switch

Basic switches • Enclosure width 56 mm, XL



With 3 x M20 x 1.5 connecting thread

Slow-action contacts	2 × (1 NO + 1 NC)	--	⤵ B	3SE5162-0BA00-1AJ0
Snap-action contacts	2 × (1 NO + 1 NC)	--	⤵ B	3SE5162-0CA00-1AJ0

Basic switch

⚙ For online configurator see www.siemens.com/sirius/configurators








⤵ Positive opening according to IEC 60947-5-1, Appendix K or positively driven actuator, necessary in safety circuits.

Note:

Selection aid see page 2/12.

SIRIUS 3SE5 mechanical position switches

3SE5, metal enclosures
Ambient temperature up to -40 °C

Version		Diameter	DT	Modular system
		mm		Article No.
Operating mechanisms				
 Rounded plungers	Rounded plungers, type B according to EN 50041 High-grade steel plungers, with 3 mm overtravel	10	⤵ B	3SE5000-0AC02-1AJ0
	Roller plungers, type C acc. to EN 50041 High-grade steel roller, with 3 mm overtravel	10	⤵ B	3SE5000-0AD02-1AJ0
 Roller plungers	Roller levers Metal lever, plastic roller	13	⤵ B	3SE5000-0AE01-1AJ0
	High-grade steel lever, plastic roller	13	⤵ B	3SE5000-0AE03-1AJ0
 Roller lever	Angular roller levers Metal lever, plastic roller	13	⤵ B	3SE5000-0AF01-1AJ0
	High-grade steel lever, plastic roller	13	⤵ B	3SE5000-0AF03-1AJ0
 Angular roller lever				
Twist actuators				
 Twist actuator	Twist actuators, metal (without lever) Switching right and/or left, adjustable		⤵ B	3SE5000-0AH00-1AJ0
Levers				
 Twist lever	Twist levers, type A acc. to EN 50041 Metal lever, plastic roller	19	⤵ B	3SE5000-0AA01-1AJ0
	High-grade steel lever, plastic roller	19	⤵ B	3SE5000-0AA11-1AJ0
 Twist lever, adjustable length	Twist levers, adjustable length, with grid hole Metal lever, plastic roller	19	⤵ B	3SE5000-0AA60-1AJ0
	High-grade steel lever, plastic roller	19	⤵ B	3SE5000-0AA62-1AJ0

⤵ Positively driven actuator, necessary in safety circuits.

Overview



Compact design in width 30 mm

Particularly in harsh environments or on equipment with limited space, the small 3SE54 position switches in compact design with a depth of 16 mm and a weight of only 80 g (without cable) are ideal. Above all the versions with molded cable can be mounted in the most confined spaces.

3SE54 compact position switches are available in two different widths as complete units:

- The 3SE5413 series complies with the EU standard and features a 30 mm wide enclosure with drilled holes at a distance of 20 mm.
- The 3SE5423 series meets the requirements of the US market and features a 40 mm wide enclosure with drilled holes at a spacing of 25 mm.

Both the enclosure and the actuator head are made of metal and comply with the high IP67 degree of protection. Following actuators are available:

- Rounded plungers
- Rounded plungers with central fixing
- Rounded plungers with external seal
- Roller plungers
- Roller plungers with central fixing
- Twist levers

The contact block is designed with snap-action contacts 1 NO + 1 NC. The NC contact complies with the requirements for positive opening acc. to IEC 60947-5-1.

Use in safety circuits up to Category 4 according to EN ISO 13849-1.

Connection:

- With molded cable, 2 m or 5 m long
- With M12 connector socket

Benefits








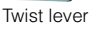
- Very compact yet with the same rating as the 3SE51 standard switches, for notable space savings in confined installation conditions
- Various actuator versions available
- Roller plungers can be rotated through 90°
- Twist lever can be rotated through 180°;
Twist lever can be adjusted in 15° increments
- Time is saved when mounting the fully assembled unit
- With metal enclosure of degree of protection IP67, ideal for use in rough industrial environments
- Insensitive to electromagnetic interference

SIRIUS 3SE5 mechanical position switches

3SE5, metal enclosures Compact design

Selection and ordering data

2 snap-action contacts 1 NO + 1 NC · Degree of protection IP67 · With connecting cable or M12 connector socket

Operating mechanism		Enclosure width	DT	Configurator	
		mm		Article No.	
Complete units • Enclosure width 30 or 40 mm					
Rounded plungers					
	• Standard mounting				
	- With 2 m cable 5 x 0.75 mm ²	30	→ A	3SE5413-0CC20-1EA2	
		40	→ A	3SE5423-0CC20-1EA2	
	- With 5 m cable 5 x 0.75 mm ²	30	→ B	3SE5413-0CC20-1EA5	
	- With M12 connector socket, 5-pole	30	→ A	3SE5413-0CC20-1EB1	
Rounded plungers		40	→ A	3SE5423-0CC20-1EB1	
	• With central fixing M12 x 1				
	- With 2 m cable 5 x 0.75 mm ²	30	→ A	3SE5413-0CC21-1EA2	
		40	→ A	3SE5423-0CC21-1EA2	
With central fixing					
	• With external seal				
	- With 2 m cable 5 x 0.75 mm ²	30	→ A	3SE5413-0CC22-1EA2	
		40	→ A	3SE5423-0CC22-1EA2	
With external seal					
Roller plungers					
	• Standard mounting				
	- With 2 m cable 5 x 0.75 mm ²	30	→ A	3SE5413-0CD20-1EA2	
		40	→ A	3SE5423-0CD20-1EA2	
	- With 5 m cable 5 x 0.75 mm ²	30	→ B	3SE5413-0CD20-1EA5	
	- With M12 connector socket, 5-pole	30	→ A	3SE5413-0CD20-1EB1	
Roller plunger		40	→ A	3SE5423-0CD20-1EB1	
	• With central fixing M12 x 1				
	- With 2 m cable 5 x 0.75 mm ²	30	→ A	3SE5413-0CD21-1EA2	
		40	→ A	3SE5423-0CD21-1EA2	
With plug					
	• Actuator head rotated 90°				
	- With 2 m cable 5 x 0.75 mm ²	30	→ A	3SE5413-0CD23-1EA2	
With plug, enclosure width 40 mm					
Twist levers					
	• Standard mounting				
	- With 2 m cable 5 x 0.75 mm ²	30	→ A	3SE5413-0CN20-1EA2	
		40	→ A	3SE5423-0CN20-1EA2	
	- With 5 m cable 5 x 0.75 mm ²	30	→ A	3SE5413-0CN20-1EA5	
	- With M12 connector socket, 5-pole	30	→ A	3SE5413-0CN20-1EB1	
Twist lever		40	→ A	3SE5423-0CN20-1EB1	
	• Twist levers with a smaller mounting depth and lower height				
	- With 2 m cable 5 x 0.75 mm ²	30	→ A	3SE5413-0CP20-1EA2	

→ Positive opening according to IEC 60947-5-1, Appendix K.

Overview



Open-type design

Their compact design makes these switches particularly suitable for use in confined conditions. The fixing dimensions and operating points are according to EN 50047.

The switches are equipped with two or three contacts in snap-action, slow-action or slow-action with make-before-break versions. The stroke is 6 mm.

The empty enclosure can be equipped with all contact block versions (see page 2/55).





Improved version

NEW: The switches now have a robust metal plunger with increased abrasion resistance (instead of the teflon plunger). This enables the switch to be approached from a 30° angle.

2

Selection and ordering data

2 or 3 contacts · Degree of protection IP20 (2 contacts), IP10 (3 contacts)

Version	Contacts	DT	Configurator	
			Article No.	
Plastic enclosures • Enclosure width 30 mm				
With metal plunger, Ø 6 mm				
	Slow-action contacts	1 NO + 1 NC	↻ A	3SE5250-0BC05
	Snap-action contacts	1 NO + 1 NC	↻ ►	3SE5250-0CC05
2 contacts	Slow-action contacts	1 NO + 2 NC	↻ B	3SE5250-0KC05
	Snap-action contacts	1 NO + 2 NC	↻ ►	3SE5250-0LC05
	Slow-action contacts with make-before-break	1 NO + 2 NC	↻ A	3SE5250-0MC05
	Slow-action contacts	2 NO + 1 NC	↻ A	3SE5250-0PC05
	Empty enclosures without contact block	--	↻ B	3SE5250-0AC05
	3 contacts			
	Empty enclosure			
Contact blocks with 2 contacts for open-type design ¹⁾				
	• Slow-action contacts	1 NO + 1 NC	↻ B	3SE5050-0BA00
	• Snap-action contacts	1 NO + 1 NC	↻ B	3SE5050-0CA00
	- Standard		↻ B	3SE5050-0GA00
	- 2 × 2 mm switching interval		↻ B	3SE5050-0NA00
	- Short stroke		↻ B	3SE5050-0NA00
2 contacts				

→ Positive opening according to IEC 60947-5-1, Appendix K.












¹⁾ Contact blocks with 3 contacts see page 2/55.

SIRIUS 3SE5 mechanical position switches

Accessories and spare parts

Selection and ordering data

The quick-release devices and plug-in connections are used for fast installation and replacement of position switches.

Version		DT	Article No.
Quick-release devices for enclosure width 40 mm			
   3SY3110 3SY3027	Adapter plates with screws	B	3SY3110
	Base plates with locking lever	B	3SY3027
Plug-in connections for M20 × 1.5 connecting threads			
 3SY3131	Connector sockets (6-pole + PE), for M20 × 1.5 For max. 250 V, 10 A With 0.75 mm ² connecting cable, plastic, degree of protection IP65, ambient temperature -40 to +90 °C	C	3SY3131
	Cable boxes (6-pole + PE)¹⁾ With terminal compartment, can be pre-assembled, plastic, degree of protection IP65	A	3SY3136
 3SY3127	Connector sockets (4-pole), M12, for M20 × 1.5, fixed For max 250 V, 4 A, $U_{imp} = 2500$ V With four 0.25 mm ² connecting cables, plastic, degree of protection IP67, ambient temperature -40 to +85 °C	B	3SY3127
	Connector sockets (5-pole), M12, for M20 × 1.5, fixed For max. 125 V, 4 A, $U_{imp} = 1500$ V With five 0.25 mm ² connecting cables, plastic, degree of protection IP67, ambient temperature -40 to +85 °C	B	3SY3128
 3SY3134	Connector sockets (8-pole), M12, for M20 × 1.5, fixed, metal version For max. 30 V, 2 A, $U_{imp} = 800$ V With eight 0.25 mm ² connecting cables, metal, degree of protection IP67, ambient temperature -25 to +85 °C	C	3SY3134
	M12 socket, angled, 4-pole, For AS-Interface, max 4 A with cabling box, max. 0.75 mm ²	C	3RK1902-4CA00-4AA0
Adapters and cable glands for M20 × 1.5 connecting threads			
 3SX9917	Adapters acc. to ,  and  For cable entry from M20 × 1.5 to NPT1/2	B	3SX9917
	• Metal • Plastic	D	3SX9918
 3SX9926	Cable glands M20 × 1.5 Plastic	A	3SX9926

¹⁾ For wiring, a crimping tool is necessary, max. conductor cross-section 1 mm².

SIRIUS 3SE5 mechanical position switches

Accessories and spare parts

Version		Color/ contacts	DT	Article No.
Manuals for 3SE5, 3SF1				
Configuration Manual SIRIUS 3SE5/3SF1 Position Switches ¹⁾				3ZX1012-0SE50-1AC1
Optional accessories for 3SE51, 3SE52				
 Protective cap	Protective caps, rubber For rounded plungers acc. to EN 50047, 3SE5...-.C05	Black	A	3SE5000-0AC30
 Adapter	Adapters with screw ²⁾ For an increase in the mounting depth on the 3SE5000-0AH00 twist actuator, in combination with twist lever with adjustable length or rod actuator		B	3SX5100-3B
Spare parts for 3SE51, 3SE52				
 Enclosure width 31 mm	Empty enclosures, plastic Enclosure width 31 mm • With increased corrosion protection Enclosure width 40 mm Enclosure width 50 mm • With increased corrosion protection	Turquoise	B B B B B	3SE5232-0AC05 3SE5232-0AC05-1CA0 3SE5132-0AA00 3SE5242-0AC05 3SE5242-0AC05-1CA0
 Enclosure width 40 mm	Empty enclosures, metal Enclosure width 31 mm • With increased corrosion protection Enclosure width 40 mm • With increased corrosion protection Enclosure width 56 mm • With increased corrosion protection Enclosure width 56 mm, XL ²⁾	Turquoise	B B B B B B	3SE5212-0AC05 3SE5212-0AC05-1CA0 3SE5112-0AA00 3SE5112-0AA00-1CA0 3SE5122-0AA00 3SE5122-0AA00-1CA0 3SE5162-0AA00
 2 contacts	Contact blocks with 2 contacts ³⁾ • Slow-action contacts • Snap-action contacts - Standard - Gold-plated contacts - 2 x 2 mm switching interval - Short stroke	1 NO + 1 NC 1 NO + 1 NC	⤵ B ⤵ C ⤵ B ⤵ B ⤵ B	3SE5000-0BA00 3SE5000-0CA00 3SE5000-0CA00-1AC1 3SE5000-0GA00 3SE5000-0NA00
 3 contacts	Contact blocks with 3 contacts • Slow-action contacts • Snap-action contacts • Slow-action contacts with make-before-break • Slow-action contacts	1 NO + 2 NC 1 NO + 2 NC 1 NO + 2 NC 2 NO + 1 NC	⤵ B ⤵ B ⤵ A ⤵ A	3SE5000-0KA00 3SE5000-0LA00 3SE5000-0MA00 3SE5000-0PA00
 2 contacts	Contact blocks for enclosure XL ⁴⁾ • Slow-action contacts • Snap-action contacts • Slow-action contacts with make-before-break	1 NO + 1 NC 1 NO + 1 NC 1 NO + 2 NC	⤵ B ⤵ B ⤵ B	3SE5060-0BA00 3SE5060-0CA00 3SE5060-0MA00

⤵ Positive opening according to IEC 60947-5-1, Appendix K.

¹⁾ Download of the Configuration Manual [see http://support.automation.siemens.com/WW/view/en/43920150](http://support.automation.siemens.com/WW/view/en/43920150)

²⁾ Possibly required for the conversion from 3SE21 to 3SE51.

³⁾ Unsuitable for open-type position switches; [see page 2/53](#).

⁴⁾ Equip XL enclosures only with contact combinations according to [pages 2/11, 2/43 and 2/44](#).

SIRIUS 3SE5 mechanical position switches

Accessories and spare parts

Version	Rated voltage LED V	DT	Article No.
---------	---------------------------	----	-------------

Spare parts for 3SE51, 3SE52



31 mm,
turquoise with LED

Covers for plastic enclosures, width 31 mm

• Turquoise with LED	24 DC	B	3SE5230-1AA00
	230 AC	B	3SE5230-3AA00
• Yellow	--	B	3SE5230-0AA00-1AG0
• Yellow with LED	24 DC	B	3SE5230-1AA00-1AG0
	230 AC	B	3SE5230-3AA00-1AG0



40 mm, yellow with LED

Covers for plastic enclosures, width 40 mm

• Turquoise with LED	24 DC	B	3SE5130-1AA00
	230 AC	B	3SE5130-3AA00
• Yellow	--	B	3SE5130-0AA00-1AG0
• Yellow with LED	24 DC	B	3SE5130-1AA00-1AG0
	230 AC	B	3SE5130-3AA00-1AG0



50 mm, turquoise
with LED

Covers for plastic enclosures, width 50 mm

• Turquoise with LED	24 DC	B	3SE5240-1AA00
	230 AC	B	3SE5240-3AA00
• Yellow	--	B	3SE5240-0AA00-1AG0
• Yellow with LED	24 DC	B	3SE5240-1AA00-1AG0
	230 AC	B	3SE5240-3AA00-1AG0



31 mm, turquoise
with LED

Covers for metal enclosures, width 31 mm

• Turquoise with LED	24 DC	B	3SE5210-1AA00
	230 AC	B	3SE5210-3AA00
• Yellow	--	B	3SE5210-0AA00-1AG0
• Yellow with LED	24 DC	B	3SE5210-1AA00-1AG0
	230 AC	B	3SE5210-3AA00-1AG0



40 mm, yellow with LED

Covers for metal enclosures, width 40 mm

• Turquoise with LED	24 DC	B	3SE5110-1AA00
	230 AC	B	3SE5110-3AA00
• Yellow	--	B	3SE5110-0AA00-1AG0
• Yellow with LED	24 DC	B	3SE5110-1AA00-1AG0
	230 AC	B	3SE5110-3AA00-1AG0



56 mm, yellow with LED

Covers for metal enclosures, width 56 mm

• Turquoise with LED	24 DC	B	3SE5120-1AA00
	230 AC	B	3SE5120-3AA00
• Yellow	--	B	3SE5120-0AA00-1AG0
• Yellow with LED	24 DC	B	3SE5120-1AA00-1AG0
	230 AC	B	3SE5120-3AA00-1AG0

Covers for XL metal enclosures, width 56 mm

• Yellow	--	B	3SE5160-0AA00-1AG0
----------	----	---	--------------------

SIRIUS 3SE5, 3SE2 mechanical safety switches

With separate actuator

General data

Overview

Safety switches with separate actuator are used where the position of doors, covers or protective grilles must be monitored for safety reasons.

3SE5 safety switches with separate actuator have the same enclosures as the 3SE5 position switches (modular system).



3SE5 safety switches with head for separate actuator

Design

Enclosure sizes

The 3SE5 safety switches are available in four different enclosure sizes:

- Plastic enclosures according to EN 50047, 31 mm wide, IP65, 1 cable entry
- Metal enclosures according to EN 50047, 31 mm wide, IP66/IP67, 1 cable entry
- Plastic and metal enclosures according to EN 50041, 40 mm wide, IP66/IP67, 1 cable entry
- Plastic enclosures, 50 mm wide, IP66/IP67, 2 cable entries
- Metal enclosures, 56 mm wide, IP66/IP67, 3 cable entries

Also available are safety switches in the 3SE2 series which have been developed in this form according to general market requirements:

- Molded-plastic enclosures outside of the standards, enclosure width 52 mm, IP67

Enclosure versions

Various basic versions can be selected for the enclosures of the 3SE5 series:

- Available with two- or three-pole contact blocks designed as slow-action contacts
- Optional LED status display
- With mounted four- or five-pole M12 connector socket (available for the wide enclosures as an accessory for self-assembly)
- With 6-pole connector socket + PE on the metal enclosures
- Similarly with a combination of connector socket and LED indicators
- AS-Interface version with integrated ASIsafe electronics for all enclosure designs (see page 2/89)

For a description of the basic switches, see page 2/4.

Operation

The actuator head is included in the scope of supply. For actuation from four directions it can be adjusted through $4 \times 90^\circ$. The switches can also be approached from above.

The actuator heads of the 3SE2243 and 3SE2257 switches with special enclosures cannot be changed. The switches can be approached from the two broad sides and from above.

The actuators are not included in the scope of supply of the safety switches and must be ordered separately from a choice of different versions to suit the application (see page 2/66).

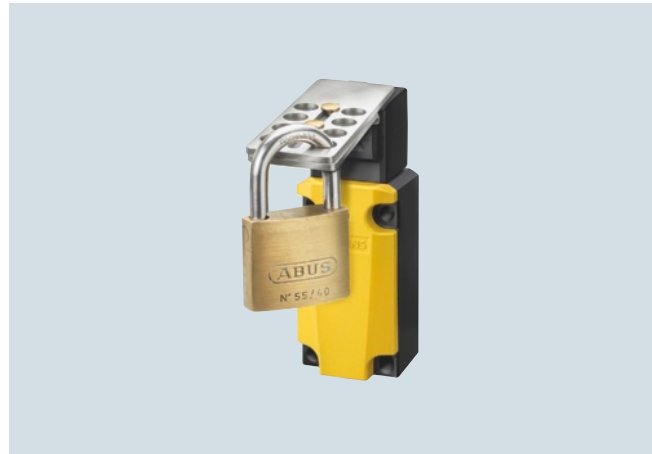
The actuator is encoded. Simple overruling by hand or auxiliary devices is impossible.

Radius actuators

The safety switches with radius actuators are particularly suitable for rotary protective devices. The movable actuation key allows even small radii to be approached. Damage to the switch and the actuator due to inaccurate approach is prevented.

Locking devices

A high-grade steel blocking insert for attaching up to eight padlocks is available for even more safety (see page 2/66).



Blocking inserts with padlock

Dust protection

A rubber cap to protect the actuator entry of the actuator head from contamination is available for operation in dusty environments (see page 2/66).

Contact reliability

The contact blocks ensure an extremely high contact stability. This applies even when the devices are switching low voltages and currents, e.g. 1 mA at 5 V DC.

Positive opening ➞

The NC contacts of the switch are forced open mechanically, positively-driven and reliably by the plunger. This is referred to as "positive opening".

SIRIUS 3SE5, 3SE2 mechanical safety switches

With separate actuator

General data

Benefits

The 3SE5 safety switches with separate actuator differ from the previous series through the following new characteristics:

- All enclosure sizes with increased corrosion protection
- All enclosure sizes are optionally available with an LED signaling indicator.
- The three-pole contact block 1 NO + 2 NC is available for all enclosure sizes.
- The plastic enclosure has simple and fast wiring equipment which makes it possible to save approx. 20 to 25 % of the time when connecting.
- The ASIsafe electronic component is integrated in the enclosure for the versions with AS-Interface connection (see page 2/89); an additional adapter is not required.

Application

Safety switches with separate actuator are used where the position of doors, covers or protective grilles must be monitored for safety reasons.

The safety switch can only be operated with the matching coded actuator. Simple overruling by hand or auxiliary devices is impossible.

Devices are available with enclosure versions to suit the particular ambient conditions. Different control tasks can be performed with the best contact blocks suited for the particular purpose. Dimensions, fixing points of the enclosure are in

accordance with EN 50041 or EN 50047 standards. The devices are suitable for use in any climate.

Standards


IEC 60947-5-1 oder DIN EN 60947-5-1.

The protective measure of "total insulation" by the molded-plastic enclosure is guaranteed by the use of molded-plastic screw glands.

Safety position switches

For controls according to IEC 60204-1 or EN 60204-1 the devices can be used as a safety position switch. To secure position switches against changes in their position, keyed techniques must be employed on installation.

Safety circuits

IEC 60947-5-1 and EN 60947-5-1 require positive opening of the NC contacts, i.e. for the purposes of personal safety, the assured opening of NC contacts is expressly stipulated for the electrical equipment of machines in all safety circuits and marked according to the IEC standard 60947-5-1 with the symbol .

Category 3 according to EN ISO 13849-1 can be attained with a safety switch with separate actuator if the corresponding fail-safe evaluation units are selected and correctly installed, e.g. the 3SK1 or 3TK28 safety relays or matching units from the ASIsafe, SIMATIC or SINUMERIK product ranges.

Category 4 can be achieved when using an additional 3SE5 safety switch.

Technical specifications

Type		3SE51...-V.., 3SE52...-V..	3SE2257-XX..	3SE2243-XX..
General data				
Standards		IEC 60947-5-1, EN 60947-5-1		
Rated insulation voltage U_i	V	400	500	
Pollution degree acc. to IEC 60664-1		Class 3	Class 3	
Rated impulse withstand voltage U_{imp}	kV	6		
Rated operational voltage U_e	V	AC 400; over 300 V AC only equal potential	AC 500; over 380 V AC only equal potential	
Conventional thermal current I_{th}	A	6	10	
Rated operational current I_e		2-pole	3-pole	1-pole
• With alternating current 50/60 Hz		$I_e/AC-15$	$I_e/AC-15$	$I_e/AC-12$
- At 24 V	A	6	6	10
- At 120 V	A	6	3	10
- At 240 V	A	3	1.5	10
- At 400 V	A	--	--	10
- At 500 V	A	--	--	10
• For direct current		$I_e/DC-13$	$I_e/DC-13$	$I_e/DC-12$
- At 24 V	A	3	3	10
- At 125 V	A	0.55	0.55	--
- At 250 V	A	0.27	0.27	--
- At 110 V	A	--	--	4
- At 220 V	A	--	--	1
- At 440 V	A	--	--	0.5
Short-circuit protection ¹⁾				
• With DIAZED fuse links, operational class gG	A	6	6	
• With fuse links, quick	A	--	10	
• With miniature circuit breaker, Char. C	A	1	--	
• With miniature circuit breaker, Char. B	A	2	--	
Mechanical endurance		1 ×10 ⁶ operating cycles		
Electrical endurance				
• With 3RH.1, 3RT contactors in size S00, S0		10 ×10 ⁶ operating cycles	> 1 ×10 ⁶ operating cycles	
• For utilization category AC-15 when switching off $I_e/AC-15$ at 240 V		0.1 ×10 ⁶ operating cycles	0.5 ×10 ⁶ operating cycles	
Switching frequency		6000 operating cycles/h		
With 3RH.1, 3RT contactors in size S00, S0				
Minimum pull-out force for positive opening	N	20	10	30

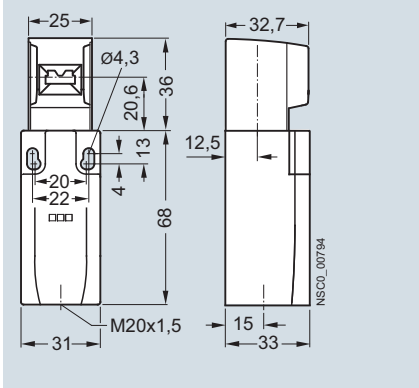
SIRIUS 3SE5, 3SE2 mechanical safety switches

With separate actuator

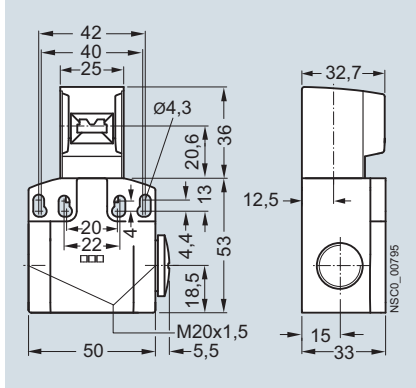
General data

3SE51, 3SE52 configuration

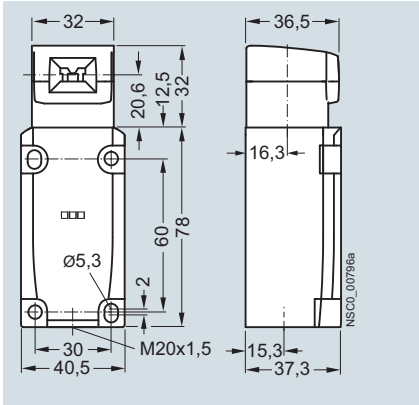
Enclosure width 31 mm
3SE523.-QV40, 3SE523.-RV40



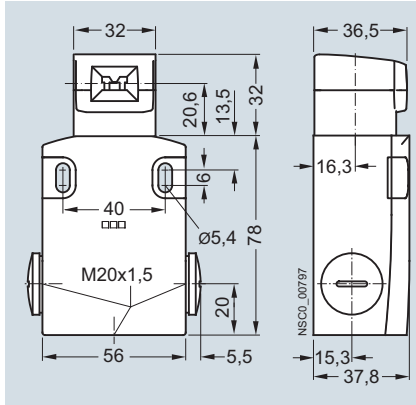
Enclosure width 50 mm
3SE524.-QV40, 3SE524.-RV40



Enclosure width 40 mm
3SE511.-QV10, 3SE511.-RV10

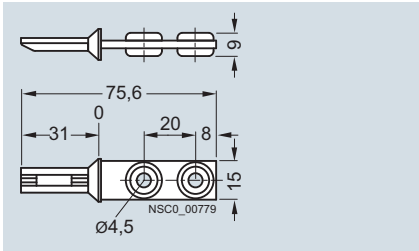


Enclosure width 56 mm
3SE512.-QV10, 3SE512.-RV10

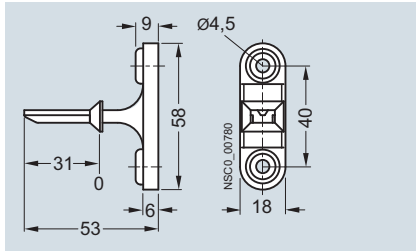


Actuators

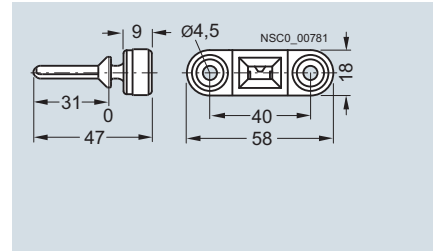
Standard actuator
3SE5000-0AV01



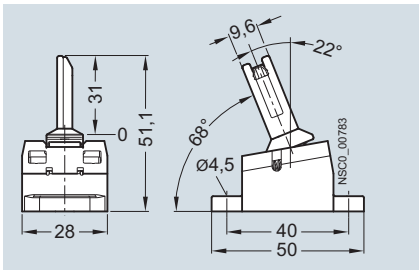
Actuator with vertical fixing
3SE5000-0AV02



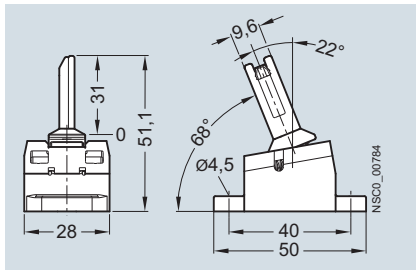
Actuator with horizontal fixing
3SE5000-0AV03



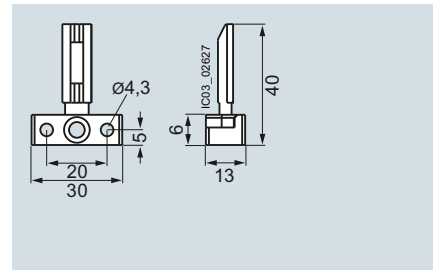
Radius actuator, approach from left
3SE5000-0AV04



Radius actuator, approach from right
3SE5000-0AV06



Actuator with horizontal fixing
3SE5000-0AV11

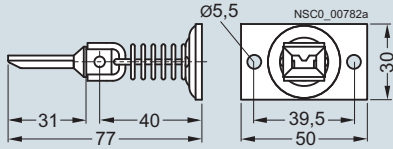


SIRIUS 3SE5, 3SE2 mechanical safety switches

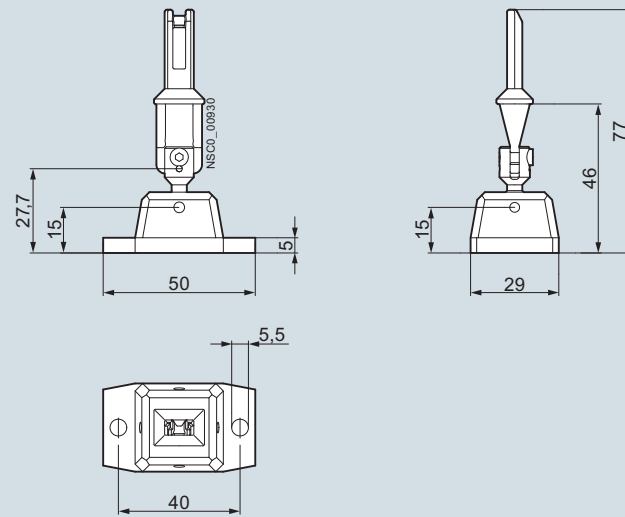
With separate actuator

General data

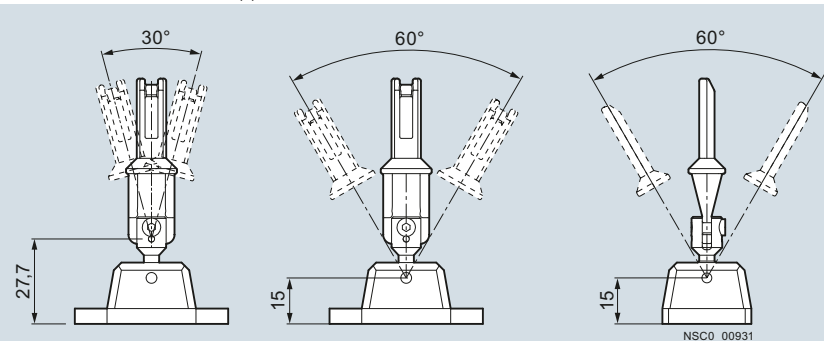
Universal radius actuator 3SE5000-0AV05



Universal radius actuator, heavy duty 3SE5000-0AV07



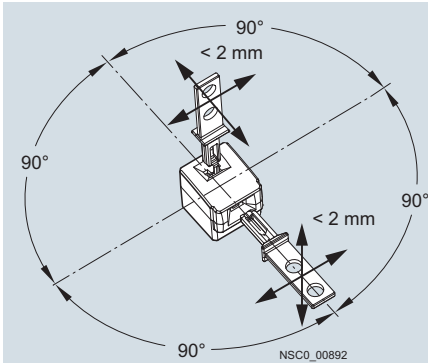
Flexible lateral and vertical approach



Actuation and travel

Standard actuators

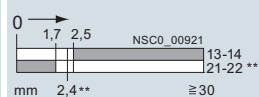
Axial and lateral actuation ($4 \times 90^\circ$)



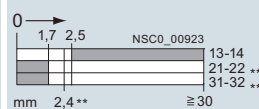
Lateral actuation ($4 \times 90^\circ$)

Slow-action contacts

1 NO + 1 NC, Ident. No. 11



1 NO + 2 NC, Ident. No. 12



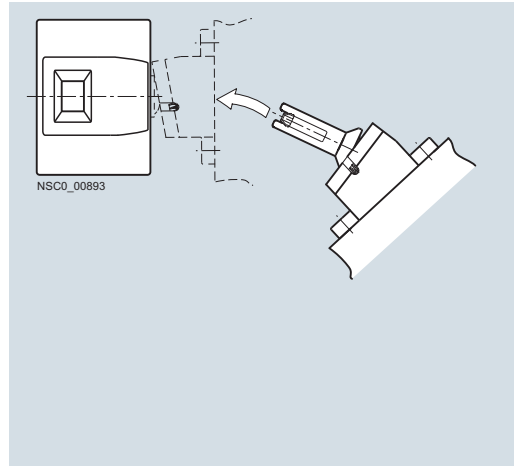
■ Contact closed
□ Contact open

Actuator in actuator head:
NC is closed

** Positive opening point

Radius actuators (all directions of approach)

Example: Direction of approach from the left



Circuit diagrams and connector assignment [see page 2/11](#).

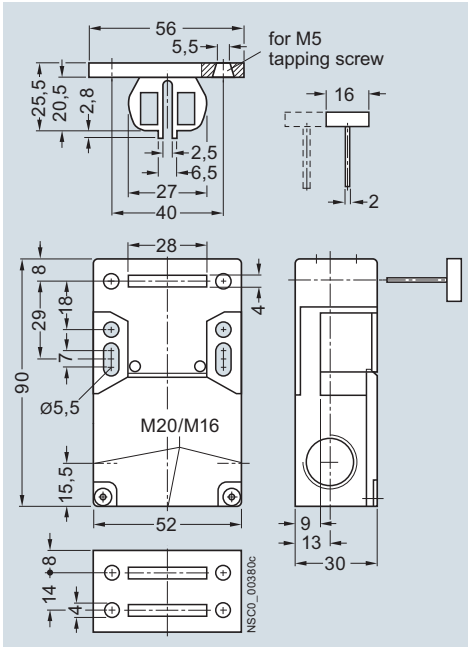
SIRIUS 3SE5, 3SE2 mechanical safety switches

With separate actuator

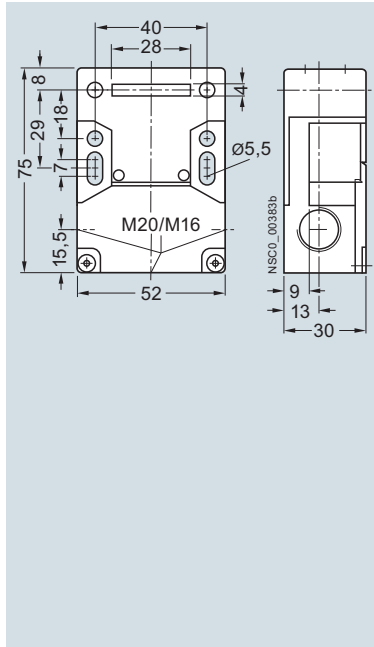
General data

3SE2243, 3SE2257 configuration

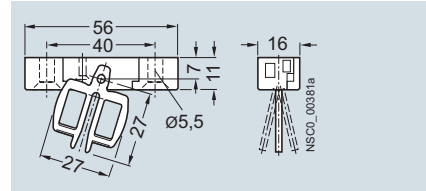
3SE2243, lateral and front-end actuation, with 3SX3218 standard actuator



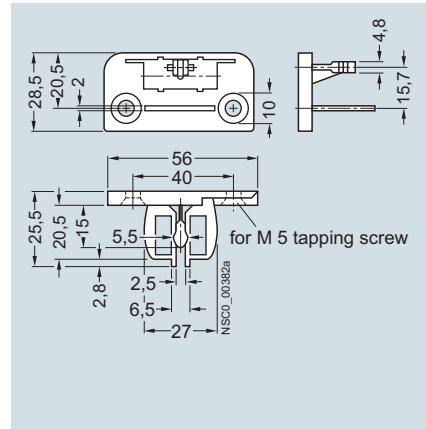
3SE2257, lateral and front-end actuation



3SX3228 universal radius actuator



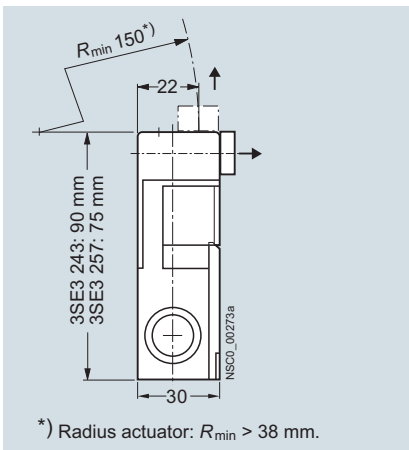
3SX3217 actuator with ball locating



Actuation and travel

Standard and radius actuators

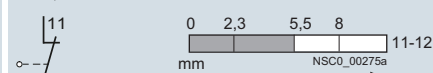
Axial and lateral actuation



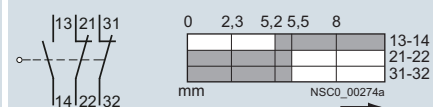
Lateral actuation

Slow-action contacts

1 NC, Ident. No. 01



1 NO + 2 NC, Ident. No. 12



■ Contact closed
□ Contact open

Actuator in actuator head:
NC is closed

*) Radius actuator: $R_{min} > 38$ mm.

SIRIUS 3SE5, 3SE2 mechanical safety switches

With separate actuator

3SE5, plastic enclosures
Enclosure width 31 mm acc. to EN 50047 / 50 mm

Selection and ordering data

Complete units

2 or 3 contacts · 5 directions of approach · Degree of protection IP65 (31 mm) or IP66/IP67 (50 mm) · Cable entry M20 × 1.5

Version ¹⁾	Contacts	LEDs	DT	Complete units	
				Configurator	
				Article No.	

Enclosure width 31 mm acc. to EN 50047



With separate actuator

5 directions of approach

Slow-action contacts	1 NO + 1 NC --	⤴ B	3SE5232-0RV40
Slow-action contacts	1 NO + 2 NC --	⤴ ▶ B	3SE5232-0QV40
With increased minimum pull-out force 30 N			
Slow-action contacts	1 NO + 2 NC --	⤴ B	3SE5232-0QV40-1AA1



With M12 plug

With M12 connector socket, 4-pole (250 V, 4 A)

Slow-action contacts	1 NO + 1 NC --	⤴ B	3SE5234-0RV40-1AC4
Slow-action contacts	2 NC --	⤴ B	3SE5234-0QV40-1AE0



With 2 LEDs

With 2 LEDs, yellow/green

Slow-action contacts	1 NO + 1 NC 24 V DC	⤴ B	3SE5232-1RV40
Slow-action contacts	1 NO + 1 NC 230 V AC	⤴ B	3SE5232-3RV40

With M12 connector socket, 5-pole (125 V, 4 A), and 2 LEDs

Slow-action contacts	1 NO + 1 NC 24 V DC	⤴ B	3SE5234-1RV40-1AF3
----------------------	---------------------	-----	--------------------

Enclosure width 50 mm



With separate actuator

5 directions of approach

Slow-action contacts	1 NO + 2 NC --	⤴ B	3SE5242-0QV40
With increased minimum pull-out force 30 N			
Slow-action contacts	1 NO + 1 NC --	⤴ B	3SE5242-0RV40-1AA1



With 2 LEDs

With 2 LEDs, yellow/green

Slow-action contacts	1 NO + 2 NC 24 V DC	⤴ B	3SE5242-1QV40
Slow-action contacts	1 NO + 2 NC 230 V AC	⤴ B	3SE5242-3QV40

For online configurator see www.siemens.com/sirius/configurators

⤴ Positive opening according to IEC 60947-5-1, Appendix K.

¹⁾ Supplied without actuator. Please order separately (see page 2/66).

SIRIUS 3SE5, 3SE2 mechanical safety switches

With separate actuator

3SE5, plastic enclosures
Enclosure width 40 mm acc. to EN 50041

Selection and ordering data

Complete units

2 or 3 contacts · 5 directions of approach · Degree of protection IP66/IP67 · Cable entry M20 × 1.5

Version ¹⁾	Contacts	LEDs	DT	Complete units	
				Configurator	
				Article No.	

Enclosure width 40 mm acc. to EN 50041



With separate actuator

5 directions of approach

Slow-action contacts

1 NO + 2 NC --

B

3SE5132-0QV20



With 2 LEDs

With 2 LEDs, yellow/green

Slow-action contacts

1 NO + 2 NC 24 V DC

C

3SE5132-1QV20

Slow-action contacts

1 NO + 2 NC 230 V AC

C

3SE5132-3QV20

For online configurator see www.siemens.com/sirius/configurators

Positive opening according to IEC 60947-5-1, Appendix K.

¹⁾ Supplied without actuator. Please order separately (see page).

SIRIUS 3SE5, 3SE2 mechanical safety switches

With separate actuator

3SE5, metal enclosures
Enclosure width 31 mm acc. to EN 50047

Selection and ordering data

Complete units

2 or 3 contacts · 5 directions of approach · Degree of protection IP66/IP67 · Cable entry M20 × 1.5

Version ¹⁾	Contacts	LEDs	DT	Complete units	
				Configurator	
				Article No.	

Enclosure width 31 mm acc. to EN 50047



With separate actuator

5 directions of approach

Slow-action contacts	1 NO + 1 NC --	A	3SE5212-0RV40
Slow-action contacts	1 NO + 2 NC --	B	3SE5212-0QV40



With 2 LEDs

With 2 LEDs, yellow/green

Slow-action contacts	1 NO + 1 NC 24 V DC	B	3SE5212-1RV40
Slow-action contacts	1 NO + 1 NC 230 V AC	B	3SE5212-3RV40

For online configurator see www.siemens.com/sirius/configurators

Positive opening according to IEC 60947-5-1, Appendix K.

¹⁾ Supplied without actuator. Please order separately (see page 2/66).

SIRIUS 3SE5, 3SE2 mechanical safety switches

With separate actuator

3SE5, metal enclosures
Enclosure width 40 mm acc. to EN 50041 / 56 mm

Selection and ordering data

Complete units

2 or 3 contacts · 5 directions of approach · Degree of protection IP66/IP67 · Cable entry M20 × 1.5

Version ¹⁾	Contacts	LEDs	DT	Complete units	
				Configurator	
				Article No.	

Enclosure width 40 mm acc. to EN 50041



With separate actuator

5 directions of approach

Slow-action contacts 1 NO + 2 NC --



3SE5112-0QV10

With increased minimum pull-out force 30 N

Slow-action contacts 1 NO + 2 NC --



3SE5112-0QV10-1AA7



With M12 plug

With M12 connector socket, 5-pole (125 V, 4 A)

Slow-action contacts 1 NO + 1 NC --



3SE5114-0RV10-1AC5

Slow-action contacts 2 NC --



3SE5114-0QV10-1AE1

With connector socket, 6-pole + PE (250 V, 10 A)

Slow-action contacts 1 NO + 2 NC --



3SE5115-0QV10-1AD1



With 2 LEDs

With 2 LEDs, yellow/green

Slow-action contacts 1 NO + 2 NC 24 V DC



3SE5112-1QV10

Slow-action contacts 1 NO + 2 NC 230 V AC



3SE5112-3QV10

With M12 connector socket, 5-pole (125 V, 4 A), and 2 LEDs

Slow-action contacts 1 NO + 1 NC 24 V DC



3SE5114-1RV10-1AF3

With connector socket, 6-pole + PE (10 A), and 2 LEDs

Slow-action contacts 1 NO + 1 NC 24 V DC



3SE5115-1RV10-1AF2

Enclosure width 56 mm



With separate actuator

5 directions of approach

Slow-action contacts 1 NO + 2 NC --



3SE5122-0QV10

With increased minimum pull-out force 30 N

Slow-action contacts 1 NO + 2 NC --



3SE5122-0QV10-1AA7



With 2 LEDs

With 2 LEDs, yellow/green

Slow-action contacts 1 NO + 2 NC 24 V DC



3SE5122-1QV10

Slow-action contacts 1 NO + 2 NC 230 V AC



3SE5122-3QV10

For online configurator see www.siemens.com/sirius/configurators

Positive opening according to IEC 60947-5-1, Appendix K.












¹⁾ Supplied without actuator. Please order separately (see page 2/66).

SIRIUS 3SE5, 3SE2 mechanical safety switches

With separate actuator

Accessories

Selection and ordering data

Version	DT	Article No.
Actuators for 3SE51, 3SE52		
Standard actuators		
 3SE5000-0AV01	▶	3SE5000-0AV01
 3SE5000-0AV02	B	3SE5000-0AV02
 3SE5000-0AV03	B	3SE5000-0AV03
 3SE5000-0AW11	B	3SE5000-0AW11
Radius actuators, length 51 mm		
 3SE5000-0AV06	A	3SE5000-0AV04
	▶	3SE5000-0AV06
Universal radius actuators		
 3SE5000-0AV05-1AA6	B	3SE5000-0AV05
	B	3SE5000-0AV05-1AA6
Universal radius actuators, heavy duty		
 3SE5000-0AV07	A	3SE5000-0AV07-1AK2
	B	3SE5000-0AV07
Optional accessories for 3SE5		
 3SE5000-0AV08-1AA2	C	3SE5000-0AV08-1AA2
 3SE5000-0AV08-1AA3	B	3SE5000-0AV08-1AA3
Connections for 3SE5, 3SE2		
 3SY3127	B	3SY3127
	B	3SY3128
 3SX9926	A	3SX9926

¹⁾ Not suitable for safety switches with interlocking.

SIRIUS 3SE5, 3SE2 mechanical safety switches




With separate actuator

3SE2, plastic enclosures
Enclosure width 52 mm

Selection and ordering data

Complete units

1 or 3 contacts · 3 directions of approach · Degree of protection IP67

Version		Operation		DT	Complete units				
					Article No.				
Molded-plastic enclosures in special width of 52 mm									
 3SE2243	Lateral and front-end actuation¹⁾		6 mm stroke						
	• With M20 × 1.5 connecting thread	- Slow-action contacts 1 NO + 2 NC	Holding force 5 N	➞ ➞	3SE2243-0XX40				
			Holding force 30 N	➞ ➞	3SE2243-0XX				
			With automatic ejection	➞ ➞	3SE2243-0XX30				
	- Slow-action contacts 1 NC		Holding force 5 N	➞ ➞	3SE2257-6XX40				
			Holding force 30 N	➞ ➞	3SE2257-6XX				
			With automatic ejection	➞ B	3SE2257-6XX30				
	• With M16 × 1.5 connecting thread	- Slow-action contacts 1 NO + 2 NC	Holding force 5 N	➞ B	3SE2243-0XX48				
			Holding force 30 N	➞ A	3SE2243-0XX18				
			With automatic ejection	➞ C	3SE2243-0XX38				
	- Slow-action contacts 1 NC		Holding force 5 N	➞ B	3SE2257-6XX48				
			Holding force 30 N	➞ C	3SE2257-6XX18				
			With automatic ejection	➞ C	3SE2257-6XX38				
	Accessories								
 3SX3218	Actuators				A	3SX3218			
	• Standard actuators (<i>r</i> _{min} = 150 mm), length 28 mm					A	3SX3228		
		• Universal radius actuator (<i>r</i> _{min} = 45 mm), length 34 mm					D	3SX3256	
			• Radius actuator, adjustable radius, length 34 mm					A	3SX3217
				• Ball locating, force adjustable up to 100 N by 2 screws, length 28 mm					D
		• Actuator, length 34 mm, with dust protection and slit cover							
 3SX3234	Accessories				D	3SX3233			
	• Slit cover (1 set = 3 units)								

➞ Positive opening according to IEC 60947-5-1, Appendix K.

¹⁾ Supplied without actuator.

SIRIUS 3SE5, 3SE2 mechanical safety switches

With solenoid interlocking

General data

Overview

The safety switches with solenoid interlocking are exceptional safety-related devices which prevent an unforeseen or intentional opening of protective doors, protective grilles or other covers as long as a dangerous situation is present (i.e. follow-on motion of the switched-off machine).



3SE5 safety switch with solenoid interlocking

The safety switches with solenoid interlocking comprise a switch part with electromechanical interlock and a mechanical actuator which has to be ordered separately.

They are rugged protective devices that enable the greatest possible safety for man and machine.

The safety switches with solenoid interlocking are offered in plastic or metal enclosures.

Dimensions (W × H × D): 54 mm × 185 mm × 43.5 mm

Operation

The actuator head is included in the scope of supply. For actuation from four directions it can be adjusted through $4 \times 90^\circ$. The switches can also be approached from above.

The actuators are not included in the scope of supply of the safety switches and must be ordered separately from a choice of different versions to suit the application (see page 2/74).

Actuation data:

- Maximum actuating speed $v_{\max} = 1.5 \text{ m/s}$
- Minimum actuating speed $v_{\min} = 0.4 \text{ mm/s}$
- Minimum force in the direction of actuation $F_{\min} = 30 \text{ N}$

The actuator is encoded. Simple overruling by hand or auxiliary devices is impossible.

Radius actuators

The safety switches with radius actuators are particularly suitable for rotary protective devices. The movable actuation key allows even small radii to be approached. Damage to the switch and the actuator due to inaccurate approach is prevented.

Locking devices

A high-grade steel locking device for attaching up to eight padlocks is available for even more safety (see page 2/74).

Dust protection

A rubber cap to protect the actuator entry of the actuator head from contamination is available for operation in dusty environments (see page 2/74).

Solenoid interlocking

- Spring-actuated lock (closed-circuit principle) with various release mechanisms
- Solenoid-locked (open-circuit principle)

The spring-actuated lock switch is equipped with an auxiliary release for emergency situations or setup mode. Available as options:

- Escape release or
- Emergency release

Contact blocks

The safety switches with solenoid interlocking have one contact block each for:





- Monitoring the actuator or the position of the protective door
- Monitoring the position of the solenoid

The mechanical design of the switch corresponds to the requirements of the fail-safe principle according to EN 1088.

Optical signaling equipment

The safety switches with solenoid interlocking are available with an optional optical signaling device.

The signaling device indicates the switch position of the lock and the protective device optically by means of 2 LEDs on the front.

Protective device	Solenoid interlocking	Display	Meaning
Closed	Released	 	Actuator to be pulled
Closed	Locked		Actuator locked
Open	Released		Actuator pulled

Internal wiring:

- The yellow LED is pre-wired to the magnetic monitoring NO contact.
- The green LED is pre-wired to the actuator monitoring NC contact.
- LED ground is pre-wired to the ground of the solenoid.

Note:

- The operational voltage must be connected to the corresponding contacts by the customer.
- This voltage for the LEDs must match the operational voltage of the solenoid (same potential).

SIRIUS 3SE5, 3SE2 mechanical safety switches

With solenoid interlocking

General data

Benefits

The new generation of 3SE53 safety switches offers

- More safety through higher locking forces:
 - 1300 N with plastic enclosure
 - 2600 N with metal enclosure
- Various release mechanisms: Lock release, escape release and emergency release
- Two contact blocks each with three contacts as standard equipment, hence fewer versions needed
- Same dimensions for all enclosure versions: Plastic, metal or with integrated ASIsafe
- An extensive range of actuators
- An optional LED status display 24 V DC, 115 V AC or 230 V AC for all switch versions
- Devices with ASIsafe electronics integrated in the enclosure (see page 2/93)

Application

The safety switches with solenoid interlocking are exceptional safety-related devices which prevent an unforeseen or intentional opening of protective doors, protective grilles or other covers as long as a dangerous situation is present (i.e. follow-on motion of the switched-off machine).

The safety position switches with solenoid interlocking have the following functions:

- Enabling the machine or process with closed and locked protective device
- Locking the machine or process with opened protective device
- Position monitoring of the protective device and solenoid interlocking

Standards

The switches comply with the standards IEC 60947-1 (Low-Voltage Switchgear and Controlgear, General) and IEC 60947-5-1 (Electromechanical Control Circuit Devices).

The mechanical design of the switch corresponds to the requirements of the fail-safe principle according to EN 1088.

Approvals

The switches are approved for use with locking devices according to EN 1088 and EN 292, Parts 1 and 2.

Category 3 according to EN ISO 13849-1 can be attained with a safety switch with solenoid interlocking if the corresponding fail-safe evaluation units are selected and correctly installed, e.g. the 3SK1 or 3TK28 safety relays or matching units from the ASIsafe, SIMATIC or SINUMERIK product ranges.

Category 4 can be achieved when using an additional 3SE5 safety switch.

These switches are approved according to UL 508, UL 50 and UL 746-C.

Solenoid interlocking

The separate actuator operates in a similar way to the coding of a key and protects against manipulation. It transmits the locking force to the protective device and helps to monitor its position.

There are two versions of locking:

Spring-actuated lock (closed-circuit principle)

- In the standard version, the safety switch locks by means of spring force and releases by means of electromagnetic force. In the case of voltage failure, it reliably prevents the protective device from opening when machine parts are still moving.
- The switch is equipped with an auxiliary release for emergency situations or setup mode.
- An auxiliary release which can be secured with a lock to prevent misuse is available as a version.

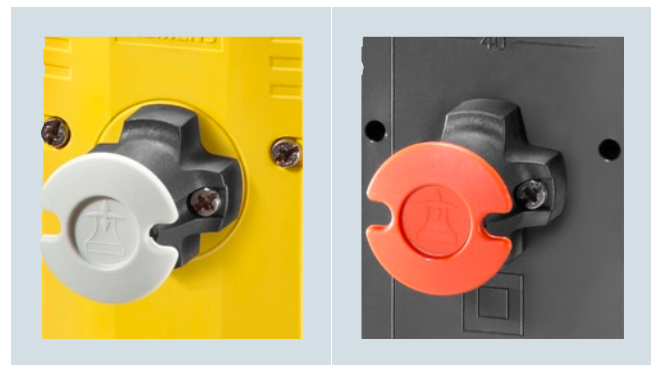


Auxiliary release

Auxiliary release with lock

The 3SE5 3 safety switches are also available with an escape release or emergency release.

- Personnel working inside the hazard zone can use the escape release feature to manually release the interlocking without tools from the escape side (hazardous area side) so that they can exit the hazard area. An intentional act (in this case pulling the gray actuator) is required to release the locking mechanism and restore the normal operating state.
- The emergency release enables someone in an emergency situation to manually release the interlock without tools from the access side (outside the hazardous area). Releasing the lock and restoring the normal operating state must require effort which is comparable to repair activity, in this case disassembly of the red actuator and resetting the mechanical lock.



Escape release from the front

Emergency release from the back

Solenoid-locked (open-circuit principle)

- The second version offers locking by means of electromagnetic force and release by means of spring force. This version has an advantage when it is necessary to quickly access the machine after a power failure occurs, or in the case of very short coasting times.

SIRIUS 3SE5, 3SE2 mechanical safety switches

With solenoid interlocking

General data

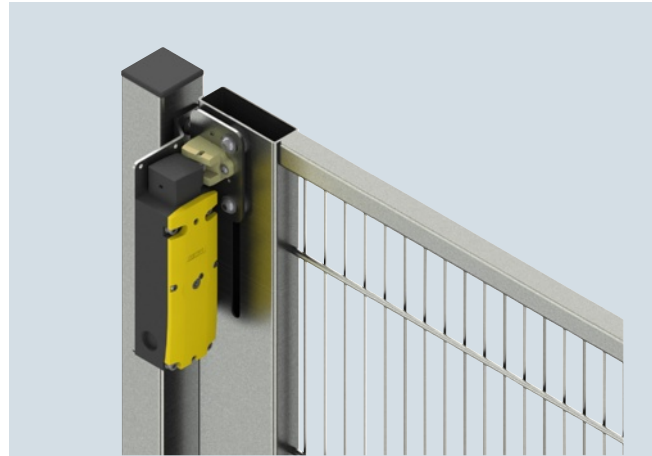
Examples of door interlocking



X-Lock door interlocking from Axelent

AXELEN T GmbH

Sigmaringer Straße 112
D-70567 Stuttgart
Tel.: +49 (711) 252 509-0
Fax.: +49 (711) 252 509-49
E-Mail: sales@axelent.de



Door interlocking from Brühl

Hans Georg Brühl GmbH

Waldstraße 63 b
D-57250 Netphen
Tel.: +49 (2737) 5934-45
Fax: +49 (2737) 5919-46
E-Mail: info@schutzeinrichtungen.com

Technical specifications

Type		3SE5322	3SE5312
General data			
Standards		IEC 60947-5-1, EN 60947-5-1	
Rated insulation voltage U_i	V	250	
Pollution degree acc. to IEC 60664-1		Class 3	
Rated impulse withstand voltage U_{imp}	kV	4	
Rated operational voltage U_e			
• DC	V	24	
• 50/60 Hz AC	V	230	
Conventional thermal current I_{th}	A	6	
Rated operational current I_e			
• With alternating current 50/60 Hz		I_e / AC-15 or B300	
- At 24 V	A	6	
- At 120 V	A	3	
- At 230 V	A	1.5	
• For direct current		I_e / DC-13 or Q300	
- At 24 V	A	3	
- At 125 V	A	0.55	
- At 250 V	A	0.27	
Magnet			
• Locking force, max.	N	1 300	2 600
• Locking force according to GS-ET 19	N	1 000	2 000
• Power consumption at U_e	W	3.5	
Short-circuit protection¹⁾			
• With DIAZED fuse links, operational class gG	A	6	
• With miniature circuit breaker, Char. C	A	0.5	
Mechanical endurance		1 × 10 ⁶ operating cycles	
Electrical endurance			
• With 3RH.1, 3RT contactors in size S00, S0		1 × 10 ⁶ operating cycles	
• For utilization category AC-15 with interrupting of I_e / AC-15 at 230 V		1 × 10 ⁵ operating cycles	
• With utilization category DC-12/DC-13		For direct current depending on the loading of the switch	
Switching frequency With 3RH.1, 3RT contactors in size S00, S0		6000 operating cycles/h	
Shock resistance acc. to IEC 60068-2-27		30 g / 11 ms	

¹⁾ Without any welds according to IEC 60947-5-1.

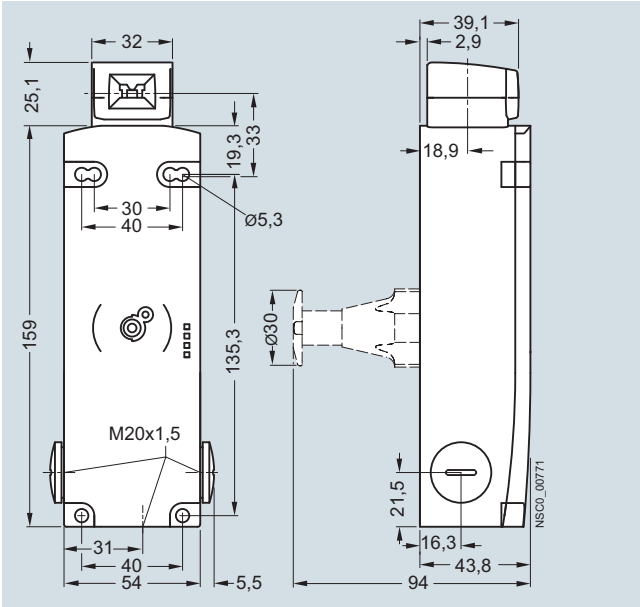
SIRIUS 3SE5, 3SE2 mechanical safety switches

With solenoid interlocking

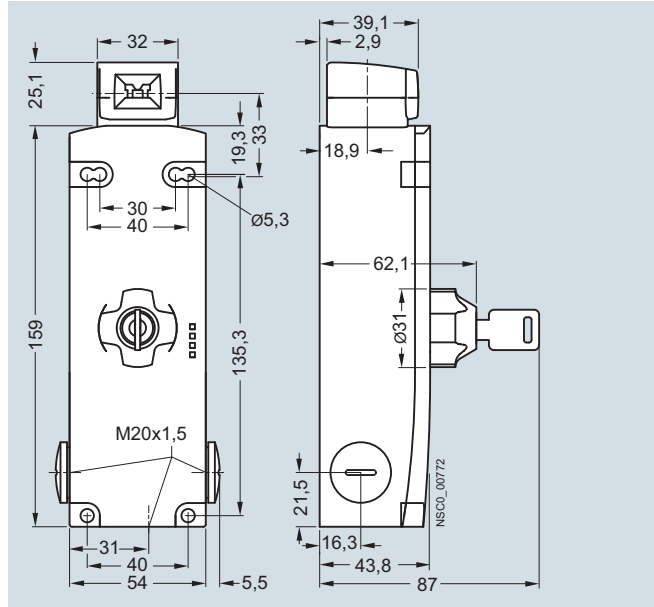
General data

3SE53 configuration

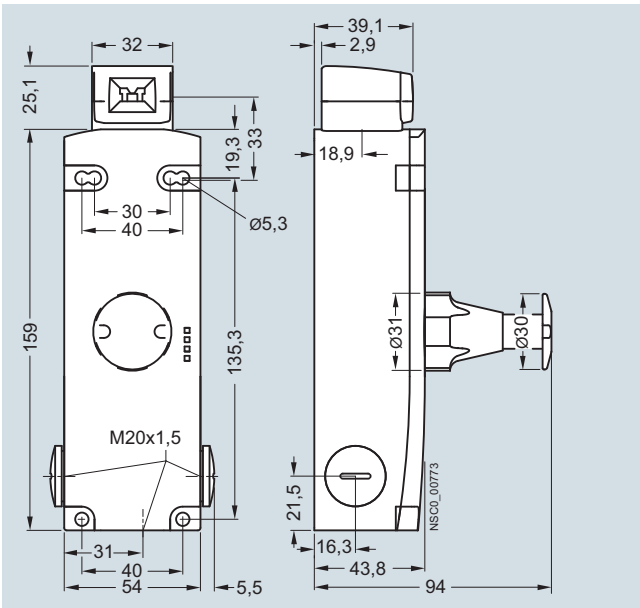
Spring-actuated lock, with auxiliary release
 3SE5322-.SD2., 3SE5322-.SG2., 3SE5322-.SJ2.,
 3SE5312-.SD1., 3SE5312-.SG1., 3SE5312-.SJ1.,



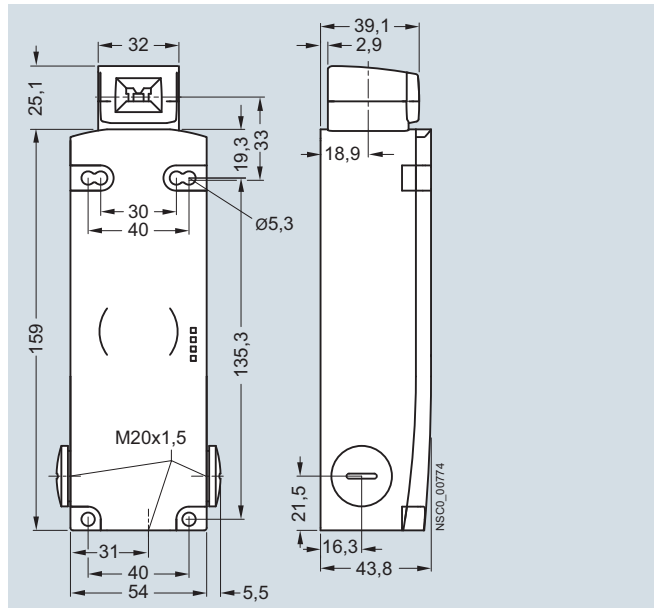
Spring-actuated lock, with auxiliary release with lock
 3SE5322-.SE2.,
 3SE5312-.SE1.



Spring-actuated lock, with escape release
 3SE5322-.SF2.,
 3SE5312-.SF1.



Solenoid lock
 3SE5322-.SB2.,
 3SE5312-.SB1.



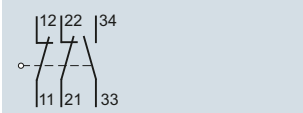
Note:

The plastic enclosures have knock-out openings behind the connecting thread; they are delivered therefore without protective caps.

Circuit diagrams

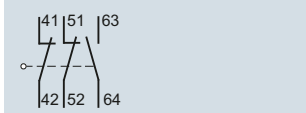
Monitoring the actuator

Slow-action contacts 1 NO + 2 NC



Monitoring the solenoid

Slow-action contacts 1 NO + 2 NC



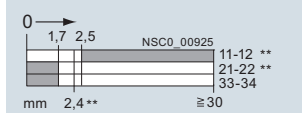
Actuators [see pages 2/59 und 2/60](#).

Actuation [see page 2/60](#).

Operating travel

Monitoring the actuator

Slow-action contacts 1 NO + 2 NC



SIRIUS 3SE5, 3SE2 mechanical safety switches

With solenoid interlocking

3SE5, plastic enclosures
with locking force greater than 1200 N

Selection and ordering data

6 slow-action contacts · 5 directions of approach · Degree of protection IP66/IP67 · Cable entry 3 × M20 × 1.5 · Locking force 1 300 N

Interlock ¹⁾	LEDs	Solenoid, rated opera- tional voltage	DT	Complete units Position monitoring: Actuators: 1 NO + 2 NC Solenoid: 1 NO + 2 NC
				Configurator
				Article No.

1 300 N locking force · Enclosure width 54 mm

Spring-actuated locks

- With auxiliary release

--	24 DC	➡ B	3SE5322-0SD21
--	115 AC	➡ B	3SE5322-0SD22
--	230 AC	➡ B	3SE5322-0SD23
Yellow/Green	24 DC	➡ A	3SE5322-1SD21
Yellow/Green	115 AC	➡ B	3SE5322-2SD22
Yellow/Green	230 AC	➡ B	3SE5322-3SD23

3SE5312-0SD2.

- With auxiliary release
with lock

--	24 DC	➡ B	3SE5322-0SE21
--	115 AC	➡ B	3SE5322-0SE22
--	230 AC	➡ B	3SE5322-0SE23
Yellow/Green	24 DC	➡ B	3SE5322-1SE21
Yellow/Green	115 AC	➡ B	3SE5322-2SE22
Yellow/Green	230 AC	➡ B	3SE5322-3SE23

3SE5312-0SE2.

- With escape release from the
front

--	24 DC	➡ B	3SE5322-0SF21
--	115 AC	➡ B	3SE5322-0SF22
--	230 AC	➡ B	3SE5322-0SF23
Yellow/Green	24 DC	➡ B	3SE5322-1SF21
Yellow/Green	115 AC	➡ B	3SE5322-2SF22
Yellow/Green	230 AC	➡ B	3SE5322-3SF23

3SE5312-0SF2.

- With escape release from the
front and emergency release
from the back

--	24 DC	➡ B	3SE5322-0SL21
- For ambient temperature up to -40 °C	24 DC	➡ B	3SE5322-0SL21-1AJ0

- With escape release from the
back and auxiliary release from
the front

--	24 DC	➡ B	3SE5322-0SG21
--	115 AC	➡ B	3SE5322-0SG22
--	230 AC	➡ B	3SE5322-0SG23
Yellow/Green	24 DC	➡ B	3SE5322-1SG21
Yellow/Green	115 AC	➡ B	3SE5322-2SG22
Yellow/Green	230 AC	➡ B	3SE5322-3SG23

3SE5312-0SG2.

- With escape release from the
back and auxiliary release with
lock from the front

--	24 DC	➡ B	3SE5322-0SH21
----	-------	-----	---------------

- With emergency release from
the back and auxiliary release
from the front

--	24 DC	➡ B	3SE5322-0SJ21
--	115 AC	➡ B	3SE5322-0SJ22
--	230 AC	➡ B	3SE5322-0SJ23
Yellow/Green	24 DC	➡ B	3SE5322-1SJ21
Yellow/Green	115 AC	➡ B	3SE5322-2SJ22
Yellow/Green	230 AC	➡ B	3SE5322-3SJ23

3SE5312-0SJ2.

Solenoid locks

--	24 DC	➡ B	3SE5322-0SB21
--	115 AC	➡ B	3SE5322-0SB22
--	230 AC	➡ B	3SE5322-0SB23
Yellow/Green	24 DC	➡ A	3SE5322-1SB21
Yellow/Green	115 AC	➡ B	3SE5322-2SB22
Yellow/Green	230 AC	➡ B	3SE5322-3SB23

3SE5312-0SB2.

For online configurator see www.siemens.com/sirius/configurators

➡ Positive opening according to IEC 60947-5-1, Appendix K.

¹⁾ Supplied without actuator. Please order separately (see page 2/74).



SIRIUS 3SE5, 3SE2 mechanical safety switches

With solenoid interlocking

3SE5, metal enclosures
With locking force greater than 2000 N

Selection and ordering data

6 slow-action contacts · 5 directions of approach · Degree of protection IP66/IP67 · Cable entry 3 × M20 × 1.5 · Locking force 2 600 N

Interlock ¹⁾	LEDs	Solenoid, rated operational voltage	DT	Complete units Position monitoring: Actuators: 1 NO + 2 NC Solenoid: 1 NO + 2 NC	
				Configurator	
				Article No.	
V					
2 600 N locking force · Enclosure width 54 mm					
Spring-actuated locks					
 3SE5312-0SD1.	• With auxiliary release	--	24 DC	➡ ▶	3SE5312-0SD11
		--	115 AC	➡ B	3SE5312-0SD12
		--	230 AC	➡ B	3SE5312-0SD13
		Yellow/Green	24 DC	➡ B	3SE5312-1SD11
		Yellow/Green	115 AC	➡ B	3SE5312-2SD12
		Yellow/Green	230 AC	➡ B	3SE5312-3SD13
 3SE5312-0SE1.	• With auxiliary release with lock	--	24 DC	➡ B	3SE5312-0SE11
		--	115 AC	➡ B	3SE5312-0SE12
		--	230 AC	➡ B	3SE5312-0SE13
		Yellow/Green	24 DC	➡ B	3SE5312-1SE11
		Yellow/Green	115 AC	➡ B	3SE5312-2SE12
		Yellow/Green	230 AC	➡ B	3SE5312-3SE13
 3SE5312-0SF1.	• With escape release from the front	--	24 DC	➡ B	3SE5312-0SF11
		--	115 AC	➡ B	3SE5312-0SF12
		--	230 AC	➡ B	3SE5312-0SF13
		Yellow/Green	24 DC	➡ B	3SE5312-1SF11
		Yellow/Green	115 AC	➡ B	3SE5312-2SF12
		Yellow/Green	230 AC	➡ B	3SE5312-3SF13
 3SE5312-0SG1.	• With escape release from the back and auxiliary release from the front	--	24 DC	➡ B	3SE5312-0SG11
		--	115 AC	➡ B	3SE5312-0SG12
		--	230 AC	➡ B	3SE5312-0SG13
		Yellow/Green	24 DC	➡ B	3SE5312-1SG11
		Yellow/Green	115 AC	➡ B	3SE5312-2SG12
		Yellow/Green	230 AC	➡ B	3SE5312-3SG13
 3SE5312-0SH1.	• With escape release from the back and auxiliary release with lock from the front	--	24 DC	➡ B	3SE5312-0SH11
		--	115 AC	➡ B	3SE5312-0SH12
		--	230 AC	➡ B	3SE5312-0SH13
		Yellow/Green	24 DC	➡ B	3SE5312-1SH11
		Yellow/Green	115 AC	➡ B	3SE5312-2SH12
		Yellow/Green	230 AC	➡ B	3SE5312-3SH13
 3SE5312-0SJ1.	• With emergency release from the back and auxiliary release from the front	--	24 DC	➡ B	3SE5312-0SJ11
		--	115 AC	➡ B	3SE5312-0SJ12
		--	230 AC	➡ B	3SE5312-0SJ13
		Yellow/Green	24 DC	➡ B	3SE5312-1SJ11
		Yellow/Green	115 AC	➡ B	3SE5312-2SJ12
		Yellow/Green	230 AC	➡ B	3SE5312-3SJ13
 3SE5312-0SB1.	Solenoid locks	--	24 DC	➡ ▶	3SE5312-0SB11
		--	115 AC	➡ B	3SE5312-0SB12
		--	230 AC	➡ B	3SE5312-0SB13
		Yellow/Green	24 DC	➡ B	3SE5312-1SB11
		Yellow/Green	115 AC	➡ B	3SE5312-2SB12
		Yellow/Green	230 AC	➡ B	3SE5312-3SB13

For online configurator see www.siemens.com/sirius/configurators

➡ Positive opening according to IEC 60947-5-1, Appendix K.










¹⁾ Supplied without actuator. Please order separately (see page 2/74).

SIRIUS 3SE5, 3SE2 mechanical safety switches

With solenoid interlocking

Accessories

Selection and ordering data

	Version	DT	Article No.
Actuators for 3SE53			
 3SE5000-0AV01	Standard actuators <ul style="list-style-type: none"> Length 75.6 mm 	►	3SE5000-0AV01
	 3SE5000-0AV02	B	3SE5000-0AV02
	 3SE5000-0AV03	B	3SE5000-0AV03
 3SE5000-0AV04	Radius actuators , length 51 mm <ul style="list-style-type: none"> Direction of approach from the left Direction of approach from the right 	A ►	3SE5000-0AV04 3SE5000-0AV06
	Universal radius actuators <ul style="list-style-type: none"> Length 77 mm Length 77 mm, tab rotated 90° 	B B	3SE5000-0AV05 3SE5000-0AV05-1AA6
 3SE5000-0AV07	Universal radius actuators, heavy duty <ul style="list-style-type: none"> Length 67 mm Length 77 mm 	A B	3SE5000-0AV07-1AK2 3SE5000-0AV07
Optional accessories for 3SE5			
 3SE5000-0AV08-1AA2	Protective caps made of black rubber for the actuator head, to protect the actuator openings from contamination	C	3SE5000-0AV08-1AA2
 3SE5000-0AV08-1AA3	Blocking inserts , high-grade steel, for actuator head, for up to eight padlocks	B	3SE5000-0AV08-1AA3
Spare parts for 3SE53			
	Spare keys	B	3SX5100-1F
Connection for 3SE5			
 3SY3 127  3SX9 926	Connector sockets (4-pole), M12, fixed for M20 × 1.5 For max. 250 V, 4 A With 0.25 mm ² connecting cable, plastic, degree of protection IP67, ambient temperature -40 to +85 °C	B	3SY3127
	Connector sockets (5-pole), M12, fixed for M20 × 1.5 For max. 125 V, 4 A With 0.25 mm ² connecting cable, plastic, degree of protection IP67, ambient temperature -40 to +85 °C	B	3SY3128
	Cable glands M20 × 1.5 Plastic	A	3SX9926

SIRIUS 3SE5, 3SE2 mechanical safety switches

Hinge switches

General data

Overview

3SE5 hinge switches have the same enclosures as the 3SE5 position switches (modular system).



Hinge switches

Design

Enclosure sizes

The 3SE5 switches are available as complete units in two enclosure sizes:

- Plastic enclosures according to EN 50047, 31 mm wide, IP65, 1 cable entry
- Metal enclosures according to EN 50047, 31 mm wide, IP66/IP67, 1 cable entry
- Plastic and metal enclosures according to EN 50041, 40 mm wide, IP66/IP67, 1 cable entry

Enclosure versions

Various basic versions can be selected for the enclosures:

- Available with two or three-pole contact blocks designed as snap-action contacts
- AS-Interface version with integrated ASIsafe electronics for all enclosure designs ([see page 2/96](#))

For a description of the basic switches, [see page 2/4](#).

Operating mechanism

The hinge switches are provided for mounting on hinges. The actuator head is included in the scope of supply. There are two versions:

- Operating mechanism with hollow shaft, inner diameter 8 mm, outer 12 mm
- Operating mechanism with solid shaft, diameter 10 mm

3SE2283 hinge switches

The 3SE2283 hinge switches with integrated hinge are available in a special design. They are particularly suitable for use in machine doors and flaps.

Benefits

The 3SE5 hinge switches differ from the previous series through the following new characteristics:

- All actuators can be turned around the axis in increments of 22.5° ([see picture, page 2/5](#)).
- The new three-pole contact block 1 NO + 2 NC is available for all enclosure sizes ([see picture, page 2/5](#)).
- The plastic enclosure with a width of 31 mm has simple and fast wiring equipment which makes it possible to save from approx. 20 to 25 % of the time when connecting ([see picture, page 2/5](#)).
- The ASIsafe electronic component is integrated in the enclosure for the versions with AS-Interface connection ([see page 2/81](#)); an additional adapter is not required.

Application

The hinge switches are used in those areas where the position of swiveling protective devices such as doors or flaps must be monitored. With these switches, the position of the doors and hinge switches is converted into electric signals. The switches allow shutdown and signaling without delay in the event of a small opening angle through the snap-action contacts with an operating angle of 10°.

Devices are available with enclosure versions to suit the particular ambient conditions. Different control tasks can be performed with the best contact blocks suited for the particular purpose. Dimensions and fixing points of the enclosures are in accordance with EN 50041 or EN 50047 standards.

The devices are suitable for use in any climate.

Standards


IEC 60947-5-1 or EN 60947-5-1.


The protective measure of "total insulation" by the molded-plastic enclosure is guaranteed by the use of molded-plastic screw glands.

Safety position switches

For controls according to IEC 60204-1 or EN 60204-1 the devices can be used as a safety position switch. To secure position switches against changes in their position, keyed techniques must be employed on installation.

Safety circuits

IEC 60947-5-1 and EN 60947-5-1 require positive opening of the NC contacts, i.e. for the purposes of personal safety, the assured opening of NC contacts is expressly stipulated for the electrical equipment of machines in all safety circuits and marked according to IEC 60947-5-1 with the symbol .

Category 4 according to EN ISO 13849-1 can be attained with the 3SE5 hinge switches with  if the corresponding fail-safe evaluation units are selected and correctly installed, e.g. the 3TK28 or 3SK1 safety relays or matching devices from the ASIsafe, SIMATIC or SINUMERIK product ranges.

SIRIUS 3SE5, 3SE2 mechanical safety switches

Hinge switches

General data

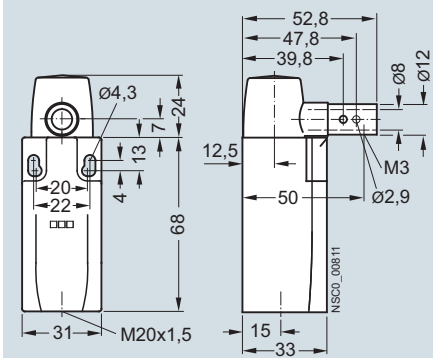
Technical specifications

The technical specifications are the same as for the standard switches (see page 2/7).

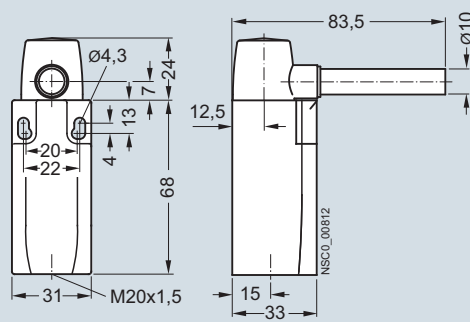
Configuration

Enclosure width 31 mm

With hollow shaft
3SE5212-0.U21, 3SE5232-0.U21

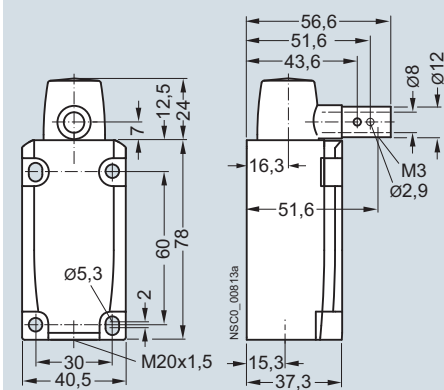


With solid shaft
3SE5212-0.U22, 3SE5232-0.U22

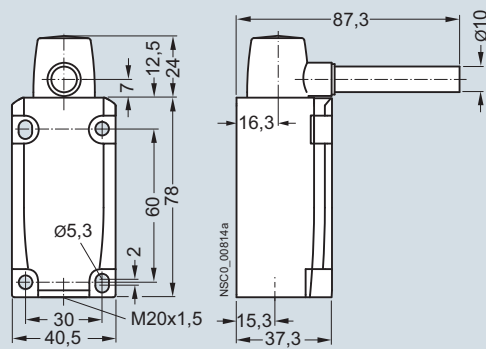


Enclosure width 40 mm

With hollow shaft
3SE5112-0.U21, 3SE5132-0.U21



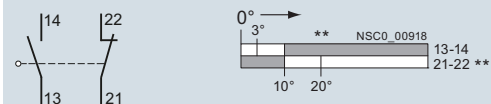
With solid shaft
3SE5112-0.U22, 3SE5132-0.U22



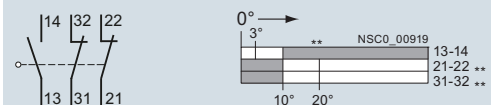
Operating travel of the shaft

Snap-action contacts

1 NO + 1 NC, Ident. No. 11



1 NO + 2 NC, Ident. No. 12



■ Contact closed
□ Contact open

** Positive opening point

SIRIUS 3SE5, 3SE2 mechanical safety switches

Hinge switches

3SE5, plastic enclosures
Enclosure width 31 mm / 40 mm

Selection and ordering data

Complete units

2 or 3 contacts · Degree of protection IP65 (31 mm) or IP67/IP68 (40 mm) · Cable entry M20 × 1.5

Version	Snap-action contacts	DT	Complete units	<input type="checkbox"/>
			Configurator	
			Article No.	

Plastic enclosures · Enclosure width 31 mm acc. to EN 50047



With hollow shaft

With hollow shaft

Operating angle 10°	1 NO + 1 NC ¹⁾	↻ B	3SE5232-0HU21
Operating angle 10°	1 NO + 2 NC	↻ B	3SE5232-0LU21



With solid shaft

With solid shaft

Operating angle 10°	1 NO + 1 NC ¹⁾	↻ B	3SE5232-0HU22
Operating angle 10°	1 NO + 2 NC	↻ B	3SE5232-0LU22

Plastic enclosures · Enclosure width 40 mm acc. to EN 50041



With hollow shaft

With hollow shaft

Operating angle 10°	1 NO + 2 NC	↻ B	3SE5132-0LU21
---------------------	-------------	-----	----------------------



With solid shaft

With solid shaft

Operating angle 10°	1 NO + 2 NC	↻ B	3SE5132-0LU22
---------------------	-------------	-----	----------------------

For online configurator see www.siemens.com/sirius/configurators

Positive opening according to IEC 60947-5-1, Appendix K.

¹⁾ Contact blocks permanently integrated, replacement not available.

Spare parts

Version	DT	Article No.
---------	----	-------------

Actuator heads



With hollow shaft

With hollow shaft

Operating angle 10°	B	3SE5000-0AU21
---------------------	---	----------------------



With solid shaft

With solid shaft

Operating angle 10°	B	3SE5000-0AU22
---------------------	---	----------------------

Note:

The respective actuators are included in the scope of supply for the complete units.

SIRIUS 3SE5, 3SE2 mechanical safety switches

Hinge switches

3SE5, metal enclosures
Enclosure width 31 mm / 40 mm

Selection and ordering data

Complete units

3 contacts · Degree of protection IP66/IP67 · Cable entry M20 × 1.5

Version	Snap-action contacts	DT	Complete units <input type="checkbox"/>
			Configurator
			Article No.

Metal enclosures · Enclosure width 31 mm according to EN 50047



With hollow shaft

With hollow shaft

Operating angle 10°

1 NO + 2 NC B

3SE5212-0LU21



With solid shaft

With solid shaft

Operating angle 10°

1 NO + 2 NC B

3SE5212-0LU22

Metal enclosures · Enclosure width 40 mm acc. to EN 50041



With hollow shaft

With hollow shaft

Operating angle 10°

1 NO + 2 NC B

3SE5112-0LU21



With solid shaft

With solid shaft

Operating angle 10°

1 NO + 2 NC B

3SE5112-0LU22

For online configurator see www.siemens.com/sirius/configurators

Positive opening according to IEC 60947-5-1, Appendix K.

Spare parts

Version	DT	Article No.
---------	----	-------------

Actuator heads



With hollow shaft

With hollow shaft

Operating angle 10°

B **3SE5000-0AU21**



With solid shaft

With solid shaft

Operating angle 10°

B **3SE5000-0AU22**

Note:

The respective actuators are included in the scope of supply for the complete units.

SIRIUS 3SE5, 3SE2 mechanical safety switches

Hinge switches

3SE2, plastic enclosures
with integrated hinge

Overview

The 3SE2283 hinge switches with built-in hinge are particularly suitable for use in doors and flaps of machines that must be closed to ensure the safety of operating personnel. Their thin profile and the compact design allow them to be directly mounted on a hinged protective cover and the stable frame.

Benefits

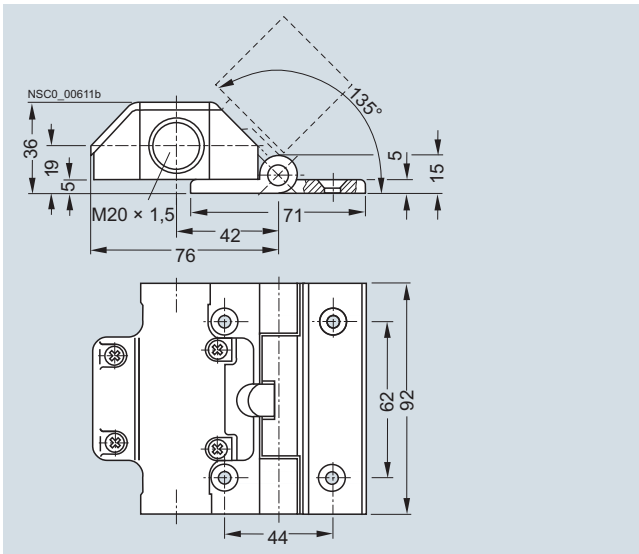
- Easy mounting through use of versions with integrated hinge
- Versions with small operating angle of 4° or 8°
- Protection against personal injury provided by positively driven NC contacts according to IEC 60947-5-1
- Simultaneous shutdown and reporting by 1 NO + 2 NC contacts

Technical specifications

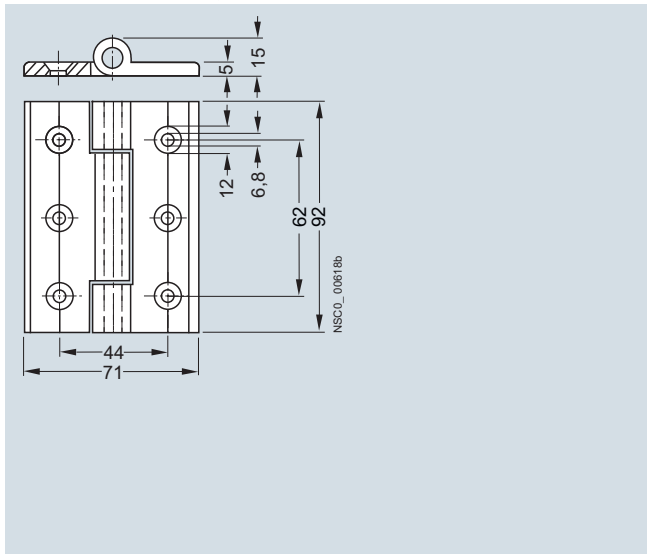
Type	3SE2283	
Rated insulation voltage U_i	V	250
Conventional thermal current I_{th}	A	2.5
Rated operational current I_e		
• At AC-15, 120 V	A	4.2
• At AC-15, 250 V	A	2
• At DC-13, 24 V	A	1
Min. make-break capacity	> 5 V / 1 mA	
Short-circuit protection		
• Operational class gG	A	2
Mechanical endurance	> 1 × 10 ⁶ operating cycles	
Switching frequency	1 200 operating cycles/h	
Positive opening	2 mm after opening point	
Enclosure material	Plastic	
Degree of protection	IP65	
Ambient temperature	°C	-25 ... +65
Shock resistance	30 g/18 ms	
Resistance to vibrations	20 g/10 ... 200 Hz	
Cable entry	2 × (M20 × 1.5)	
Screw terminals	0.5 ... 1.5 mm ² /AWG 15	

Configuration

3SE2283-GA.3 hinge switch with hinge



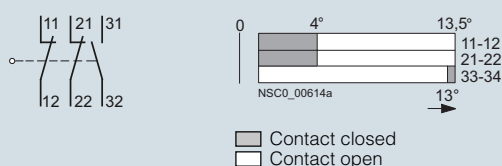
3SX3225 additional hinge



Operating travel of the hinge

Slow-action contacts

1 NO + 2 NC, Ident. No. 12



Slow-action contacts

3 NC, Ident. No. 03



SIRIUS 3SE5, 3SE2 mechanical safety switches

Hinge switches

3SE2, plastic enclosures with integrated hinge

Selection and ordering data

3 contacts · Degree of protection IP65 · Cable entry 2 × (M20 × 1.5)

Version	Slow-action contacts	DT	Complete units <input type="checkbox"/>
			Article No.

Plastic enclosures with integrated hinge



3SE2283

With integrated hinge

(Delivery includes additional hinge and fixing accessories)

• Aluminum hinge					
- Operating angle 4°	1 NO + 2 NC	→	A	3SE2283-0GA43	
- Operating angle 4°	3 NC	→	B	3SE2283-6GA43	
- Operating angle 8°	1 NO + 2 NC	→	C	3SE2283-0GA53	
- Operating angle 8°	3 NC	→	C	3SE2283-6GA53	
• High-grade steel hinge					
- Operating angle 4°	1 NO + 2 NC	→	B	3SE2283-0GA44	
- Operating angle 4°	3 NC	→	C	3SE2283-6GA44	

→ Positive opening according to IEC 60947-5-1, Appendix K.

Accessories/spare parts

Version	DT	Article No.
---------	----	-------------

Accessories



3SX3225

Additional hinge

(delivered with fixing accessories)

• Made of aluminum	→	D	3SX3225
• Made of high-grade steel	→	D	3SX3231

SIRIUS 3SF1 mechanical safety switches for AS-Interface

General data

Overview

The 3SF1 position switches with safety-related communication can be directly connected using the AS-Interface bus system. The safety functions no longer have to be conventionally wired up.

With the 3SF1 position switches the ASIsafe electronics component is integrated in the switch enclosure.



Examples of selection options in the modular system

Modular system

The position switches of the 3SF11.4 and 3SF12.4 series are designed as a modular system comprising different versions of the basic switch and an actuator which must be ordered separately. Thanks to the modular design of the switch the end users can select the right solution for their application from numerous versions and install it themselves in a very short time.

Design

The 3SF1 switches are available in four different enclosure sizes:

- Plastic and metal enclosures according to EN 50047, 31 mm wide, with M12 plug
- Metal enclosures according to EN 50041, 40 mm wide, with M12 plug
- Plastic enclosures, 50 mm wide, with M12 plug and M12 socket
- Metal enclosures, 56 mm wide, with M12 plug and M12 socket

Display

The switches have a status display with three LEDs:

- LED 1 (yellow): F-IN1
- LED 2 (yellow): F-IN2
- LED 3 (green/red): AS-i/FAULT

Connection

Connection to the AS-Interface is by means of a 4-pole M12 connector socket (plastic version) connected to the yellow AS-Interface bus cable.

The wide enclosures (50 or 56 mm) also have an M12 socket for connecting a second position switch. Category 4 according to EN ISO 13849-1 is thus achieved.

Benefits

The new generation of 3SF1 position switches offers:

- ASIsafe electronics component integrated in the enclosure, with low power consumption < 60 mA
- An extensive range of actuators
- Status display with three LEDs

Application

With the standard position switches, mechanical positions of moving machine parts are converted into electrical signals. Through their modular and uniform design and large number of variants, the devices can comply with practically all requirements in industry.

Devices are available with enclosure versions to suit the particular ambient conditions. Different control tasks can be performed with the best contact blocks suited for the particular purpose. And many different actuator variants are available to match the mechanical configuration of the moving machined parts. Dimensions, fixing points and characteristics are largely in accordance with the EN 50041 or EN 50047 standards.

The devices are suitable for use in any climate.

Standards

The switches comply with the standards IEC 60947-1 (Low-Voltage Switchgear and Controlgear, General) and IEC 60947-5-1 (Electromechanical Control Circuit Devices).

The mechanical design of the switch corresponds to the requirements of the fail-safe principle according to EN 1088.

Approvals

AS-Interface according to EN 50295 and IEC 62026-2.

With a 3SF1 position switch it is possible to achieve Category 2 according to EN ISO 13849-1 or SIL 1 according to IEC 61508.

Categories 3 or 4 according to EN ISO 13849-1 or SIL 2 or 3 according to IEC 61508 can be achieved by using a second 3SE5 position switch.

The 3SF1 position switches are approved according to UL 508, UL 50 and UL 746-C.

SIRIUS 3SF1 mechanical safety switches for AS-Interface

General data

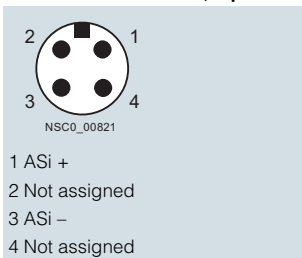
Technical specifications

Type	3SF11..., 3SF12..	
General data		
Standards	IEC 60947-5-1, EN 60947-5-1, EN 1088	
According to AS-Interface specification		
• I/O configuration / ID configuration		0 / B
• ID1 code / ID2 code (Hex)		F / F
• Power consumption, overall	mA	≤ 60
Inputs		
• Low signal range		Contact open
• High signal range		Contact closed, I_{in} dynamic ($I_{peak} \geq 5$ mA)
Status display	Green/red dual LED	
Rated impulse withstand voltage U_{imp}	kV	0.6
EMC resistance		
• IEC 61000-1-2	kV	4
• IEC 61000-4-3	V/m	10
• IEC 61000-4-4 (A / B)	kV	1 / 2
Mechanical endurance		
• Basic switches		15×10^6 operating cycles
• With separate actuator, 3SF1...-..V..		1×10^6 operating cycles
PFH value		
Probability of failure upon request of the safety function, with 1 actuation per hour and $B10 = 5 \times 10^6$		
• Basic switches	1/h	4×10^{-9}
• With separate actuator, 3SF1...-..V..	1/h	2×10^{-9}
• Hinge switches, 3SF1...-..U..	1/h	2×10^{-9}
Shock resistance acc. to IEC 60068-2-27		
30 g / 11 ms		

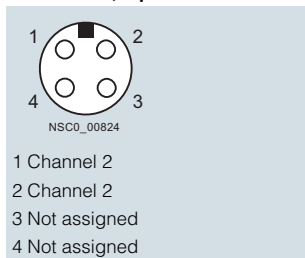
Type		3SF1234	3SF1134	3SF1244	3SF1214	3SF1114	3SF1124
Enclosure							
Enclosure							
• Material		Ultramid A3X2G7			Zinc diecasting GD Zn Al4 Cu1		
• Width	mm	31	40	50	31	40	56
• Dimensions according to EN		EN 50047	EN 50041	--	EN 50047	EN 50041	--
Degree of protection acc. to IEC 60529		IP65	IP66/IP67				
Ambient temperature							
• During operation	°C	-25 ... +60					
• Storage, transport	°C	-40 ... +80					
Mounting position		Any					

Connector assignment

M12 connector socket, 4-pole



M12 socket, 4-pole



LEDs

Status display (operating state)

LED	No voltage on AS-Interface chip	Communication OK	Communication failed	Slave has address "0"
ASi/Fault (GN/RD)				

Safe inputs

LED	Not actuated	Actuated		
F-IN1 (YE)				
F-IN2 (YE)				

SIRIUS 3SF1 mechanical safety switches for AS-Interface

Plastic enclosures
Enclosure width 31 mm acc. to EN 50047 / 50 mm

Selection and ordering data

Modular system

For the ASIsafe version of the position switch, the basic switch and actuator must be ordered separately.

1 or 2 contacts · 3 LEDs · Degree of protection IP65 (31 mm) or IP66/IP67 (50 mm) · M12 connector socket

Version	Contacts	LEDs	DT	Modular system	
				Configurator	
				Article No.	

Basic switches (with rounded plunger¹⁾) · Enclosure width 31 mm acc. to EN 50047



With teflon plunger

With M12 connector socket, 4-pole,
channel 1 on NC contact,
channel 2 on NC contact

Slow-action contacts	2 NC	24 V DC	⤵ B	3SF1234-1KC05-1BA1
Snap-action contacts	2 NC	24 V DC	⤵ B	3SF1234-1LC05-1BA1

ASIsafe basic switch

Basic switches (with rounded plunger¹⁾) · Enclosure width 50 mm



With teflon plunger

With M12 connector socket, 4-pole,
channel 1 on NC contact,
channel 2 on M12 socket, right

Slow-action contacts	1 NC	24 V DC	⤵ B	3SF1244-1KC05-1BA2
Snap-action contacts	1 NC	24 V DC	⤵ B	3SF1244-1LC05-1BA2

ASIsafe basic switch

⚙ For online configurator see www.siemens.com/sirius/configurators

⤵ Positive opening according to IEC 60947-5-1, Appendix K, or positively driven actuator for use in safety circuits.








¹⁾ For enclosures with widths of 31 mm and 50 mm, the basic switch is a complete unit with rounded plungers.

Note:

Selection aid see page 2/12.

SIRIUS 3SF1 mechanical safety switches for AS-Interface

Plastic enclosures
Enclosure width 31 mm acc. to EN 50047 / 50 mm

Version		Roller diameter	DT	Modular system	
		mm		Article No.	
Operating mechanisms					
 Roller plungers	Roller plungers, type C acc. to EN 50047				
	Plastic roller	10	⤵ A	3SE5000-0AD03	
	High-grade steel roller	10	⤵ B	3SE5000-0AD04	
 With central fixing	Roller plungers with central fixing				
	Plastic roller	10	⤵ B	3SE5000-0AD10	
	High-grade steel roller	10	⤵ B	3SE5000-0AD11	
 Roller lever	Roller levers, type E acc. to EN 50047				
	Metal lever, plastic roller	13	⤵ A	3SE5000-0AE10	
	Metal lever, high-grade steel roller	13	⤵ B	3SE5000-0AE11	
	High-grade steel lever, plastic roller	13	⤵ B	3SE5000-0AE12	
	High-grade steel lever, high-grade steel roller	13	⤵ B	3SE5000-0AE13	
 Angular roller lever	Angular roller levers				
	Metal lever, plastic roller	13	⤵ A	3SE5000-0AF10	
	Metal lever, high-grade steel roller	13	⤵ B	3SE5000-0AF11	
	High-grade steel lever, plastic roller	13	⤵ A	3SE5000-0AF12	
	High-grade steel lever, high-grade steel roller	13	⤵ B	3SE5000-0AF13	
Twist actuators with lever					
 Twist actuator	Twist actuators, plastic (without lever)				
	Switching right or left, adjustable		⤵ A	3SE5000-0AK00	
Levers					
 Twist lever	Twist levers, type A acc. to EN 50047				
	Metal lever, plastic roller	19	⤵ A	3SE5000-0AA21	
	Metal lever, high-grade steel roller	19	⤵ B	3SE5000-0AA22	
	Metal lever, high-grade steel roller with ball bearing	19	⤵ B	3SE5000-0AA23	
	Metal lever, plastic roller	30	⤵ B	3SE5000-0AA25	
	High-grade steel lever, plastic roller	19	⤵ B	3SE5000-0AA31	
	High-grade steel lever, high-grade steel roller	19	⤵ B	3SE5000-0AA32	
 Twist lever, adjustable length	Twist levers 30 mm, straight¹⁾				
	Metal lever, plastic roller	19	⤵ B	3SE5000-0AA24	
	Metal lever, plastic roller	30	⤵ B	3SE5000-0AA26	
	Twist levers, adjustable length, with grid hole				
	Metal lever, plastic roller	19	⤵ B	3SE5000-0AA60	
	Metal lever, high-grade steel roller	19	⤵ B	3SE5000-0AA61	
	Metal lever, plastic roller	50	⤵ B	3SE5000-0AA67	
	Metal lever, rubber roller	50	⤵ B	3SE5000-0AA68	
	High-grade steel lever, plastic roller	19	⤵ B	3SE5000-0AA62	
	High-grade steel lever, high-grade steel roller	19	⤵ B	3SE5000-0AA63	

⤵ Positively driven actuator, for use in safety circuits.

¹⁾ Can be clinch mounted (turned through 180°, rear of lever).

SIRIUS 3SF1 mechanical safety switches for AS-Interface

Metal enclosures
Enclosure width 31 mm acc. to EN 50047

Selection and ordering data

Modular system

For the ASIsafe version of the position switch, the basic switch and actuator must be ordered separately.

2 contacts · 3 LEDs · Degree of protection IP66/IP67 · M12 connector socket

Version	Contacts	LEDs	DT	Modular system	PU (UNIT, SET, M)	PS*	PG
				Configurator			
				Article No.	Price per PU		

Basic switches (with rounded plunger¹⁾) · Enclosure width 31 mm acc. to EN 50047



With plunger

With M12 connector socket, 4-pole, channel 1 on NC contact, channel 2 on NC contact

Slow-action contacts	2 NC	24 V DC	⤵ B	3SF1214-1KC05-1BA1	99.70	1	1 unit	42A
Snap-action contacts	2 NC	24 V DC	⤵ B	3SF1214-1LC05-1BA1	98.50	1	1 unit	42A

ASIsafe basic switch

⚙ For online configurator see www.siemens.com/sirius/configurators

⤵ Positive opening according to IEC 60947-5-1, Appendix K, or positively driven actuator for use in safety circuits.









¹⁾ For enclosures with widths of 31 mm, the basic switch is a complete unit with rounded plungers.

Note:

Selection aid see page 2/12.

SIRIUS 3SF1 mechanical safety switches for AS-Interface

Metal enclosures Enclosure width 31 mm acc. to EN 50047

Version		Roller diameter	DT	Modular system	
		mm		Article No.	
Operating mechanisms					
 Plain plunger	Plain plungers				
	High-grade steel plungers	10	⤵ A	3SE5000-0AB01	
 Roller plungers	Roller plungers, type C acc. to EN 50047				
	Plastic roller	10	⤵ A	3SE5000-0AD03	
	High-grade steel roller	10	⤵ B	3SE5000-0AD04	
 With central fixing	Roller plungers with central fixing				
	Plastic roller	10	⤵ B	3SE5000-0AD10	
	High-grade steel roller	10	⤵ B	3SE5000-0AD11	
 Roller lever	Roller levers, type E acc. to EN 50047				
	Metal lever, plastic roller	13	⤵ A	3SE5000-0AE10	
	Metal lever, high-grade steel roller	13	⤵ B	3SE5000-0AE11	
	High-grade steel lever, plastic roller	13	⤵ B	3SE5000-0AE12	
	High-grade steel lever, high-grade steel roller	13	⤵ B	3SE5000-0AE13	
 Angular roller lever	Angular roller levers				
	Metal lever, plastic roller	13	⤵ A	3SE5000-0AF10	
	Metal lever, high-grade steel roller	13	⤵ B	3SE5000-0AF11	
	High-grade steel lever, plastic roller	13	⤵ A	3SE5000-0AF12	
	High-grade steel lever, high-grade steel roller	13	⤵ B	3SE5000-0AF13	
Twist actuators with lever					
 Twist actuator	Twist actuators, plastic (without lever)				
	Switching right or left, adjustable		⤵ A	3SE5000-0AK00	
Levers					
 Twist lever	Twist levers, type A acc. to EN 50047				
	Metal lever, plastic roller	19	⤵ A	3SE5000-0AA21	
	Metal lever, high-grade steel roller	19	⤵ B	3SE5000-0AA22	
	Metal lever, high-grade steel roller with ball bearing	19	⤵ B	3SE5000-0AA23	
	Metal lever, plastic roller	30	⤵ B	3SE5000-0AA25	
	High-grade steel lever, plastic roller	19	⤵ B	3SE5000-0AA31	
 Twist lever, adjustable length	High-grade steel lever, high-grade steel roller	19	⤵ B	3SE5000-0AA32	
	Twist levers 30 mm, straight¹⁾				
	Metal lever, plastic roller	19	⤵ B	3SE5000-0AA24	
	Metal lever, plastic roller	30	⤵ B	3SE5000-0AA26	
	Twist levers, adjustable length, with grid hole				
	Metal lever, plastic roller	19	⤵ B	3SE5000-0AA60	
	Metal lever, high-grade steel roller	19	⤵ B	3SE5000-0AA61	
	Metal lever, plastic roller	50	⤵ B	3SE5000-0AA67	
	Metal lever, rubber roller	50	⤵ B	3SE5000-0AA68	
	High-grade steel lever, plastic roller	19	⤵ B	3SE5000-0AA62	
	High-grade steel lever, high-grade steel roller	19	⤵ B	3SE5000-0AA63	

⤵ Positively driven actuator, for use in safety circuits.

¹⁾ Can be clinch mounted (turned through 180°, rear of lever).

SIRIUS 3SF1 mechanical safety switches for AS-Interface

Metal enclosures
Enclosure width 40 mm acc. to EN 50041 / 56 mm

Selection and ordering data

Modular system

For the ASIsafe version of the position switch, the basic switch and actuator must be ordered separately.

1 or 2 contacts · 3 LEDs · Degree of protection IP66/IP67 · M12 connector socket

Version	Contacts	LEDs	DT	Modular system	
				Configurator	
				Article No.	

Basic switches · Enclosure width 40 mm acc. to EN 50041



With M12 connector socket, 4-pole,
channel 1 on NC contact,
channel 2 on NC contact

Slow-action contacts	2 NC	24 V DC	⤵ B	
Snap-action contacts	2 NC	24 V DC	⤵ B	

3SF1114-1KA00-1BA1
3SF1114-1LA00-1BA1

ASIsafe basic switch

Basic switches · Enclosure width 56 mm



With M12 connector socket, 4-pole,
channel 1 on NC contact,
channel 2 on M12 socket, right

Slow-action contacts	1 NC	24 V DC	⤵ B	
Snap-action contacts	1 NC	24 V DC	⤵ B	

3SF1124-1KA00-1BA2
3SF1124-1LA00-1BA2

ASIsafe basic switch

For online configurator see www.siemens.com/sirius/configurators

⤵ Positive opening according to IEC 60947-5-1, Appendix K, or positively driven actuator for use in safety circuits.

Note:

Selection aid see page 2/12.

Version	Roller diameter	DT	Modular system	
	mm		Article No.	

Operating mechanisms



Plain plunger

Plain plungers

High-grade steel plungers	10	⤵ A	
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3SE5000-0AB01



Rounded plunger

Rounded plungers, type B, acc. to EN 50041

High-grade steel plungers, with 3 mm overtravel	10	⤵ B	
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3SE5000-0AC02



Roller plunger

Roller plungers, type C acc. to EN 50041

High-grade steel roller, with 3 mm overtravel	13	⤵ B	
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3SE5000-0AD02

⤵ Positively driven actuator, for use in safety circuits.

SIRIUS 3SF1 mechanical safety switches for AS-Interface

Metal enclosures

Enclosure width 40 mm acc. to EN 50041 / 56 mm

Version		Roller diameter	DT	Modular system	
				Article No.	
			mm		
Operating mechanisms					
	Roller levers				
	Metal lever, plastic roller	22	→ A	3SE5000-0AE01	
	Metal lever, high-grade steel roller	22	→ B	3SE5000-0AE02	
	High-grade steel lever, plastic roller	22	→ B	3SE5000-0AE03	
	High-grade steel lever, high-grade steel roller	22	→ B	3SE5000-0AE04	
	Angular roller levers				
	Metal lever, plastic roller	22	→ A	3SE5000-0AF01	
	Metal lever, high-grade steel roller	22	→ B	3SE5000-0AF02	
	High-grade steel lever, plastic roller	22	→ B	3SE5000-0AF03	
	High-grade steel lever, high-grade steel roller	22	→ B	3SE5000-0AF04	
Twist actuators with lever					
	Twist actuators, metal (without lever)				
	• For twist levers, switching right or left, adjustable				
	- For enclosure width 40 and 56 mm		→ A	3SE5000-0AH00	
	• For fork levers, latching		→ B	3SE5000-0AT10	
Levers					
	Twist levers 27 mm, offset, type A, according to EN 50041				
	Metal lever, plastic roller	19	→ A	3SE5000-0AA01	
	Metal lever, high-grade steel roller	19	→ A	3SE5000-0AA02	
	Metal lever, high-grade steel roller with ball bearing	19	→ B	3SE5000-0AA03	
	Metal lever, 2 plastic rollers	19	→ B	3SE5000-0AA04	
	Metal lever, plastic roller	30	→ B	3SE5000-0AA05	
	Metal lever, plastic roller	50	→ B	3SE5000-0AA07	
	Metal lever, rubber roller	50	→ B	3SE5000-0AA08	
	High-grade steel lever, plastic roller	19	→ B	3SE5000-0AA11	
	High-grade steel lever, high-grade steel roller	19	→ B	3SE5000-0AA12	
	Twist levers 35 mm, offset				
	Metal lever, plastic roller	19	→ B	3SE5000-0AA15	
	High-grade steel lever, plastic roller	19	→ B	3SE5000-0AA16	
	Twist levers 30 mm, straight ¹⁾				
	Metal lever, plastic roller	19	→ B	3SE5000-0AA24	
	Metal lever, plastic roller	30	→ B	3SE5000-0AA26	
	Twist levers, adjustable length, with grid hole				
	Metal lever, plastic roller	19	→ B	3SE5000-0AA60	
	Metal lever, high-grade steel roller	19	→ B	3SE5000-0AA61	
	Metal lever, plastic roller	50	→ B	3SE5000-0AA67	
	Metal lever, rubber roller	50	→ B	3SE5000-0AA68	
	High-grade steel lever, plastic roller	19	→ B	3SE5000-0AA62	
	High-grade steel lever, high-grade steel roller	19	→ B	3SE5000-0AA63	
	Fork levers (for switches with snap-action contacts only)				
	Metal lever, 2 plastic rollers	19	→ B	3SE5000-0AT01	
	Metal lever, 2 high-grade steel rollers	19	→ B	3SE5000-0AT02	
	High-grade steel lever, 2 plastic rollers	19	→ B	3SE5000-0AT03	
	High-grade steel lever, 2 high-grade steel rollers	19	→ B	3SE5000-0AT04	

⊕ Positively driven actuator, for use in safety circuits.

¹⁾ Can be clinch mounted (turned through 180°, rear of lever).

SIRIUS 3SF1 mechanical safety switches for AS-Interface

With separate actuator

General data

Overview

The 3SF1 safety switches with safety-related communication can be directly connected using the AS-Interface bus system. The safety functions no longer have to be conventionally wired up.

With the 3SF1 safety switches the ASIsafe electronics component is integrated in the switch enclosure.



3SF1 safety switches with head for separate actuator and with integrated ASIsafe electronics

3SF1 safety switches with separate actuator have the same enclosures as the 3SF1 position switches.

Operation

The actuator head is included in the scope of supply. For actuation from four directions it can be adjusted through $4 \times 90^\circ$. The switches can also be approached from above.

The actuators are not included in the scope of supply of the safety switch and must be ordered separately from a choice of different versions to suit the application ([see page 2/92](#)).

The actuator is encoded. Simple overruling by hand or auxiliary devices is impossible.

A high-grade steel blocking insert for attaching up to eight padlocks is available for even more safety.

A rubber cap to protect the actuator head from contamination is available for operation in dusty environments.

Display

The switches have a status display with three LEDs:

- LED 1 (yellow): F-IN1
- LED 2 (yellow): F-IN2
- LED 3 (green/red): AS-i/FAULT

Connection

Connection to the AS-Interface is by means of a 4-pole M12 connector socket (plastic version) connected to the yellow AS-Interface bus cable.

The wide enclosures (50 or 56 mm) also have an M12 socket for connecting a second safety switch. Category 4 according to EN ISO 13849-1 is thus achieved.

Benefits

The new generation of 3SF1 safety switches with separate actuator offers

- ASIsafe electronics component integrated in the enclosure, with low power consumption $< 60 \text{ mA}$
- An extensive range of actuators
- Status display with three LEDs

Application

Safety switches with separate actuator are used where the position of doors, covers or protective grilles must be monitored for safety reasons.

The safety switch can only be operated with the matching coded actuator. Simple overruling by hand or auxiliary devices is impossible.

Devices are available with enclosure versions to suit the particular ambient conditions. Different control tasks can be performed with the best contact blocks suited for the particular purpose. Dimensions, fixing points of the enclosure are in accordance with EN 50041 or EN 50047 standards.

The devices are suitable for use in any climate.

Standards

The switches comply with the standards IEC 60947-1 (Low-Voltage Switchgear and Controlgear, General) and IEC 60947-5-1 (Electromechanical Control Circuit Devices).

The mechanical design of the switch corresponds to the requirements of the fail-safe principle according to EN 1088.

Approvals

AS-Interface according to EN 50295 and IEC 62026-2.

With a 3SF1 safety switch it is possible to achieve Category 3 according to EN ISO 13849-1 or SIL 2 according to IEC 61508.

Category 4 according to EN ISO 13849-1 or SIL 3 according to IEC 61508 can be achieved by using a second 3SE5 safety switch.

The 3SF1 safety switches are approved according to UL 508, UL 50 and UL 746-C.

SIRIUS 3SF1 mechanical safety switches for AS-Interface

With separate actuator

Plastic enclosures
Enclosure width 31 mm / 50 mm

Overview

- Contacts: 1 or 2 slow-action contacts
- Status display with 3 LEDs 24 V DC;
1: F-IN1, 2: F-IN2, 3: AS-I/FAULT
- Degree of protection IP65 (31 mm) or IP66/IP67 (50 mm)

Auswahl- und Bestelldaten

Version ¹⁾	Contacts	DT	Complete units
			Configurator
			Article No.

Enclosure width 31 mm acc. to EN 50047



5 directions of approach

With M12 connector socket, 4-pole,
channel 1 on NC contact,
channel 2 on NC contact
Slow-action contacts

2 NC



B

3SF1234-1QV40-1BA1

Enclosure width 50 mm



5 directions of approach

With M12 connector socket, 4-pole;
channel 1 on NC contact,
channel 2 on M12 socket, right
Slow-action contacts

1 NC



B

3SF1244-1QV40-1BA2

For online configurator see www.siemens.com/sirius/configurators

Positive opening according to IEC 60947-5-1, Appendix K.

¹⁾ Supplied without actuator. Please order separately (see page 2/92).

SIRIUS 3SF1 mechanical safety switches for AS-Interface









With separate actuator

Metal enclosures
Enclosure width 31 mm / 40 mm / 56 mm


Overview

- Contacts: 1 or 2 slow-action contacts
- Status display with 3 LEDs 24 V DC;
1: F-IN1, 2: F-IN2, 3: AS-I/FAULT
- Degree of protection IP66/IP67

Selection and ordering data

Version ¹⁾	Contacts	DT	Complete units 
			Configurator 
			Article No.
Enclosure width 31 mm acc. to EN 50047			
	5 directions of approach With M12 connector socket, 4-pole, channel 1 on NC contact, channel 2 on NC contact Slow-action contacts	2 NC  B	3SF1214-1QV40-1BA1
Enclosure width 40 mm acc. to EN 50041			
	5 directions of approach With M12 connector socket, 4-pole, channel 1 on NC contact, channel 2 on NC contact Slow-action contacts	2 NC  B	3SF1114-1QV10-1BA1
Enclosure width 56 mm			
	5 directions of approach With M12 connector socket, 4-pole; channel 1 on NC contact, channel 2 on M12 socket, right Slow-action contacts	1 NC  B	3SF1124-1QV10-1BA2

 For online configurator see www.siemens.com/sirius/configurators

 Positive opening according to IEC 60947-5-1, Appendix K.







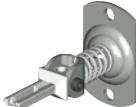



¹⁾ Supplied without actuator. Please order separately (see page 2/92).

SIRIUS 3SF1 mechanical safety switches for AS-Interface

With separate actuator

Accessories

Overview

Version		DT	Article No.
Actuators			
Standard actuators			
	• Length 75.6 mm	▶	3SE5000-0AV01
3SE5000-0AV01			
	• With vertical fixing, length 53 mm	B	3SE5000-0AV02
3SE5000-0AV02			
	• With transverse fixing, length 47 mm	B	3SE5000-0AV03
3SE5000-0AV03			
	• With transverse fixing, plastic ¹⁾ Length 40 mm	B	3SE5000-0AW11
3SE5000-0AW11			
Radius actuators			
	• Length 51 mm, direction of approach from the left	A	3SE5000-0AV04
3SE5000-0AV04			
	• Length 51 mm, direction of approach from the right	▶	3SE5000-0AV06
3SE5000-0AV6			
Universal radius actuators			
	- Length 77 mm	B	3SE5000-0AV05
	- Length 77 mm, tab rotated 90°	B	3SE5000-0AV05-1AA6
3SE5000-0AV05-1AA6			
Universal radius actuators, heavy duty			
	- Length 67 mm	A	3SE5000-0AV07-1AK2
	- Length 77 mm	B	3SE5000-0AV07
3SE5000-0AV07			
Optional accessories			
	Protective caps made of black rubber for the actuator head, C to protect the actuator openings from contamination (Only for enclosure width 40 or 56 mm)	C	3SE5000-0AV08-1AA2
3SE5000-0AV08-1AA2			
	Blocking inserts , high-grade steel, for actuator head, for up to eight padlocks	B	3SE5000-0AV08-1AA3
3SE5000-0AV08-1AA3			

¹⁾ Not suitable for safety switches with interlocking.

SIRIUS 3SF1 mechanical safety switches for AS-Interface

With solenoid interlocking

General data

Overview

The 3SF1 safety switches with safety-related communication can be directly connected using the AS-Interface bus system. The safety functions no longer have to be conventionally wired up.

With the 3SF1 safety switches the ASIsafe electronics component is integrated in the switch enclosure.



3SF1 safety switch with solenoid interlocking and with integrated ASIsafe electronics

Operation

The actuator head is included in the scope of supply. For actuation from four directions it can be adjusted through $4 \times 90^\circ$. The switches can also be approached from above.

The actuators are not included in the scope of supply of the safety switch and must be ordered separately from a choice of different versions to suit the application (see page 2/92).

The actuator is encoded. Simple overruling by hand or auxiliary devices is impossible.

A high-grade steel blocking insert for attaching up to eight padlocks is available for even more safety.

A rubber cap to protect the actuator entry of the actuator head from contamination is available for operation of the enclosures in dusty environments.

Solenoid interlocking

There are two versions for interlocking the actuator:

- Spring-actuated lock (closed-circuit principle) with various release mechanisms
- Solenoid-locked (open-circuit principle)

For more explanations see page 2/69.

Display

The switches have a status display with four LEDs:

- LED 1 (green): AS-i
- LED 2 (red): FAULT
- LED 3 (yellow): F-IN1
- LED 4 (yellow): F-IN2

Connection

Connection to the AS-Interface is by means of a 4-pole M12 connector socket (plastic version) connected to the yellow AS-Interface bus cable (no additional supply of auxiliary power is required thanks to the low current consumption of the solenoid of max. 170 mA).

Benefits

The new generation of 3SF13 safety switches with solenoid interlocking offers:

- More safety through higher locking forces:
 - 1 300 N for the plastic version
 - 2 600 N for the metal version
- Various release mechanisms: Lock release, escape release and emergency release
- ASIsafe electronics integrated in the enclosure; connected through 4-pole M12 connector socket
- Current consumption of the solenoid no more than 170 mA
- Two contact blocks as standard equipment, hence fewer versions needed
- Same dimensions for all enclosure versions: Plastic, metal
- An extensive range of actuators
- Status display with four LEDs

Application

The safety switches with solenoid interlocking are exceptional safety-related devices which prevent an unforeseen or intentional opening of protective doors, protective grilles or other covers as long as a dangerous situation is present (i.e. follow-on motion of the switched-off machine).

The safety switches with tumbler have the following functions:

- Enabling the machine or process with closed and locked protective device
- Locking the machine or process with opened protective device
- Position monitoring of the protective device and solenoid interlocking

Standards

The switches comply with the standards IEC 60947-1 (Low-Voltage Switchgear and Controlgear, General) and IEC 60947-5-1 (Electromechanical Control Circuit Devices).

The mechanical design of the switch corresponds to the requirements of the fail-safe principle according to EN 1088.

Approvals

AS-Interface according to EN 50295 and IEC 62026-2.

The switches are approved for use with locking devices according to EN 1088 and EN 292, Parts 1 and 2.

3SF13 safety switches with solenoid interlocking have a VDE test mark.

With a 3SF13 safety switch with solenoid interlocking it is possible to achieve Category 3 according to EN ISO 13849-1 or SIL 2 according to IEC 61508.

Category 4 according to EN ISO 13849-1 or SIL 3 according to IEC 61508 can be achieved by using a second 3SE5 safety switch.

The 3SF1 safety switches are approved according to UL 508, UL 50 and UL 746-C.

SIRIUS 3SF1 mechanical safety switches for AS-Interface

With solenoid interlocking

Plastic enclosures
With locking force greater than 1200 N

Overview

5 directions of approach · Degree of protection IP66/IP67

- Slow-action contacts:
 - Version -1BA1: ASIsafe channel 1 on 1 NC contact from the actuator and channel 2 on 1 NC contact from the solenoid
 - Version -1BA3: ASIsafe channel 1 on the first NC contact from the actuator and channel 2 on the second NC contact from the actuator
 - Version -1BA4: ASIsafe channel 1 on 2 NC contacts from the actuator and channel 2 on 1 NC contact from the solenoid. A discrepancy between the two contacts of the actuator will be evaluated already in the switch.
- Solenoid: Rated operational voltage 24 V DC
- 1 300 N locking force
- Status display with 4 LEDs 24 V DC;
 - 1: AS-i, 2: FAULT, 3: F-IN1, 4: F-IN2

Safety level

The 3SF1324-1S.21-1BA4 safety switches are also recommended where there are several protective door interlocking devices where reliable diagnostics and quick restart capability of equipment is required.

- A response is received from the magnet.
- No opening of the doors after the solenoid is unlocked.

In connection with an ASIsafe MSS modular safety system or in DP/AS-i F-Link it is possible to achieve SIL 2 according to IEC 61508 or PL d according to ISO 13849-1.




Comparison of versions

Safety switches	Contacts	Achievable safety level	Diagnostics	Reclosing condition after unlocking the solenoid (depending on the type of evaluation)
Type	Actuator / solenoid		Feedback from the solenoid	
3SF1324-1S.21-1BA1	1 NC/1 NC	SIL 1 / PL c	✓	Door does <u>not</u> have to be opened
	1 NC/1 NC	SIL 2 / PL d	✓	Door must be opened
3SF1324-1S.21-1BA3	2 NC	SIL 2 / PL d	--	Door does <u>not</u> have to be opened
3SF1324-1S.21-1BA4	2 NC/1 NC	SIL 2 / PL d	✓	Door does <u>not</u> have to be opened

✓ Available

-- Not available

Selection and ordering data

Interlock ¹⁾		Contacts Actuators/ Solenoids	DT	Complete units
				Configurator
				Article No.
1300 N locking force · Enclosure width 54 mm				
	Spring-actuated locks			
	• With auxiliary release	1 NC/1 NC	→ B	3SF1324-1SD21-1BA1
		2 NC/--	→ B	3SF1324-1SD21-1BA3
		2 NC/1 NC	→ B	3SF1324-1SD21-1BA4
	• With auxiliary release with lock	1 NC/1 NC	→ B	3SF1324-1SE21-1BA1
3SF1324-1SD21-...				
	• With escape release from the front	1 NC/1 NC	→ B	3SF1324-1SF21-1BA1
		2 NC/1 NC	→ B	3SF1324-1SF21-1BA4
	• With escape release from the back and auxiliary release from the front	1 NC/1 NC	→ B	3SF1324-1SG21-1BA1
		2 NC/1 NC	→ B	3SF1324-1SG21-1BA4
	• With emergency release from the back and auxiliary release from the front	1 NC/1 NC	→ B	3SF1324-1SJ21-1BA1
3SF1324-1SF21-...				
	Solenoid locks			
		1 NC/1 NC	→ B	3SF1324-1SB21-1BA1
3SF1324-1SB21-...		2 NC/--	→ B	3SF1324-1SB21-1BA3

For online configurator see www.siemens.com/sirius/configurators

→ Positive opening according to IEC 60947-5-1, Appendix K.

¹⁾ Supplied without actuator. Please order separately.

For actuators and optional accessories see page 2/92.

SIRIUS 3SF1 mechanical safety switches for AS-Interface

With solenoid interlocking

Metal enclosures
With locking force greater than 2000 N

Overview

5 directions of approach · Degree of protection IP66/IP67

- Slow-action contacts:
Version -1BA1: ASIsafe channel 1 on 1 NC contact from the actuator and channel 2 on 1 NC contact from the solenoid
- Solenoid: Rated operational voltage 24 V DC
- 2 600 N locking force
- Status display with 4 LEDs 24 V DC;
1: AS-i, 2: FAULT, 3: F-IN1, 4: F-IN2

Safety level

See page 2/94.

Selection and ordering data

Interlock ¹⁾		Contacts Actuators/ Solenoids	DT	Complete units	
				Configurator	
				Article No.	
2600 N locking force · Enclosure width 54 mm					
	Spring-actuated locks				
	• With auxiliary release	1 NC/1 NC	⤵ B	3SF1314-1SD11-1BA1	
	• With auxiliary release with lock	1 NC/1 NC	⤵ B	3SF1314-1SE11-1BA1	
	• With escape release from the front	1 NC/1 NC	⤵ B	3SF1314-1SF11-1BA1	
	• With escape release from the back and auxiliary release from the front	1 NC/1 NC	⤵ B	3SF1314-1SG11-1BA1	
	• With escape release from the back and auxiliary release with lock from the front	1 NC/1 NC	⤵ B	3SF1314-1SH11-1BA1	
	• With emergency release from the back and auxiliary release from the front	1 NC/1 NC	⤵ B	3SF1314-1SJ11-1BA1	
	Solenoid locks	1 NC/1 NC	⤵ B	3SF1314-1SB11-1BA1	

For online configurator see www.siemens.com/sirius/configurators

⤵ Positive opening according to IEC 60947-5-1, Appendix K.

¹⁾ Supplied without actuator. Please order separately.

For actuators and optional accessories see page 2/92.

SIRIUS 3SF1 mechanical safety switches for AS-Interface

Hinge switches

Plastic enclosures
Enclosure width 31 mm / 50 mm

Overview

The 3SF1 safety hinge switches with safety-related communication can be directly connected using the AS-Interface bus system. The safety functions no longer have to be conventionally wired up.

With the 3SF1 hinge switches the ASIsafe electronics component is integrated in the switch enclosure.

The hinge switches are provided for mounting on hinges.

There are two actuator variants here:

- Hollow shaft, inner diameter 8 mm, outer 12 mm
- Solid shaft, diameter 10 mm

For the ASIsafe version of the hinge switch, the basic switch and actuator head must be ordered separately. The basic switches correspond to the 3SF1 position switches (use only versions with snap-action contacts).

The standards and approvals are the same as for the 3SF1 standard switches ([see page 2/81](#)).

Selection and ordering data

Modular system

1 or 2 contacts · 3 LEDs · Degree of protection IP65 (31 mm) or IP66/IP67 (50 mm) · M12 connector socket

Version	Contacts	LEDs	DT	Modular system
				Configurator
				Article No.

Basic switches · Enclosure width 31 mm acc. to EN 50047



With teflon plunger, with M12 connector socket, 4-pole, channel 1 on NC contact, channel 2 on NC contact

Snap-action contacts 2 NC 24 V DC → B **3SF1234-1LC05-1BA1**

ASIsafe basic switch

Basic switches · Enclosure width 50 mm



With teflon plunger, with M12 connector socket, 4-pole, channel 1 on NC contact, channel 2 on M12 socket, right

Snap-action contacts 1 NC 24 V DC → B **3SF1244-1LC05-1BA2**

ASIsafe basic switch

Actuator heads



Actuator head with hollow shaft

With hollow shaft

Operating angle 10° B **3SE5000-0AU21**



Actuator head with solid shaft

With solid shaft

Operating angle 10° B **3SE5000-0AU22**

⚙ For online configurator [see www.siemens.com/sirius/configurators](http://www.siemens.com/sirius/configurators)

→ Positive opening according to IEC 60947-5-1, Appendix K.

SIRIUS 3SF1 mechanical safety switches for AS-Interface

Hinge switches

Metal enclosures
Enclosures width 31 mm / 40 mm / 56 mm

Overview

The 3SF1 safety hinge switches with safety-related communication can be directly connected using the AS-Interface bus system. The safety functions no longer have to be conventionally wired up.

With the 3SF1 hinge switches the ASIsafe electronics component is integrated in the switch enclosure.

The hinge switches are provided for mounting on hinges.

There are two actuator variants here:

- Hollow shaft, inner diameter 8 mm, outer 12 mm
- Solid shaft, diameter 10 mm

For the ASIsafe version of the hinge switch, the basic switch and actuator head must be ordered separately. The basic switches correspond to the 3SF1 position switches (use only versions with snap-action contacts).

The standards and approvals are the same as for the 3SF1 standard switches ([see page 2/81](#)).

Selection and ordering data

Modular system

1 or 2 contacts · 3 LEDs · Degree of protection IP66/IP67 · M12 connector socket

Version	Contacts	LEDs	DT	Modular system
				Configurator
				Article No.

Basic switches · Enclosure width 31 mm acc. to EN 50047



With plunger

With M12 connector socket, 4-pole,
channel 1 on NC contact,
channel 2 on NC contact

Snap-action contacts 2 NC 24 V DC ↻ B **3SF1214-1LC05-1BA1**

ASIsafe basic switch

Basic switches · Enclosure width 40 mm acc. to EN 50041



With M12 connector socket, 4-pole,
channel 1 on NC contact,
channel 2 on NC contact

Snap-action contacts 2 NC 24 V DC ↻ B **3SF1114-1LA00-1BA1**

ASIsafe basic switch

Basic switches · Enclosure width 56 mm



With M12 connector socket, 4-pole,
channel 1 on NC contact,
channel 2 on M12 socket, right

Snap-action contacts 1 NC 24 V DC ↻ B **3SF1124-1LA00-1BA2**

ASIsafe basic switch

Actuator heads



Actuator head with
hollow shaft

Hollow shaft

Operating angle 10°

B **3SE5000-0AU21**



Actuator head with
solid shaft

Solid shaft

Operating angle 10°

B **3SE5000-0AU22**

For online configurator [see www.siemens.com/sirius/configurators](http://www.siemens.com/sirius/configurators)

↻ Positive opening according to IEC 60947-5-1, Appendix K.

SIRIUS 3SE6 non-contact safety switches

Magnet

3SE66, 3SE67 magnetically operated switches

Overview

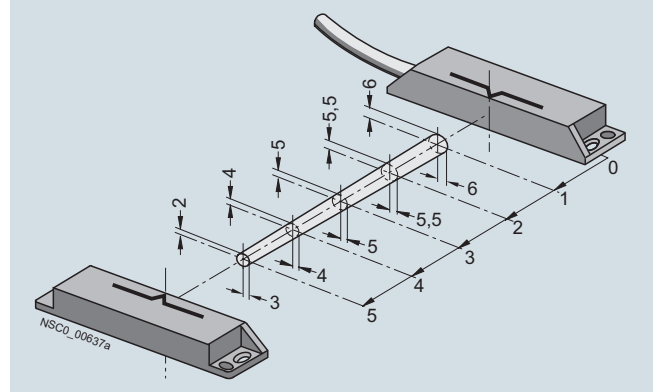


3SE66 contact blocks and 3SE67 switching magnets

A magnetically operated switch comprises a coded switching magnet and a contact block (sensor unit). Evaluation requires a safety relay or connection to a bus system.

3SE6806 safety relays

Up to six protective devices (sensors) can be connected to the safety relay.



Enabling range (example)

The device has six current-sourcing semiconductor outputs (Y1 ... Y6) which signal the state of the connected protective devices.

The 3SE6806 safety relay has two floating enabling circuits (safe circuits) as NO contact circuits and one floating signaling circuit as an NC contact circuit. The number of enabling circuits can be increased by adding one or more 3TK2830 expansion modules.

Application

SIRIUS 3SE6 magnetically operated switches are designed for mounting on movable protective guards (hoods, hinge switches, doors, etc.). Evaluation can be performed by means of a safety relay or through connection to a bus system.

The 3SE66 non-contact, magnetically operated safety switches stand out due to their enclosed design with degree of protection IP67. They are particularly suitable therefore for areas exposed to contamination, cleaning or disinfecting.

A magnetic monitoring system comprises one or more magnetically operated switches and an evaluation unit, e.g. a safety relay. When contact blocks 1 NO + 1 NC are used the 3SE6806 safety relay provides a high degree of protection against manipulation and can be installed in safety circuits up to SIL 3 according to EN ISO 13849-1.








Combination of monitoring units and magnetically operated switches

Monitoring units		Magnetically operated switches (contact block + switching magnet)			Achievable SIL (IEC 61508, IEC 62061) Performance Level (EN ISO 13849-1)
		1 NO + 1 NC	2 NC	1 NO + 2 NC ¹⁾	
		3SE6605-.BA	3SE6604-2BA	3SE6606-3BA	
		3SE6704-.BA	3SE6704-2BA	3SE6704-3BA	
Relay outputs					
SIRIUS safety relays, 6-fold	3SE6806-2CD00	✓	--	✓	SIL 3 / e
SIRIUS safety relays	3SK1111	--	✓	--	SIL 3 / e
	3SK1121, 3TK2826	✓	✓	✓	SIL 3 / e
Solid-state outputs					
SIRIUS safety relays	3SK1112, 3SK1122	--	✓	--	SIL 3 / e
	3TK2845	--	✓	--	SIL 3 / e
SIRIUS safety relays with contactor relay	3TK2850, 3TK2851, 3TK2852	--	✓	--	SIL 2 / d
	3TK2853	--	✓	--	SIL 3 / e
ASIsafe compact safety modules	3RK1205, 3RK1405	--	✓	--	SIL 3 / e
Modular Safety System (MSS)	3RK3	✓	✓	✓	SIL 3 / e
SIMATIC S7-31xF-2 DP or SIMATIC ET 200M	SM 326 F, 24 DI, 24 V DC, SM 326 F, 8 DI, NAMUR	✓	✓	✓	SIL 3
SIMATIC ET 200S PROFIsafe	4/8 F-DI / 3 F-DO, 24 V DC	✓	✓	✓	SIL 2
	4/8 F-DI, 24 V DC	✓	✓	✓	SIL 3
SIMATIC ET 200eco	4/8 F-DI, 24 V DC	✓	✓	✓	SIL 3
SIMATIC ET 200pro	8/16 F-DI, 24 V DC, 4/8 F-DI / 4 F-DO 2 A, 24 V DC, F-Switch	✓	✓	✓	SIL 3

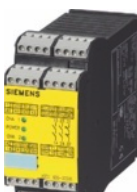
✓ Suitable magnetically operated switch

¹⁾ The second NC is a signaling contact, not a safety contact.

Selection and ordering data

Version	Size mm	Contacts	DT	Article No.
Round sensor units				
 3SE6704-1BA	Switching magnets (coded)	M30	A	3SE6704-1BA
 3SE6505-1BA	Contact blocks • With cable, 3 m • With M12 plug, 4-pole	M30 M30	1 NO + 1 NC C 1 NO + 1 NC X	3SE6605-1BA 3SE6605-1BA02
Rectangular sensor units				
 3SE6704-2BA	Switching magnets (coded)	25 × 88	--	A 3SE6704-2BA
 3SE660.-2BA	Contact blocks • With cable, 3 m • With cable, 10 m • With M8 plug, 4-pole	25 × 88 25 × 88 25 × 88	1 NO + 1 NC C 2 NC C 1 NO + 1 NC A 2 NC A 1 NO + 1 NC X 2 NC X	3SE6605-2BA 3SE6604-2BA 3SE6605-2BA10 3SE6604-2BA10 3SE6605-2BA01 3SE6604-2BA01
 3SE660.-3BA	Switching magnets (coded)	25 × 33	--	X 3SE6704-3BA
	Contact blocks • With cable, 3 m • With cable, 5 m • With cable, 10 m • With cable, 15 m • With cable, 1 m	25 × 33 25 × 33 25 × 33 25 × 33 25 × 33	1 NO + 1 NC C D D X 1 NO + 2 NC ¹⁾ A	3SE6605-3BA 3SE6605-3BA05 3SE6605-3BA10 3SE6605-3BA15 3SE6606-3BA
Accessories				
 3SX3260	Spacers	25 × 88	--	D 3SX3260
 3SX3261	Spacers	25 × 33	--	D 3SX3261

¹⁾ The second NC is a signaling contact, not a safety contact.

Version	Number of sensors	Enabling/sig- naling circuits	DT	Article No.
Monitoring units				
 3SE6806-2CD00	Safety relays with relay output, 6-fold Rated control supply voltage 24 V DC	6	2 NO / 1 NC X	3SE6806-2CD00

For more monitoring units see chapters 2, 8, 9 and 11 as well as catalog IK PI.

SIRIUS 3SE6 non-contact safety switches

RFID

RFID 3SE63 safety switches

Overview



Non-contact RFID safety switches with maximum tamper resistance

RFID 3SE63 non-contact safety switches comply with the highest safety requirements, SIL3 or Cat. 4, for monitoring the positions of movable protective devices.

An RFID safety switch consists of a coded RFID switch with an 8-pole M12 connector plug and an identical RFID actuator.

The switch is available in several versions:

- Family coded with M12 plug or with additional 18 N magnetic catch as an option
- Individually coded, programmable once, with M12 plug or with additional 18 N magnetic catch as an option
- Individually coded, programmable more than once (an unlimited number of times), with M12 plug or version with additional 18 N magnetic catch

The actuator is therefore available in two versions

- Standard
- With 18 N magnetic catch

The magnetic catch keeps doors and hinge switches closed with permanent magnets.

Mounting and maintenance

Various options for mounting save on enclosure variants:

- Mounting of the switch on the right or left side
- The actuator can be mounted on all sides

Quick and easy mounting thanks to universal mounting holes

- Standard gauge/holes for 3SE6 magnetically operated switches
- Fine adjustment thanks to slotted holes

Little adjustment or maintenance required

- Threshold indication by LED display on the switch for quick and easy adjustment during mounting and maintenance
- Molded switch allows it to be used as an end stop for small and medium-sized doors

Note:

- Keep metal parts and cuttings away from the vicinity of the switch
- Minimum distance between two switches 100 mm

Optional accessories (mounting)

- Covers for sealing mounting holes, also suitable for tamper-proofing screw fixings

- Spacers (approx. 3 mm high) to facilitate cleaning under the installation surface when using high-pressure cleaners, for example

Coding

Family coded

These safety switches are delivered ready to use, i.e. no programming is necessary.

Individually coded, programmable once

The assignment of safety switch and actuator thus created is irreversible.

The actuator is programmed simply by routine during startup, thus permanently preventing any form of tampering by means of a replacement actuator.

Individually coded, programmable several times

The procedure for programming a new actuator can be repeated an unlimited number of times. When a new actuator is programmed the previous code becomes invalid. A protected coding process allows new actuators to be programmed for service purposes.

After this, a ten-minute lockout provides enhanced tamper protection. The green LED flashes until the lockout time has ended and the new actuator has been detected. If the operational voltage is interrupted during this time, the ten-minute guard time is restarted.

Programming procedure for individual coding

1. Apply operational voltage to safety sensor
2. Move actuator into detection range: red LED lights up, yellow LED flashes (1 Hz).
3. After 10 s it changes to a shorter flashing frequency (3 Hz). In this state switch off operational voltage.
4. After the next time the operational voltage is switched on, the actuator is detected again to activate the programmed actuator code. The activated code is thus stored permanently.

Diagnostics

The RFID safety switch indicates its operating state including faults by means of the LED indicator in the switch and the short-circuit proof diagnostics output. The signals can then be used for central displays or non-safety-related control tasks.

There are two diagnostics functions:

- Crossover monitoring
- Open-circuit monitoring
- External voltage monitoring
- Ambient temperature too high
- Wrong or defective actuator
- Switching interval threshold identification with LED display

The signal combination "diagnostics output switched off" and "safety outputs still switched on" can be used to move the machine into a controlled stop position.

Any crossover or a fault that is not currently compromising the safe function of a safety switch results in the disconnection of the safety channels after a 30-minute delay. However, the diagnostics output switches off instantaneously.

Mode of operation of the diagnostics LEDs

The safety switch indicates not only its operating state, but also faults by means of LEDs in three colors at the ends of the RFID switch.

- The green LED indicates readiness for operation when the control supply voltage is connected.
- The yellow LED indicates that there is an actuator in detection range. If the actuator is in the switching interval threshold, this is indicated by flashing. This flashing can be used to identify a change in the distance between sensor and actuator at an early stage (e.g. as a result of the sagging of a protective door). The installation should be tested before the distance increases further, the safety outputs switch off and the machine stops.
- The red LED indicates the individual causes of the fault by means of defined flashing frequencies.

Benefits

- Maximum tamper resistance by means of individual coding of switches and actuators at the highest safety level
- Plastic enclosure with integrated connector
- Two solid-state short-circuit proof safety outputs, each 250 mA
- Integrated crossover, open circuit and external voltage monitoring, with series circuit as far as the control cabinet
- Safety and diagnostics signals can be connected in series
- Series connection of safety circuits in Cat. 4/PL e/SIL 3
- LED status indication including switching interval threshold indication for quick and easy adjustment during installation and maintenance
- Short-circuit proof conventional diagnostics output
- Optional version with magnetic catch for interlocking hinge switches or small doors even when de-energized
- Highly rugged thanks to the use of tested enclosure materials, resistant to aggressive cleaning products, with a degree of protection of up to IP69K
- Fine adjustment thanks to slotted holes
- Little adjustment or maintenance required
- Molded switch allows it to be used as an end stop for small and medium-sized doors

Technical specifications

Type	3SE63
General data	
Standards	IEC 60947-5-3, IEC 61508, EN ISO 13849-1
Enclosure material	Glass-fiber reinforced thermoplast, self-extinguishing
Degree of protection	IP69K
Ambient temperature	
• During operation	°C -25 ... +70
• During storage, transport	°C -25 ... +85
Shock resistance	30 g / 11 ms
Vibration resistance	10 ... 55 Hz / amplitude 1 mm

Application

RFID non-contact safety switches are designed for use in safety circuits, and are used to monitor the positions of movable protective devices. They monitor the positions of rotating, laterally sliding or removable protective devices using the coded electronic actuator.

Their high degree of protection (IP69K) and the use of cleaning product-resistant materials means that these switches are optimized for use under extreme environmental conditions.

Their electronic operating principle makes these switches ideal for metalworking machinery.

The switches have a larger switching interval and switching displacement than mechanical switches, improve the mounting tolerance of the protective door, and offer a wide range of diagnostics options.

The RFID switches can be connected to all standard evaluation units suitable for solid-state inputs and in which the built-in crossover monitoring function can be deactivated, e.g.:

Monitoring units	
Relay outputs	
SIRIUS safety relays	3SK1111-.AB30, 3SK1121
SIRIUS safety relays	3TK2826-.BB4.
Solid-state outputs	
SIRIUS safety relays	3SK1112, 3SK1122
SIRIUS safety relays	3TK2841, 3TK2842, 3TK2845
SIRIUS safety relays	3TK2853-.BB40
Modular Safety System (MSS)	3RK3 (safe inputs)
SIMATIC ET 200S	6ES7138-4FA0.-0AB0, 6ES7138-4FC0.-0AB0
SIMATIC ET 200M	6ES7326-1BK0.-0AB0
SIMATIC ET 200eco	6ES7148-3FA00-0XB0
SIMATIC ET 200pro	6ES7148-4F.00-0AB0

These safety categories can be achieved in safety circuits:

- Category 4 according to EN ISO 13849-1
- PL e according to EN ISO 13849-1
- SIL 3 according to IEC 61508

Type	3SE63
Electrical specifications	
Rated insulation voltage U_i	V 32
Pollution degree acc. to IEC 60664-1	3
Rated impulse withstand voltage U_{imp}	V 800
Rated conditional short-circuit current	A 100
Rated operational voltage U_e (PELV according to EN 60204-1)	V DC 24 -15/+10 %
Protection class	II
Overvoltage category	III
Rated operational current I_e	A 0.6
Smallest operational current I_m	mA 0.5
No-load supply current I_0	mA 35

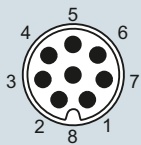
SIRIUS 3SE6 non-contact safety switches

RFID

RFID 3SE63 safety switches

Type	3SE63	
Inputs/outputs		
Safety inputs X1/X2		
• Input voltage	V DC	24 –15/+10 %
• Power consumption per input	mA	5
Safety outputs OSSD1/OSSD2		
		p operation
• Max. rated operational current I_e	A	0.25
• Rated operational current I_e /DC-12/DC-13 at U_e	A	0.25
• Voltage drop U_e	V	< 1
• Switching frequency	Hz	1
• Response time, max.	ms	100
• Risk time, max.	ms	200
• Recovery, max.	s	5
Diagnostics output		
		p operation
• Max. rated operational current $I_{e2\max}$	A	0.05
• Rated operational current I_e /DC-12/DC-13 at U_e	A	0.05
• Voltage drop U_e	V	< 2
• Operational current	mA	150
• Conductor capacity, max.	nF	50

Connector assignment

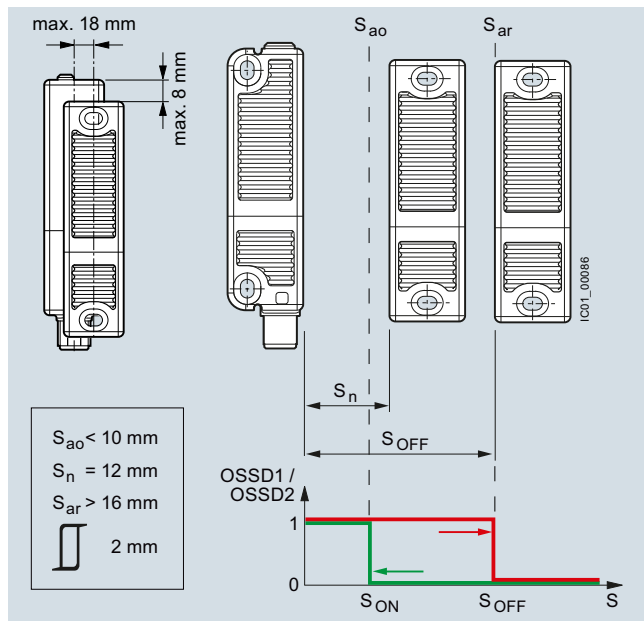


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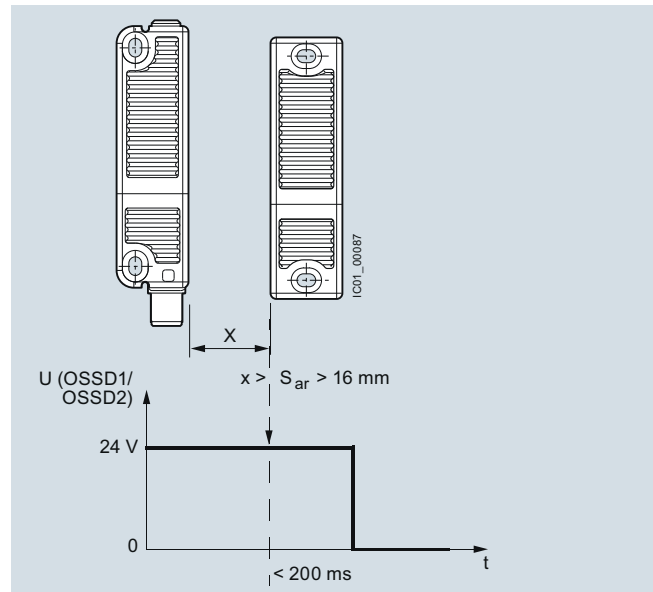
- Pin 1: A1 rated operational voltage 24 V DC
- Pin 2: X1 safety input 24 V DC
- Pin 3: A2 grounding
- Pin 4: OSSD1 safety output
- Pin 5: OUT conventional diagnostics output
- Pin 6: X2 safety input 24 V DC
- Pin 7: OSSD2 safety output
- Pin 8: Not used

Directions of approach and switching interval

The side area permits a maximum height offset of the switch and actuator of ± 8 mm (e.g. mounting tolerance or due to sagging of the protective door). The transverse offset also equals max. ± 8 mm.



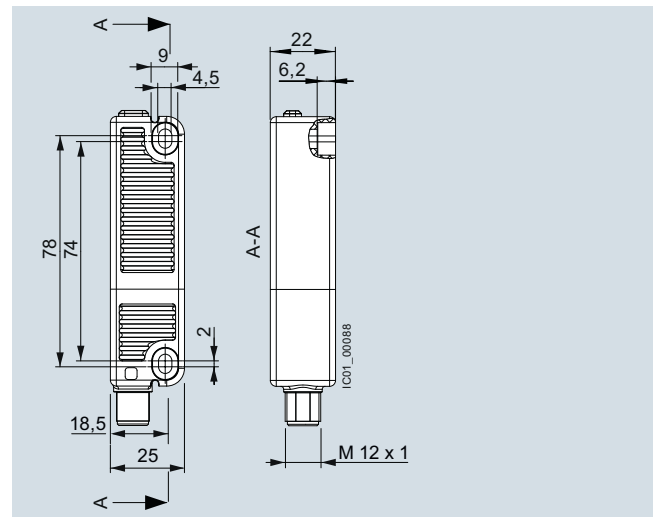
Switching interval: Output signal with hysteresis



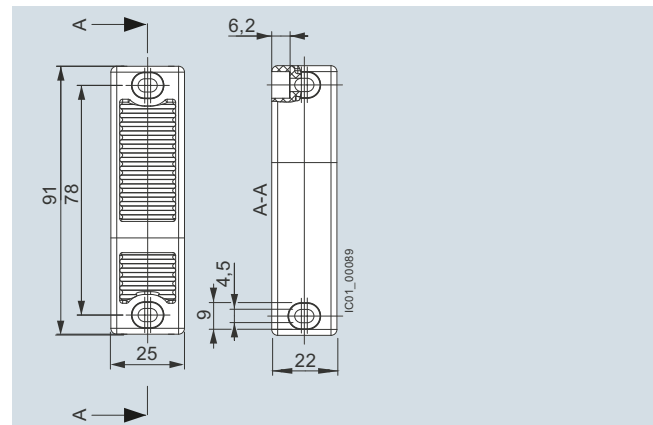
Switching interval: Output signal

Dimensional drawings

RFID switch 3SE6315







RFID actuator 3SE6310



Selection and ordering data

With M12 connector, 8-pole

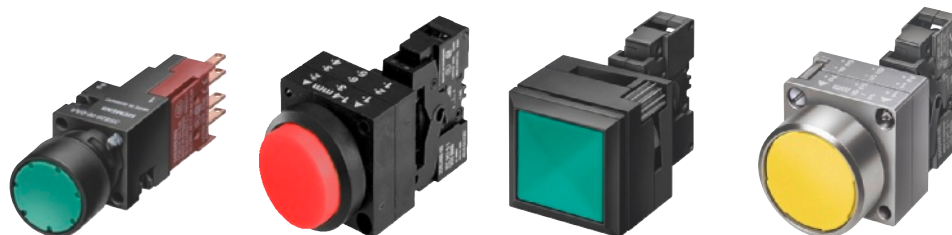
Version/coding		Latching/length	DT	Article No.
Rectangular safety switches 91 mm x 25 mm				
 3SE6315	RFID safety switches			
	• Family coded	None	A	3SE6315-0BB01
		With 18 N magnetic catch	A	3SE6315-1BB01
	• Individually coded, programmable several times	None	A	3SE6315-0BB02
		With 18 N magnetic catch	A	3SE6315-1BB02
	• Individually coded, programmable once	None	A	3SE6315-0BB03
		With 18 N magnetic catch	A	3SE6315-1BB03
 3SE6310	RFID actuators			
	• Standard	None	A	3SE6310-0BC01
		With 18 N magnetic catch	A	3SE6310-1BC01
Optional accessories				
 3SX5600-1G	Covers and spacers		A	3SX5600-1G
	One pack (1 unit) contains 8 covers and 4 spacers			
 3SX5601-2GA	Connecting cables, 8-pole, with 1 straight M12 socket			
		Length 3 m	A	3SX5601-2GA03
		Length 5 m	A	3SX5601-2GA05
	Rated voltage 30 V	Length 10 m	A	3SX5601-2GA10
	Rated current 2 A			

For monitoring units see catalog IC 10 chapter 2, "Industrial Communication" → "AS-Interface" and chapter 11, "Safety Technology" as well as catalogs IK PI and ST 70.

Commanding and signaling devices

Introduction

Overview



3SB2

3SB30, 3SB32

3SB31, 3SB33

3SB35, 3SB36

Pushbuttons and indicator lights

Designs

Nominal diameter	16 mm	22 mm	26 mm × 26 mm	22 mm
Version	Plastic, round	Plastic, round	Plastic, square	Metal, round

Actuators

Pushbuttons and switches	✓ ¹⁾	✓	✓	✓
Illuminated pushbuttons and switches	✓ ¹⁾	✓	✓	✓
Mushroom pushbuttons	--	✓	--	✓
Push-pull buttons	--	✓	--	✓
EMERGENCY-STOP mushroom pushbuttons	✓	✓	✓	✓
Selector switches	✓	✓	✓	✓
Key-operated switches	✓	✓	✓	✓

Special actuators

Coordinate switches	--	✓	--	--
Twin pushbuttons	--	✓	--	--
Potentiometer drives	--	✓	--	--

Indicators

Indicator lights	✓	✓	✓	✓
Acoustic signaling devices	--	✓	--	--

Contact blocks

Single-pole	✓	✓	✓	✓
Two-pole	✓	✓	✓	✓

Lampholders

Wedge bases	✓	✓ (with solder connections)	✓ (with solder connections)	✓ (with solder connections)
BA 9s bases	--	✓	✓	✓
With integrated LED	--	✓	✓	✓

Connections

Plug-in connection	✓	--	--	--
Screw terminals	--	✓	✓	✓
Spring-type terminals	--	✓	✓	✓
Solder pins	✓	✓	✓	✓
AS-Interface	--	✓	✓	✓

✓ Standard

-- Not available

□ Optional

¹⁾ Only pushbuttons, no pushbutton switches.

AS-Interface solutions

Commanding and signaling devices of the SIRIUS 3SB3 series can be connected to the AS-Interface communication system quickly and easily with the help of various solutions.

For AS-Interface solutions [see catalog IK PI "SIMATIC NET Industrial Communication"](#).

AS-Interface EMERGENCY-STOP according to ISO 13850

Using a special F adapter, EMERGENCY-STOP control devices according to ISO 13850 can be directly connected through the standard AS-Interface with safety-related communication ([see page 2/122](#)).

AS-Interface enclosures

Enclosures with standard fittings are listed in this catalog. For customized enclosures, use the 3SB3/3SF5 configurator to select the elements for equipping ([see page 2/130](#)).

AS-Interface front panel modules

The front panel module has one 4I/4O slave for connection of four 3SB3 commanding or signaling devices ([see catalog IK PI](#)).

Note:

Safety characteristics [see chapter 5, "Appendix" → "Standards and Approvals" → "Overview"](#).



	3SB38	3SB386	3SE7, 3SF2	3SE29, 3SB39
	Enclosures	Two-hand operation consoles	Cable-operated switches	Foot switches
Enclosures				
Plastic	✓	✓	--	✓
Metal	✓	✓	✓	✓
Actuators				
Pushbuttons and switches	✓	✓	✓	✓
Illuminated pushbuttons and switches	✓	✓	--	--
Mushroom pushbuttons	✓	✓	--	--
Push-pull buttons	✓	☐	--	--
EMERGENCY-STOP mushroom pushbuttons	✓	✓	✓	--
Selector switches	✓	☐	--	--
Key-operated switches	✓	☐	--	--
Bowden wires	--	--	✓	--
Indicators				
Indicator lights	✓	☐	✓	--
Acoustic signaling devices	✓	☐	--	--
Contact blocks				
Single-pole	✓	✓	--	--
Two-pole	--	✓	✓	✓
Three-pole	--	--	✓	✓
Four-pole	--	--	✓	✓
Connections				
Screw terminals	✓	✓	✓	✓
Spring-type terminals	✓	☐	--	--
Molded cables	--	--	--	✓
Plug-in connection	☐	☐	☐	☐
AS-Interface	✓	☐	✓	--



	8WD42, 8WD44	8WD53
	Signaling columns	Integrated signal lamps
Enclosures		
Plastic	✓	✓
Metal	--	--
Lighting		
Incandescent lamps	✓	✓
LEDs	✓	✓
Flashlights	✓	✓
Connections		
Screw terminals	✓	✓
Spring-type terminals	✓	--
AS-Interface	✓	--

3SB2 pushbuttons and indicator lights, 16 mm

General data

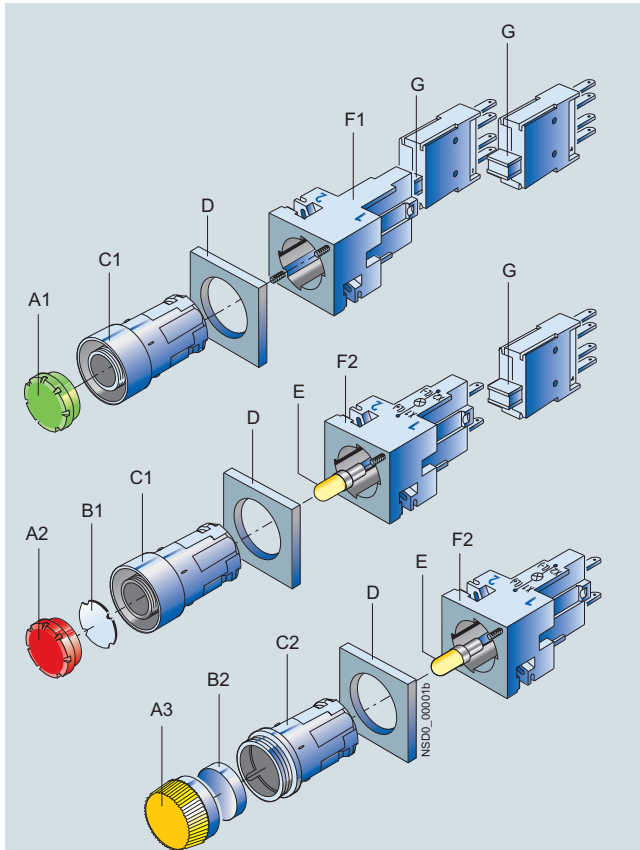
Overview

The 3SB2 pushbuttons and indicator lights are provided for front plate mounting and rear connection with flat connectors. For use on printed circuit boards, contact blocks and lampholders with solder pins are also available.

Standards

IEC 60947-1, EN 60947-1,
IEC 60947-5-1, EN 60947-5-1,
IEC 60947-5-5, EN 60947-5-5 for
EMERGENCY-STOP mushroom pushbuttons

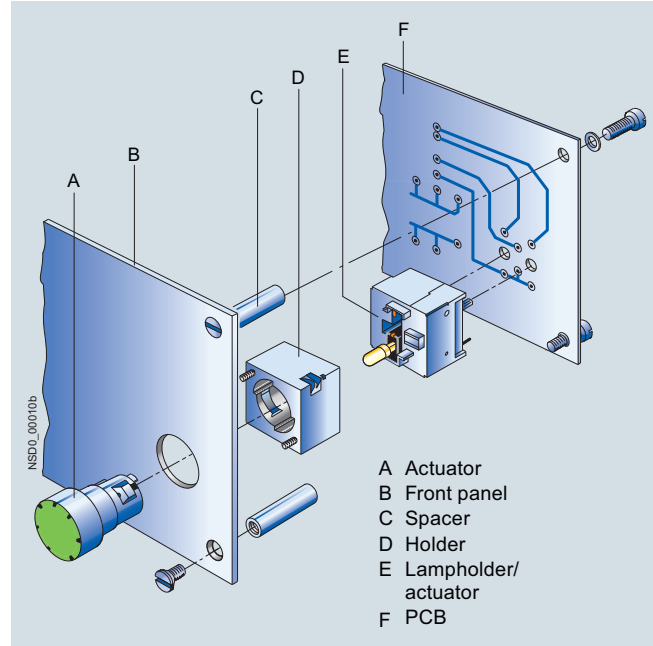
Version with flat connector



- A1 Button, flat
- A2 Illuminated button, flat
- A3 Screw lens for indicator light
- B1 Insert label, for labeling
- B2 Insert cap, for labeling
- C1 Collar with extruded front ring
- C2 Collar for indicator light
- D Frame for rectangular design
- E Wedge base lamp, W2 x 4.6d
- F1 Holders
- F2 Lampholder with holder
- G Contact blocks (1 NO or 1 NC) for snapping onto the holder or onto the lampholder

For PCB mounting

For use on printed circuit boards, special contact blocks and lampholders for soldering into the printed circuit board are available. For this purpose, the contact blocks and lampholders are fitted with 0.8 mm x 0.8 mm solder pins of length 3.5 mm.



Connection methods



Flat connectors



Solder pin connections

The terminals are indicated in the corresponding tables by the symbols shown on orange backgrounds.

Application

The devices are climate-proof and suitable for marine applications.

Safety EMERGENCY-STOP pushbuttons according to ISO 13850

For controls according to IEC 60204-1 or EN 60204-1, the mushroom pushbuttons of the 3SB2 series are suitable for use as safety EMERGENCY-STOP pushbuttons.

Safety circuits



IEC 60947-5-1 and EN 60947-5-1 require positive opening, i.e. for the purposes of personal safety, the assured opening of NC contacts is expressly stipulated for the electrical equipment of machines in all safety circuits and marked according to IEC 60947-5-1 with the symbol

Category 4 according to EN ISO 13849-1 can be attained with the EMERGENCY-STOP mushroom pushbuttons if the corresponding fail-safe evaluation units are selected and correctly installed, e.g. the 3SK11 safety relays, the 3RK3 Modular Safety System (see catalog IC 10 chapter 11, "Safety Technology") or matching units from the ASIsafe, SIMATIC or SINUMERIK product ranges.

3SB2 pushbuttons and indicator lights, 16 mm


Complete units
Actuators and indicators

Selection and ordering data

Complete units	Contact blocks	Color of handle	DT	Flat connectors
				Article No.
 <p>EMERGENCY-STOP mushroom pushbuttons</p>	1 NC  ²⁾	Red	▶	3SB2203-1AC01

EMERGENCY-STOP mushroom pushbuttons according to ISO 13850, latching¹⁾
Latches automatically when pressed; unlatches by turning the mushroom head counterclockwise, with yellow name plate with inscription "NOT-HALT"

EMERGENCY-STOP mushroom pushbuttons

Actuators and indicators	Color of handle	DT	Article No.
 <p>EMERGENCY-STOP mushroom pushbuttons</p>	Red	▶	3SB2000-1AC01

Pushbuttons

EMERGENCY-STOP mushroom pushbuttons acc. to ISO 13850, latching¹⁾
Latches automatically when pressed; unlatches by turning the mushroom head counterclockwise

EMERGENCY-STOP mushroom pushbuttons

- ¹⁾ The mushroom pushbutton cannot be combined with 3SB2902-0AB name plate or 3SB2902-0AA single frame.
²⁾ Positive opening according to IEC 60947-5-1, Appendix K.

3SB2 pushbuttons and indicator lights, 16 mm

Contact and lampholders

Selection and ordering data

Version	Graphic symbols	Operating travel	DT	Flat connectors
		<div style="display: flex; align-items: center;"> <div style="width: 10px; height: 10px; background-color: gray; border: 1px solid black; margin-right: 5px;"></div> Contact closed </div> <div style="display: flex; align-items: center;"> <div style="width: 10px; height: 10px; background-color: white; border: 1px solid black; margin-right: 5px;"></div> Contact open </div>		
				Article No.

Contact blocks and lampholders with flat connectors 2 × 2.8 – 0.8 mm according to IEC 60760

Holders for fixing the actuator and the contact blocks

Holders for 2 contact blocks
Inscription with identification number 1-2



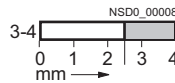
Holder

3SB2908-0AA

Contact blocks for fixing in the holder or lampholder

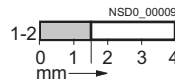
Contact blocks with one contact¹⁾

1 NO



3SB2404-0B

1 NC ²⁾



3SB2404-0C

¹⁾ For plug-in and insulation sleeves see "Accessories", page 2/109.

²⁾ NC with positive opening according to IEC 60947-5-1, Appendix K.

Version	Graphic symbols	Operating travel	DT	Solder pin connections
		<div style="display: flex; align-items: center;"> <div style="width: 10px; height: 10px; background-color: gray; border: 1px solid black; margin-right: 5px;"></div> Contact closed </div> <div style="display: flex; align-items: center;"> <div style="width: 10px; height: 10px; background-color: white; border: 1px solid black; margin-right: 5px;"></div> Contact open </div>		
				Article No.

Contact blocks and lampholders with solder pins

Holders for contact block with solder pins

For mounting the actuators in the front panel



Holder

C 3SB2908-0AB

Lampholders

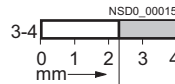
Wedge base W2 x 4.6d¹⁾



B 3SB2455-2A

Contact blocks

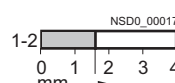
1 NO



B 3SB2455-0B

1 NC

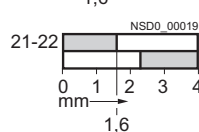
²⁾



B 3SB2455-0C

1 NO + 1 NC

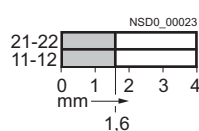
²⁾



B 3SB2455-0J

1 NC + 1 NC

²⁾



B 3SB2455-0F

¹⁾ The lamp is not included in the scope of supply.

²⁾ NC with positive opening according to IEC 60947-5-1, Appendix K.

3SB2 pushbuttons and indicator lights, 16 mm

Name plates and flat connectors, tools









Overview

The name plates consist of a black plastic label holder and an inscription label (silver with black print) for sticking in place.

Note mounting dimensions!

Inscriptions

The inscriptions (also special inscriptions) are lower case with upper case initial letters. Graphic symbols, including those not listed in the catalog, are according to ISO 7000 or IEC 60417.

Version	DT	Article No.
Accessories for command points		
 3SB2908-2AG	Name plates, yellow, Ø 50 mm As backing plate for EMERGENCY-STOP, self-adhesive <ul style="list-style-type: none"> • Blank • With German inscription "NOT-HALT" • With German inscription "NOT-AUS" 	▶ 3SB2908-2AF ▶ 3SB2908-2AG ▶ 3SB2908-2AK
Flat connectors		
 3SB2908-8AA	Plug-in sleeves For flat connectors 2.8 × 0.8 mm, cross-section 0.5 ... 1.5 mm ²	A 3SB2908-8AA
 3SB2908-8AB	Insulation sleeves For flat connectors, attachable from the front	C 3SB2908-8AB
 3SB2908-8AD	Complete connectors¹⁾ For connecting contact blocks and lampholders (up to 10 connections) Ensures finger-safety according to EN 50274 and BGV A3	B 3SB2908-8AD
 3SB2908-8AE	Plug-in sleeves For flat connectors 2.8 × 0.8 mm, with locating spring for latching in complete connector	B 3SB2908-8AE
Tools		
 3SB2908-2AA	Dismantling tools For holders and lampholders with holder	▶ 3SB2908-2AA
 3SB2908-2AC	Mounting tools For buttons and screw lenses	▶ 3SB2908-2AC
 6179 0950	Crimping tools for non-insulated connections, type KRBC 0560 For plug-in sleeves (both versions) Manufacturer: Lapp Kabel, Stuttgart, Germany E-mail: info@lappkabel.de Website: www.lappkabel.de	6179 0950

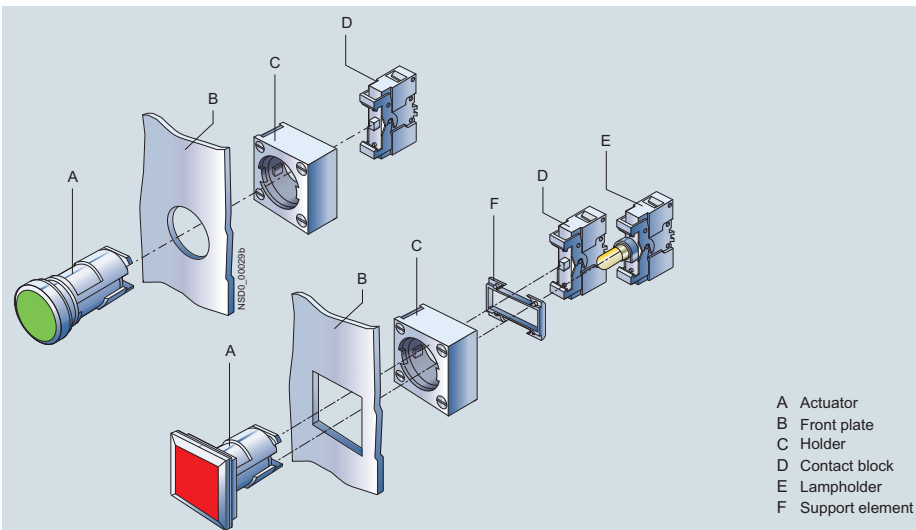
¹⁾ Required 3SB2908-8AE plug-in sleeves for flat connectors 2.8 × 0.8 mm are not included in the scope of supply.

3SB3 pushbuttons and indicator lights, 22 mm

General data

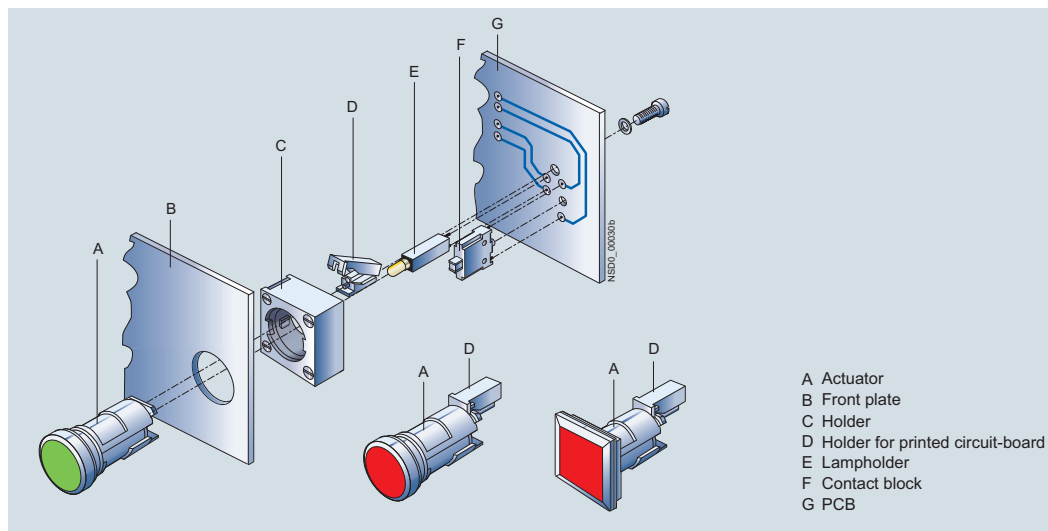
Overview

Front plate mounting



For actuators [see pages 2/112 ff.](#) For contact blocks and lampholders [see pages 2/118 bis 2/120.](#)
For holders [see page 2/121.](#)

Mounting on printed circuit boards



For contact blocks for mounting on printed circuit boards [see page 2/121.](#)

Design

The 3SB3 series is a modular range of commanding and signaling devices for front plate mounting and rear conductor connection. As an alternative, individual elements can also be supplied for use on printed circuit boards. Complete units are offered for the most commonly used applications.



Actuators and indicators and complete units

3SB3 pushbuttons and indicator lights, 22 mm

General data

The 3SB3 series is available:

- Made of molded plastic in flat, round and square design
- Made of metal in round design

The devices are of modern industrial design and can be mounted rapidly by a single person. The operating surfaces of the pushbuttons and illuminated pushbuttons are concave. The lenses of the indicator lights are convex.

The metal version with a high degree of protection according to IP67 and NEMA 4 is available for the world market.

One command point comprises:

- An actuator or lens assembly in front of the control panel
- A holder for mounting behind the control panel
- Up to 3 contact blocks and/or 1 lampholder behind the control panel
- A comprehensive range of accessories for inscription

Mounting of the contact blocks

Two contact blocks can be snapped onto the actuator in the standard version.

When three contact blocks or illuminated actuators are required, an additional holder must be plugged onto the actuator from the rear.

- 3SB3901-0AB holder for 3 contact blocks or for 2 contact blocks and 1 lampholder
- 3SB3901-0AC holder with pressure plates for actuating a central contact block when using a selector switch, key-operated switch and twin pushbutton with 3 contact blocks

For illuminated pushbuttons, illuminated switches and illuminated selector switches the holder is included in the scope of supply as standard.

Contact blocks

The contact blocks are fitted with slow-action contacts (NO contact or NC contact) with double operating contacts. These ensure a high switching reliability even with small voltages and currents, such as 5 V/1 mA. They are suitable for use in electronic systems as well as conventional controls.

Standards

IEC 60947-1, EN 60947-1,
IEC 60947-5-1, EN 60947-5-1,
IEC 60947-5-5, EN 60947-5-5
for EMERGENCY-STOP mushroom pushbuttons

Connection methods

The devices are available with screw terminals (box terminals), spring-type terminals or solder pins.



Screw terminals



Spring-type terminals



Solder pin connections

The terminals are indicated in the corresponding tables by the symbols shown on orange backgrounds.

Support function

The 3SB3 pushbuttons and indicator lights can also be ordered via an online configurator.



Configurator available in the Industry Mall

The online configurator is indicated in the corresponding tables by the symbol shown on an orange background.

Application

Environmental conditions

The devices are climate-proof (KTW 24) and suitable for standard industrial applications and operation in marine applications. For operation in oily atmospheres (organic oils/lubricants) we recommend actuators which are marked as "solvent-resistant".

AS-Interface solutions

The 3SB3 commanding and signaling devices can be connected to the AS-Interface communication system quickly and safely with the help of various solutions.

The following solutions are available:

- ASIsafe EMERGENCY-STOP mushroom pushbuttons (see page 2/122)
- AS-Interface enclosures with 1 to 6 command points (see page 2/130)
- AS-Interface front panel modules for 4 command points (see catalog IK PI, "SIMATIC NET Industrial Communication")


"Intrinsic safety" type of protection EEx i according to ATEX directive 94/9/EC

The pushbuttons and indicator lights in round design can also be used in hazardous areas. The 3SB34..-0. contact blocks and the 3SB34..-1A lampholders (with 3SB3901-1.A LED lamp) with screw terminals or spring-type terminals can be used.

Safety EMERGENCY-STOP pushbuttons according to ISO 13850

For controls according to IEC 60204-1 or EN 60204-1, the mushroom pushbuttons of the 3SB3 series are suitable for use as safety EMERGENCY-STOP pushbuttons.

Safety circuits

The IEC 60947-5-1 and EN 60947-5-1 standards require positive opening, i.e. for the purposes of personal safety, the assured opening of NC contacts is expressly stipulated for the electrical equipment of machines in all safety circuits and marked according to IEC 60947-5-1 with the symbol .





Category 4 according to EN ISO 13849-1 can be attained with the EMERGENCY-STOP mushroom pushbuttons if the corresponding fail-safe evaluation units are selected and correctly installed, e.g. the 3SK11 safety relays, the 3RK3 Modular Safety System (see catalog IC 10 chapter 11, "Safety Technology") or matching units from the ASIsafe, SIMATIC or SINUMERIK product ranges.

3SB3 pushbuttons and indicator lights, 22 mm

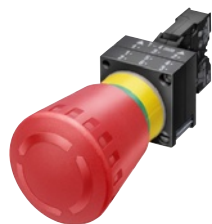
Actuators and indicators, plastic, round, 22 mm

Complete units

Selection and ordering data

Color of handle	Contacts for front plate mounting ¹⁾	DT	Screw terminals 	DT	Spring-type terminals 
			Configurator 		Configurator 
			Article No.		Article No.




EMERGENCY-STOP control devices according to ISO 13850 and IEC 60947-5-5, with holder and yellow name plate, Ø 80 mm, with inscription






With rotate-to-unlatch mechanism

EMERGENCY-STOP mushroom pushbuttons, Ø 40 mm, with positive latching function, With rotate-to-unlatch mechanism



- German inscription "NOT-HALT"

Red	1 NC		▶
	1 NC with installation monitoring		B
Red	1 NO + 1 NC		B

- English inscription "EMERGENCY STOP"

Red	1 NC		B
	1 NC with installation monitoring		B
Red	1 NO + 1 NC		B

- French inscription "ARRET D'URGENCE"

Red	1 NC		B
Red	1 NO + 1 NC		B

3SB3203-1HA20

B

3SB3203-1HA20-0CC0

3SB3266-1HA20

--

3SB3201-1HA20

B

3SB3201-1HA20-0CC0

3SB3203-1HR20

--

3SB3266-1HR20

--

3SB3201-1HR20

--

3SB3203-1HP20

--

3SB3201-1HP20




--






With rotate-to-unlatch mechanism and switch position indication

With rotate-to-unlatch mechanism and mechanical switch position indication

- German inscription "NOT-HALT"

Red	1 NC		▶
	1 NC with installation monitoring		B
Red	1 NO + 1 NC		B

- English inscription "EMERGENCY STOP"

Red	1 NC		B
	1 NC with installation monitoring		B
Red	1 NO + 1 NC		B

3SB3203-1HA26

B

3SB3203-1HA26-0CC0

3SB3266-1HA26

--

3SB3201-1HA26

B

3SB3201-1HA26-0CC0

3SB3203-1HR26

--

3SB3266-1HR26

--

3SB3201-1HR26



--





With pull-to-unlatch mechanism

With pull-to-unlatch mechanism

- German inscription "NOT-HALT"

Red	1 NC		B
Red	1 NO + 1 NC		B

- English inscription "EMERGENCY STOP"

Red	1 NC		B
Red	1 NO + 1 NC		B

3SB3203-1TA20

--

3SB3201-1TA20

--

3SB3203-1TR20

--

3SB3201-1TR20

--

For online configurator see www.siemens.com/sirius/configurators

Positive opening according to IEC 60947-5-1, Appendix K.
Can be used with 3SK11 safety relays or the 3RK3 Modular Safety System;
see catalog IC 10 chapter 11, "Safety Technology".
Zertifikat:





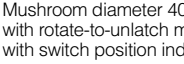









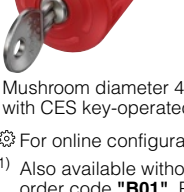

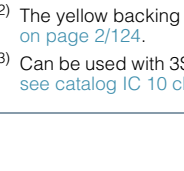



¹⁾ The inscription 1 NO + 1 NC means that a contact block with two contacts is used (3SB3400-0A or 3SB3403-0A).

3SB3 pushbuttons and indicator lights, 22 mm

Actuators and indicators, plastic, round, 22 mm

Actuators and Indicators

Version	Color of handle	Approval	DT	Configurator	Article No.
EMERGENCY-STOP control devices acc. to ISO 13850 and IEC 60947-5-5 with holder¹⁾²⁾, can also be used with safety relays³⁾					
	Red		B	3SB3000-1FA20	
	Red			3SB3000-1HA20 3SB3000-1HA26	
	Black		B	3SB3000-1HA10	
	Red		B	3SB3000-1TA20	
	Red		B	3SB3000-1AA20	
	Red		B	3SB3000-1BA20	
	Red		B	3SB3000-1KA20	
	Red		B	3SB3000-1LA20	
	Red		B	3SB3000-1MA20	

For online configurator see www.siemens.com/sirius/configurators

¹⁾ Also available without holder. Supplement Article No. with "-Z" and quote order code "B01". Price reduction on request.



²⁾ The yellow backing plates must be ordered separately, see "Accessories" on page 2/124.

³⁾ Can be used with 3SK11 safety relays or the 3RK3 Modular Safety System; see catalog IC 10 chapter 11, "Safety Technology".

3SB3 pushbuttons and indicator lights, 22 mm

Actuators and indicators, plastic, square, 26 mm x 26 mm

Complete units

Version	Color of handle	Contacts for front plate mounting ¹⁾	DT	Screw terminals 
				Configurator 
				Article No.

EMERGENCY-STOP control devices
according to ISO 13850 and IEC 60947-5-5,
with holder and yellow name plate, Ø 80 mm, with inscription²⁾



EMERGENCY-STOP
mushroom pushbuttons,
Ø 40 mm,
with positive latching
function,
with rotate-to-unlatch
mechanism

Red

1 NC



B

1 NO + 1 NC



B

3SB3303-1HA20**3SB3301-1HA20**

EMERGENCY-STOP
mushroom pushbutton
with rotate-to-unlatch
mechanism

 For online configurator see www.siemens.com/sirius/configurators

 Positive opening according to IEC 60947-5-1, Appendix K.
Can be used with 3SK11 safety relays or the 3RK3 Modular Safety System;
see catalog IC 10 chapter 11, "Safety Technology".
Certificate:



¹⁾ The inscription 1 NO + 1 NC means that a contact block with two contacts
is used (3SB3400-0A).

²⁾ German inscription "NOT-HALT".

3SB3 pushbuttons and indicator lights, 22 mm

Actuators and indicators, square, 26 mm x 26 mm

Actuators and Indicators

Version	Color of handle	Approval	DT	Configurator
				Article No.



EMERGENCY-STOP devices according to ISO 13850 and IEC 60947-5-5 with holder¹⁾²⁾, can also be used with safety relays³⁾



EMERGENCY-STOP mushroom pushbutton with rotate-to-unlatch mechanism

EMERGENCY-STOP mushroom pushbuttons, Ø 40 mm, with positive latching according to ISO 13850, with rotate-to-unlatch mechanism

Red



B

3SB3110-1HA20

EMERGENCY-STOP mushroom pushbutton with RONIS key-operated switch

EMERGENCY-STOP mushroom pushbuttons, Ø 40 mm, with RONIS key-operated switch (with 2 keys), lock No. SB 30, with positive latching according to ISO 13850, unlocking only possible using key

Red



B

3SB3110-1BA20

EMERGENCY-STOP mushroom pushbutton with CES key-operated switch

EMERGENCY-STOP mushroom pushbuttons, Ø 40 mm, with CES key-operated switch (with 2 keys), lock No. SSG 10, with positive latching according to ISO 13850, unlocking only possible using key

Red



B

3SB3110-1KA20

EMERGENCY-STOP mushroom pushbuttons, Ø 40 mm, with BKS key-operated switch (with 2 keys), lock No. S1, with positive latching according to ISO 13850, unlocking only possible using key

Red



B

3SB3110-1LA20

EMERGENCY-STOP mushroom pushbutton with O.M.R. key-operated switch

EMERGENCY-STOP mushroom pushbuttons, Ø 40 mm, with O.M.R. key-operated switch (with 2 keys), lock No. 73037 with positive latching according to ISO 13850, unlocking only using key

Red



B

3SB3110-1MA20

For online configurator see www.siemens.com/sirius/configurators

¹⁾ Also available without holder. Supplement Article No. with "-Z" and quote order code **"B01"**. Price reduction on request.

²⁾ Yellow backing plates must be ordered separately, see "Accessories" on page 2/124.

³⁾ Can be used with 3SK11 safety relays or the 3RK3 Modular Safety System; see catalog IC 10 chapter 11, "Safety Technology".

3SB3 pushbuttons and indicator lights, 22 mm

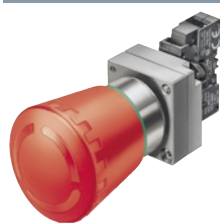
Actuators and indicators, metal, round, 22 mm

Complete units

Selection and ordering data

Color of handle	Contacts for front plate mounting ¹⁾	DT	Screw terminals	DT	Spring-type terminals
			Configurator		Configurator
			Article No.		Article No.

EMERGENCY-STOP devices according to ISO 13850 and IEC 60947-5-5, with holder and yellow name plate, Ø 80 mm, with inscription



EMERGENCY-STOP mushroom pushbutton with rotate-to-unlatch mechanism

EMERGENCY-STOP mushroom pushbuttons, Ø 40 mm, with positive latching function, with rotate-to-unlatch mechanism

- German inscription "NOT-HALT"

Red	1 NC	⤵	▶
	1 NC with installation monitoring	⤵	B
	1 NO + 1 NC	⤵	B
	1 NC, 1 NC	⤵	

- English inscription "EMERGENCY STOP"

Red	1 NC	⤵	B
	1 NC with installation monitoring	⤵	B
	1 NO + 1 NC	⤵	B

- French inscription "ARRET D'URGENCE"

Red	1 NC	⤵	B
	1 NO + 1 NC	⤵	B

3SB3603-1HA20

B

3SB3603-1HA20-0CC0

3SB3666-1HA20

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3SB3601-1HA20

B

3SB3601-1HA20-0CC0

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B

3SB3611-1HA20-0CC0

3SB3603-1HR20

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3SB3666-1HR20

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3SB3601-1HR20

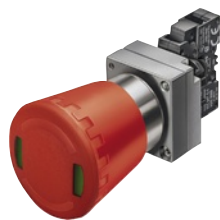
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3SB3603-1HP20

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3SB3601-1HP20

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EMERGENCY-STOP mushroom pushbuttons with rotate-to-unlatch mechanism and switch position indicator

With rotate-to-unlatch mechanism and mechanical switch position indicator

- German inscription "NOT-HALT"

Red	1 NC	⤵	C
	1 NC with installation monitoring	⤵	B
	1 NO + 1 NC	⤵	B

- English inscription "EMERGENCY STOP"

Red	1 NC	⤵	B
	1 NC with installation monitoring	⤵	B
	1 NO + 1 NC	⤵	B

3SB3603-1HA26

B

3SB3603-1HA26-0CC0

3SB3666-1HA26

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3SB3601-1HA26

B

3SB3601-1HA26-0CC0

3SB3603-1HR26

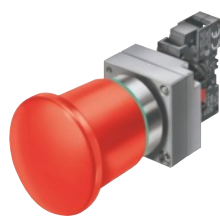
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3SB3666-1HR26

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3SB3601-1HR26

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EMERGENCY-STOP mushroom pushbutton with pull-to-unlatch mechanism

With pull-to-unlatch mechanism, solvent-resistant

- German inscription "NOT-HALT"

Red	1 NC	⤵	B
	1 NO + 1 NC	⤵	B
	1 NC, 1 NC	⤵	

- English inscription "EMERGENCY STOP"

Red	1 NC	⤵	B
	1 NO + 1 NC	⤵	B

- French inscription "ARRET D'URGENCE"

Red	1 NC	⤵	B
	1 NO + 1 NC	⤵	B

3SB3603-1TA20

B

3SB3603-1TA20-0CC0

3SB3601-1TA20

B

3SB3601-1TA20-0CC0

--

B

3SB3611-1TA20-0CC0

3SB3603-1TR20

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3SB3601-1TR20

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3SB3603-1TP20

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3SB3601-1TP20

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For online configurator see www.siemens.com/sirius/configurators

Positive opening according to IEC 60947-5-1, Appendix K.
Can be used with 3SK11 safety relays or the 3RK3 Modular Safety System;
see catalog IC 10 chapter 11, "Safety Technology".
Zertifikat:



¹⁾ Meaning of the inscription:

1 NO + 1 NC : One contact block is delivered with two contacts
(3SB3400-0A or 3SB3403-0A).

1 NC, 1 NC: Two contact blocks are delivered with one contact each
(2 x 3SB3403-0C).

3SB3 pushbuttons and indicator lights, 22 mm

Actuators and indicators, metal, round, 22 mm

Actuators and Indicators

Version	Color of handle	Approval	DT	Configurator	Article No.
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EMERGENCY-STOP devices according to ISO 13850 and IEC 60947-5-5 with holder¹⁾²⁾, can also be used with safety relays³⁾



Mushroom diameter 32 mm

EMERGENCY-STOP mushroom pushbuttons, Ø 32 mm, with positive latching according to ISO 13850, with rotate-to-unlatch mechanism

- Standard version
- Solvent-resistant⁴⁾



B

B

3SB3500-1FA20**3SB3500-1FA20-0PA0**

Mushroom diameter 40 mm, with rotate-to-unlatch mechanism with switch position indicator

EMERGENCY-STOP mushroom pushbuttons, Ø 40 mm, with positive latching according to ISO 13850, with rotate-to-unlatch mechanism

- Without switch position indicator

Red



▶

3SB3500-1HA20

- Without switch position indicator, solvent-resistant⁴⁾

B

3SB3500-1HA20-0PA0

- With mechanical switch position indicator

▶

3SB3500-1HA26

Mushroom pushbuttons, Ø 40 mm, with positive latching acc. to ISO 13850, with rotate-to-unlatch mechanism

Black



B

3SB3500-1HA10

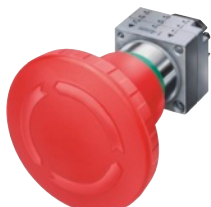
Mushroom diameter 40 mm, pull-to-unlatch mechanism

EMERGENCY-STOP mushroom pushbuttons, Ø 40 mm, with positive latching according to ISO 13850, with pull-to-unlatch mechanism⁴⁾

Red



B

3SB3500-1TA20

Mushroom diameter 60 mm

EMERGENCY-STOP mushroom pushbuttons, Ø 60 mm With positive latching according to ISO 13850, with rotate-to-unlatch mechanism⁴⁾

Red



B

3SB3500-1AA20

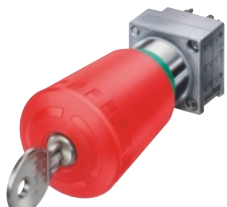
Mushroom diameter 40 mm, with RONIS key-oper. switch

EMERGENCY-STOP mushroom pushbuttons, Ø 40 mm, with RONIS key-operated switch (with 2 keys), lock No. SB 30, with positive latching according to ISO 13850, unlocking only possible using key

Red



B

3SB3500-1BA20

Mushroom diameter 40 mm, with CES key-operated switch

EMERGENCY-STOP mushroom pushbuttons, Ø 40 mm, with CES key-operated switch, (with 2 keys), lock No. SSG 10, with positive latching according to ISO 13850, unlocking only possible using key

Red



B

3SB3500-1KA20

EMERGENCY-STOP mushroom pushbuttons, Ø 40 mm, with BKS key-operated switch, (with 2 keys), lock No. S1, with positive latching according to ISO 13850, unlocking only possible using key

Red



B

3SB3500-1LA20

EMERGENCY-STOP mushroom pushbuttons, Ø 40 mm, with O.M.R. key-operated switch (with 2 keys), lock No. 73037, with positive latching according to ISO 13850, unlocking only using key

Red



B

3SB3500-1MA20

For online configurator see www.siemens.com/sirius/configurators

¹⁾ Also available without holder. Supplement Article No. with "-Z" and quote order code "B01". Price reduction on request.

²⁾ Yellow backing plates must be ordered separately, see "Accessories" on page 2/124.

³⁾ Can be used with 3SK11 safety relays or the 3RK3 Modular Safety System; see catalog IC 10 chapter 11, "Safety Technology".





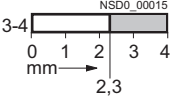

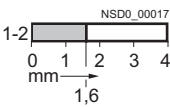


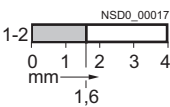


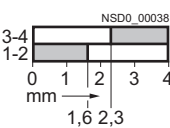

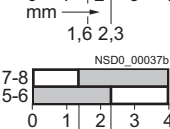

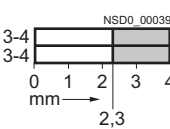

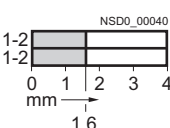

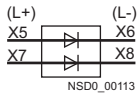
⁴⁾ Not suitable for laser inscription.

3SB3 pushbuttons and indicator lights, 22 mm

Components for actuators and indicators

Contact blocks and lampholders

Selection and ordering data

Version	Graphic symbols	Operating travel	DT	Screw terminals
	 Contact closed  Contact open			Article No.
Contact blocks for front plate mounting				
Contact blocks with one contact				
 3SB3400-0B	• Mounting depth 50 mm 1 NO 1 NO with gold-plated contacts	 	▶ C	3SB3400-0B 3SB3400-0BA
	1 NC 1 NC with gold-plated contacts	 	▶ C	3SB3400-0C 3SB3400-0CA
 3SB3400-0M	• Mounting depth 63 mm 1 NC with installation monitoring contact ¹⁾	 	B	3SB3400-0M
Contact block with 2 contacts				
 3SB3400-0A	Mounting depth 63 mm (including unit labeling plate) 1 NO + 1 NC 1 NO + 1 NC with gold-plated contacts	 	▶ B	3SB3400-0A 3SB3400-0AA
	1 NO + 1 NC with dust protection ²⁾ 1 NO leading + 1 NC lagging 1 NO leading + 1 NC lagging with gold-plated contacts	 	D	3SB3400-0H 3SB3400-0HA
	2 NO 2 NO with gold-plated contacts 2 NO with dust protection ²⁾	 	B	3SB3400-0D 3SB3400-0DA
	2 NC 2 NC with gold-plated contacts 2 NC with dust protection ²⁾	 	B	3SB3400-0E 3SB3400-0EA
 3SB3400-2A	Blocks with 2 diodes type 1N 4007 Mounting depth 63 mm $U_{RMS} = \text{max. } 250 \text{ V}$ $I_{FAV} = 0.8 \text{ A}$ at $T_U = 60^\circ \text{C}$		B	3SB3400-2A

➔ Positive opening according to IEC 60947-5-1, Appendix K.
Can be used with 3SK1, 3TK28 safety relays or the 3RK3 Modular Safety System; see catalog IC 10 chapter 11, "Safety Technology".



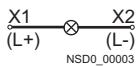
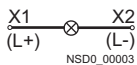
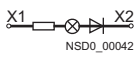

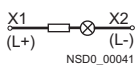
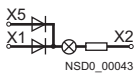
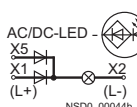

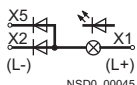
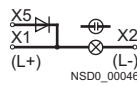

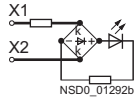

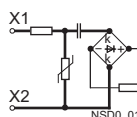

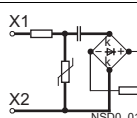


1) The NC contact opens automatically upon disconnection of the actuator. On delivery, the contact is open (= safe state). Activation (= NC contacts on the non-actuated control device are closed) takes place upon first-time actuation after the contact block is snapped onto the actuator.
Unsuitable for mounting in 3SB38 enclosures.

2) With 3SB3901-0CH dust protection shield.

3SB3 pushbuttons and indicator lights, 22 mm

Components for actuators and indicators

Contact blocks and lampholders

Version	Graphic symbols	Rated voltage	DT	Screw terminals	
					
				V	Article No.
Contact blocks for front plate mounting					
	BA 9s lampholders, mounting depth 50 mm				
	Without lamp		Acc. to lamp	▶	3SB3400-1A
	With 24 V incandescent lamp (3SX1344)		24 AC/DC	B	3SB3400-1D
	With integrated voltage reducer and with 130 V lamp (3SX1731) ¹⁾²⁾		230/240 AC	B	3SB3400-1C
	With built-in resistor for longer endurance and with 130 V lamp (3SX1731) ¹⁾³⁾		110/130 AC/DC	B	3SB3400-1B
	BA 9s lampholders, mounting depth 66 mm, with separate lamp test function ⁴⁾				
	With integrated voltage reducer and with 130 V lamp (3SX1731) ¹⁾		230/240 AC	B	3SB3400-1F
	Without lamp		Acc. to lamp	B	3SB3400-1G
	For incandescent lamp, max. 2.6 W; for LED lamp, 24/48/230 V AC/DC ⁵⁾		Acc. to lamp	B	3SB3400-1L
	Without lamp		Acc. to lamp	B	3SB3400-1H
	For incandescent lamp, max. 2.6 W; for glow lamp, AC				
	Lampholders with integrated LED				
Mounting depth 50 mm					
	Yellow		24 AC/DC	B	3SB3400-1PA
	Red			▶	3SB3400-1PB
	Green			▶	3SB3400-1PC
	Blue			▶	3SB3400-1PD
	White			▶	3SB3400-1PE
	Yellow		110 AC	B	3SB3400-1QA
	Red			B	3SB3400-1QB
	Green			B	3SB3400-1QC
	Blue			B	3SB3400-1QD
	White			B	3SB3400-1QE
	Yellow		230 AC	B	3SB3400-1RA
	Red			▶	3SB3400-1RB
	Green			▶	3SB3400-1RC
	Blue			▶	3SB3400-1RD
	White			▶	3SB3400-1RE
Transformers					
	For snapping onto 3SB3400-1A lampholder		127 / 24	B	3SB3400-3A
			240 / 24	B	3SB3400-3C
			260 / 24	D	3SB3400-3E
			400 / 24	B	3SB3400-3F
	For incandescent lamp AC, max. 2 W		127 / 6	B	3SB3400-3M
			240 / 6	B	3SB3400-3P
			400 / 6	B	3SB3400-3S
			480 / 6	B	3SB3400-3U
	Mounting depth: 97 mm		600 / 6	D	3SB3400-3W

¹⁾ The voltage reducer can only be used with this lamp.

²⁾ Also suitable for LED lamp 230 V AC, 3SB3901-1.F

³⁾ Also suitable for LED lamp 130 V AC, 3SB3901-1.D

⁴⁾ The lampholder with separate lamp test function can not be installed in an enclosure.

⁵⁾ Not suitable for LED lamps which are suitable only for AC or DC.

3SB3 pushbuttons and indicator lights, 22 mm

Components for actuators and indicators

Contact blocks and lampholders

Version	Rated voltage of lamp/ Graphic symbol	Operating travel/color	DT	Spring-type terminals
	V	<input type="checkbox"/> Contact closed <input type="checkbox"/> Contact open		Article No.

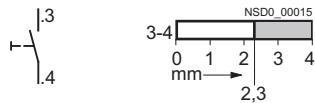
Contact blocks for front plate mounting



3SB3403-0B

Contact blocks with one contact, mounting depth 50 mm

1 NO
1 NO with gold-plated contacts



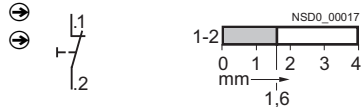
B

3SB3403-0B

B

3SB3403-0BA

1 NC
1 NC with gold-plated contacts



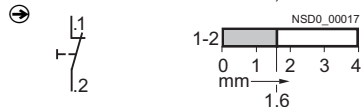
B

3SB3403-0C

B

3SB3403-0CA

1 NC with installation monitoring contact¹⁾
• Mounting depth 63 mm



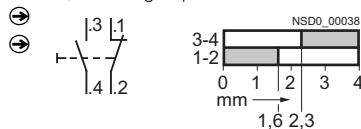
B

3SB3403-0M

3SB3403-0M

Contact blocks with 2 contacts, mounting depth 63 mm

1 NO + 1 NC
1 NO + 1 NC with gold-plated contacts



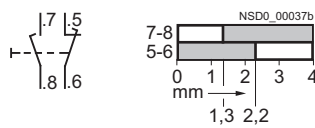
B

3SB3403-0A

B

3SB3403-0AA

1 NO leading + 1 NC lagging
1 NO leading + 1 NC lagging with gold-plated contacts



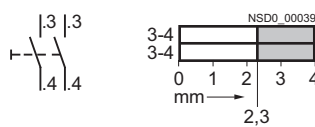
B

3SB3403-0H

C

3SB3403-0HA

2 NO
2 NO with gold-plated contacts



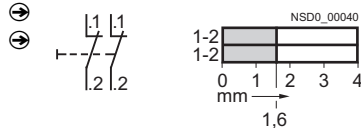
B

3SB3403-0D

D

3SB3403-0DA

2 NC
2 NC with gold-plated contacts



B

3SB3403-0E

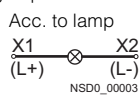
D

3SB3403-0EA

3SB3403-0A

BA 9s lampholders, mounting depth 50 mm

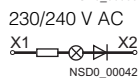
Without lamp²⁾



B

3SB3403-1A

With integrated voltage reducer and with 130 V lamp (3SX1731)²⁾³⁾

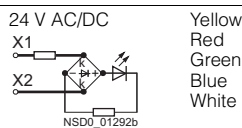


B

3SB3403-1C

Lampholders with integrated LED

Mounting depth 50 mm



B

3SB3403-1PA

B

3SB3403-1PB

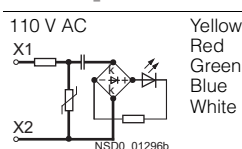
B

3SB3403-1PC

B

3SB3403-1PD

B

3SB3403-1PE

B

3SB3403-1QA

B

3SB3403-1QB

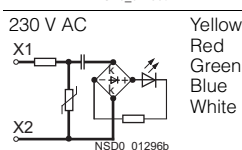
B

3SB3403-1QC

B

3SB3403-1QD

B

3SB3403-1QE

B

3SB3403-1RA

B

3SB3403-1RB

B

3SB3403-1RC

B

3SB3403-1RD

B

3SB3403-1RE

3SB3403-1C



3SB3403-1PA

⊕ Positive opening according to IEC 60947-5-1, Appendix K.

¹⁾ The NC contact opens automatically upon disconnection of the actuator. On delivery, the contact is open (= safe state). More explanations [see footnote 1\) on page 2/118](#). Unsuitable for mounting in 3SB38 enclosures.

²⁾ Not suitable for square command devices.

³⁾ Use these lamps only.

3SB3 pushbuttons and indicator lights, 22 mm

Components for actuators and indicators

Contact blocks and lampholders

Version	Graphic symbols	Operating travel	DT	Solder pin connections
		<input type="checkbox"/> Contact closed		Article No.
		<input type="checkbox"/> Contact open		

Contact blocks for use on printed circuit boards

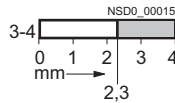


3SB3411-0B

Contact blocks with one contact

Mounting depth 44 mm

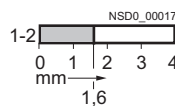
1 NO



B

3SB3411-0B

1 NC



B

3SB3411-0C

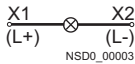


3SB3411-1A

Wedge base lampholders W2 x 4.6d

Mounting depth: 44 mm

Without lamp



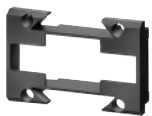
B

3SB3411-1A

⊕ Positive opening according to IEC 60947-5-1, Appendix K.

Version	DT	Article No.
---------	----	-------------

Holders for 3 contact blocks, for front plate mounting



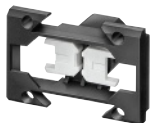
3SB3901-0AB

Holders for pushbuttons and switches¹⁾

For snapping on 3 blocks
(for illuminated pushbuttons and illuminated selector switches the holder is included in the scope of supply)

▶

3SB3901-0AB



3SB3901-0AC

Holders for selector switches, key-operated switches and twin pushbuttons

With pressure plate for actuating the central contact block of three contact blocks²⁾

▶

3SB3901-0AC

Pressure plates for use on printed circuit boards



3SB3901-0AW

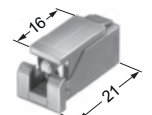
Pressure plates for selector switches and key-operated switches

For actuating the central contact block of three contact blocks²⁾

B

3SB3901-0AW

Accessories for printed circuit boards



3SB3901-0AA

Holders for printed circuit boards

For mounting the command devices on the printed circuit board
(screw is included in the scope of supply)

B

3SB3901-0AA

¹⁾ Holder also for mushroom pushbutton and push-pull button.

²⁾ The pressure plates can be removed to meet individual requirements.

3SB3 pushbuttons and indicator lights, 22 mm

Components for actuators and indicators

AS-Interface F adapters for EMERGENCY-STOP devices

Overview



EMERGENCY-STOP mushroom pushbutton with F adapter for bus connection



The AS-Interface F adapter is used to connect an EMERGENCY-STOP device according to ISO 13850 from the 3SB3 series to the AS-Interface bus system. The F adapter is suitable for control devices with mounting on front plates.



The F adapter has a safe AS-Interface 2E slave and is snapped from behind onto the EMERGENCY-STOP mushroom pushbutton. In the 2E/1A expanded version, an output is also available for actuating an indicator light with LED.



Depending on the version, screw terminals or spring-type terminals or the insulation piercing method are used for connecting to the AS-Interface bus cable. Addressing is performed using the AS-Interface connection or the integrated addressing socket.

Safety category 4 (SIL 3) is achieved with the adapter.

Selection and ordering data

Version		DT	Screw terminals	
			Article No.	
	AS-Interface F adapter for 3SB3 EMERGENCY-STOP mushroom pushbuttons For mounting on front plates <ul style="list-style-type: none">• 2I• 2I/1O, with output for LED control	▶	3SF5402-1AA03	
		▶	3SF5402-1AB03	
3SF5402-1AA03				

Version		DT	Spring-type terminals	
			Article No.	
	AS-Interface F adapter for 3SB3 EMERGENCY-STOP mushroom pushbuttons For mounting on front plates <ul style="list-style-type: none">• 2I• 2I/1O, with output for LED control	▶	3SF5402-1AA04	
		▶	3SF5402-1AB04	
3SF5402-1AA04				



Version		DT	Insulation piercing method	
			Article No.	
	AS-Interface F adapter for 3SB3 EMERGENCY-STOP mushroom pushbuttons For mounting on front plates <ul style="list-style-type: none">• 2I• 2I/1O, with output for LED control	▶	3SF5402-1AA05	
		▶	3SF5402-1AB05	
3SF5402-1AA05				

3SB3 pushbuttons and indicator lights, 22 mm

Accessories and spare parts



Protective covers

Selection and ordering data

Version	Use	Color	DT	Article No.	
Protective caps ¹⁾ , degree of protection IP67					
	Protective caps For round version	Mushroom push-pull button, Ø 40 mm (plastic and metal)	Clear	B	3SB1902-2BH
		EMERGENCY-STOP mushroom pushbutton, Ø 40 mm (plastic and metal)	Clear	B	3SB3921-0BU

¹⁾ No protective caps can be used with 3SB38 plastic enclosures.

For the 3SB38 metal enclosures, protective caps can only be used together with single-pole contact blocks for front plate mounting. In addition, the base plate must be removed.

Version	Use	Color	DT	Article No.
Protective collars for front plates				
	Protective collars for EMERGENCY-STOP¹⁾ For round version	EMERGENCY-STOP mushroom pushbutton without key-operated switch	Yellow Gray	B C
		EMERGENCY-STOP mushroom pushbutton with key-operated switch	Yellow	B
	Protective collars for EMERGENCY-STOP for 5 padlocks¹⁾ For round version	3SB3...-1AA20 EMERGENCY-STOP mushroom pushbutton	Yellow	B




¹⁾ The protective collar must only be used to protect against inadvertent actuating and must be fitted to allow unimpeded actuation of the EMERGENCY-STOP mushroom pushbutton.

3SB3 pushbuttons and indicator lights, 22 mm

Accessories and spare parts

Miscellaneous accessories

Selection and ordering data

Version	Use	Inscriptions	DT	Article No.	
Yellow name plates for EMERGENCY-STOP					
For use on front plates					
	Name plates, round Self-adhesive, external diameter 60 mm, internal diameter 23 mm	EMERGENCY-STOP mushroom pushbutton (round version)	Blank	B	3SB3921-0DY
			Customized inscription ¹⁾	B	3SB3921-0DZ K1Y
	Name plates, round Self-adhesive, external diameter 80 mm, internal diameter 23 mm	EMERGENCY-STOP mushroom pushbutton (round version)	Blank	B	3SB3921-0AB
			4 languages, de ²⁾ , en, it, es	B	3SB3921-0BW
			NOT-HALT	B	3SB3921-0AC
			NOT-AUS	B	3SB3921-0CK
			EMERGENCY STOP	B	3SB3921-0AD
			ARRET D'URGENCE	B	3SB3921-0AG
			EMERGENZA	B	3SB3921-0AN
			Customized inscription ¹⁾	B	3SB3921-0AZ K1Y
3SB3921-0BW	Name plates, round Self-adhesive, external diameter 80 mm, cutout 26 mm × 26 mm	EMERGENCY-STOP mushroom pushbuttons (square version)	Blank	B	3SB3941-0AB
			NOT-HALT	B	3SB3941-0AC
			NOT-AUS	B	3SB3941-0BX
			EMERGENCY STOP	B	3SB3941-0AD
	Name plates, round 1 mm thick, external diameter 75 mm, internal diameter 22.5 mm	EMERGENCY-STOP mushroom pushbutton (round version)	Blank	B	3SB1902-2BA
			NOT-HALT	B	3SB1902-2BB
			NOT-AUS	B	3SB3921-0CH
3SB3921-0DA	Name plates, illuminated, round self-adhesive, external diameter 60 mm, internal diameter 23 mm ³⁾	EMERGENCY-STOP mushroom pushbutton (round version)	Blank	▶	3SB3921-0DA
			NOT-HALT	▶	3SB3921-0DK
			NOT-AUS	B	3SB3921-0DC
			EMERGENCY STOP	B	3SB3921-0DD
As signaling device for EMERGENCY-STOP, with plug-in terminal for 24 V AC/DC ⁴⁾					

¹⁾ The customized inscription, e.g. in other languages than specified in the table, occurs in capital letters according to the order code "**K1Y**"

²⁾ With German inscription "NOT-HALT"




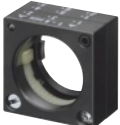
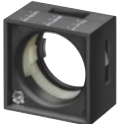


³⁾ For front plate thickness of max. 4 mm.

⁴⁾ The illuminated label can also be operated through the AS-Interface F adapter (see page 2/122).

3SB3 pushbuttons and indicator lights, 22 mm

Accessories and spare parts

Miscellaneous accessories

Version	Use	DT	Article No.
Holders and pressure plates			
 3SB3901-0AB	Holders For snapping on 3 blocks ¹⁾	Pushbuttons, push-pull buttons, mushroom pushbuttons with front plate mounting	▶ 3SB3901-0AB
 3SB3901-0AC	Holders with pressure plate For actuating the central contact block of 3 contact blocks ²⁾	Selector switches, key-operated switches and twin pushbuttons with front plate mounting	▶ 3SB3901-0AC
 3SB3901-0AW	Pressure plates For actuating the central contact block of 3 contact blocks ²⁾	Selector switches and key- operated switches for use on PCBs or with base mounting	B 3SB3901-0AW
Holders for commanding and signaling elements³⁾			
 3SB3931-0AA	Holders For plastic version, round	As-supplied state for front plate thickness 1 ... 4 mm	▶ 3SB3931-0AA
 3SB3951-0AA	Holders For plastic version, square		B 3SB3951-0AA
 3SB3931-0AC	Holders For metal version, round		▶ 3SB3931-0AC
 3SB3921-0BD	Grounding screws For grounding metal actuators for fitting in front plates and enclosures made of non-conducting materials, e.g. 3SB38 plastic enclosures		B 3SB3921-0BD

¹⁾ The holder for illuminated commanding devices is included in the scope of supply.

²⁾ The pressure plates can be removed one by one to meet individual requirements.

³⁾ The matching holder for actuators and indicators is included in the scope of supply (exception: Order with order code "B01").

3SB3 pushbuttons and indicator lights, 22 mm Enclosures

General data

Overview



Enclosures with standard and customized equipment

Enclosed pushbuttons and indicator lights are used as hand operated control devices for separately allocated control units and cabinets.

Enclosures with handle are available for suspension (e.g. for crane control units).

The enclosed pushbuttons and indicator lights are available with conventional controls as well as for connection to the AS-Interface bus system.

The following versions are available:

- Enclosures with standard fittings with 1 to 3 command points
- Enclosures with customized equipment with 1 to 6 command points
- Empty enclosures (individual parts must be ordered separately)

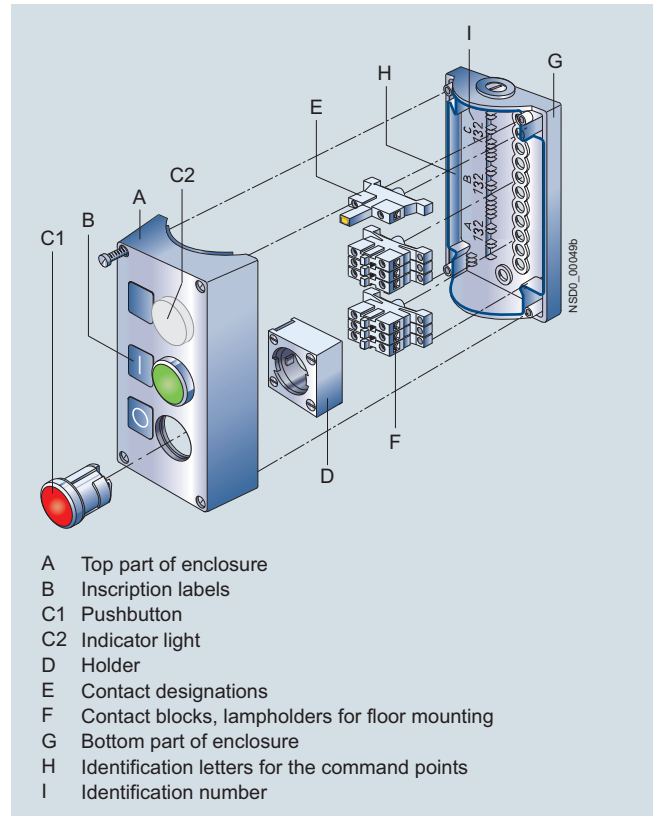
Customized enclosures

On request enclosures with more than 6 command points can also be supplied with AS-Interface connection.

Use the configurator for selection.

For AS-Interface enclosures [see page 2/130](#).

Enclosures with standard fittings



Standards

IEC 60947-5-1, DIN EN 60947-5-1

Application

The devices are climate-proof (KTW 24) according to EN ISO 6270-2 and suitable for stationary use (weather-protected) and for use in marine applications.

Technical specifications

Type	3SB380.-0, 3SB380.-1	3SB380.-2, 3SB380.-3
Enclosures		
Enclosure material	Plastic	Metal
Actuators and indicators	Plastic, round	Metal, round
Degree of protection acc. to IEC 60529	IP65	IP67 and NEMA Type 4
Climatic withstand capability according to EN ISO 6270-2	KTW 24	
Shock resistance according to IEC 60068-2-27 for half-sine shock type, 11 ms shock duration		
• Devices without incandescent lamp	≤ 50 g	
• Devices with incandescent lamp	≤ 30 g	
Vibration resistance acc. to IEC 60068-2-6		
• Acceleration at frequency 20 ... 200 Hz	5 g	

3SB3 pushbuttons and indicator lights, 22 mm Enclosures

Enclosures with standard fittings

Overview

Enclosures with standard fittings are available with:

- 1 to 3 command points
- Operational voltage up to 400 V
- Vertical mounting type
- Plastic enclosures are equipped with plastic actuators and indicators, metal enclosures are equipped with metal actuators and indicators
- Contact blocks and lampholders for base mounting (are snapped into the enclosure base); screw terminals (box terminals) as standard; some versions also with spring-type terminals (Article No. ends with -OCC0)

Color of enclosure cover:

- Gray, RAL 7035
- Yellow, RAL 1004 for EMERGENCY-STOP

Color of enclosure base:

- Black, RAL 9005

Selection and ordering data

Equipment	Contact block function	Number of command points	DT	Screw terminals
				Configurator
				Article No.

Plastic enclosures with standard fittings



3SB38 01-0.F3

Cable entry top and bottom each 1 x M20

A = EMERGENCY-STOP mushroom pushbuttons, red, Ø 40 mm, with positive latching according to ISO 13850 and rotate-to-unlatch mechanism

- With yellow top part, without protective collar
- With yellow top part, with protective collar¹⁾

1 NC	1	B
2 NC	1	B
1 NC	1	B
2 NC	1	B

3SB3801-0DG3
3SB3801-0EG3
3SB3801-0DF3
3SB3801-0EF3

Equipment	Contact block function	Number of command points	DT	Screw terminals
				Spring-type terminals ²⁾
				Configurator
				Article No.

Metal enclosures with standard fittings



3SB3801-2.F3

Cable entry top and bottom each 1 x M20

A = EMERGENCY-STOP mushroom pushbuttons, red, Ø 40 mm, with positive latching according to ISO 13850 and rotate-to-unlatch mechanism

- With yellow top part, without protective collar
- With M12 plug

1 NC	1	B
2 NC	1	B
2 NC	1	C
1 NC	1	B
2 NC	1	B

3SB3801-2DG3
3SB3801-2EG3
3SB3801-2EG10-OCC0
3SB3801-2DF3
3SB3801-2EF3



3SB3801-2EB30-OCC0

A = EMERGENCY-STOP mushroom pushbuttons, red, Ø 60 mm, with positive latching according to ISO 13850 and rotate-to-unlatch mechanism

- With yellow top part, with protective collar for 5 padlocks¹⁾

2 NC	1	B
2 NC	1	B

3SB3801-2EA30
3SB3801-2EA30-OCC0

For online configurator see www.siemens.com/sirius/configurators

Positive opening according to IEC 60947-5-1, Appendix K. Can be used with 3SK1, 3TK28 safety relays or the 3RK3 Modular Safety System; see catalog IC 10, chapter 11, "Safety Technology".


¹⁾ The protective collar must only be used to protect against inadvertent actuating and must be fitted to allow unimpeded access to the EMERGENCY-STOP mushroom pushbutton.

²⁾ -OCC0: Contact blocks with spring-type terminals.

3SB3 pushbuttons and indicator lights, 22 mm Enclosures

Empty enclosures

Selection and ordering data

Version	Number of command points	DT	Configurator 
			Article No.

Empty enclosures, plastic



3SB3802-0AA3

Cable entry top and bottom each 1 x M20 for 1 to 3 command points, each 1 x M25 for 4 and 6 command points

For contact blocks, lampholders and accessories with snap-on base mounting, also single-pole front plate blocks can be used (switching state is maintained upon opening), with gray top part

1	B
2	B
3	B
4	B
6	B

3SB3801-0AA3
3SB3802-0AA3
3SB3803-0AA3
3SB3804-0AA3
3SB3806-0AA3



3SB3801-0AB3

For EMERGENCY-STOP, for contact blocks and accessories with snap-on base mounting, also single-pole front plate blocks can be used (switching state is maintained upon opening)

- With yellow top part, without protective collar

1	B
---	---

3SB3801-0AB3

- With yellow top part, with protective collar¹⁾

1	B
---	---

3SB3801-0AD3

Empty enclosures, metal



3SB3804-2AA3

Cable entry top and bottom each 1 x M20 for 1 to 3 command points, each 1 x M25 for 4 and 6 command points

For contact blocks, lampholders and accessories with snap-on base mounting, also single-pole front plate blocks can be used (switching state is maintained upon opening), with gray top part

1	B
2	B
3	B
4	B
6	B

3SB3801-2AA3
3SB3802-2AA3
3SB3803-2AA3
3SB3804-2AA3
3SB3806-2AA3



3SB3801-2AB3

For EMERGENCY-STOP, for contact blocks, lampholders and accessories with snap-on base mounting, also single-pole front plate blocks can be used (switching state is maintained upon opening)

- With yellow top part, without protective collar

1	B
---	---

3SB3801-2AB3

- With yellow top part, with protective collar¹⁾

1	B
---	---

3SB3801-2AD3



3SB3801-2AD3

- With gray top part, with protective collar¹⁾

1	B
---	---

3SB3801-2AE3

- With yellow top part, with protective collar for 3 padlocks¹⁾, for mushroom Ø 40 mm, can be locked (BKS, CES, O.M.R.)

1	B
---	---

3SB3801-2EC3



3SB3801-2EC3

 For online configurator see www.siemens.com/sirius/configurators




¹⁾ The protective collar must only be used to protect against inadvertent actuating and must be fitted to allow unimpeded access to the EMERGENCY-STOP mushroom pushbutton.

3SB3 pushbuttons and indicator lights, 22 mm Enclosures



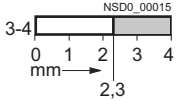

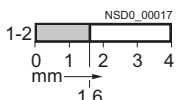
Contact blocks and lampholders




Selection and ordering data

For self-equipping of the enclosures



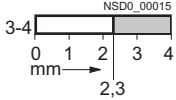

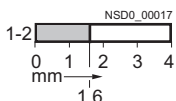
Version	Rated voltage/ Graphical symbol	Operating travel/color	DT	Screw terminals
		 Contact closed		
		 Contact open		Article No.


Contact blocks for base mounting

	Contact blocks with one contact			
	1 NO			3SB3420-0B
	1 NO with gold-plated contacts			3SB3420-0BA
	1 NC			3SB3420-0C
	1 NC with gold-plated contacts			3SB3420-0CA

Version	Rated voltage/ Graphical symbol	Operating travel/color	DT	Spring-type terminals
		 Contact closed		
		 Contact open		Article No.


Contact blocks for base mounting

	Contact blocks with one contact			
	1 NO			3SB3423-0B
	1 NO with gold-plated contacts			3SB3423-0BA
	1 NC			3SB3423-0C
	1 NC with gold-plated contacts			3SB3423-0CA

 Positive opening according to IEC 60947-5-1, Appendix K.

Version	Color/ inscription	DT	Article No.
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Accessories for enclosures

	Yellow name plates As backing plate for EMERGENCY-STOP, self-adhesive	Without inscription	D	3SB1902-1AQ
		With inscription		
		• NOT-HALT	B	3SB1902-2AQ
		• NOT-AUS	B	3SB3921-0CJ
		With recess for inscription label	B	3SB3921-0BV

3SB3 pushbuttons and indicator lights, 22 mm

Enclosures for AS-Interface

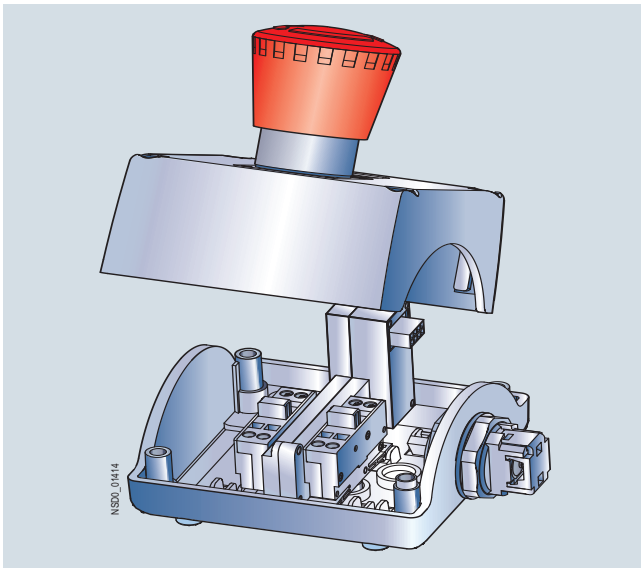
General data

Overview



AS-Interface enclosures with customized equipment

Distributed command devices of the 3SB3 series can be quickly connected to the AS-Interface using AS-Interface enclosures. Using suitable components you can make your own enclosures with integrated AS-Interface or flexibly modify existing enclosures.



EMERGENCY-STOP enclosures

Enclosures

Color of enclosure cover:

- Gray, RAL 7035
- Yellow, RAL 1004, for EMERGENCY-STOP

Color of enclosure base:

- Black, RAL 9005

Installation of AS-Interface slaves

The following slave types are available for connecting the command points:

- Slave in A/B technology with 4 inputs and 3 outputs
- Slave with 4 inputs and 4 outputs
- F Slave with two secure inputs for EMERGENCY-STOP mushroom pushbutton

The following table shows the maximum number of equippable slaves:

Enclosures for	Number of slaves for enclosures without EMERGENCY-STOP	Number of slaves for enclosures with EMERGENCY-STOP
1 command point	Not available	1 x F slave
2 command points	1 x slave 4I/4O or 4I/3O	Not available
3 command points	1 x slave 4I/4O or 4I/3O	1 x slave 4I/4O or 4I/3O + 1 x F slave
4 command points	2 x slave 4I/4O or 4I/3O ¹⁾	2 x slave 4I/4O or 4I/3O + 1 x F slave ¹⁾
6 command points	2 x slave 4I/4O or 4I/3O	2 x slave 4I/4O or 4I/3O + 1 x F slave

¹⁾ Applies to plastic enclosures. For metal enclosures with 4 command points, only 1 x slave 4I/4O or 4I/3O is possible.

Connection

One set of links is required in each case to connect a slave to contact blocks, to lampholders and to the connection element.

The connection elements are mounted in the front-end cable glands and are used for connection of the AS-Interface or for bringing unused inputs or outputs out of the enclosure.

For connection to AS-Interface can be selected between:

- Terminal for shaped AS-Interface cable. The cable is contacted by the insulation piercing method and routed past the enclosure on the outside (possible only with plastic enclosure).
- Cable gland for the shaped AS-Interface cable or round cable. The cable is routed into the enclosure (preferable for metal enclosure).
- Connection using M12 plug.

If less than all inputs/outputs of the installed slaves in an enclosure are used for connecting the command devices, free inputs and outputs can be routed on request to the outside through an M12 socket on the top or bottom side of the enclosure.

To supply inputs with power, the S+ connection of the slave must be assigned to the socket, for outputs the OUT- connection must be assigned.

Addressing is performed using the AS-Interface connections or the integrated addressing socket. An external power supply is not required.

Customized enclosures (selection by configurator)

To order customized 3SF58 AS-Interface enclosures with the 3SB3 control devices, use the 3SB3/3SF5 configurator to select the blocks for equipping. An electronic order form will be generated for the additional options.

3SB3 pushbuttons and indicator lights, 22 mm

Enclosures for AS-Interface

AS-Interface enclosures with standard fittings

Overview

Enclosures with standard fittings are available with:

- 1 to 3 command points
- Operational voltage through AS-Interface (approx. 30 V)
- Vertical mounting type
- Plastic enclosures are equipped with plastic actuators and indicators, metal enclosures are equipped with metal actuators and indicators



The enclosures without EMERGENCY-STOP each have one user module with 4I/3O; the enclosures with EMERGENCY-STOP mushroom pushbuttons have a safe AS-Interface slave integrated in the enclosure.

Enclosures with EMERGENCY-STOP mushroom pushbuttons are fitted with two NC contact blocks, which are wired to the safe slave. The contact blocks and lampholders (with spring-type terminals) of the control device, and the AS-Interface slaves, are mounted in the base of the enclosure and are cable-connected.

The plastic enclosures are designed with a connection for the AS-Interface flat cable (the cable is run along the outside of the enclosure). For metal enclosures, the AS-Interface cable is run inside the enclosure.

The housing with EMERGENCY-STOP mushroom pushbuttons with an M12 connector is also available.

Selection and ordering data

Equipping options (A, B, C = identification letters of the command points)		No. of command points	DT	Configurator	Article No.
AS-Interface enclosures, plastic					
	With M12 top connector				
	A = EMERGENCY-STOP mushroom pushbuttons, red, with rotate-to-unlatch mechanism, 1 NC, 1 NC	1	B		3SF5811-0AA10
	• Yellow enclosure top				
	With terminal for insulation piercing method at top				
	A = EMERGENCY-STOP mushroom pushbuttons, red, with rotate-to-unlatch mechanism, 1 NC, 1 NC				
	• Yellow enclosure top	1	A		3SF5811-0AA08
	• Yellow enclosure top, with protective collar ¹⁾	1	A		3SF5811-0AB08
AS-Interface enclosures, metal					
	With M12 top connector				
	A = EMERGENCY-STOP mushroom pushbuttons, red, with rotate-to-unlatch mechanism, 1 NC, 1 NC				
	• Yellow enclosure top	1	C		3SF5811-2AA10
	• Yellow enclosure top, with protective collar ¹⁾	1	C		3SF5811-2AB10
	With cable gland at top				
	A = EMERGENCY-STOP mushroom pushbuttons, red, with rotate-to-unlatch mechanism, 1 NC, 1 NC				
	• Yellow enclosure top	1	A		3SF5811-2AA08
	• Yellow enclosure top, with protective collar ¹⁾	1	A		3SF5811-2AB08

For online configurator see www.siemens.com/sirius/configurators

¹⁾ The protective collar must only be used to protect against inadvertent actuating and must be fitted to allow unimpeded access to the EMERGENCY-STOP mushroom pushbutton.


















3SB3 pushbuttons and indicator lights, 22 mm

Enclosures for AS-Interface

Components for AS-Interface enclosures

Selection and ordering data

For self-equipping of the enclosures

Version	Number of command points	DT	Article No.	
For plastic enclosures				
 3SF5500-0BA	AS-Interface slaves			
	F slave, 2 safe inputs, for plastic enclosure, EMERGENCY-STOP, without protective collar	1 ... 6	A	3SF5500-0BA
	F slave, 2 safe inputs, for plastic or metal enclosure, EMERGENCY-STOP, with protective collar	1	A	3SF5500-0DA
	A/B slave, 4I/3O for plastic enclosure	2 ... 6	A	3SF5500-0BB
	Slave, 4I/4O, for plastic enclosure	2 ... 6	A	3SF5500-0BC
 3SF5500-0BB				
 3SF5900-0CA	Sets of links			
	For F slave		A	3SF5900-0BA
 3SF5900-0CB	For slave 4I/4O or A/B slave 4I(3O)		A	3SF5900-0BB
	Connection elements			
 3SF5900-0CC	For AS-Interface shaped cable, connection by insulation piercing method, for plastic enclosure	1 ... 3	A	3SF5900-0CA
		4 ... 6	B	3SF5900-0CB
 3SF5900-0CC	For AS-Interface connection using M12 plug, for plastic enclosure	1 ... 3	B	3SF5900-0CC
		4 ... 6	B	3SF5900-0CD
 3SF5900-0CC	For bringing out unused inputs/outputs through an M12 socket, for plastic enclosure	1 ... 3	B	3SF5900-0CE
		4 ... 6	B	3SF5900-0CF
 3SF5900-0CG	For AS-Interface shaped cable, cable is routed into the enclosure, for plastic or metal enclosure	1 ... 3	A	3SF5900-0CG
		4 ... 6	A	3SF5900-0CH
 3SF5900-0CG	For round cable, cable is routed into the enclosure, for plastic or metal enclosure	1 ... 3	A	3SF5900-0CJ
		4 ... 6	A	3SF5900-0CK
For metal enclosures				
 3SF5500-0CB	AS-Interface slaves			
	F slave, 2 safe inputs, for metal enclosure, EMERGENCY-STOP, without protective collar	1 ... 6	A	3SF5500-0CA
	F slave, 2 safe inputs, for plastic or metal enclosure, EMERGENCY-STOP, with protective collar	1	A	3SF5500-0DA
	A/B slave, 4I/3O, for metal enclosure	2 ... 6	A	3SF5500-0CB
	Slave, 4I/4O, for metal enclosure	2 ... 6	A	3SF5500-0CC
 3SF5900-0CG	Sets of links			
	For F slave		A	3SF5900-0BA
 3SF5900-0CG	For slave 4I/4O or A/B slave 4I(3O)		A	3SF5900-0BB
	Connection elements			
 3SF5900-0CJ	For AS-Interface connection using M12 plug, for metal enclosure	1 ... 3	B	3SF5900-2CC
		4 ... 6	B	3SF5900-2CD
 3RK1901-3QA00	For bringing out unused inputs/outputs through an M12 socket, for metal enclosure	1 ... 3	B	3SF5900-2CE
		4 ... 6	B	3SF5900-2CF
 3RK1901-3QA00	For AS-Interface shaped cable, cable is routed into the enclosure, for plastic or metal enclosure	1 ... 3	A	3SF5900-0CG
		4 ... 6	A	3SF5900-0CH
 3RK1901-3QA00	For round cable, cable is routed into the enclosure, for plastic or metal enclosure	1 ... 3	A	3SF5900-0CJ
		4 ... 6	A	3SF5900-0CK
Spare parts				
 3RK1901-3QA00	Cable clips For cable adapters	▶ 3RK1901-3QA00		

3SB3 two-hand operation consoles

Plastic and metal enclosures

Overview



Two-hand operation console with metal enclosure

Equipment

The two-hand operation consoles are pre-equipped with 3SB3 command devices. In the case of plastic enclosures the command points are equipped as standard with actuators and indicators made of plastic, in the case of metal enclosures they are equipped with actuators and indicators made of metal.

The standard equipment comprises:

- 2 black mushroom pushbuttons, Ø 40 mm, 1 NO + 1 NC, Article No. 3SB3000-1GA11 or 3SB3500-1GA11
- 1 red EMERGENCY-STOP mushroom pushbutton according to ISO 13850, Ø 40 mm, with positive latching, 2 NC, Article No. 3SB3000-1HA20 or 3SB3500-1HA20

The plastic version can be retrofitted with up to 8 customized command points. The surface of the console has premachined breaking points for this purpose.

Application

The two-hand operation consoles are required for use with machines and systems that have hazardous areas, in order to direct both hands of the operator to one position.

Operator panels are primarily used on presses, stamping machines, printing presses and paper converting machines, in the chemical industry and in the rubber and plastics industries.




The control command is given by pressing the two mushroom pushbuttons on the sides simultaneously (within 0.5 s of each other) and must be maintained for as long as a hazard exists.

For the further processing of control commands, suitable evaluation units are used, e.g. 3SK11 safety relays or the 3RK3 Modular Safety System (see chapter 3, "Conventional design").

Standards

The two-hand operation consoles comply with the requirements of EN 574.

Selection and ordering data

Version	DT	Article No.
Metal enclosures, degree of protection IP65		
 3SB3863-4BB	Two-hand operation consoles, metal enclosure	
	• With standard fittings	B 3SB3863-4BB
	• With standard fittings and 4 additional holes for 22.5 mm command devices ¹⁾	B 3SB3863-4BA
	• Empty enclosure, unequipped	B 3SB3863-4BC
Plastic enclosures, degree of protection IP65		
 3SB3863-1BB3	B	3SB3863-1BB3
Accessories		
 3SB3901-0AQ	B	3SB3901-0AQ3

¹⁾ See 3SB3 Pushbuttons and Indicator Lights, 22 mm, page 2/110.

3SE7, 3SF2 cable-operated switches

3SE7 metal enclosures

Übersicht



3SE7 cable-operated switches

The cable-operated switches are used for monitoring or for EMERGENCY-STOP devices on particularly endangered system components.

As the effective range of a cable-operated switch is only limited by the length of the trip-wire, large systems can also be protected. Cable-operated switches (requiring pulling at both ends) and conveyor belt unbalance trackers are used primarily for monitoring very long belt systems.

Contact blocks

The switches for wire lengths up to 50 m are supplied with 1 NO + 1 NC or 2 NC contacts and those up to 75 m with 1 NO + 3 NC contacts. The switches for wire lengths from 2 x 75 m and the conveyor belt unbalance protection device are supplied with 2 NO + 2 NC contacts.

The NC contacts of the cable-break or cable-pull signaling are positive opening. The NO contact can be used, for example, for signaling purposes.

Free position and display

Cable-operated switches with one-side operation are held in free position by the pre-tension on the turnbuckle.

On switches with interlocking, with a pretensioned cable, the locking must be deactivated beforehand in order to return the cable-operated switch to its original position.

The cable-operated switch and the conveyor belt unbalance tracker can be supplied optionally with a factory-fitted LED (red, 24 V DC). This light in innovative chip-on-board technology allows the operating state of the switch to be visible at a distance of at least 50 m.

Application

Standards

The switches are equipped with positive latching and positive NC contacts and are thus suitable for operation in EMERGENCY-STOP devices according to EN ISO 13850.

Technical specifications

Type		3SE7120	3SE7150	3SE7140	3SE7141	3SE7160	3SE7310	
General data								
Standards		IEC 60947-5-1, EN 60947-5-1; IEC 60204-1, EN 60204-1; EN ISO 13850						
Approvals		UL/CSA						
Electrical design		Contacts electrically isolated from each other						
Electrical load								
• 2-pole, at AC-15		400 V AC, 6 A		400 V AC, 6 A	250 V AC, 2 A	400 V AC, 6 A	--	
• 3-pole, at AC-15		250 V AC, 2 A		--	--	--	--	
• 4-pole, at AC-15		--		--	--	400 V AC, 6 A	400 V AC, 6 A	
• Minimum		24 V AC/DC, 10 mA						
Short-circuit protection		A	6 (slow)					
Mechanical endurance		> 1 million operating cycles						
Contact material		Fine silver						
Operation		By pulling or breaking of wire						
Wire length, maximum		m	10	25	50	75	2 x 75	--
Distance between wire supports, max.		m	2.5	3	5			--
Enclosures								
Enclosure material		GD Al alloy, coated (color), dark black RAL 9005						
Cover		Shock-resistant thermoplast						
Degree of protection acc. to IEC 60529		IP65			IP67	IP65		
Ambient temperature		°C	–25 ... +70					
Mounting		Designed for M5						
Fixing spacing		mm	30 and 40					
Cable entry		2 x (M20 x 1.5)			1 x (M16 x 1.5)	3 x (M20 x 1.5)	2 x (M25 x 1.5)	
Connection type		Screw terminals M3.5, self-lifting clamp terminal						

Selection and ordering data

Version	Wire length m	Contacts	DT	Article No.
Cable-operated switches				
 3SE7120-1BH00	10	Metal enclosures, IP65 (cover made of molded plastic) <ul style="list-style-type: none"> • Without latching, only cable pull monitoring • With latching and button reset <ul style="list-style-type: none"> - With yellow lid 	1 NO + 1 NC → A 2 NC → A 1 NO + 2 NC → A	3SE7120-2DD01 3SE7120-1BF00 3SE7120-1BH00
 3SE7150-1BD00 3SE7150-1BH00	25	Metal enclosures, IP65 (cover made of molded plastic), with alignment window <ul style="list-style-type: none"> • Without latching • With latching and button reset <ul style="list-style-type: none"> - With yellow lid • With latching and key unlatching 	1 NO + 1 NC → A 1 NO + 1 NC → A 2 NC → A 1 NO + 2 NC → B 1 NO + 1 NC → B	3SE7150-2DD00 3SE7150-1BD00 3SE7150-1BF00 3SE7150-1BH00 3SE7150-1CD00
 3SE7150-1BD04	25	Metal enclosures, IP65 (cover made of molded plastic), with alignment window, with LED, red, 24 V DC <ul style="list-style-type: none"> • Without latching • With latching and button reset 	1 NO + 1 NC → B 1 NO + 1 NC → B	3SE7150-2DD04 3SE7150-1BD04
 3SE7140-1B.00	50	Metal enclosures, IP65 (cover made of molded plastic) <ul style="list-style-type: none"> • With latching and button reset • In addition with LED, red, 24 V DC • With latching and key unlatching 	1 NO + 1 NC → A 2 NC → B 1 NO + 1 NC → B 1 NO + 1 NC → B	3SE7140-1BD00 3SE7140-1BF00 3SE7140-1BD04 3SE7140-1CD00
 3SE7141-1EG10	75	Metal enclosures, IP67 (cover made of molded plastic), with EMERGENCY-STOP mush- room, with rotate-to-unlatch mechanism	1 NO + 3 NC → A	3SE7141-1EG10
 3SE7160-1AE00	2 x 75	Metal enclosures, IP65 with actuation on both sides <ul style="list-style-type: none"> • With latching and button reset • In addition with LED, red, 24 V DC 	2 NO + 2 NC → A 1 NO + 1 NC → B 2 NO + 2 NC → B	3SE7160-1AE00 3SE7160-1BD00 3SE7160-1AE04

→ Positive opening according to IEC 60947-5-1, Appendix K.

3SE7, 3SF2 cable-operated switches

3SE7 metal enclosures

Version	Contacts	DT	Article No.
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Conveyor belt unbalance trackers



3SE7310-1AE00

Metal enclosures, IP65

- With latching and button reset
- In addition with LED, red, 24 V DC

2 NO + 2 NC	⊕ B
2 NO + 2 NC	⊕ B

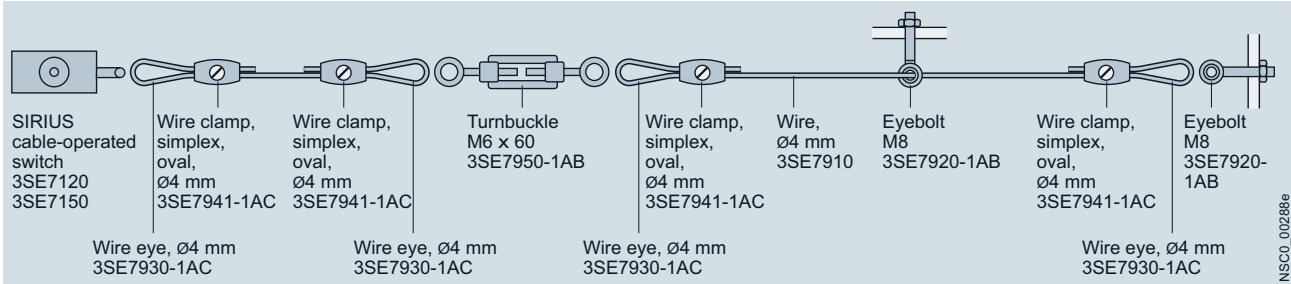
3SE7310-1AE00
3SE7310-1AE04

⊕ Positive opening according to IEC 60947-5-1, Appendix K.

Accessories

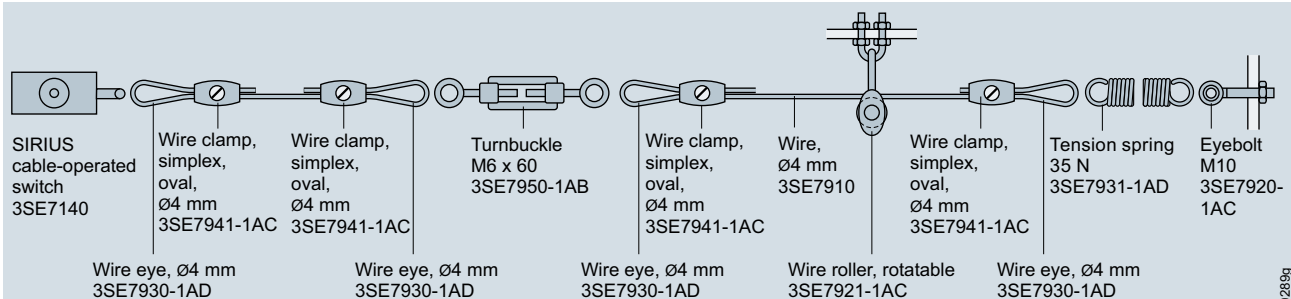
Configuration of the cable-operated switches

Short lengths of wire up to 25 m



NSC0_00288e

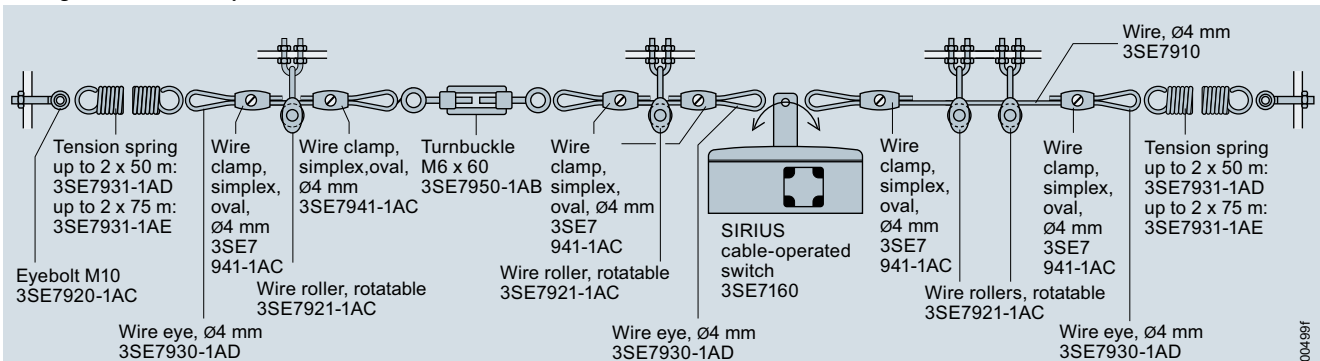
Long lengths of wire up to 50 m



NSC0_00289g

Use of a tension spring is essential for lengths of wire ≥ 25 m.

Pulling from both sides up to 2 x 75 m















NSC0_00499f

Use of a tension spring is essential for lengths of wire ≥ 25 m.

Note:

Large temperature fluctuations require corresponding compensation springs. For reliable connection the PVC sheath must be re-

moved from the clamping area of the steel bowden wire. Bowden wire supports must be used at the recommended intervals.

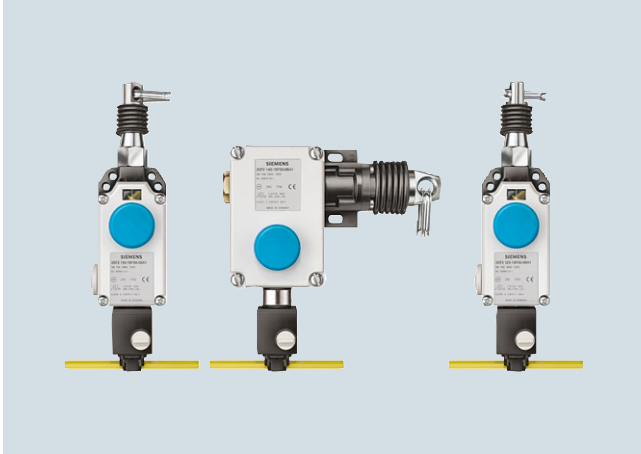
Version	Wire length/ diameter	DT	Article No.	
Trip-wire with fixing				
	Steel wires , with red plastic sheath, Ø 4 mm ¹⁾	10 m	A	3SE7910-3AA
		15 m	A	3SE7910-3AB
		20 m	A	3SE7910-3AC
		50 m	A	3SE7910-3AH
   	Wire clamps , galvanized white			
	• Oval	2 x Ø 4 mm	A	3SE7941-1AC
	• Single (1 set = 4 units)	2 x Ø 4 mm	A	3SE7942-1AA
	• Simplex (1 set = 4 units)	2 x Ø 4 mm	A	3SE7943-1AC
	• Duplex (1 set = 4 units)	2 x Ø 4 mm	A	3SE7944-1AC
	Tension springs (zinc-plated) to maintain the counter tension			
	• 13 N		A	3SE7931-1AB
	• 35 N, for bowden wires up to 50 m		A	3SE7931-1AD
	• > 35 N, for bowden wires up to 2 x 75 m		B	3SE7931-1AE
	Wire rollers for changing the direction of the wire, rotatable	Ø 4 mm	A	3SE7921-1AC
	Fixtures for the wire rollers (incl. fixing nuts)		A	3SE7921-1AA
	Wire eyes for changes in wire direction and improved power transmission at the fixing points (1 set = 4 units)	Ø 4 mm	A	3SE7930-1AD
	Eyebolts for fixing the wire			
	• Including M8 nut		A	3SE7920-1AB
	• Including M10 nut		A	3SE7920-1AC
	Turnbuckles for precise adjustment of the pretension			
	• M6 x 60		A	3SE7950-1AB
	• M6 x 110		A	3SE7950-1AD
Spare parts				
	LED lamps , red 24 V DC 25 mm diameter; for M20 x 1.5 connection		B	3SX3235

¹⁾ Diameter including casing; the diameter of the steel wire is 3.2 mm.

3SE7, 3SF2 cable-operated switches

3SF2 cable-operated switches for AS-Interface

Overview



3SF2 cable-operated switch with AS-Interface adapter

AS-Interface cable-operated switches can be directly connected via the bus system AS-Interface with safety-oriented communication.

The safety functions no longer have to be conventionally wired up.

Application




SIRIUS cable-operated switches are used for monitoring or for EMERGENCY-STOP devices on particularly endangered system components.

As the effective range of a cable-operated switch is only limited by the length of the trip-wire, large systems can also be protected.

Standards

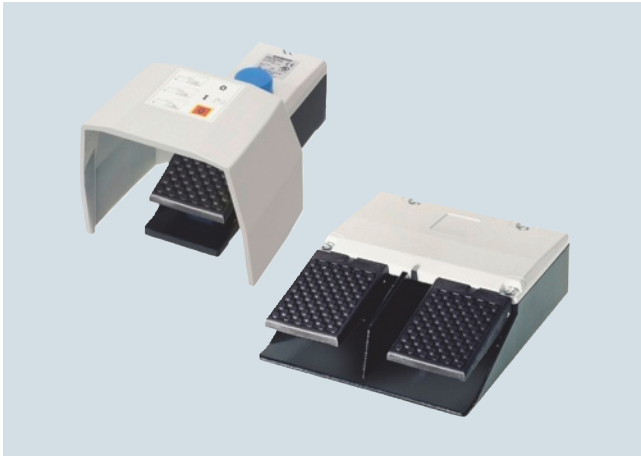
The switches with positive latching are suitable for operation in EMERGENCY-STOP devices according to EN ISO 13850. They can achieve up to category 4 according to EN ISO 13849-1 or SIL 3 according to IEC 61508.

Selection and ordering data

Version	Basic switches	DT	Article No.
ASIsafe cable-operated switches			
 3SF2120-1BF00-0BA1  3SF2150-1BF00-0BA1  3SF2140-1BF00-0BA1	Metal enclosures, IP65 (cover made of molded plastic), with dust protection, latching acc. to ISO 13850, with button reset, 2 NC contacts		
	<ul style="list-style-type: none"> For wire lengths up to 10 m, with alignment window 	3SE7120-1BF00 → C	3SF2120-1BF00-0BA1
	<ul style="list-style-type: none"> For wire lengths up to 25 m, with alignment window 	3SE7150-1BF00 → C	3SF2150-1BF00-0BA1
	<ul style="list-style-type: none"> For wire lengths up to 50 m 	3SE7140-1BF00 → B	3SF2140-1BF00-0BA1

→ Positive opening according to IEC 60947-5-1, Appendix K.

Overview



3SE29 foot switch with metal enclosure

Standard switches

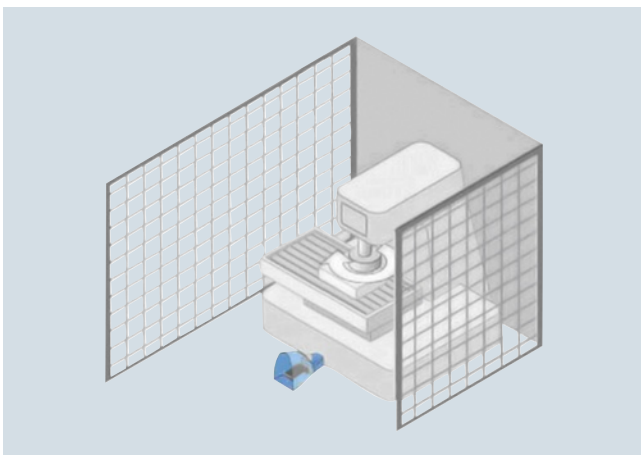
The 3SE29 and 3SE39 foot switch range encompasses versions in a metal enclosure for rugged applications as well as versions with plastic enclosure for less harsh environments. The devices can be supplied with or without a cover and have fixing holes for them to be screwed to the floor.

Depending on the particular application, the metal enclosures can be ordered in latching or momentary-contact versions. The momentary-contact pedal switch in the plastic enclosure has one microswitch (changeover contact) per actuating pedal.

Safety foot switches

The 3SE2924-3AA20 single-pedal safety foot switches are used on machines and plants as OK switches when operation by hand is not possible. The switches are interlocked according to EN ISO 13850 and bear the CE mark in accordance with the machinery directive.

The safety foot switches are protected by a guard hood against accidental operation.



Application example

The switches have two contact blocks, each with one NO contact and one NC contact. The NO contacts and NC contacts of the two contact blocks are connected for easy connection of a single-phase motor. The normal workflow is initiated by pressing down the pedal as far as the pressure point so that the two NO contacts close and the motor starts to run.

If in the event of danger the pedal is pressed beyond the resistance of the pressure point, the positively driven NC contacts will open and the motor is stopped. At the same time the independent latching takes effect and holds the NC contacts in open position. This prevents the machine parts from continuing to run out of control or from being restarted.

After the hazard is eliminated, the machine can only be restarted after manually releasing the switch using a pushbutton on the top of the enclosure. The contacts are then released again and return to their initial position (the NO contacts are open and the NC contacts are closed).







Technical specifications

Type	3SE29	3SE39
Metal and plastic enclosures		
Standards	IEC 60947-5-1	
Electrical load		
• At AC-15, 400 V		
- 1 NO + 1 NC	A 10	--
- 2 NO + 2 NC	A 6	--
- 3SE2924-3AA20 (2 NO + 2 NC)	A 10	
• At 250 V AC	A –	5
Short-circuit protection		
- 1 NO + 1 NC	A 10 (slow)	--
- 2 NO + 2 NC	A 6 (slow)	--
- 3SE2924-3AA20 (2 NO + 2 NC)	A 10 (slow)	--
- 1 CO contact	A --	5 (slow)
Mechanical endurance	> 10 ⁶ operating cycles	
Material		
• Enclosures	Aluminum casting	Impact-resistant thermoplast, self-extinguishing according to UL 94 VO
• Covers	Thermoplast	–
• Guard hoods	Aluminum casting	Metal
Degree of protection	IP65	IP65
Ambient temperature	°C -25 ... +80	-10 ... +75
Connection	Cable entry, metric	Cable AWG20, UL Style 2464, length 3 m

3SE2, 3SE3 foot switches

Plastic and metal enclosures

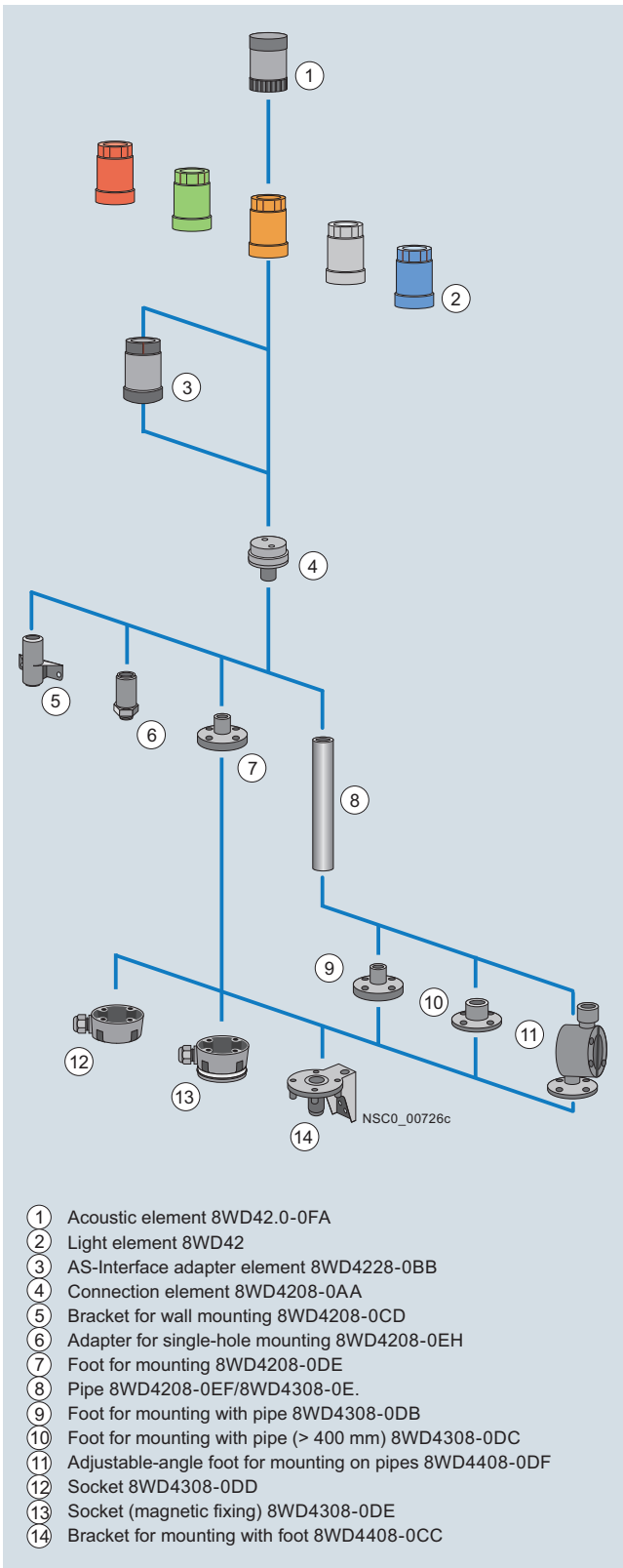
Selection and ordering data

Version		Slow-action con- tacts for each pedal		DT	Article No.
Metal enclosures, degree of protection IP65					
 3SE290.-.AA20 3SE291.-.AA20	Momentary-contact foot switches, single pedal				
	M20 x 1.5 cable entry				
	• Without hood	1 NO + 1 NC	↻	A	3SE2902-0AB20
		2 NO + 2 NC	↻	A	3SE2903-1AB20
	• With hood	1 NO + 1 NC	↻	A	3SE2902-0AA20
		2 NO + 2 NC	↻	A	3SE2903-1AA20
 3SE2912.-.AA20 3SE2924.-.AA20	Momentary-contact foot switches, single pedal				
	M20 x 1.5 cable entry				
	• Without hood	1 NO + 1 NC	↻	C	3SE2912-2AB20
	• With hood	1 NO + 1 NC	↻	C	3SE2912-2AA20
	 3SE2932.-.AB20 3SE2934.-.AA20	Momentary-contact foot switches, two pedals			
M25 x 1.5 cable entry					
• Without hood		1 NO + 1 NC	↻	B	3SE2932-0AB20
		2 NO + 2 NC	↻	B	3SE2932-1AB20
• With hood		1 NO + 1 NC	↻	B	3SE2932-0AA20
		2 NO + 2 NC	↻	B	3SE2932-1AA20
 3SE2924-3AA20	Safety foot switches, single pedal, with hood,		2 NO + 2 NC	↻	C
	M20 x 1.5 cable entry, with interlock according to ISO 13850, NO closes as momentary contact type, NC opens with latching				3SE2924-3AA20
Plastic enclosures, degree of protection IP65					
 3SE3902-4CA20 3SE3904-4CA20	Momentary-contact pedal switches,		Microswitch		
	3 m cable				
	• Single pedal				
	- Without hood	1 CO contact		B	3SE3902-4CB20
	- With hood	1 CO contact		B	3SE3902-4CA20
 3SE3934-5CB20	• Two pedals, without hood		2 x 1 CO	B	3SE3934-5CB20

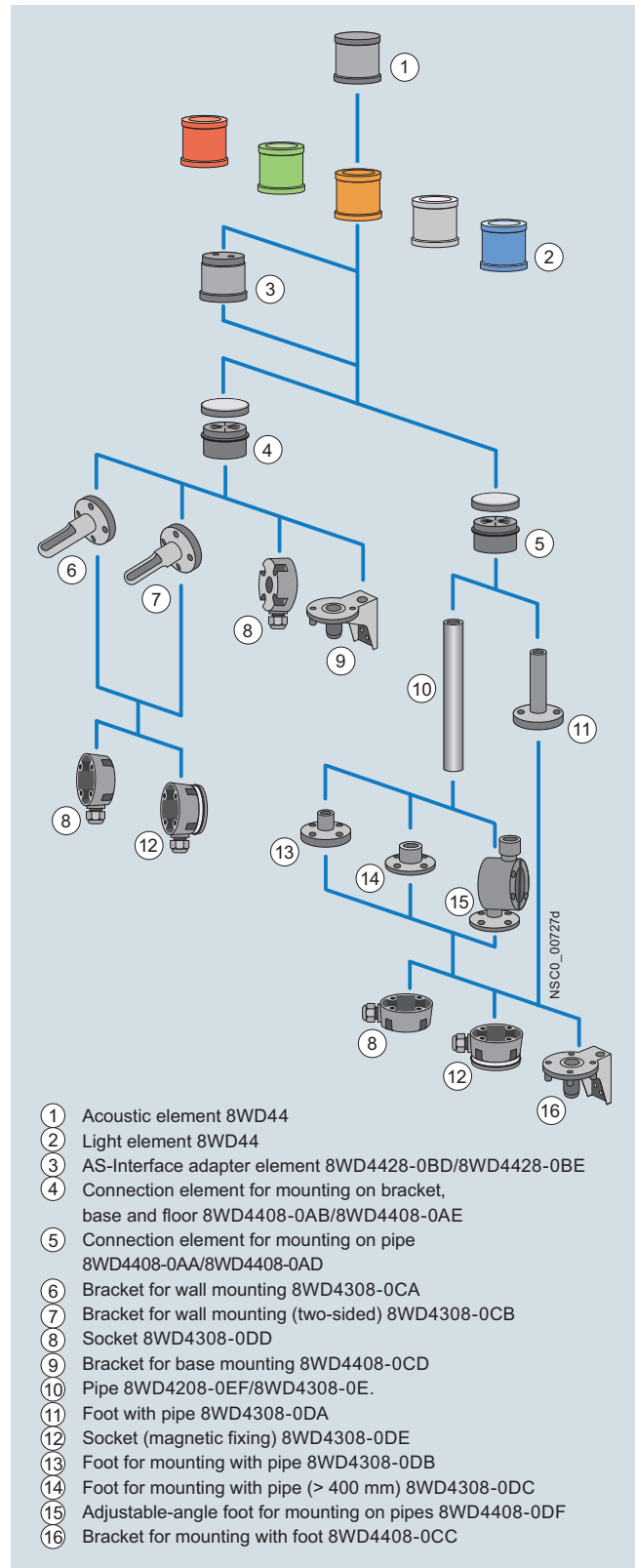
⊙ Positive opening according to IEC 60947-5-1, Appendix K.

Overview

The 8WD4 signaling columns are flexible in design and versatile in use.



8WD42 signaling column (width 50 mm) with up to 4 elements



8WD44 signaling columns (width 70 mm) with up to 5 elements

8WD4 signaling columns

General data

Two product series are available:

- 8WD42
 - Thermoplast enclosure, diameter 50 mm
 - Degree of protection IP54
 - Up to 4 elements can be mounted between the connection element and the cover
- 8WD44
 - Thermoplast enclosure, diameter 70 mm
 - Advanced design and significantly improved illumination
 - Fast and flexible connection using spring-type terminals
 - Integrated degree of protection IP65
 - Up to 5 elements can be mounted between the connection element and the cover



Signaling columns, mounting examples

The illustrated examples are from the left:

- 8WD42: Cover (no No.), four light elements ②, connection element ④, pipe ⑧, foot ⑨
- 8WD44: Acoustic element with cover ①, two light elements ②, connection element ⑤, foot with pipe ⑪
- 8WD44: Cover (no No.), four light elements ②, AS-Interface adapter element ③, connection element ④, bracket for wall mounting ⑥
- 8WD44: Cover (no No.), three light elements ②, AS-Interface adapter element ③, connection element ⑤, foot with pipe ⑪

Note:

The cover is supplied with the connection element.

Benefits

- Choice of various light and acoustic elements with different functions: continuous light, blinklight, flashlight and rotating light; buzzer and siren
- Light elements with particularly long-lasting LEDs
- Variety of colors: red, yellow, green, white or blue
- Optimized illumination through improved prism technology with the 8WD44
- Acoustic elements can be adjusted in tone and volume
- Extremely resistant to shock and vibrations
- Easy connection and quick lamp change with secure bayonet mechanism
- Communication capability through connection to AS-Interface

Application

8WD4 signaling columns are used in machines or in automatic processes for monitoring complex procedures or as visual or acoustic warning devices in emergency situations, e.g. for displaying individual assembly stages.

Communication capability

Connection to AS-Interface

The 8WD4 signaling columns can be directly connected to the AS-Interface bus system through an adapter element that can be integrated in the column. Wiring outlay is reduced as the result. The two-wire bus cable is fixed to the terminals in the connection element. Up to four signaling elements can be mounted on it using an adapter element.

A/B technology enables the connection of up to 62 slaves on one AS-Interface system.

Connection

The signaling elements are wired up using the screw terminals in the connection element, screw terminals on the 8WD42 and screw or spring-type terminals on the 8WD44.

Cable outlet

The connecting cables can be guided either downwards or sideways through the cable gland using an adapter that can be screwed under the foot. This makes wiring easier if there is no access from below.

Connection to AS-Interface

8WD42:

The two-wire bus cable is fixed to the screw terminals in the connection element. The adapter element must be the first module to be mounted on the connection element. A maximum of four signaling elements can then be mounted on it.

The 8WD4228-0BB adapter element is a standard slave.

8WD44:

The two-wire bus cable is fixed to the screw or spring-type terminals in the connection element. The adapter element must be the first module to be mounted on the connection element. The signaling elements can then be mounted on it.

The 8WD4428-0BE adapter element is a standard slave. A maximum of four signaling elements can be mounted on it.

The 8WD4428-0BD adapter element with A/B technology enables the connection of up to 62 slaves on one AS-Interface system. The addressing socket provides user-friendly parameterization of the AS-Interface elements. A maximum of three signaling elements can be mounted on it.

Technical specifications

Type	8WD42	8WD44
General data		
Approvals	UL, CSA	UL, CSA
Light and acoustic elements		
Rated voltage, power consumption		
Light elements with incandescent lamp	(AC values for 50/60 Hz)	(AC values for 50/60 Hz)
• Continuous light	12 V, 24 V, 115 V, 230 V AC/DC	12 V, 24 V, 115 V, 230 V AC/DC
• Blinklight	24 V AC/DC/125 mA; 115 V AC/20 mA; 230 V AC/15 mA	24 V AC/DC/125 mA; 115 V AC/20 mA; 230 V AC/15 mA
• Flashlights	--	24 V DC/125 mA; 115 V AC/20 mA; 230 V AC/35 mA
• Max. inrush current, blinklight/flashlight	--	500 mA
Light elements with integrated LED		
• Continuous light	24 V AC/DC/60 mA	24 V AC/DC/25 mA; 115 V AC/25 mA; 230 V AC/25 mA
• Blinklight	24 V AC/DC/60 mA; 115 V AC/60 mA; 230 V AC/60 mA	24 V AC/DC/40 mA
• Rotating light	--	24 V AC/DC/70 mA
Acoustic elements		
• Buzzer element (tone: pulsating or continuous tone)	80 dB: 24 V AC/DC/25 mA; 115 V AC/DC/25 mA; 230 V AC/25 mA	85 dB: 24 V AC/DC/25 mA; 115 V AC/25 mA; 230 V AC/25 mA
• Siren element (8 tones + amplification can be set, 100 dB)	--	24 V AC/DC/80 mA; 115 V AC/30 mA; 230 V AC/16 mA
• Siren element (108 dB)	--	24 V DC/100 mA
Power consumption		
• Incandescent lamps, base BA 15d	W	7
• Flashlight, flash energy	Ws	2
Endurance		
• Flashlights	--	4 × 10 ⁶ flashes
AS-Interface adapter elements		
IO code/ID code	8/F	8/E
Power supply		
• Operational voltage	V	Through bus cable
• Power consumption I_{\max}	mA	18.5 ... 31.6
		100
Protective measures		
• Watchdog	✓	✓
• Short-circuit/overload protection	External back-up fuse M 1.6 A	✓
• Reverse polarity protection	✓	✓
• Induction protection	N/A	✓
Outputs		
• Load voltage	V	4 relay outputs
	V	External auxiliary voltage
		0 ... 30 DC
		0 ... 230 AC
• Current carrying capacity ΣI_{\max}		3 solid-state outputs
- With external auxiliary voltage	A	Through bus cable or external auxiliary voltage, switch-selectable
- Without external auxiliary voltage	A	
		0.3
		0.2
Operating temperature	°C	-20 ... +50
		-20 ... +50
Enclosures		
Enclosure material	Thermoplast (polyamide), impact-resistant, black	Thermoplast (polyamide), impact-resistant, black
Light elements	Thermoplast (polycarbonate)	Thermoplast (polycarbonate)
Mounting		
• Horizontal (for base mounting, foot with 25 mm Ø pipe)	✓	✓
• Horizontal (single-hole mounting)	✓	--
• Vertical with bracket	✓	✓
Degree of protection		
• Light elements	IP54	IP65 (seal premounted with every module)
• Acoustic elements, AS-i adapter elements	IP54	IP65
Operating temperature	°C	-20 ... +50
		-20 ... +50
Connection		
• Conductor cross-sections	mm ²	Spring-type terminals/M3 screw terminals
• Tightening torque	Nm	Max. 2.5
		- / max. 0.5

8WD4 signaling columns

8WD42 signaling columns, 50 mm diameter

Overview

Features:

- Thermoplast enclosure, diameter 50 mm
- Degree of protection IP54

- Up to four elements can be mounted between the connection element and the cover

Selection and ordering data

Version	Rated voltage	Color	DT	Article No.		
V						
Acoustic elements ¹⁾						
	Buzzer elements 80 dB, pulsating or continuous tone, adjustable by means of a wire jumper	24 AC/DC	Black	A	8WD4220-0FA	
		115 AC/DC	Black	A	8WD4240-0FA	
		230 AC	Black	A	8WD4250-0FA	
Light elements for incandescent lamps/LEDs, BA 15d bases ²⁾						
	Continuous light elements	24 ... 230 AC/DC	Red	A	8WD4200-1AB	
			Green	A	8WD4200-1AC	
			Yellow	A	8WD4200-1AD	
			Clear	A	8WD4200-1AE	
			Blue	A	8WD4200-1AF	
Light elements with integrated LED						
	Continuous light elements	24 AC/DC	Red	A	8WD4220-5AB	
			Green	A	8WD4220-5AC	
			Yellow	A	8WD4220-5AD	
			Clear	A	8WD4220-5AE	
			Blue	A	8WD4220-5AF	
115 AC		Red	A	8WD4240-5AB		
		Green	A	8WD4240-5AC		
		Yellow	A	8WD4240-5AD		
		Clear	A	8WD4240-5AE		
		Blue	A	8WD4240-5AF		
230 AC		Red	A	8WD4250-5AB		
		Green	A	8WD4250-5AC		
		Yellow	A	8WD4250-5AD		
		Clear	A	8WD4250-5AE		
		Blue	A	8WD4250-5AF		
	Blinklight elements	24 AC/DC	Red	A	8WD4220-5BB	
			Green	A	8WD4220-5BC	
			Yellow	A	8WD4220-5BD	
			Clear	A	8WD4220-5BE	
			Blue	A	8WD4220-5BF	
115 AC		Red	A	8WD4240-5BB		
		Green	A	8WD4240-5BC		
		Yellow	A	8WD4240-5BD		
		Clear	A	8WD4240-5BE		
		Blue	A	8WD4240-5BF		
230 AC		Red	A	8WD4250-5BB		
		Green	A	8WD4250-5BC		
		Yellow	A	8WD4250-5BD		
		Clear	A	8WD4250-5BE		
		Blue	A	8WD4250-5BF		
	Flashlight elements	24 AC/DC	Red	A	8WD4220-0CB	
			Green	A	8WD4220-0CC	
			Yellow	A	8WD4220-0CD	
			Clear	A	8WD4220-0CE	
			Blue	A	8WD4220-0CF	
Adapter elements for AS-Interface						
		AS-Interface adapter elements with external auxiliary voltage	For 4 signaling elements 24 V DC	Black	A	8WD4228-0BB

¹⁾ One acoustic element can be mounted per signaling column. The cover is included in the scope of supply of the acoustic elements and fixed in place.

²⁾ The lamp is not included in the scope of supply. Please order separately.

8WD4 signaling columns

8WD42 signaling columns, 50 mm diameter

Version	Rated voltage	Color	DT	Article No.
	V			
Connection elements				
	Connection elements with cover For mounting on pipes, floors and angles Essential part for assembling the signaling columns	Black	A	8WD4208-0AA
Mounting				
	Feet, single	Plastic, for mounting on pipes Metal, for pipe lengths > 400 mm Plastic, for base mounting (without pipe)	A A A	8WD4308-0DB 8WD4308-0DC 8WD4208-0DE
	Adjustable-angle feet for positioning in 7.5° increments ¹⁾	Plastic, for mounting on pipes, incl. rubber seal	A	8WD4408-0DF
	Pipes, single	Length 100 mm Length 150 mm Length 250 mm Length 400 mm Length 1 000 mm	A A A A A	8WD4208-0EF 8WD4308-0EE 8WD4308-0EA 8WD4308-0EB 8WD4308-0ED
	Sockets for feet	Side cable outlet	A	8WD4308-0DD
		Side cable outlet, with magnetic fixing ²⁾	A	8WD4308-0DE
	Brackets for mounting with foot		A	8WD4408-0CC
	Brackets for wall mounting (plastic)	Mounting without feet and pipe	A	8WD4208-0CD
	Adapters for single-hole mounting	Mounting without feet and pipe, with M18 thread and fixing nut	A	8WD4208-0EH
Lamps				
	Incandescent lamps, 5 W Base BA 15d	24 AC/DC 115 AC 230 AC	Clear Clear Clear	A A A
	LEDs Base BA 15d	24 AC/DC 115 AC 230 AC	Red Green Yellow Clear Blue Red Green Yellow Clear Blue Red Green Yellow Clear Blue	A A A A A A A A A A A A A A A
				8WD4328-1XX 8WD4348-1XX 8WD4358-1XX 8WD4428-6XB 8WD4428-6XC 8WD4428-6XD 8WD4428-6XE 8WD4428-6XF 8WD4448-6XB 8WD4448-6XC 8WD4448-6XD 8WD4448-6XE 8WD4448-6XF 8WD4458-6XB 8WD4458-6XC 8WD4458-6XD 8WD4458-6XE 8WD4458-6XF

For labeling panels see 8WD44, page 2/148.

¹⁾ Markings for 30°, 45°, 60° and 90°.²⁾ For horizontal mounting, only 1 element is recommended.

8WD4 signaling columns






8WD44 signaling columns, 70 mm diameter

Overview

Features:

- Thermoplast enclosure, diameter 70 mm
- Advanced design and significantly improved illumination
- Fast and flexible connection using spring-type terminals
- Integrated degree of protection IP65
- Up to five elements can be mounted

Selection and ordering data

Version	Rated voltage	Color	DT	Article No.	
V					
Acoustic elements ¹⁾					
	Buzzer elements 85 dB, pulsating or continuous tone, adjustable by means of a wire jumper	24 AC/DC	Black	A	8WD4420-0FA
		115 AC	Black	A	8WD4440-0FA
		230 AC	Black	A	8WD4450-0FA
	Siren elements , multi-tone, 100 dB, 8 tones and volume are adjustable	24 AC/DC	Black	A	8WD4420-0EA2
		115 AC	Black	A	8WD4440-0EA2
		230 AC	Black	A	8WD4450-0EA2
	Siren elements 108 dB, IP40	24 DC	Black	A	8WD4420-0EA
Light elements for incandescent lamps/LEDs, BA 15d bases ²⁾					
	Continuous light elements	12 ... 230 AC/DC	Red	A	8WD4400-1AB
			Green	A	8WD4400-1AC
			Yellow	A	8WD4400-1AD
			Clear	A	8WD4400-1AE
			Blue	A	8WD4400-1AF
Light elements with integrated flash lamps ³⁾					
	Flashlight elements with integrated electronic flash	24 DC	Red	A	8WD4420-0CB
			Green	A	8WD4420-0CC
			Yellow	A	8WD4420-0CD
			Clear	A	8WD4420-0CE
			Blue	A	8WD4420-0CF
		115 AC	Red	A	8WD4440-0CB
			Green	D	8WD4440-0CC
			Yellow	A	8WD4440-0CD
			Clear	D	8WD4440-0CE
			Blue	D	8WD4440-0CF
		230 AC	Red	A	8WD4450-0CB
			Green	A	8WD4450-0CC
			Yellow	A	8WD4450-0CD
			Clear	A	8WD4450-0CE
			Blue	A	8WD4450-0CF

¹⁾ One acoustic element can be mounted per signaling column. The cover is included in the scope of supply of the acoustic elements and fixed in place.

²⁾ The lamp is not included in the scope of supply. Please order separately.

³⁾ The lamp is included in the scope of supply.

8WD4 signaling columns

8WD44 signaling columns, 70 mm diameter


Version	Rated voltage V	Color	DT	Article No.		
Light elements with integrated LED						
      	Continuous light elements	24 AC/DC	Red	A	8WD4420-5AB	
			Green	A	8WD4420-5AC	
			Yellow	A	8WD4420-5AD	
			Clear	A	8WD4420-5AE	
			Blue	A	8WD4420-5AF	
		115 AC	Red	A	8WD4440-5AB	
			Green	A	8WD4440-5AC	
			Yellow	A	8WD4440-5AD	
			Clear	A	8WD4440-5AE	
			Blue	A	8WD4440-5AF	
	230 AC	Red	A	8WD4450-5AB		
		Green	A	8WD4450-5AC		
		Yellow	A	8WD4450-5AD		
		Clear	A	8WD4450-5AE		
		Blue	A	8WD4450-5AF		
	Blinklight elements	24 AC/DC	Red	A	8WD4420-5BB	
			Green	A	8WD4420-5BC	
			Yellow	A	8WD4420-5BD	
			Clear	A	8WD4420-5BE	
			Blue	A	8WD4420-5BF	
			115 AC	Red	A	8WD4440-5BB
				Green	A	8WD4440-5BC
				Yellow	A	8WD4440-5BD
				Clear	A	8WD4440-5BE
				Blue	A	8WD4440-5BF
230 AC		Red	A	8WD4450-5BB		
		Green	A	8WD4450-5BC		
		Yellow	A	8WD4450-5BD		
		Clear	A	8WD4450-5BE		
		Blue	A	8WD4450-5BF		
Rotating light elements	24 AC/DC	Red	A	8WD4420-5DB		
		Green	A	8WD4420-5DC		
		Yellow	A	8WD4420-5DD		
		Clear	A	8WD4420-5DE		
		Blue	A	8WD4420-5DF		
Adapter elements for AS-Interface						
	AS-Interface adapter elements					
	With/without external auxiliary voltage, switchable					
	• A/B technology	For 3 signaling elements 24 V DC	Black	A	8WD4428-0BD	
	• Standard AS-i	For 4 signaling elements 24 V DC	Black	A	8WD4428-0BE	
Connection elements ¹⁾						
	Connection elements with cover		Black			
	Screw terminals					
	• For mounting on pipes		A	8WD4408-0AA		
	• For mounting on brackets and floors		A	8WD4408-0AB		
	Spring-type terminals					
	• For mounting on pipes		A	8WD4408-0AD		
	• For mounting on brackets and floors		A	8WD4408-0AE		
	Cover (replacement)		A	8WD4408-0XA		

¹⁾ The connection element with cover is an essential part for assembling the signaling columns.

8WD4 signaling columns

8WD44 signaling columns, 70 mm diameter

2

Version		DT	Article No.	
Mounting				
	Foot with pipe	Pipe length 100 mm	A	8WD4308-0DA
	Feet, single	Plastic, for mounting on pipes	A	8WD4308-0DB
		Metal, for pipe lengths > 400 mm	A	8WD4308-0DC
	Adjustable-angle feet for positioning in 7.5° increments ¹⁾	Plastic, for mounting on pipes, incl. rubber seal	A	8WD4408-0DF
	Pipes, single	Length 100 mm	A	8WD4208-0EF
		Length 150 mm	A	8WD4308-0EE
		Length 250 mm	A	8WD4308-0EA
		Length 400 mm	A	8WD4308-0EB
		Length 1 000 mm	A	8WD4308-0ED
	Sockets for feet	Side cable outlet (can also be used without feet)	A	8WD4308-0DD
		Side cable outlet, with magnetic fixing ²⁾	A	8WD4308-0DE
	Brackets for wall mounting (mounting without feet and pipe)	For single-sided mounting	A	8WD4308-0CA
		For double-sided mounting	A	8WD4308-0CB
	Brackets for mounting with foot		A	8WD4408-0CC
	Brackets for base mounting	Mounting without feet and pipe	A	8WD4408-0CD
	Adapter for mounting on pipes according to NPT	Mounting on pipes, Ø 25 mm, with NPT 1/2" thread	A	8WD4308-0DF

¹⁾ Markings for 30°, 45°, 60° and 90°.

²⁾ For horizontal mounting, only 1 element is recommended.

Lamps

[see page 2/145](#)

Inscriptions



Labeling panels

With fixing accessories for mounting on pipe Ø 25 mm
 Inscription area/ step 50 mm x 140 mm
 Suitable for standard labels, e.g.
 • Zweckform 3425
 • Herma 4457

A

8WD4408-0FA

Overview



8WD53 integrated signal lamps

Design

Features:

- Thermoplast enclosures, diameter 70 mm
- Degree of protection IP65
- Rated voltage 24 V, 115 V, 230 V AC/DC
- Ambient temper. -20 to +50 °C, incandescent lamp up to 60 °C

The special shape of the integrated signal lamps means that the light is emitted optimally in every direction (to the sides and upwards). Continuous lights (with incandescent lamp or LED) and single-flash lights are available in five colors.







The LED versions of the integrated signal lamps offer a considerably longer endurance than the incandescent lamp versions.

All integrated signal lamps have a high degree of protection IP65 and are made of a material highly resistant to impact.

Mounting

8WD53 integrated signal lamps can be mounted directly at any point of the machine for the purpose of giving visual signals. They are mounted by means of a Pg 29 screw base with nut.

Selection and ordering data

Version	Rated voltage	Color	DT	Article No.			
V							
Luminaires for incandescent lamps/LED, BA 15d base							
	Continuous lights ¹⁾	12 ... 230 AC/DC	Red	A	8WD5300-1AB		
			Green	A	8WD5300-1AC		
			Yellow	A	8WD5300-1AD		
			Clear	A	8WD5300-1AE		
			Blue	A	8WD5300-1AF		
Luminaires with integrated flash lamp							
 	Single-flash lights with integrated electronic flash	24 AC/DC	Red	A	8WD5320-0CB		
			Green	A	8WD5320-0CC		
			Yellow	A	8WD5320-0CD		
			Clear	A	8WD5320-0CE		
			Blue	A	8WD5320-0CF		
		115 AC	Red	A	8WD5340-0CB		
			Green	A	8WD5340-0CC		
			Yellow	A	8WD5340-0CD		
			Clear	A	8WD5340-0CE		
			Blue	D	8WD5340-0CF		
		230 AC	Red	A	8WD5350-0CB		
			Green	D	8WD5350-0CC		
			Yellow	A	8WD5350-0CD		
			Clear	A	8WD5350-0CE		
			Blue	D	8WD5350-0CF		
		Luminaires with integrated LED					
		 	Continuous light	24 AC/DC	Red	A	8WD5320-5AB
					Green	A	8WD5320-5AC
Yellow	A				8WD5320-5AD		
Clear	A				8WD5320-5AE		
Blue	A				8WD5320-5AF		
Blinklight lamps	24 AC/DC		Red	A	8WD5320-5BB		
			Green	A	8WD5320-5BC		
			Yellow	A	8WD5320-5BD		
			Clear	A	8WD5320-5BE		
			Blue	A	8WD5320-5BF		
Rotating lights	24 AC/DC		Red	A	8WD5320-5DB		
			Green	A	8WD5320-5DC		
			Yellow	A	8WD5320-5DD		
			Clear	A	8WD5320-5DE		
			Blue	A	8WD5320-5DF		
Accessories for mounting (optional)							
	Pipe adapter For mounting on pipes ²⁾		A	8WD5308-0EG			

¹⁾ Lamp not included in scope of supply, see Signaling Columns, page 2/148.

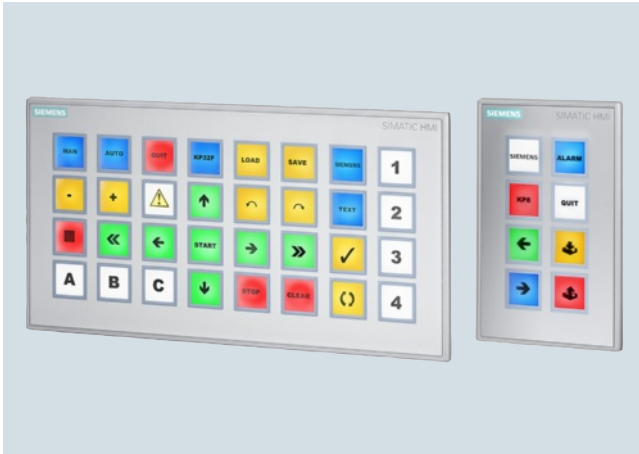
²⁾ Pipes and feet see Signaling Columns, page 2/148.

Operator control devices

Key panels

SIMATIC HMI KP8/KP8F/32F

Overview



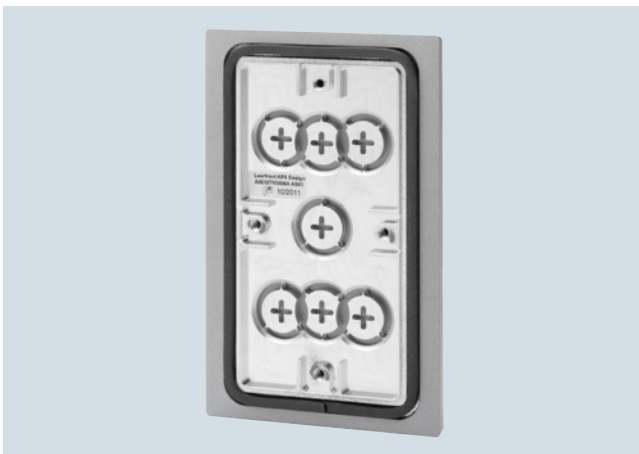
SIMATIC HMI KP32F and HMI KP8

SIMATIC HMI Key Panels

- Optimum operability thanks to large mechanical keys and multi-colored lamps (daylight readable)
- Over 60% time savings for wiring and installation (Plug&Play)
- More than 30% savings in material costs compared to conventional keypad operator panels
- 2 PROFINET ports (incl. switch) already integrated for setting up line and ring topologies
- Freely configurable digital I/Os on the rear for connecting key-operated switches, indicator lamps, etc.
- Connection of fail-safe emergency stop buttons or other fail-safe signals with KP8F and KP32F
- Functionally compatible with all standard PROFINET master CPUs, also non-Siemens
- KP8 and empty front design, also optimized for installation in IPC extension units in IP65
- Maximum flexibility due to parameterization
- Empty front design for standardized assembly of flexible operator panels



Empty front (Illustration similar)



Empty front (Illustration similar)

Operator control devices

Key panels

SIMATIC HMI KP8/KP8F/32F

Technical specifications

	6AV3688-3AY36-0AX0 SIMATIC HMI KP8 PN	6AV3688-3AF37-0AX0 SIMATIC HMI KP8F PN	6AV3688-3EH47-0AX0 SIMATIC HMI KP32F PN	6AV3688-3XY38-3AX0 SIMATIC HMI design empty front
Control elements				
With parameterizable keys	Yes	Yes	Yes	No
With key and signal lamp test	Yes; Automatically when switching on	Yes; Automatically when switching on	Yes; Automatically when switching on	No
Keyboard fonts				
• freely inscribable membrane keys	Yes	Yes	Yes	No
• Short stroke keys				
- Number of short-stroke keys	8	8	32	0
Expansions for operator control of the process				
• Number/LEDs	8	8	32	0
• Number of color modes for LED	5; Red, green, blue, white, yellow	5; Red, green, blue, white, yellow	5; Red, green, blue, white, yellow	0
• Number/keys	8	8	32	0
Installation type/mounting				
Rack mounting possible	No	No	No	No
Design/front/fastening	Yes; Compatible with extension unit dimensions	Yes; Compatible with extension unit dimensions	Yes	Yes; Compatible with extension unit dimensions
Mounting rail installation possible	No	No	No	No
Wall mounting/direct mounting possible	No	No	No	No
Mounting in portrait format possible	Yes	Yes	Yes	Yes
Mounting in landscape format possible	Yes	Yes	Yes	Yes
Mounting technology				
• Clamp terminals	Yes	Yes	Yes	Yes
Number of slots for command devices and signaling units	0	0	0	5; Max. 5 possible
Supply voltage				
Type of supply voltage	DC	DC	DC	external
Rated voltage (DC)	24 V	24 V	24 V	
permissible range, lower limit (DC)	20.4 V	20.4 V	20.4 V	
permissible range, upper limit (DC)	28.8 V	28.8 V	28.8 V	
Type of output				
LED colors				
• Red	Yes	Yes	Yes	No
• Yellow	Yes	Yes	Yes	No
• Green	Yes	Yes	Yes	No
• White	Yes	Yes	Yes	No
• Blue	Yes	Yes	Yes	No
Digital inputs				
Number/binary inputs	8; Max. 8 inputs and outputs (total)	8; Max. 32 inputs and outputs (total)	32; Max. 32 inputs and outputs (total)	0
Digital outputs				
Number/binary outputs	8; Max. 8 inputs and outputs (total)	8; Max. 8 inputs and outputs (total)	16; Max. 32 inputs and outputs (total)	0
Load "resistive"	100 mA	100 mA	100 mA	
Voltage (DC)	24 V; Non-isolated	24 V; Non-isolated	24 V; Non-isolated	
Number of digital outputs				
• Output current (per output) max.	100 mA	100 mA	100 mA	
• Total current (per group), max.	800 mA	800 mA	800 mA	
• Short-circuit protection	Yes	Yes	Yes	No

Operator control devices

Key panels

SIMATIC HMI KP8/KP8F/32F

Technical specifications (continued)

	6AV3688-3AY36-0AX0 SIMATIC HMI KP8 PN	6AV3688-3AF37-0AX0 SIMATIC HMI KP8F PN	6AV3688-3EH47-0AX0 SIMATIC HMI KP32F PN	6AV3688-3XY38-3AX0 SIMATIC HMI design empty front
Interfaces				
Supports protocol for PROFINET IO				
• Number of PROFINET interfaces	2; Incl. switch	2; Incl. switch	2; Incl. switch	0
Industrial Ethernet				
• Number of industrial Ethernet interfaces	2; For the construction of lines and rings without external switch	2; For the construction of lines and rings without external switch	2; For the construction of lines and rings without external switch	0
• Industrial Ethernet status LED	2; Per port	2; Per port	2; Per port	0
• Number of ports of the integrated switch	2; Per port	2; Per port	2; Per port	0
Protocols				
PROFINET	Yes; Incl. shared device	Yes; Incl. shared device	Yes; Incl. shared device	No
PROFINET IO	Yes	Yes	Yes	No
IRT supported	Yes	Yes	Yes	No
MRP supported	Yes	Yes	Yes	No
PROFINET CBA	No	No	No	No
PROFIsafe	No	Yes; Mode V2.0; 2 inputs can be used	Yes; Mode V2.0; 4 inputs can be used	No
PROFIBUS	No	No	No	No
Test commissioning functions				
Illuminant test	Yes; During switch on	Yes; During switch on	Yes; During switch on	No
Pushbutton and lamp test	Yes; During switch on	Yes; During switch on	Yes; During switch on	No
EMC				
Emission of radio interference acc. to EN 55 011				
• Emission of radio interferences acc. to EN 55 011 (limit class A)	Yes; Group 1, measured at a distance of 10 m	Yes; Group 1, measured at a distance of 10 m	Yes; Group 1, measured at a distance of 10 m	No
• Emission of radio interference acc. to EN 55 011 (limit class B)	No	No	No	No
Degree and class of protection				
Type of protection	IP20	IP20	IP20	IP20
IP (at the front)	IP65	IP65	IP65	IP65
Enclosure type 4x at the front	Yes; Incl. NEMA12	Yes; Incl. NEMA12	Yes; Incl. NEMA12	No
Standards, approvals, certificates				
CE	Yes	Yes	Yes	Yes
KC	Yes	Yes	Yes	No
cULus	Yes	Yes	Yes	No
C-TICK	Yes	Yes	Yes	No
GL	No	No	No	No
ABS	No	No	No	No
BV	No	No	No	No
DNV	No	No	No	No
LRS	No	No	No	No
Class NK	No	No	No	No
PRS	No	No	No	No
Suitable for safety functions	No	Yes	Yes	Yes; e.g. installation of emergency stop
Use in hazardous areas				
• ATEX Zone 2	Yes	Yes	No; On request	No
• ATEX Zone 22	Yes	Yes	No; On request	No
• cULus Class I Zone 1	No	No	No	No
• cULus Class I Zone 2, Division 2	Yes	Yes	Yes	No
• FM Class I Division 2	Yes	Yes; Available soon	Yes	No

Technical specifications (continued)

	6AV3688-3AY36-0AX0 SIMATIC HMI KP8 PN	6AV3688-3AF37-0AX0 SIMATIC HMI KP8F PN	6AV3688-3EH47-0AX0 SIMATIC HMI KP32F PN	6AV3688-3XY38-3AX0 SIMATIC HMI design empty front
Ambient conditions				
Mounting position	vertical	vertical	vertical	Any
maximum permissible angle of inclination without external ventilation	30°; To the front/rear	30°; To the front/rear	30°; To the front/rear	180°; To the front/rear
Operating temperature				
• Operating temperature range, max.	55 °C	55 °C	55 °C	55 °C
• Operating temperature range, min.	0 °C	0 °C	0 °C	0 °C
• Operation (vertical installation)				
- in vertical mounting position/ minimum	0 °C	0 °C	0 °C	0 °C
- in vertical mounting position/ maximum	55 °C	55 °C	55 °C	55 °C
• Operation (max. tilt angle)				
- at maximum tilt angle/ minimum	0 °C	0 °C	0 °C	0 °C
- at maximum tilt angle/ maximum	45 °C	45 °C	45 °C	45 °C
• Operation (vertical installation, portrait format)				
- in vertical mounting position/ minimum	0 °C	0 °C	0 °C	0 °C
- in vertical mounting position/ maximum	45 °C	45 °C	45 °C	45 °C
• Operation (max. tilt angle, portrait format)				
- at maximum tilt angle/ minimum	0 °C	0 °C	0 °C	0 °C
- at maximum tilt angle/ maximum	45 °C	45 °C	45 °C	45 °C
Storage/transport temperature				
• Min.	-20 °C	-20 °C	-20 °C	-20 °C
• max.	60 °C	60 °C	60 °C	60 °C
Relative humidity				
• max. relative humidity	95 %	95 %	95 %	95 %
Configuration				
Configuration software				
• STEP 7 Basic (TIA Portal)	Yes	Yes	Yes	No
• STEP 7 Professional (TIA Portal)	Yes	Yes	Yes	No
Functionality under WinCC (TIA Portal)				
Process coupling				
• S7-1200	Yes	Yes	Yes	Yes
• S7-1500	Yes	Yes	Yes	Yes
• S7-200	No	No	No	No
• S7-300/400	Yes	Yes	Yes	Yes
• LOGO!	No	No	No	No
• Win AC	Yes	Yes	Yes	Yes
• SINUMERIK	No	No	No	No
• SIMOTION	No	No	No	No
• Allen Bradley (EtherNet/IP)	No	No	No	No
• Allen Bradley (DF1)	No	No	No	No
• Mitsubishi (MC TCP/IP)	No	No	No	No
• Mitsubishi (FX)	No	No	No	No
• OMRON (FINS TCP)	No	No	No	No
• OMRON (LINK/Multilink)	No	No	No	No
• Modicon (Modbus TCP/IP)	No	No	No	No
• Modicon (Modbus)	No	No	No	No

Operator control devices

Key panels

SIMATIC HMI KP8/KP8F/32F

Technical specifications (continued)

	6AV3688-3AY36-0AX0 SIMATIC HMI KP8 PN	6AV3688-3AF37-0AX0 SIMATIC HMI KP8F PN	6AV3688-3EH47-0AX0 SIMATIC HMI KP32F PN	6AV3688-3XY38-3AX0 SIMATIC HMI design empty front
Mechanics/material				
Type of housing (front)				
• Plastic	Yes	Yes	No	No
• Aluminum	No	No	Yes	Yes
Lifetime, typ.				
• Short-stroke keys (in switching cycles)	1500000	1500000	1500000	
Dimensions				
Width of the housing front	98 mm	98 mm	295 mm	98 mm
Height of housing front	155 mm	155 mm	155 mm	155 mm
Depth/installation dimension	49 mm; Incl. angled SIMATIC Ethernet connector	49 mm; Incl. angled SIMATIC Ethernet connector	69 mm; Incl. angled SIMATIC Ethernet connector	49 mm
Mounting cutout (W x H x D)				
• Mounting cutout, width	68 mm; Max. thickness of mounting plate 2-6 mm	68 mm; Max. thickness of mounting plate 2-6 mm	277 mm; Max. thickness of mounting plate 2-6 mm	68 mm; Max. thickness of mounting plate 2-6 mm
• Mounting cutout, height	129 mm	129 mm	137 mm	129 mm
Weight				
Weight without packaging	270 g	280 g	1 220 g	240 g

Ordering data

Article No.

Article No.

SIMATIC HMI KP8 PN

Key Panel, 8 short-stroke keys with multicolored LEDs, PROFINET interfaces, 2 x parameterizable with STEP 7 V5.5

6AV3688-3AY36-0AX0

Documentation

You can find the manual for the Key Panels on the Internet at:

<http://support.automation.siemens.com/WW/view/en/56652789>

SIMATIC HMI KP8F PN

Key Panel, 8 short-stroke keys with multicolored LEDs, PROFINET interfaces with PROFIsafe, parameterizable with STEP 7 V5.5; 4 additional fail-safe inputs. Can be used as 2 x SIL 2 or 1 x SIL 3.

6AV3688-3AF37-0AX0

Accessories

see catalog ST 80/ST PC or Industry Mall
www.siemens.com/industrymall

SIMATIC HMI KP32F PN

KKey Panel, 32 short-stroke keys with multicolored LEDs, PROFINET interfaces with PROFIsafe, parameterizable with STEP 7 V5.5, including 8 fail-safe inputs. Can be used as 4 x SIL 2 or 2 x SIL 3

6AV3688-3EH47-0AX0

Empty front design

for standard 22.5 mm operator controls, same mounting dimensions as KP8

6AV3688-3XY38-3AX0

Demo Case

SIMATIC HMI Key Panel - low-cost demo and experiment case

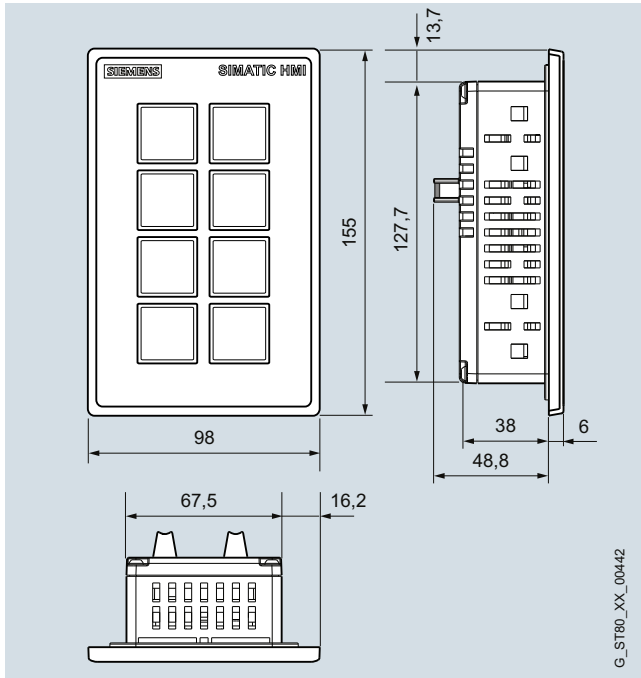
- Includes:
 - 1x case
 - 1x KP8 PN
 - 1x CPU1211C
 - 1x stand, permanently wired, including program
- Power supply possible with a standard laptop mains adapter (not included in scope of supply)

A5E31477788

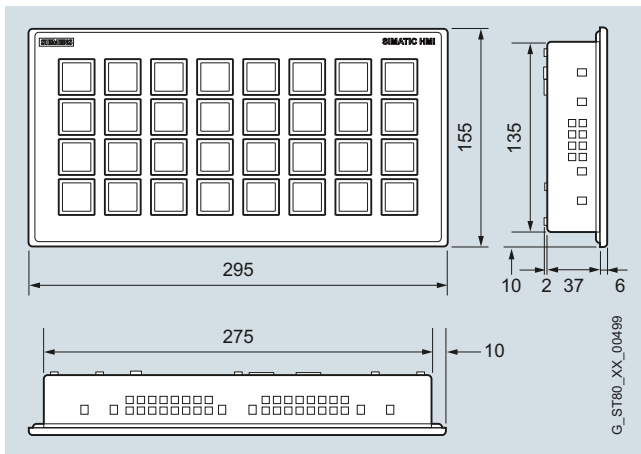
Only by fax to
Siemens AG,
Mr. Michael Christ
Industry Sector,
I IA CE SE MF RS FDS
Wuerzburger Str. 121,
90766 Fuerth, Germany
Tel.: +49 911 750-4128
Fax: +49 911 750-2411

Dimensional drawings

All dimensions in mm. For installation cutout, see technical specifications.



SIMATIC HMI Key Panel KP8; installation dimensions also valid for empty front design.



SIMATIC HMI Key Panel KP32F

More information

Further information can be found on the Internet at:
www.siemens.com/simatic-key-panels

Note:

Do you need a specific modification or extension to the products described here? Then refer to "Customized Automation". There you will find information about additional and generally available sector-specific products as well as options for customer-specific modification and adaptation.

DEMO case

Can be ordered by fax:

Siemens AG, Mr. Michael Christ
 Industry Sector, I IA CE SE MF RS FDS
 Wuerzburger Str. 121, 90766 Fuerth, Germany
 Tel.: +49 911 750-4128
 Fax: +49 911 750-2411

Operator control devices

Mobile panels – 270 Series

SIMATIC mobile panel 277(F) IWLAN

Overview



Mobile Panels

The SIMATIC Mobile Panels 277(F) IWLAN enable operator control and monitoring at the actual site of the event with direct access and visual contact to the process.

They provide wireless freedom and can thus be used flexibly on a machine or system.

Technical specifications

	6AV6645-0DD01-0AX1	6AV6645-0DE01-0AX1	6AV6645-0EB01-0AX1	6AV6645-0EC01-0AX1	6AV6645-0EF01-0AX1 RFID TAG
		with integrated handwheel, keyoperated switch and two illuminated pushbuttons	with integrated acknowledgement button and emergency stop button	with integrated acknowledgement button and emergency stop button, handwheel, key-operated switch, and two illuminated pushbuttons	with integrated acknowledgement button and emergency stop button, handwheel, key-operated switch, and two illuminated pushbuttons
Display					
Size	7.5"	7.5"	7.5"	7.5"	7.5"
Display type	TFT, 65536 colors	TFT, 65536 colors	TFT, 65536 colors	TFT, 65536 colors	TFT, 65536 colors
Resolution (pixels)					
• Resolution (WxH in pixel)	640 x 480	640 x 480	640 x 480	640 x 480	640 x 480
Backlighting					
• MTBF backlighting (at 25 °C)	about 50000 h	about 50000 h	about 50000 h	about 50000 h	about 50000 h
Control elements					
Operating options	Keys and Touch	Keys and Touch	Keys and Touch	Keys and Touch	Keys and Touch
Function keys, programmable	18 function keys, 18 with LEDs	18 function keys, 18 with LEDs	18 function keys, 18 with LEDs	18 function keys, 18 with LEDs	18 function keys, 18 with LEDs
Connection for mouse/keyboard/barcode reader	USB / USB / USB	USB / USB / USB	USB / USB / USB	USB / USB / USB	USB / USB / USB
Touch operation					
• Touch screen	Analog, resistive	Analog, resistive	Analog, resistive	Analog, resistive	Analog, resistive
Special operator controls					
• Emergency-Stop button	No	No	Yes	Yes	Yes
• Acknowledgement button	No	No	Yes	Yes	Yes
• Key-operated switch	No	Yes	No	Yes	Yes
• Illuminated pushbutton	No	Yes	No	Yes	Yes
• Handwheel	No	Yes	No	Yes	Yes
Supply voltage					
Supply voltage	DC	DC	DC	DC	DC
Via charging station	Yes	Yes	Yes	Yes	Yes
Via table power supply	Yes	Yes	Yes	Yes	Yes
Main Battery					
• Rated voltage	7.2 V	7.2 V	7.2 V	7.2 V	7.2 V
• Capacity	5 100 mA·h	5 100 mA·h	5 100 mA·h	5 100 mA·h	5 100 mA·h
• Number of loading cycles, min	500	500	500	500	500
• Charging time, typ.	4 h	4 h	4 h	4 h	4 h
• Operating time, typ.	4 h	4 h	4 h	4 h	4 h
• Display for battery capacity	Yes	Yes	Yes	Yes	Yes
• Energy-saving mode	Yes	Yes	Yes	Yes	Yes
• Battery replacement during operation	Yes	Yes	Yes	Yes	Yes

Operator control devices

Mobile panels – 270 Series

SIMATIC mobile panel 277(F) IWLAN

Technical specifications (continued)

	6AV6645-0DD01-0AX1	6AV6645-0DE01-0AX1 with integrated handwheel, key-operated switch and two illuminated pushbuttons	6AV6645-0EB01-0AX1 with integrated acknowledgement button and emergency stop button	6AV6645-0EC01-0AX1 with integrated acknowledgement button and emergency stop button, handwheel, key-operated switch, and two illuminated pushbuttons	6AV6645-0EF01-0AX1 RFID TAG with integrated acknowledgement button and emergency stop button, handwheel, key-operated switch, and two illuminated pushbuttons
Processor					
Processor	ARM, 520 MHz	ARM, 520 MHz	ARM, 520 MHz	ARM, 520 MHz	ARM, 520 MHz
Memory					
Type	Flash / RAM	Flash / RAM	Flash / RAM	Flash / RAM	Flash / RAM
Usable memory for user data	6 MB	6 MB	6 MB	6 MB	6 MB
Type of output					
Status LEDs	Yes	Yes	Yes	Yes	Yes
LED for safe			Yes	Yes	Yes
LED for communication	Yes	Yes	Yes	Yes	Yes
LED for battery	Yes	Yes	Yes	Yes	Yes
Vibrations	Yes	Yes	Yes	Yes	Yes
Time of day					
Clock					
• Type	Hardware clock, battery backup, synchronizable	Hardware clock, battery backup, synchronizable	Hardware clock, battery backup, synchronizable	Hardware clock, battery backup, synchronizable	Hardware clock, battery backup, synchronizable
Interfaces					
Interfaces	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)
USB port	1 x USB	1 x USB	1 x USB	1 x USB	1 x USB
Multi Media Card slot	1 MMC/SD card slot	1 MMC/SD card slot	1 MMC/SD card slot	1 MMC/SD card slot	1 MMC/SD card slot
Industrial Ethernet					
• Industrial Ethernet interface	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)
WLAN					
• Wireless LAN	Yes	Yes	Yes	Yes	Yes
• Supports rapid roaming	Yes	Yes	Yes	Yes	Yes
Protocols					
PROFINET	Yes	Yes	Yes	Yes	Yes
PROFINET IO	Yes	Yes	Yes	Yes	Yes
PROFIsafe			Yes	Yes	Yes
EMC					
• Emission of radio interferences acc. to EN 55 011 (limit class A)	Yes; The product is designed for use in industrial environments. When used in residential areas, the emission of radio interference according to limit class B of EN 55011 must be ensured. For further information refer to the user documentation				
Degree and class of protection					
IP65 enclosure	Yes	Yes	Yes	Yes	Yes
Standards, approvals, certificates					
Certifications	CE, cULus, C-TICK	CE, cULus, C-TICK	CE, cULus, C-TICK	CE, cULus, C-TICK	CE, cULus, C-TICK
TÜV safety certification			Yes	Yes	Yes
Safety category according to IEC 61508			SIL 3	SIL 3	SIL 3
Highest safety class achievable in safety mode					
• Performance Level in accordance with EN ISO 13849-1			e	e	e

Operator control devices

Mobile panels – 270 Series

SIMATIC mobile panel 277(F) IWLAN

Technical specifications (continued)

	6AV6645-0DD01-0AX1	6AV6645-0DE01-0AX1 with integrated handwheel, keyoperated switch and two illuminated pushbuttons	6AV6645-0EB01-0AX1 with integrated acknowledgement button and emergency stop button	6AV6645-0EC01-0AX1 with integrated acknowledgement button and emergency stop button, handwheel, key-operated switch, and two illuminated pushbuttons	6AV6645-0EF01-0AX1 RFID TAG with integrated acknowledgement button and emergency stop button, handwheel, key-operated switch, and two illuminated pushbuttons
Ambient conditions					
Drop height	1.2 m	1.2 m	1.2 m	1.2 m	1.2 m
Operating temperature	0 °C to +40 °C	0 °C to +40 °C	0 °C to +40 °C	0 °C to +40 °C	0 °C to +40 °C
Storage/transport temperature	-20 °C to +60 °C	-20 °C to +60 °C	-20 °C to +60 °C	-20 °C to +60 °C	-20 °C to +60 °C
Max. relative humidity	80 %	80 %	80 %	80 %	80 %
Operating systems					
Operating system	Windows CE	Windows CE	Windows CE	Windows CE	Windows CE
Languages					
• Number of online/run-time languages	16	16	16	16	16
Functionality under WinCC (TIA Portal)					
Libraries	Yes	Yes	Yes	Yes	Yes
Task planner	Yes	Yes	Yes	Yes	Yes
With alarm logging system (incl. buffer and acknowledgment)					
• Number of messages	4 000	4 000	4 000	4 000	4 000
• Bit messages	Yes	Yes	Yes	Yes	Yes
• Analog messages	Yes	Yes	Yes	Yes	Yes
Recipes					
• Number of recipes	300	300	300	300	300
• Data records per recipe	500	500	500	500	500
• Entries per data record	1 000	1 000	1 000	1 000	1 000
• Recipe memory	64 KB integrated Flash, expandable	64 KB integrated Flash, expandable	64 KB integrated Flash, expandable	64 KB integrated Flash, expandable	64 KB integrated Flash, expandable
Variables					
• Number of variables per device	2 048	2 048	2 048	2 048	2 048
• Limit values	Yes	Yes	Yes	Yes	Yes
• Multiplexing	Yes	Yes	Yes	Yes	Yes
Images					
• Number of configurable images	500	500	500	500	500
Image objects					
• Text objects	10000 text elements	10000 text elements	10000 text elements	10000 text elements	10000 text elements
• Graphics object	Bit maps, icons, vector graphics	Bit maps, icons, vector graphics	Bit maps, icons, vector graphics	Bit maps, icons, vector graphics	Bit maps, icons, vector graphics
Complex image objects					
• Status/control	With SIMATIC S7	With SIMATIC S7	With SIMATIC S7	With SIMATIC S7	With SIMATIC S7
• dynamic objects	Diagrams, bar graphs, sliders, analog display, invisible buttons	Diagrams, bar graphs, sliders, analog display, invisible buttons	Diagrams, bar graphs, sliders, analog display, invisible buttons	Diagrams, bar graphs, sliders, analog display, invisible buttons	Diagrams, bar graphs, sliders, analog display, invisible buttons
Lists					
• Number of text lists per project	500	500	500	500	500
• Number of graphics lists per project	400	400	400	400	400
Archiving					
• Number of archives per device	20	20	20	20	20
• Number of measuring points per project	20	20	20	20	20
• Number of entries per archive	10 000	10 000	10 000	10 000	10 000
Security					
• Number of user groups	50	50	50	50	50
• Number of user rights	32	32	32	32	32
• Password export/import	Yes	Yes	Yes	Yes	Yes

Operator control devices

Mobile panels – 270 Series

SIMATIC mobile panel 277(F) IWLAN

Technical specifications (continued)

	6AV6645-0DD01-0AX1	6AV6645-0DE01-0AX1 with integrated handwheel, key-operated switch and two illuminated pushbuttons	6AV6645-0EB01-0AX1 with integrated acknowledgement button and emergency stop button	6AV6645-0EC01-0AX1 with integrated acknowledgement button and emergency stop button, handwheel, key-operated switch, and two illuminated pushbuttons	6AV6645-0EF01-0AX1 RFID TAG with integrated acknowledgement button and emergency stop button, handwheel, key-operated switch, and two illuminated pushbuttons
Logging through printer • Recording/Printing	Alarms, report (shift report), PROFINET	Alarms, report (shift report), PROFINET	Alarms, report (shift report), PROFINET	Alarms, report (shift report), PROFINET	Alarms, report (shift report), PROFINET
Transfer (upload/download) • Transfer of configuration • Wireless LAN	USB, Ethernet, automatic transfer recognition Yes	USB, Ethernet, automatic transfer recognition Yes	USB, Ethernet, automatic transfer recognition Yes	USB, Ethernet, automatic transfer recognition Yes	USB, Ethernet, automatic transfer recognition Yes
Process coupling • Connection to controller • S7-1200 • S7-1500 • Zones - Number of zones per project, max. - Number of transponders for zones per project, max. • Effective range - Number of effective ranges per project, max. - Number of transponders for effective ranges per project, max. • Transponder - Number of transponders per project, max. - Adjustable distance range - Adjustable distance, min. - Adjustable distance, max.	S7-200, S7-300/400 Yes Yes Yes 254 255 Yes 256 Yes 2 m 8 m	S7-200, S7-300/400 Yes Yes Yes 254 255 Yes 256 Yes 2 m 8 m	S7-200, S7-300/400 No No (available soon) Yes 254 255 Yes 127 127 Yes 256 Yes 2 m 8 m	S7-200, S7-300/400 No No (available soon) Yes 254 255 Yes 127 127 Yes 256 Yes 2 m 8 m	S7-200, S7-300/400 No No (available soon) Yes 127
I/O I/O devices • Multi Media Card	Barcode reader Yes	Barcode reader Yes	Barcode reader Yes	Barcode reader Yes	Barcode reader Yes
Mechanics/material Type of housing (front)	Plastic	Plastic	Plastic	Plastic	Plastic
Dimensions Housing diameter/depth	Dia 290 mm / D 103 mm	Dia 290 mm / D 103 mm	Dia 290 mm / D 103 mm	Dia 290 mm / D 103 mm	Dia 290 mm / D 103 mm
Weight Weight	2.2 kg	2.2 kg	2.2 kg	2.2 kg	2.2 kg
	6AV6645-0FD01-0AX1 USA version	6AV6645-0FE01-0AX1 USA version with handwheel, key-operated switch and two illuminated pushbuttons	6AV6645-0GB01-0AX1 USA version with integrated acknowledgement button and emergency stop button	6AV6645-0GC01-0AX1 USA version with integrated acknowledgement button and emergency stop button, handwheel, key-operated switch, and two illuminated pushbuttons	6AV6645-0GF01-0AX1 USA version RFID TAG with integrated acknowledgement button and emergency stop button, handwheel, key-operated switch, and two illuminated pushbuttons
Display • Size • Display type • Resolution (WxH in pixel)	7.5" TFT, 65536 colors 640 x 480	7.5" TFT, 65536 colors 640 x 480	7.5" TFT, 65536 colors 640 x 480	7.5" TFT, 65536 colors 640 x 480	7.5" TFT, 65536 colors 640 x 480
Backlighting • MTBF backlighting (at 25 °C)	50 000 h		50 000 h	50 000 h	50 000 h

Operator control devices

Mobile panels – 270 Series

SIMATIC mobile panel 277(F) IWLAN

Technical specifications (continued)

	6AV6645-0FD01-0AX1 USA version	6AV6645-0FE01-0AX1 USA version with handwheel, key-operated switch and two illuminated pushbuttons	6AV6645-0GB01-0AX1 USA version with integrated acknowledgement button and emergency stop button	6AV6645-0GC01-0AX1 USA version with integrated acknowledgement button and emergency stop button, handwheel, key-operated switch, and two illuminated pushbuttons	6AV6645-0GF01-0AX1 USA version RFID TAG with inte- grated acknowledge- ment button and emergency stop but- ton, handwheel, key-operated switch, and two illuminated pushbuttons
Control elements					
Operating options	Keys and Touch	Keys and Touch	Keys and Touch	Keys and Touch	Keys and Touch
Function keys, programmable	18 function keys, 18 with LEDs	18 function keys, 18 with LEDs	18 function keys, 18 with LEDs	18 function keys, 18 with LEDs	18 function keys, 18 with LEDs
Connection for mouse/keyboard/barcode reader	USB / USB / USB	USB / USB / USB	USB / USB / USB	USB / USB / USB	USB / USB / USB
Touch operation					
• Touch screen	Analog, resistive	Analog, resistive	Analog, resistive	Analog, resistive	Analog, resistive
Special operator controls					
• Emergency-Stop button	No	No	Yes	Yes	Yes
• Acknowledgement button	No	No	Yes	Yes	Yes
• Key-operated switch	No	Yes	No	Yes	Yes
• Illuminated pushbutton	No	Yes	No	Yes	Yes
• Handwheel	No	Yes	No	Yes	Yes
Supply voltage					
• Supply voltage	DC	DC	DC	DC	DC
• Via charging station	Yes	Yes	Yes	Yes	Yes
• Via table power supply	Yes	Yes	Yes	Yes	Yes
Main Battery					
• Rated voltage	7.2 V	7.2 V	7.2 V	7.2 V	7.2 V
• Capacity	5 100 mA·h	5 100 mA·h	5 100 mA·h	5 100 mA·h	5 100 mA·h
• Number of loading cycles, min	500	500	500	500	500
• Charging time, typ.	4 h	4 h	4 h	4 h	4 h
• Operating time, typ.	4 h	4 h	4 h	4 h	4 h
• Display for battery capacity	Yes	Yes	Yes	Yes	Yes
• Energy-saving mode	Yes	Yes	Yes	Yes	Yes
• Battery replacement during operation	Yes	Yes	Yes	Yes	Yes
Processor					
Processor	ARM, 520 MHz	ARM, 520 MHz	ARM, 520 MHz	ARM, 520 MHz	ARM, 520 MHz
Memory					
Type	Flash / RAM	Flash / RAM	Flash / RAM	Flash / RAM	Flash / RAM
Usable memory for user data	6 MB	6 MB	6 MB	6 MB	6 MB
Type of output					
• Status LEDs	Yes	Yes	Yes	Yes	Yes
• LED for safe			Yes	Yes	Yes
• LED for communication	Yes	Yes	Yes	Yes	Yes
• LED for battery	Yes	Yes	Yes	Yes	Yes
• Vibrations	Yes	Yes	Yes	Yes	Yes
Time of day					
• Clock type	Hardware clock, battery backup, synchronizable	Hardware clock, battery backup, synchronizable	Hardware clock, battery backup, synchronizable	Hardware clock, battery backup, synchronizable	Hardware clock, battery backup, synchronizable
Interfaces					
Interfaces	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)
USB port	1 x USB	1 x USB	1 x USB	1 x USB	1 x USB
Multi Media Card slot	1 MMC/SD card slot	1 MMC/SD card slot	1 MMC/SD card slot	1 MMC/SD card slot	1 MMC/SD card slot
Industrial Ethernet	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)
WLAN					
• Wireless LAN	Yes	Yes	Yes	Yes	Yes
• Supports rapid roaming	Yes	Yes	Yes	Yes	Yes
Protocols					
• PROFINET	Yes	Yes	Yes	Yes	Yes
• PROFINET IO	Yes	Yes	Yes	Yes	Yes
• PROFIsafe			Yes	Yes	Yes

Operator control devices

Mobile panels – 270 Series

SIMATIC mobile panel 277(F) IWLAN

Technical specifications (continued)

	6AV6645-0FD01-0AX1 USA version	6AV6645-0FE01-0AX1 USA version with handwheel, keyoperated switch and two illuminated pushbuttons	6AV6645-0GB01-0AX1 USA version with integrated acknowledgement button and emergency stop button	6AV6645-0GC01-0AX1 USA version with integrated acknowledgement button and emergency stop button, handwheel, key-operated switch, and two illuminated pushbuttons	6AV6645-0GF01-0AX1 USA version RFID TAG with inte- grated acknowledge- ment button and emergency stop but- ton, handwheel, key-operated switch, and two illuminated pushbuttons
EMC • Emission of radio interferences acc. to EN 55 011 (limit class A)	Yes; The product is designed for use in industrial environments. When used in residential areas, the emission of radio interference according to limit class B of EN 55011 must be ensured. For further information refer to the user documentation				
Degree and class of protection IP65 enclosure	Yes	Yes	Yes	Yes	Yes
Standards, approvals, certificates Certifications	CE, cULus, C-TICK	CE, cULus, C-TICK	CE, cULus, C-TICK	CE, cULus, C-TICK	CE, cULus, C-TICK
TÜV safety certification			Yes	Yes	Yes
Safety category according to EN954-1			SIL 3	SIL 3	SIL 3
Highest safety class achievable in safety mode • Performance Level in accordance with EN ISO 13849-1			e	e	e
Ambient conditions Drop height	1.2 m	1.2 m	1.2 m	1.2 m	1.2 m
Operating temperature	0 °C to +40 °C	0 °C to +40 °C	0 °C to +40 °C	0 °C to +40 °C	0 °C to +40 °C
Storage/transport temperature	-20 °C to +60 °C	-20 °C to +60 °C	-20 °C to +60 °C	-20 °C to +60 °C	-20 °C to +60 °C
Max. relative humidity	80 %	80 %	80 %	80 %	80 %
Operating systems Operating system	Windows CE	Windows CE	Windows CE	Windows CE	Windows CE
Languages • Number of online/ runtime languages	16	16	16	16	16
Functionality under WinCC (TIA Portal) Libraries	Yes	Yes	Yes	Yes	Yes
Task planner	Yes	Yes	Yes	Yes	Yes
With alarm logging system • Number of messages • Bit messages • Analog messages	4 000 Yes Yes	4 000 Yes Yes	4 000 Yes Yes	4 000 Yes Yes	4 000 Yes Yes
Recipes • Number of recipes • Data records per recipe • Entries per data record • Recipe memory	300 500 1 000 64 KB integrated Flash, expandable	300 500 1 000 64 KB integrated Flash, expandable	300 500 1 000 64 KB integrated Flash, expandable	300 500 1 000 64 KB integrated Flash, expandable	300 500 1 000 64 KB integrated Flash, expandable
Variables • Number of variables per device • Limit values • Multiplexing	2 048 Yes Yes	2 048 Yes Yes	2 048 Yes Yes	2 048 Yes Yes	2 048 Yes Yes
Images • Number of configurable images	500	500	500	500	500
Image objects • Text objects • Graphics object	10000 text elements Bit maps, icons, vector graphics	10000 text elements Bit maps, icons, vector graphics	10000 text elements Bit maps, icons, vector graphics	10000 text elements Bit maps, icons, vector graphics	10000 text elements Bit maps, icons, vector graphics
Complex image objects • Status/control • dynamic objects	With SIMATIC S7 Diagrams, bar graphs, sliders, analog display, invisible buttons	With SIMATIC S7	With SIMATIC S7	With SIMATIC S7	With SIMATIC S7

Operator control devices

Mobile panels – 270 Series

SIMATIC mobile panel 277(F) IWLAN

Technical specifications (continued)

	6AV6645-0FD01-0AX1 USA version	6AV6645-0FE01-0AX1 USA version with handwheel, key-operated switch and two illuminated pushbuttons	6AV6645-0GB01-0AX1 USA version with integrated acknowledgement button and emergency stop button	6AV6645-0GC01-0AX1 USA version with integrated acknowledgement button and emergency stop button, handwheel, key-operated switch, and two illuminated pushbuttons	6AV6645-0GF01-0AX1 USA version RFID TAG with inte- grated acknowledge- ment button and emergency stop but- ton, handwheel, key-operated switch, and two illuminated pushbuttons
Lists					
• Number of text lists per project	500	500	500	500	500
• Number of graphics lists per project	400	400	400	400	400
Archiving					
• Number of archives per device	20	20	20	20	20
• Number of measuring points per project	20	20	20	20	20
• Number of entries per archive	10 000	10 000	10 000	10 000	10 000
Security					
• Number of user groups	50	50	50	50	50
• Number of user rights	32	32	32	32	32
• Password export/import	Yes	Yes	Yes	Yes	Yes
Logging through printer					
• Recording/Printing	Alarms, report (shift report), PROFINET	Alarms, report (shift report), PROFINET	Alarms, report (shift report), PROFINET	Alarms, report (shift report), PROFINET	Alarms, report (shift report), PROFINET
Transfer (upload/download)					
• Transfer of configuration	USB, Ethernet, auto- matic transfer recogni- tion	USB, Ethernet, auto- matic transfer recogni- tion	USB, Ethernet, auto- matic transfer recogni- tion	USB, Ethernet, auto- matic transfer recogni- tion	USB, Ethernet, auto- matic transfer recogni- tion
• Wireless LAN	Yes	Yes	Yes	Yes	Yes
Process coupling					
• Connection to controller	S7-200, S7- 300/400	S7-200, S7- 300/400	S7-200, S7- 300/400	S7-200, S7- 300/400	S7-200, S7- 300/400
• S7-1200	Yes	Yes	No	No	No
• S7-1500	Yes	Yes	No (available soon)	No (available soon)	No (available soon)
• Zones	Yes	Yes	Yes	Yes	Yes
- Number of zones per project, max.	254	254	254	254	254
- Number of transponders for zones per project, max.	255	255	255	255	255
• Effective range			Yes	Yes	Yes
- Number of effective ranges per project, max.			127	127	127
- Number of transponders for effective ranges per project, max.			127	127	127
• Transponder	Yes	Yes	Yes	Yes	Yes
- Number of transpon- ders per project, max.	256	256	256	256	256
- Adjustable distance range	Yes	Yes	Yes	Yes	Yes
- Adjustable distance, min.	2 m	2 m	2 m	2 m	2 m
- Adjustable distance, max.	8 m	8 m	8 m	8 m	8 m
I/O					
I/O devices	Barcode reader	Barcode reader	Barcode reader	Barcode reader	Barcode reader
• Multi Media Card	Yes	Yes	Yes	Yes	Yes
Mechanics/material					
Type of housing (front)	Plastic	Plastic	Plastic	Plastic	Plastic
Dimensions					
Housing diameter/depth	Dia 290 mm / D 103 mm	Dia 290 mm / D 103 mm	Dia 290 mm / D 103 mm	Dia 290 mm / D 103 mm	Dia 290 mm / D 103 mm
Weight					
Weight	2.2 kg	2.2 kg	2.2 kg	2.2 kg	2.2 kg

Operator control devices

Mobile panels – 270 Series

SIMATIC mobile panel 277(F) IWLAN

Ordering data

	Article-No.
SIMATIC Mobile Panel 277 IWLAN V2 (RoW version ¹⁾) <ul style="list-style-type: none"> Communication via WLAN (PROFINET) 	6AV6645-0DD01-0AX1
<ul style="list-style-type: none"> Communication via WLAN (PROFINET) with integrated handwheel, key-operated switch and two illuminated pushbuttons 	6AV6645-0DE01-0AX1
SIMATIC Mobile Panel 277F IWLAN V2 PROFIsafe (RoW version ¹⁾) <ul style="list-style-type: none"> Communication via WLAN (PROFINET) with acknowledgement button and emergency stop button 	6AV6645-0EB01-0AX1
<ul style="list-style-type: none"> Communication via WLAN (PROFINET) with acknowledgement button and emergency stop button with integrated handwheel, key-operated switch, and two illuminated push-buttons 	6AV6645-0EC01-0AX1
<ul style="list-style-type: none"> RFID tag version: Communication via WLAN (PROFINET) with acknowledgement button and emergency stop button with integrated handwheel, key-operated switch, and two illuminated pushbuttons 	6AV6645-0EF01-0AX1
SIMATIC Mobile Panel 277 IWLAN V2 (USA version) <ul style="list-style-type: none"> Communication via WLAN (PROFINET) 	6AV6645-0FD01-0AX1
<ul style="list-style-type: none"> Communication via WLAN (PROFINET) with integrated handwheel, key-operated switch and two illuminated pushbuttons 	6AV6645-0FE01-0AX1
SIMATIC Mobile Panel 277F IWLAN V2 PROFIsafe (USA version) <ul style="list-style-type: none"> with acknowledgement button and emergency stop button 	6AV6645-0GB01-0AX1
<ul style="list-style-type: none"> with acknowledgement button and emergency stop button with integrated handwheel, key-operated switch, and two illuminated push-buttons 	6AV6645-0GC01-0AX1
<ul style="list-style-type: none"> with acknowledgement button and emergency stop button with integrated handwheel, key-operated switch, and two illuminated push-buttons (tag version) 	6AV6645-0GF01-0AX1
Starter kit SIMATIC Mobile Panel 277(F) IWLAN (RoW version ¹⁾)	
for	
• Mobile Panel 277 IWLAN V2	6AV6651-5GA01-0AA1
• Mobile Panel 277F IWLAN V2	6AV6651-5HA01-0AA1

Accessories

Note:

Please order the table-top power supply or charging station as well. Required for charging the battery.

Documentation

You can find the manuals for the Mobile Panels on the Internet at:

<http://support.automation.siemens.com/WW/view/en/11599011/133300>

SIMATIC Manual Collection

Electronic documentation on DVD, 5 languages (English, German, French, Italian and Spanish); contains: all manuals about S7-1200/200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, Engineering SW, RT, SW, PC57, SIMATIC HMI, SIMATIC NET, SIMATIC IDENT.

Article-No.

See catalog ST 80/ST PC or Industry Mall
www.siemens.com/industrymall

6ES7998-8XC01-8YE0

¹⁾ RoW version: "Rest of World" version:
Version for worldwide sales except in the U.S.

For national approvals see:

www.siemens.com/wireless-approvals

The Function Manuals "Fail-Safe Operation of the Mobile Panel 277F IWLAN V1" are available for downloading in English, German, and Japanese.

<http://support.automation.siemens.com/WW/view/en/31255853>

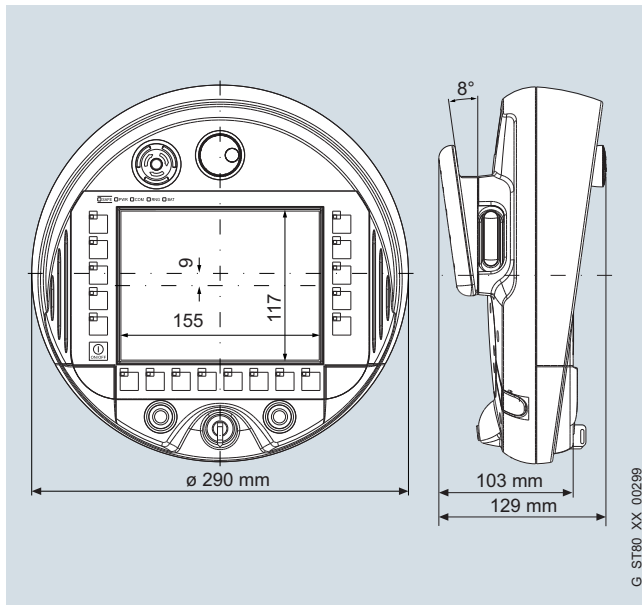
Operator control devices

Mobile panels – 270 Series

SIMATIC mobile panel 277(F) IWLAN

Dimensional drawings

All dimensions in mm. For installation cutout, see technical specifications.



Mobile Panel 277(F) IWLAN, front and side view

More information

Additional information is available in the Internet under:
www.siemens.com/simatic-mobile-panels

Note:

Do you need a specific modification or addition to the products described here? Then take a look under "Customer-specific products". There, you will find information on ordering additional and standard industry products as well as possibilities for customer-specific modifications and adjustments.

Overview



Maximum precision and absolute reliability take top priority where field instrumentation is concerned. Measuring, positioning, recording, and controlling play a key role in industrial processes. Process instrumentation is therefore an efficient lever for increasing the efficiency of process plants and improving product quality.

In numerous industrial sectors, process analysis plays a central role in the success of a company. It makes a decisive contribution toward significant process and quality optimization, and supports production processes which are both eco-conscious and resource-conserving.

Since the IEC 61508 and IEC 61511 standards for functional safety entered into force, demand has increased for process instrumentation and analytical devices which comply with the Safety Integrity Level (SIL) classification.

The tables on the following pages list all available SIL products for process instrumentation and analysis. Detailed information including an overview of values for functional safety can be found on the Internet at www.siemens.com/SIL

Process instrumentation

Pressure measurement

Pressure gauges from the SITRANS P series provide users with maximum measuring precision, ruggedness, and innovative ease of use. Whether international approvals or industrial standards: the transmitters can reliably handle the increasingly complex tasks encountered in the process industry. Some of the devices additionally offer diagnostics functions which help you to permanently keep your plant under control.

Temperature measurement

Whether head transmitter, rail-mounted or field temperature meter: SITRANS T products can be easily connected to a wide variety of thermocouples, resistance thermometers, and mV or resistance-type sensors. They operate with galvanic isolation and selectable line frequency, and are available without explosion protection or in intrinsically-safe, non-incendive and flameproof versions.

Flow measurement

The SITRANS F flowmeter range has a long-term proven track record for success in daily use. It comprises a wealth of devices - from simple flow indicators up to highly advanced, bus-based electronic flowmeters. The portfolio offers the right flowmeter for every application and medium in all industrial sectors - whether gas, liquid or vapor measurements are involved.

Level measurement

Siemens offers the optimum solution for every application where measuring the level of liquids, sludges, and bulk materials is concerned. These premium devices set the standards in their field. The offered range covers every imaginable application area: process water & wastewater, cement, mining, chemicals, petrochemicals, oil & gas, food & beverages, or pharmaceuticals.

Positioners

SIPART PS2 is the most commonly used positioner for linear and part-turn actuators in a wide range of process industries. And with good reason. For the proven all-rounder has a particularly flexible stroke range, offers comprehensive functionalities including intelligent diagnostics, and allows optional communication via HART, PROFIBUS PA or Foundation Fieldbus. Choosing technology that has proven itself so often can only be the right decision.

Process analytics

Extractive or in situ: our portfolio for gas analysis includes various physical or electrochemical measuring procedures. We offer the optimum gas analyzer for every application. Our devices can be linked to host control systems using proven communication standards. We also offer FEED for Process Analytics, a service for the optimization of plant-wide gas analysis.

Process instrumentation

2



Device	Safety-related output	Safety function: measurement of	SIL	Architecture ¹⁾
Pressure measurement				
• SITRANS P DS III analog/HART - C20	4 ... 20 mA	Pressure	SIL 2	1oo1
• SITRANS P DS III analog/HART - C23	4 ... 20 mA	Pressure	SIL 2/SIL 3	1oo1/1oo2
• SITRANS P DS III PA, PROFIsafe - C21	PROFIsafe communication	Pressure	SIL 2	1oo1
• SITRANS P500 analog/HART - C20	4 ... 20 mA	Pressure	SIL 2	1oo1
• Diaphragm seal connected to SITRANS P DS III - C20/23		Pressure	Only in conjunction with SITRANS P DS III	
Temperature measurement				
Temperature transmitter for head assembly				
• SITRANS TH200/TH300, HW version 01.00 / 01.02 - C20/C23	4 ... 20 mA	Temperature	SIL 2/SIL 3	1oo1
Temperature transmitter for rail mounting				
• SITRANS TW series	4 ... 20 mA	Temperature	SIL 1	1oo1
• SITRANS TR200/TR300, HW version 01.00 / 01.02 - C20/C23	4 ... 20 mA	Temperature	SIL 2/SIL 3	1oo1
Temperature transmitter for field mounting				
• SITRANS TF with TH200 / TH300, HW version 01.00 / 01.02 - C20 / C23	4 ... 20 mA	Temperature	SIL 2/SIL 3	1oo1/1oo2
Flow measurement				
• SITRANS FC430 compact	4 ... 20 mA	Mass flow / volume flow / density	SIL 2/SIL 3	1oo1/1oo2
Level measurement				
Point level sensors				
• SITRANS LVL200 S/E C contactless - C20	Solid-state switch	Level, min./max.	SIL 2	1oo1
• SITRANS LVL200 S/E R relay - C20	Relay	Level, min./max.	SIL 2	1oo1
• SITRANS LVL200 S/E N NAMUR - C20	Current output	Level, min./max.	SIL 2	1oo1
Continuous - radar				
• SITRANS LR250 (HART) - C20	4 ... 20 mA	Level	SIL 2	1oo1
Continuous - Guided Wave Radar				
• SITRANS LG200	4 ... 20 mA	Level	SIL 1/SIL 2	1oo1
Positioners				
• SIPART PS 2, 2-, 3-, 4-wire variants	4 ... 20 mA	Depressurizing	SIL 2	1oo1
• SIPART PS 2 PA, digital shut down input		Depressurizing	SIL 2	1oo1
• SIPART PS 2 FF, digital shut down input		Depressurizing	SIL 2	1oo1

¹⁾ Example of "1oo2" in the "Architecture" column: the safety-related system decides that a predefined temperature value has been exceeded if one of the two temperature sensors has reached this limit (read "1-out-of-2"). In the case of 1oo1 architecture, only one sensor is present.

Further info

You can find additional information about the products:

- In the catalog "Field Instruments for Process Automation" (FI 01, edition 2014); Article number: E86060-K6201-A101-B6
- On the Internet: www.siemens.com/fi01 and www.siemens.com/processinstrumentation
- Absolutely up-to-date in the Siemens Industry Mall at www.siemens.com/industrymall



Device	Safety-related output	Safety function: measurement of	SIL	Architecture ¹⁾
Continuous gas analysis - extractive				
• OXYMAT 6	4 ... 20 mA	Concentration	SIL 1/SIL 2	1oo1
• OXYMAT 61	4 ... 20 mA	Concentration	SIL 2	1oo1
• ULTRAMAT 6	4 ... 20 mA	Concentration	SIL 1	1oo1
• CALOMAT 6	4 ... 20 mA	Concentration	SIL 1	1oo1
Continuous gas analysis - in situ				
• Laser Gas Analyzer SITRANS SL (O ₂)	4 ... 20 mA	Concentration	SIL 1	1oo1
• Laser Gas Analyzer SITRANS SL (CO)	4 ... 20 mA	Concentration	SIL 1	1oo1

¹⁾ Example of "1oo2" in the "Architecture" column: the safety-related system decides that a predefined temperature value has been exceeded if one of the two temperature sensors has reached this limit (read "1-out-of-2"). In the case of 1oo1 architecture, only one sensor is present.

Further info

You can find additional information about the products:

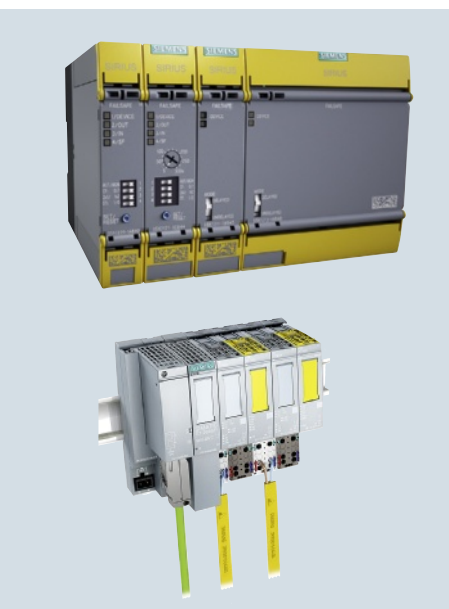
- In the catalog "Instruments for Process Analytics" (PA 01, edition 2014);
Article number: E86060-K3501-A101-A9
- On the Internet: www.siemens.com/pa01 and www.siemens.com/processanalytics absolutely up-to-date in the Siemens Industry Mall at www.siemens.com/industrymall

Sensor systems

Notes

2

Evaluating/Communication



3/2	Fail-safe communication via PROFIBUS and PROFINET s	3/105	Digital fail-safe output modules	3/182	SIPLUS isolation module
3/2	CPUs for factory automation	3/107	Digital fail-safe relay output	3/183	ET 200iSP Fail-safe distributed IO
3/2	Fail-safe CPUs	3/108	Digital fail-safe power modules	3/186	IM 152-1 interface module
3/3	CPU 1516F-3 PN/DP	3/111	CM AS-i Master ST	3/188	Power supply units
3/9	CPU 1518F-4 PN/DP	3/114	F-CM AS-i Safety ST	3/190	Fail-safe electronic modules
3/15	CPU 315F-2 DP	3/117	SIMATIC ET 200S fail-safe distributed IO	3/191	F digital input module
3/17	CPU 317F-2 DP	3/117	IM 151-7 F-CPU	3/194	F digital output module
3/19	CPU 315F-2 PN/DP	3/121	IM 151-8F PN/DP CPU	3/197	F analog input module
3/21	CPU 317F-2 PN/DP	3/125	Master interface module for IM151 CPU interface modules	3/200	ET 200eco Fail-safe distributed IO
3/23	CPU 319F-3 PN/DP	3/126	SIPLUS master interface modules for SIPLUS IM 151 CPU	3/208	Industrial communication via AS-Interface
3/31	CPU 317TF-3 PN/DP	3/127	Fail-safe I/O modules ET 200S	3/216	ASIsafe
3/15	SIPLUS CPU 315F-2 DP	3/128	PM-E F PROFIsafe F power module	3/218	3RK3 modular safety system
3/17	SIPLUS CPU 317F-2 DP	3/132	F electronic modules	3/223	Safe modules
3/19	SIPLUS CPU 315F-2 PN/DP	3/135	F electronic module relays	3/225	Communication module CM 1243-2 for S7-1200
3/21	SIPLUS CPU 317F-2 PN/DP	3/138	F terminal modules	3/227	Masters for CP 343-2 /CP 343-2P
3/40	CPU 414F-3 PN/DP	3/140	SIMATIC ET 200pro Fail-safe distributed IO	3/229	CM AS-i Master ST Communication module
3/45	CPU 416F-2, CPU 416F-3 PN/DP	3/142	IM 154-2 DP High Feature	3/233	DP/AS-i LINK Advanced
3/51	CPUs for factory and process automation	3/145	IM 154-4 PN High Feature	3/236	DP/AS-Interface Link 20E
3/51	High-availability CPUs	3/148	IM 154-6 PN HF IWLAN	3/238	DP/AS-i F-Link
3/52	CPU 412-5H	3/152	IM 154-8 F PN/DP CPU	3/242	IE/AS-i LINK PN IO
3/54	CPU 414-5H	3/158	Fail-safe digital expansion modules	3/245	AS-Interface compact modules K20, K45, K60
3/56	CPU 416-5H	3/159	SIMATIC ET 200M Fail-safe distributed IO	3/252	AS-Interface power supply units
3/58	CPU 417-5H	3/162	Interface module IM 153-2 High Feature	3/255	Data decoupling module S22.5
3/65	Sync-module for coupling the CPU 41xH	3/165	SIPLUS IM 153-2 High Feature	3/257	Data decoupling module DCM 1271
3/66	Y-Link for S7-400H	3/167	Interface module IM 153-4 PN High Feature	3/259	Shaped cables
3/69	SIPLUS CPU 412H	3/169	SM 326 F digital input modules	3/260	Innovated addressing unit for AS-Interface
3/71	SIPLUS CPU 414H	3/173	SIPLUS SM 326 F digital input modules	3/262	Accessories
3/73	SIPLUS CPU 416H	3/173	SM 326 F digital input modules	3/265	Conventional design
3/74	SIPLUS CPU 417H	3/177	SIPLUS SM 326 F digital output modules	3/265	SIRIUS 3SK1 safety relays
3/76	SIPLUS Sync-Modul	3/178	SM 336 F analog input modules	3/278	SIRIUS 3TK28 safety relays
3/78	SIPLUS Y-Link for S7-400H	3/178	SIPLUS SM 336 F analog input modules	3/288	3RK3 modular safety system
3/79	Configuration	3/182	Isolation module	3/296	Basic central unit
3/79	STEP 7 Safety Advanced V13			3/297	Advanced central unit
3/81	S7 distributed safety			3/300	Motor management and control devices-SIMOCODE
3/82	S7 F/FH systems				
3/84	S7 F systems				
3/85	SIMATIC safety matrix				
3/87	Software redundancy				
3/89	PC-based Control				
3/89	SIMATIC WinAC RTX F				
3/96	SIMATIC ET 200SP Fail-safe distributed IO				
3/96	IM 155-6 Interface module				
3/102	Digital fail-safe input modules				

Delivery time class (DT)

► Preferred type	Preferred types are available immediately from stock, i.e. are dispatched within 24 hours.
A 2 working days	
B 1 week	
C 3 weeks	Normal quantities of the products are usually delivered within the specified time following receipt of your order at our branch.
D 6 weeks	In exceptional cases, the actual delivery time may differ from that specified.
X On request	The standard transport time for Germany is 1 day.
	The delivery times specified here represent the situation in October 2013.

Safety integrated automation

CPUs for factory automation

Fail-safe CPUs

Overview

- Graded performance spectrum for a wide range of different applications
- Five fail-safe S7-300 CPUs
 - CPU 315F-2 DP
 - CPU 315F-2 PN/DP
 - CPU 317F-2 DP
 - CPU 317F-2 PN/DP
 - CPU 319F-3 PN/DP
- Four S7-300 CPUs are suitable for an extended ambient temperature range of -25 °C to +60 °C (SIPLUS)
 - SIPLUS CPU 315F-2 DP
 - SIPLUS CPU 317F-2 DP
 - SIPLUS CPU 315F-2 PN/DP
 - SIPLUS CPU 317F-2 PN/DP
- One fail-safe SIMATIC CPU with integrated technology and motion control functions:
 - CPU 317TF-3 PN/DP
- Three fail-safe S7-400 CPUs:
 - CPU 414F-3 PN/DP
 - CPU 416F-2
 - CPU 416F-3 PN/DP

Additional fail-safe CPUs that can be used with S7-300:

- Distributed fail-safe CPU ET 200S (IM151-7F, IM151-8F)
- Fail-safe software controller WinAC RTX F

Safety integrated automation

CPUs for factory automation

CPU 1516F-3 PN/DP

Overview

- The CPU with a large program and data memory in the S7-1500 controller product range for failsafe applications with high requirements regarding program scope and networking.
- High processing speed for binary and floating-point arithmetic
- Used as central controller in production lines with central and distributed I/O.
- Supports PROFIsafe in centralized and distributed configuration.
- PROFINET IO IRT interface with 2-port switch.
- Additional PROFINET interface with separate IP address.
- PROFINET IO controller for operating distributed I/O on PROFINET.
- PROFINET I-Device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or non-Siemens PROFINET IO controller.
- PROFIBUS DP master interface.
- Isochronous mode on PROFIBUS and PROFINET.
- Integrated Motion Control functionalities for controlling speed-controlled and positioning axes, support for external encoders.
- Integrated Web server with the option of creating user-defined Web pages.

Note:

SIMATIC memory card required for operation of the CPU

Application

The CPU 1516F-3 PN/DP is the CPU with a large program and data memory for demanding standard and fail-safe applications that also contain distributed automation structures alongside central I/O.

It can be used as a PROFINET IO controller or as distributed intelligence (PROFINET I-Device). The integrated PROFINET IO IRT interface is designed as a 2-port switch so that a linear topology can be set up in the system. The additional integrated PROFINET interface with separate IP address can be used, for example, for network separation. Distributed I/O can be connected via PROFIBUS (or PROFIsafe) via the integrated PROFIBUS interface. In addition, the CPU offers comprehensive control functionalities as well as the ability to connect drives via standardized PLC-open blocks.

Design

The CPU 1516F-3 PN/DP has:

- a powerful processor:
The CPU achieves a command execution time as low as 10 ns per binary command.
- extensive RAM:
1.5 MB for program, 5 MB for data
- SIMATIC memory cards as load memory;
permit additional functions such as datalog and archives
- Flexible expansion possibilities:
single-tier configuration with max. 32 modules (CPU + 31 modules)
- Display with functions for:
 - Display of overview information such as IP address of the integrated interface, station name, plant identifier, location ID, etc.
 - Display of diagnostic information
 - Display of module information
 - Showing display settings
 - Display of a user-definable logo
 - Setting IP addresses
 - Setting of date and time
 - Selection of operating mode

- Resetting of the CPU to factory settings
- Disabling/enabling of display
- Enabling of protection levels
- Display of safety mode, overall signature and date of the last download with signature change.
- PROFINET IO IRT interface for connecting distributed I/O via PROFINET
- PROFINET interface for network separation
- PROFIBUS DP interface for connecting distributed I/O via PROFIBUS
- Supports PROFIsafe in centralized and distributed configuration

Function

Thanks to a variety of innovations and integrated functions, the SIMATIC S7-1500 CPUs offer added value with regard to performance and engineering efficiency. A host of features support users in programming, commissioning, and servicing the S7-1500:

- Performance
 - Faster command processing, depending on the CPU type, language extensions and new data types
 - Even shorter response times of the CPUs due to considerably faster backplane bus
 - High-performance network connection: PROFINET IO IRT (2-port switch) as standard interface. Additional PROFINET interface integrated, e.g. for network separation.
- Integrated technology
 - Connection of analog and PROFIdrive-capable drives via standardized blocks (PLCopen)
 - Support of speed-controlled and positioning axes as well as external encoders
 - Trace functions for all CPU tags, both for diagnostics in real time as well as for sporadic error detection
 - Comprehensive control functionalities, e.g. easily configurable blocks for automatic optimization of the control parameters for optimum control quality
- Security Integrated
 - Password-based know-how protection against unauthorized reading and modification of program blocks
 - Copy protection for tying individual blocks on the SIMATIC memory card to their serial number:
The block can only run if the configured memory card is inserted into the CPU.
 - 4-level authorization concept:
Communication to the HMI devices can also be restricted.
 - Manipulation protection:
The controller recognizes changed or unauthorized transmissions of the engineering data.
- Design and handling
 - Display of overview information:
e.g. station name, plant identifier, location ID, diagnostic information, module information, display settings, etc.
 - Possible operations on the display:
set addresses, set date and time, select operating mode of CPU, reset CPU to factory settings, disable/enable display, activate protection levels.
- Integrated system diagnostics
 - System diagnostics information is displayed consistently and in plain text in the display, TIA Portal, HMI devices and web server, even for messages from the drives, and updated even if the CPU is in STOP mode.
 - Integrated in the firmware of the CPU, no special configuration is required

Safety integrated automation

CPUs for factory automation

CPU 1516F-3 PN/DP

- SIMATIC memory card (required for operation of the CPU)
 - Used as plug-in load memory or for updating the firmware.
 - Also for storing additional documents or csv files (for recipes and archives)
 - Creation of data blocks for storage/reading of data via SFCs of the user program
- Datalog (archives) and recipes
 - Storage of csv files for recipes and archives on the SIMATIC memory card;
 - easy access to plant-relevant operating data using Office tools or via a web server
 - Easy access to configuration data of the machine by means of a web browser or SD card reader (two-way data exchange from and to the controller)
- Programming of the standard program section
 - Programming with STEP 7 V13
- Programming of the fail-safe program section
 - Programming of the safety-related program section with the option package "STEP 7 Safety Advanced".

Technical specifications

6ES7 516-3FN00-0AB0	
General information	
Hardware product version	FS04
Firmware version	V1.5
Engineering with	
• STEP 7 TIA Portal can be configured/integrated as of version	V13
Display	
Screen diagonal (cm)	6.1 cm
Control elements	
Number of keys	6
Mode selector switch	1
Supply voltage	
Type of supply voltage	24 V DC
permissible range, lower limit (DC)	19.2 V
permissible range, upper limit (DC)	28.8 V
Reverse polarity protection	Yes
Input current	
Current consumption (rated value)	0.85 A
Inrush current, max.	2.4 A; Rated value
I^2t	0.39 A ² ·s
Power	
Power consumption from the backplane bus (balanced)	6.7 W
Infeed power to the backplane bus	12 W
Power losses	
Power loss, typ.	7 W
Memory	
SIMATIC Memory Card required	Yes
Work memory	
• integrated (for program)	1.5 Mbyte
• integrated (for data)	5 Mbyte
Load memory	
• Plug-in (SIMATIC Memory Card), max.	32 Gbyte
Backup	
• maintenance-free	Yes
CPU processing times	
for bit operations, typ.	10 ns
for word operations, typ.	12 ns
for fixed point arithmetic, typ.	16 ns
for floating point arithmetic, typ.	64 ns
CPU-blocks	

6ES7 516-3FN00-0AB0	
Number of blocks (total)	6 000
DB	
• Number, max.	6 000; Number range: 1 to 65535
• Size, max.	5 Mbyte
FB	
• Number, max.	5 998; Number range: 1 to 65535
• Size, max.	512 kbyte
FC	
• Number, max.	5 999; Number range: 1 to 65535
• Size, max.	512 kbyte
OB	
• Size, max.	512 kbyte
• Number of free cycle OBs	100
• Number of time alarm OBs	20
• Number of delay alarm OBs	20
• Number of time interrupt OBs	20
• Number of process alarm OBs	50
• Number of DPV1 alarm OBs	3
• Number isochronous mode OBs	2
• Number of technology synchronous alarm OBs	2
• Number of startup OBs	100
• Number of asynchronous error OBs	4
• Number of synchronous error OBs	2
• Number of diagnostic alarm OBs	1
Nesting depth	
• per priority class	24; only 8 for F-blocks
Counters, timers and their retentivity	
S7 counter	
• Number	2 048
• Retentivity	
- adjustable	Yes
IEC counter	
• Number	Any (only limited by the main memory)
• Retentivity	
- adjustable	Yes
S7 times	
• Number	2 048
• Retentivity	
- adjustable	Yes
IEC timer	
• Number	Any (only limited by the main memory)
• Retentivity	
- adjustable	Yes
Data areas and their retentivity	
retentive data area in total (incl. times, counters, flags), max.	512 kbyte; Available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 472 KB
Flag	
• Number, max.	16 kbyte
• Number of clock memories	8
Data blocks	
• Retentivity adjustable	Yes
• Retentivity preset	No
Local data	
• per priority class, max.	64 kbyte; max. 16 KB per block
Address area	
Number of IO modules	8 192
I/O address area	
• Inputs	32 kbyte; All inputs are in the process image
• Outputs	32 kbyte; All outputs are in the process image

Safety integrated automation

CPUs for factory automation

CPU 1516F-3 PN/DP

6ES7 516-3FN00-0AB0	
• per integrated IO subsystem	
- Inputs (volume)	8 kbyte
- Outputs (volume)	8 kbyte
• per CM/CP	
- Inputs (volume)	8 kbyte
- Outputs (volume)	8 kbyte
Subprocess images	
• Number of subprocess images, max.	32
Address space per module	
• Number of IO subsystems	10
Hardware configuration	
Number of DP masters	
• integrated	1
• Via CM	8; A maximum of 8 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total
Number of IO Controllers	
• Via CM	8; A maximum of 8 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total
PtP CM	
• Number of PtP CMs	the number of connectable PtP CMs is only limited by the number of available slots
Time of day	
Clock	
• Type	Hardware clock
• Deviation per day, max.	10 s; Typ.: 2 s
• Backup time	6 wk; At 40 °C ambient temperature, typically
Operating hours counter	
• Number	8
Clock synchronization	
• supported	Yes
• to DP, master	Yes
• in AS, master	Yes
• in AS, slave	Yes
• on Ethernet via NTP	Yes
Interfaces	
Number of PROFINET interfaces	2
Number of PROFIBUS interfaces	1
1st interface	
• Interface types	
- Number of ports	2
- Integrated switch	Yes
- RJ 45 (Ethernet)	Yes
• Protocols	
- PROFINET IO Controller	Yes
- PROFINET IO Device	Yes
- SIMATIC communication	Yes
- Open IE communication	Yes
- Web server	Yes
- Media redundancy	Yes
2nd interface	
• Interface types	
- Number of ports	1
- Integrated switch	No
- RJ 45 (Ethernet)	Yes
• Protocols	
- PROFINET IO Controller	No
- PROFINET IO Device	No
- SIMATIC communication	Yes
- Open IE communication	Yes
- Web server	Yes
3rd interface	
• Interface types	
- Number of ports	1
- RS 485	Yes

6ES7 516-3FN00-0AB0	
• Protocols	
- SIMATIC communication	Yes
- PROFIBUS DP master	Yes
- PROFIBUS DP slave	No
Interface types	
RJ 45 (Ethernet)	
• 100 Mbps	Yes
• Autonegotiation	Yes
• Autocrossing	Yes
• Industrial Ethernet status LED	Yes
RS 485	
• Transmission rate, max.	12 Mbit/s
Protocols	
Number of connections	
• Number of connections, max.	256; via integrated interfaces of the CPU and connected CPs / CMs
• Number of connections reserved for ES/HMI/web	10
• Number of connections via integrated interfaces	128
• Number of S7 routing paths	16
PROFINET IO Controller	
• Services	
- PG/OP communication	Yes
- S7 routing	Yes
- Isochronous mode	Yes
- Open IE communication	Yes
- IRT	Yes
- MRP	Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50
- PROFINergy	Yes
- Prioritized startup	Yes; Max. 32 PN devices
- Number of connectable IO devices, max.	256; In total, up to 768 distributed I/O devices can be connected via PROFIBUS or PROFINET
- Max. number of connectable IO devices for RT	256
- of which in line, max.	256
- Number of IO Devices with IRT and the option "high performance", max.	64
- Maximum number of IO devices that can be activated/deactivated at the same time.	8
- Max. number of IO devices per tool	8
- Updating times	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data
• with RT	
- for send cycle of 250 µs	250 µs to 128 ms
- for send cycle of 500 µs	500 µs to 256 ms
- for send cycle of 1 ms	1 ms to 512 ms
- for send cycle of 2 ms	2 ms to 512 ms
- for send cycle of 4 ms	4 ms to 512 ms
• for IRT with the "high performance" option	
- for send cycle of 250 µs	250 µs to 4 ms
- for send cycle of 500 µs	500 µs to 8 ms
- for send cycle of 1 ms	1 ms to 16 ms
- [Fehlender Merkmalstext PMD_ABY964_001_000]	2 ms to 32 ms
- for send cycle of 4 ms	4 ms to 64 ms
- For IRT with the "high performance" option and parameter assignment for so-called "odd-numbered" send cycles	Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3.875 µs)

Safety integrated automation

CPUs for factory automation

CPU 1516F-3 PN/DP

6ES7 516-3FN00-0AB0	
PROFINET IO Device	
• Services	
- PG/OP communication	Yes
- S7 routing	Yes
- Isochronous mode	No
- Open IE communication	Yes
- IRT, supported	Yes
- MRP, supported	Yes
- PROFinergy	Yes
- Shared device	Yes
- Number of IO controllers with shared device, max.	4
SIMATIC communication	
• S7 communication, as server	Yes
• S7 communication, as client	Yes
• User data per job, max.	See online help (S7 communication, user data size)
Open IE communication	
• TCP/IP	Yes
- Data length, max.	64 kbyte
- several passive connections per port, supported	Yes
• ISO-on-TCP (RFC1006)	Yes
- Data length, max.	64 kbyte
• UDP	Yes
- Data length, max.	1 472 byte
• DHCP	No
• SNMP	Yes
• DCP	Yes
• LLDP	Yes
Web server	
• HTTP	Standard and user-defined pages
• HTTPS	Standard and user-defined pages
PROFIBUS	
• Services	
- PG/OP communication	Yes
- S7 routing	Yes
- Isochronous mode	Yes
- equidistance	Yes
- Number of DP slaves	125; In total, up to 768 distributed I/O devices can be connected via PROFIBUS or PROFINET
- Activation/deactivation of DP slaves	Yes
PROFIBUS DP master	
• Number of connections, max.	48; for the integrated PROFIBUS DP interface
Further protocols	
• MODBUS	Yes; MODBUS TCP
Media redundancy	
• Switchover time on line break, typically	200 ms
• Number of stations in the ring, max.	50
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	Yes
equidistance	Yes
S7 message functions	
Number of login stations for message functions, max.	32
Block related messages	Yes
Number of configurable alarms, max.	10 000
Number of simultaneously active alarms in alarm pool	1 000
Test commissioning functions	
Status block	Yes; up to 8 simultaneously
Single step	No

6ES7 516-3FN00-0AB0	
Status/control	
• Status/control variable	Yes
• Variables	Inputs, outputs, memory bits, DB, times, counters
• of which status variables, max.	200; per job
• of which control variables, max.	200; per job
Forcing	
• Force, variables	Inputs, outputs
• Number of variables, max.	200
Diagnostic buffer	
• present	Yes
• Number of entries, max.	3 200
- Of which powerfail-proof	500
Traces	
• Number of configurable Traces	4
Interrupts/diagnostics/status information	
Diagnostics indication LED	
• RUN/STOP LED	Yes
• ERROR LED	Yes
• MAINT LED	Yes
• Connection display LINK TX/RX	Yes
supported technology objects	
Motion	Yes
• Speed-controlled axis	20; Up to 20 axes in total (speed-controlled, positioning axis, external encoders) are supported
- Number of speed-controlled axes, max.	
• Positioning axis	20; Up to 20 axes in total (speed-controlled, positioning axis, external encoders) are supported
- Number of positioning axes, max.	
• External encoders	20; Up to 20 axes in total (speed-controlled, positioning axis, external encoders) are supported
- Number of external encoders, max.	
Controller	
• PID_Compact	Yes; Universal PID controller with integrated optimization
• PID_3Step	Yes; PID controller with integrated optimization for valves
Counting and measuring	
• High-speed counter	Yes
Standards, approvals, certificates	
Highest safety class achievable in safety mode	
• Low demand (PFD) acc. to SIL3	< 2.00E-05
• High demand (PFH) acc. to SIL3	< 1.00E-09 1/h
Ambient conditions	
Operating temperature	
• horizontal installation, min.	0 °C
• horizontal installation, max.	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off
• vertical installation, min.	0 °C
• vertical installation, max.	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off
Configuration	
programming	
• Programming language	
- LAD	Yes; incl. failsafe
- FBD	Yes; incl. failsafe
- STL	Yes
- SCL	Yes
- GRAPH	Yes
Know-how protection	
• User program protection	Yes
• Copy protection	Yes
• Block protection	Yes

Safety integrated automation

CPUs for factory automation

CPU 1516F-3 PN/DP

6ES7 516-3FN00-0AB0	
Access protection	
• Password for display	Yes
• Protection level: Write protection	Yes; additional stage of protection for F-blocks (write protection)
• Protection level: Read/write protection	Yes
• Protection level: Complete protection	Yes
Cycle time monitoring	
• lower limit	adjustable minimum cycle time
• upper limit	adjustable maximum cycle time
Dimensions	
Width	70 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	845 g

Selection and ordering data

	Article No.
CPU 1516F-3 PN/DP	6ES7516-3FN00-0AB0
Fail-safe CPU, 1.5 MB RAM for program, 5 MB for data, PROFINET I/O IRT interface, PROFINET/PROFIBUS interface; SIMATIC memory card required	
Accessories	
SIMATIC memory card	
4 MB	6ES7954-8LC02-0AA0
12 MB	6ES7954-8LE02-0AA0
24 MB	6ES7954-8LF02-0AA0
2 GB	6ES7954-8LP01-0AA0
SIMATIC S7-1500 mounting rail	
Fixed lengths, with grounding elements	
• 160 mm	6ES7590-1AB60-0AA0
• 482 mm	6ES7590-1AE80-0AA0
• 530 mm	6ES7590-1AF30-0AA0
• 830 mm	6ES7590-1AJ30-0AA0
For cutting to length by customer, without drill holes; grounding elements must be ordered separately	
• 2000 mm	6ES7590-1BC00-0AA0
PE connection element for mounting rail 2000 mm	6ES7590-5AA00-0AA0
20 units	
Power supply	
For supplying the backplane bus of the S7-1500	
24 V DC input voltage, power 25 W	6ES7505-0KA00-0AB0
24/48/60 V DC input voltage, power 60 W	6ES7505-0RA00-0AB0
120/230 V AC input voltage, power 60 W	6ES7507-0RA00-0AB0
Power connector	6ES7590-8AA00-0AA0
With coding element for power supply module; spare part, 10 units	
Load power supply	
24 V DC/3A	6EP1332-4BA00
24 V DC/8A	6EP1333-4BA00
Power supply connector	
Spare part; for connecting the 24 V DC supply voltage	
• with push-in terminals	6ES7193-4JB00-0AA0

Article No.

PROFIBUS FastConnect bus connector RS485 with 90° cable outlet	
with insulation displacement, max. transmission rate 12 Mbit/s	
without PG interface, grounding via control cabinet contact surface; 1 unit	6ES7972-0BA70-0XA0
with PG interface, grounding via control cabinet contact surface; 1 unit	6ES7972-0BB70-0XA0
PROFIBUS FC Standard Cable GP	6XV1830-0EH10
Standard type with special design for fast mounting, 2-core, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	
PROFIBUS FC Robust Cable	6XV1830-0JH10
2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	
PROFIBUS FC Flexible Cable	6XV1831-2K
2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	
PROFIBUS FC Trailing Cable	
2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	
Sheath color: Petrol	6XV1830-3EH10
Sheath color: Violet	6XV1831-2L
PROFIBUS FC Food Cable	6XV1830-0GH10
2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	
PROFIBUS FC Ground Cable	6XV1830-3FH10
2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	
PROFIBUS FC FRNC Cable GP	6XV1830-0LH10
2-wire, shielded, flame-retardant, with copolymer outer sheath FRNC; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	
PROFIBUS FastConnect Stripping Tool	6GK1905-6AA00
Preadjusted stripping tool for fast stripping of PROFIBUS FastConnect bus cables	
IE FC RJ45 plugs	
RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables	

Safety integrated automation

CPUs for factory automation

CPU 1516F-3 PN/DP

	Article No.
IE FC RJ45 Plug 180	
180° cable outlet	
1 unit	6GK1901-1BB10-2AA0
10 units	6GK1901-1BB10-2AB0
50 units	6GK1901-1BB10-2AE0
IE FC TP Standard Cable GP 2 x 2	6XV1840-2AH10
4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug; PROFINET-compliant; with UL approval; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	
IE FC TP Trailing Cable 2 x 2 (Type C)	6XV1840-3AH10
4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug 180/90 for use as trailing cable; PROFINET-compatible; with UL approval; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	
IE FC TP Marine Cable 2 x 2 (Type B)	6XV1840-4AH10
4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug 180/90 with marine approval, sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	
IE FC Stripping Tool	6GK1901-1GA00
Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables	
Display	6ES7591-1BA00-0AA0
for CPU 1516-3 PN/DP; spare part	
STEP 7 Professional V13	
Target system: SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC	
Requirement: Windows 7 Professional SP1 (64 bit), Windows 7 Enterprise SP1 (64 bit), Windows 7 Ultimate SP1 (64 bit), Windows 8.1 (64 bit), Windows 8.1 Professional (64 bit), Windows 8.1 Enterprise (64 bit), Windows Server 2008 R2 StdE (full installation), Windows Server 2012 StdE (full installation)	
Form of delivery: German, English, Chinese, Italian, French, Spanish	
STEP 7 Professional V13, Floating License	6ES7822-1AA03-0YA5
STEP 7 Professional V13, Floating License, software download incl. license key ¹⁾	6ES7822-1AE03-0YA5
E-mail address required for delivery	

	Article No.
STEP 7 Safety Advanced V13	
Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-1500F, S7-300F, S7-400F, S7-1500F, WinAC RTX F, ET200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco	
Requirement: STEP 7 Professional V13	
Floating license for 1 user	6ES7833-1FA13-0YA5
Floating license for 1 user, license key download without software or documentation ¹⁾ ; email address required for delivery	6ES7833-1FA13-0YH5
¹⁾ For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery	

More information

Further information and downloads

Safety Integrated

Information on functional safety, also for S7-1500F Controllers:

<http://www.siemens.com/safety-integrated>

Manuals

The SIMATIC S7-1500 manuals can be downloaded free of charge from the Internet (SIMATIC Customer Support, <http://www.siemens.com/automation/support>).

General information

<http://www.siemens.com/S7-1500>

SIMATIC Selection Tool

<http://www.siemens.com/tia-selection-tool>

Brochures

Information material for downloading can be found on the Internet:

<http://www.siemens.com/simatic/printmaterial>

Safety integrated automation

CPUs for factory automation

CPU 1518F-4 PN/DP

Overview

- The CPU with a very large program and data memory in the S7-1500 controller product range for failsafe applications with highest requirements regarding program scope and networking.
- Extremely high processing speed for binary and floating-point arithmetic.
- For cross-industry automation tasks in series machine, special machine and plant construction
- Used as central controller in production lines with central and distributed I/O.
- Supports PROFIsafe in centralized and distributed configuration.
- PROFINET IO IRT interface with 2-port switch.
- Two additional PROFINET interfaces with separate IP addresses.
- PROFINET IO controller for operating distributed I/O on PROFINET.
- PROFINET I-Device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or non-Siemens PROFINET IO controller.
- PROFIBUS DP master interface.
- Isochronous mode on PROFIBUS and PROFINET.
- Integrated Motion Control functionalities for controlling speed-controlled and positioning axes, support for external encoders
- Integrated Web server with the option of creating user-defined Web pages.

Note:

SIMATIC Memory Card required for operation of the CPU.

Application

The CPU 1518F-4 PN/DP is the most powerful S7-1500 CPU with a very large program and data memory for demanding standard and fail-safe tasks in applications that also contain distributed automation structures alongside central I/O. It can be used, for example, as a central controller in production lines or as a machine controller with high processing speed demands.

The CPU 1518F-4 PN/DP is used as a PROFINET IO controller or as distributed intelligence (PROFINET I-Device). The integrated PROFINET IO IRT interface is designed as a 2-port switch so that a linear topology can be set up in the system. The additional integrated PROFINET interfaces with separate IP address can be used for network separation, for example.

Distributed I/O can be connected via PROFIBUS (or PROFIsafe) via the integrated PROFIBUS interface.

In addition, the CPU offers comprehensive control functionalities, as well as the ability to connect drives via standardized PLC-open blocks.

Design

The CPU 1518F-4 PN/DP features:

- A powerful processor
The CPU achieves a command execution time as low as 1 ns per binary command.
- Extensive RAM
4.5 MB for program, 10 MB for data
- SIMATIC Memory Cards as load memory;
permit additional functions such as datalog and archives
- Flexible expansion options
Single-tier configuration with max. 32 modules (CPU + 31 modules)

- Screen with functions for the
 - display of overview information such as IP address of the integrated interface, station name, plant designation, location identifier, etc.,
 - Display of diagnostic information
 - Display of module information
 - Showing display settings
 - Setting IP addresses
 - Setting date and time
 - Selection of operating mode
 - Resetting of CPU to factory settings
 - Disabling/enabling of display
 - Enabling of protection levels
 - Display of safety mode, overall signature and date of the last download with signature change.
- PROFINET IO IRT interface for connecting distributed I/O via PROFINET
- 2 PROFINET interfaces for network separation
- PROFIBUS DP interface for connecting distributed I/O via PROFIBUS
- Supports PROFIsafe in centralized and distributed configuration

Function

- Performance
 - Faster command processing, depending on the CPU type, language extensions and new data types
 - Even shorter response times of the CPUs due to considerably faster backplane bus
 - Powerful network connection:
PROFINET IO IRT (2-port switch) as standard interface. Additional PROFINET interface integrated, e.g. for network separation.
- Integrated technology
 - Connection of analog and PROFIdrive-capable drives via standardized blocks (PLCopen)
 - Support of speed-controlled and positioning axes as well as external encoders
 - Trace functions for all CPU variables, both for diagnostics in real time as well as for sporadic error detection
 - Comprehensive control functionalities, e.g. easily configurable blocks for automatic optimization of the control parameters for optimum control quality
- Security Integrated
 - Password-based know-how protection against unauthorized read-out and modification of program blocks
 - Copy protection for tying individual blocks to the serial number of the SIMATIC Memory Card: The block can only run if the configured memory card is inserted into the CPU.
 - 4-level authorization concept:
Communication to the HMI devices can also be restricted.
 - Manipulation protection:
The controller recognizes changed or unauthorized transmissions of the engineering data.
- Design and handling
 - Display for showing overview information:
e.g. station name, plant identifier, location designation, etc., diagnostic information, module information, display settings.
 - Possible operator control options on the display:
Set addresses, set date and time, select operating mode of CPU, reset CPU to factory settings, disable/enable display, activate protection levels.
- Integrated system diagnostics
 - System diagnostics information is displayed consistently and in plain text in the display, TIA Portal, HMI devices and Web server, even for messages from the drives, and updated even if the CPU is in STOP mode.
 - Integrated into the firmware of the CPU, no special configuration is required

Safety integrated automation

CPUs for factory automation

CPU 1518F-4 PN/DP

- SIMATIC Memory Card (required for operation of the CPU)
 - Used as a plug-in load memory or for updating the firmware.
 - Also for storing additional documents or csv files (for recipes and archives)
 - Creation of data blocks for storage/reading of data via SFCs of the user program
- Datalog (archives) and recipes
 - Storage of csv files for recipes and archives on the SIMATIC Memory Card;
 - easy access to plant-relevant operating data using Office tools or via a Web server
 - Easy access to machine configuration data by means of a Web browser or SD card reader (two-way data exchange from and to the controller)
- Programming of the standard program section
 - Programming with STEP 7 V13
- Programming of the fail-safe program section
 - Programming of the safety-related program section with the "STEP 7 Safety Advanced" option package.

Technical specifications

6ES7 518-4FP00-0AB0	
General information	
Hardware product version	FS01
Firmware version	V1.5
Engineering with	
• STEP 7 TIA Portal can be configured/integrated as of version	V13
Display	
Screen diagonal (cm)	6.1 cm
Control elements	
Number of keys	6
Mode selector switch	1
Supply voltage	
Type of supply voltage	24 V DC
permissible range, lower limit (DC)	19.2 V
permissible range, upper limit (DC)	28.8 V
Reverse polarity protection	Yes
Input current	
Current consumption (rated value)	1.55 A
Inrush current, max.	2.4 A; Rated value
I^2t	0.45 A ² ·s
Power	
Power consumption from the backplane bus (balanced)	30 W
Infeed power to the backplane bus	12 W
Power losses	
Power loss, typ.	24 W
Memory	
SIMATIC Memory Card required	Yes
Work memory	
• integrated (for program)	4.5 Mbyte
• integrated (for data)	10 Mbyte
Load memory	
• Plug-in (SIMATIC Memory Card), max.	32 Gbyte
Backup	
• maintenance-free	Yes
CPU processing times	
for bit operations, typ.	1 ns
for word operations, typ.	2 ns
for fixed point arithmetic, typ.	2 ns
for floating point arithmetic, typ.	6 ns

6ES7 518-4FP00-0AB0	
CPU-blocks	
Number of blocks (total)	10 000
DB	
• Number, max.	10 000; Number range: 1 to 65535
• Size, max.	10 Mbyte
FB	
• Number, max.	9 998; Number range: 1 to 65535
• Size, max.	512 kbyte
FC	
• Number, max.	9 999; Number range: 1 to 65535
• Size, max.	512 kbyte
OB	
• Size, max.	512 kbyte
• Number of free cycle OBs	100
• Number of time alarm OBs	20
• Number of delay alarm OBs	20
• Number of time interrupt OBs	20
• Number of process alarm OBs	50
• Number of DPV1 alarm OBs	3
• Number of isochronous mode OBs	2
• Number of technology synchronous alarm OBs	2
• Number of startup OBs	100
• Number of asynchronous error OBs	4
• Number of synchronous error OBs	2
• Number of diagnostic alarm OBs	1
Nesting depth	
• per priority class	24; only 8 for F-blocks
Counters, timers and their retentivity	
S7 counter	
• Number	2 048
• Retentivity	
- adjustable	Yes
IEC counter	
• Number	Any (only limited by the main memory)
• Retentivity	
- adjustable	Yes
S7 times	
• Number	2 048
• Retentivity	
- adjustable	Yes
IEC timer	
• Number	Any (only limited by the main memory)
• Retentivity	
- adjustable	Yes
Data areas and their retentivity	
retentive data area in total (incl. times, counters, flags), max.	768 kbyte; Available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 700 KB
Flag	
• Number, max.	16 kbyte
• Number of clock memories	8
Data blocks	
• Retentivity adjustable	Yes
• Retentivity preset	No
Local data	
• per priority class, max.	64 kbyte; max. 16 KB per block
Address area	
Number of IO modules	8 192
I/O address area	
• Inputs	32 kbyte; All inputs are in the process image
• Outputs	32 kbyte; All outputs are in the process image

Safety integrated automation

CPUs for factory automation

CPU 1518F-4 PN/DP

6ES7 518-4FP00-0AB0	
• per integrated IO subsystem	
- Inputs (volume)	16 kbyte; 16 KB via the integrated PROFINET IO interface, 8 KB via the integrated DP interface
- Outputs (volume)	16 kbyte; 16 KB via the integrated PROFINET IO interface, 8 KB via the integrated DP interface
• per CM/CP	
- Inputs (volume)	8 kbyte
- Outputs (volume)	8 kbyte
Subprocess images	
• Number of subprocess images, max.	32
Address space per module	
• Number of IO subsystems	10
Hardware configuration	
Number of DP masters	
• integrated	1
• Via CM	8; A maximum of 8 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total
Number of IO Controllers	
• integrated	1
• Via CM	8; A maximum of 8 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total
Rack	
• Modules per rack, max.	32; CPU + 31 modules
• Rack, number of rows, max.	1
PtP CM	
• Number of PtP CMs	the number of connectable PtP CMs is only limited by the number of available slots
Time of day	
Clock	
• Type	Hardware clock
• Deviation per day, max.	10 s; Typ.: 2 s
• Backup time	6 wk; At 40 °C ambient temperature, typically
Operating hours counter	
• Number	8
Clock synchronization	
• supported	Yes
• to DP, master	Yes
• in AS, master	Yes
• in AS, slave	Yes
• on Ethernet via NTP	Yes
Interfaces	
Number of PROFINET interfaces	3
Number of PROFIBUS interfaces	1
1st interface	
• Interface types	
- Number of ports	2
- Integrated switch	Yes
- RJ 45 (Ethernet)	Yes
• Protocols	
- PROFINET IO Controller	Yes
- PROFINET IO Device	Yes
- SIMATIC communication	Yes
- Open IE communication	Yes
- Web server	Yes
- Media redundancy	Yes
2nd interface	
• Interface types	
- Number of ports	1
- Integrated switch	No
- RJ 45 (Ethernet)	Yes

6ES7 518-4FP00-0AB0	
• Protocols	
- PROFINET IO Controller	No
- PROFINET IO Device	No
- SIMATIC communication	Yes
- Open IE communication	Yes
- Web server	Yes
3rd interface	
• Interface types	
- Number of ports	1
- Integrated switch	No
- RJ 45 (Ethernet)	Yes
• Protocols	
- PROFINET IO Controller	No
- PROFINET IO Device	No
- SIMATIC communication	Yes
- Open IE communication	Yes
- Web server	Yes
4th interface	
• Interface types	
- Number of ports	1
- RS 485	Yes
• Protocols	
- SIMATIC communication	Yes
- PROFIBUS DP master	Yes
- PROFIBUS DP slave	No
Interface types	
RJ 45 (Ethernet)	
• 100 Mbps	Yes
• Autonegotiation	Yes
• Autocrossing	Yes
• Industrial Ethernet status LED	Yes
RS 485	
• Transmission rate, max.	12 Mbit/s
Protocols	
Number of connections	
• Number of connections, max.	384; via integrated interfaces of the CPU and connected CPs / CMs
• Number of connections reserved for ES/HMI/web	10
• Number of connections via integrated interfaces	192
• Number of S7 routing paths	64; in total, only 16 S7-Routing connections are supported via PROFIBUS
PROFINET IO Controller	
• Services	
- PG/OP communication	Yes
- S7 routing	Yes
- Isochronous mode	Yes
- Open IE communication	Yes
- IRT	Yes
- MRP	Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50
- PROFINergy	Yes
- Prioritized startup	Yes; Max. 32 PN devices
- Number of connectable IO devices, max.	512; In total, up to 1000 distributed I/O devices can be connected via PROFIBUS or PROFINET
- Max. number of connectable IO devices for RT	512
- of which in line, max.	512
- Number of IO Devices with IRT and the option "high performance", max.	64
- Maximum number of IO devices that can be activated/deactivated at the same time.	8
- Max. number of IO devices per tool	8

Safety integrated automation

CPUs for factory automation

CPU 1518F-4 PN/DP

6ES7 518-4FP00-0AB0	
- Updating times	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data
• with RT	
- for send cycle of 250 µs	250 µs to 128 ms
- for send cycle of 500 µs	500 µs to 256 ms
- for send cycle of 1 ms	1 ms to 512 ms
- for send cycle of 2 ms	2 ms to 512 ms
- for send cycle of 4 ms	4 ms to 512 ms
• for IRT with the "high performance" option	
- for send cycle of 250 µs	250 µs to 4 ms
- for send cycle of 500 µs	500 µs to 8 ms
- for send cycle of 1 ms	1 ms to 16 ms
- [Fehlender Merkmalstext PMD_ABY964_001_000]	2 ms to 32 ms
- for send cycle of 4 ms	4 ms to 64 ms
- For IRT with the "high performance" option and parameter assignment for so-called "odd-numbered" send cycles	Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3.875 µs)
PROFINET IO Device	
• Services	
- PG/OP communication	Yes
- S7 routing	Yes
- Isochronous mode	No
- Open IE communication	Yes
- IRT, supported	Yes
- MRP, supported	Yes
- PROFinergy	Yes
- Shared device	Yes
- Number of IO controllers with shared device, max.	4
SIMATIC communication	
• S7 communication, as server	Yes
• S7 communication, as client	Yes
• User data per job, max.	See online help (S7 communication, user data size)
Open IE communication	
• TCP/IP	Yes
- Data length, max.	64 kbyte
- several passive connections per port, supported	Yes
• ISO-on-TCP (RFC1006)	Yes
- Data length, max.	64 kbyte
• UDP	Yes
- Data length, max.	1 472 byte
• DHCP	No
• SNMP	Yes
• DCP	Yes
• LLDP	Yes
Web server	
• HTTP	Yes; Standard and user-defined pages
• HTTPS	Yes; Standard and user-defined pages
PROFIBUS	
• Services	
- PG/OP communication	Yes
- S7 routing	Yes
- Isochronous mode	Yes
- equidistance	Yes
- Number of DP slaves	125; In total, up to 1000 distributed I/O devices can be connected via PROFIBUS or PROFINET
- Activation/deactivation of DP slaves	Yes
PROFIBUS DP master	
• Number of connections, max.	48; for the integrated PROFIBUS DP interface
Further protocols	

6ES7 518-4FP00-0AB0	
• MODBUS	Yes; MODBUS TCP
Media redundancy	
• Switchover time on line break, typically	200 ms
• Number of stations in the ring, max.	50
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	Yes
equidistance	Yes
S7 message functions	
Number of login stations for message functions, max.	32
Block related messages	Yes
Number of configurable alarms, max.	10 000
Number of simultaneously active alarms in alarm pool	1 000
Test commissioning functions	
Status block	Yes; Up to 16 simultaneously
Single step	No
Status/control	
• Status/control variable	Yes
• Variables	Inputs, outputs, memory bits, DB, times, counters
• of which status variables, max.	200; per job
• of which control variables, max.	200; per job
Forcing	
• Force, variables	Inputs, outputs
• Number of variables, max.	200
Diagnostic buffer	
• present	Yes
• Number of entries, max.	3 200
- Of which powerfail-proof	1 000
Traces	
• Number of configurable Traces	8
Interrupts/diagnostics/status information	
Diagnostics indication LED	
• RUN/STOP LED	Yes
• ERROR LED	Yes
• MAINT LED	Yes
• Connection display LINK TX/RX	Yes
supported technology objects	
Motion	Yes
• Speed-controlled axis	
- Number of speed-controlled axes, max.	128; Up to 128 axes in total (speed-controlled, positioning axis, external encoders) are supported
• Positioning axis	
- Number of positioning axes, max.	128; Up to 128 axes in total (speed-controlled, positioning axis, external encoders) are supported
• External encoders	
- Number of external encoders, max.	128; Up to 128 axes in total (speed-controlled, positioning axis, external encoders) are supported
Controller	
• PID_Compact	Yes; Universal PID controller with integrated optimization
• PID_3Step	Yes; PID controller with integrated optimization for valves
Counting and measuring	
• High-speed counter	Yes
Standards, approvals, certificates	
Highest safety class achievable in safety mode	
• Low demand (PFD) acc. to SIL3	< 2.00E-05
• High demand (PFH) acc. to SIL3	< 1.00E-09 1/h

Safety integrated automation

CPUs for factory automation

CPU 1518F-4 PN/DP

6ES7 518-4FP00-0AB0	
Ambient conditions	
Operating temperature	
• horizontal installation, min.	0 °C
• horizontal installation, max.	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off
• vertical installation, min.	0 °C
• vertical installation, max.	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off
Configuration	
programming	
• Programming language	
- LAD	Yes; incl. failsafe
- FBD	Yes; incl. failsafe
- STL	Yes
- SCL	Yes
- GRAPH	Yes
Know-how protection	
• User program protection	Yes
• Copy protection	Yes
• Block protection	Yes
Access protection	
• Password for display	Yes
• Protection level: Write protection	Yes; additional stage of protection for F-blocks (write protection)
• Protection level: Read/write protection	Yes
• Protection level: Complete protection	Yes
Cycle time monitoring	
• lower limit	adjustable minimum cycle time
• upper limit	adjustable maximum cycle time
Dimensions	
Width	175 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	1 988 g

Selection and ordering data

	Article No.
CPU 1518F-4 PN/DP	6ES7518-4FP00-0AB0
Fail-safe CPU, 4.5 MB RAM for program, 10 MB for data, PROFINET IO IRT interface, 2 PROFINET interfaces, PROFIBUS interface; SIMATIC Memory Card required	
Accessories	
SIMATIC memory card	
4 MB	6ES7954-8LC02-0AA0
12 MB	6ES7954-8LE02-0AA0
24 MB	6ES7954-8LF02-0AA0
2 GB	6ES7954-8LP01-0AA0
SIMATIC S7-1500 mounting rail	
Fixed lengths, with grounding elements	
• 160 mm	6ES7590-1AB60-0AA0
• 482 mm	6ES7590-1AE80-0AA0
• 530 mm	6ES7590-1AF30-0AA0
• 830 mm	6ES7590-1AJ30-0AA0
For cutting to length by customer, without drill holes; grounding elements must be ordered separately	
• 2000 mm	6ES7590-1BC00-0AA0

Article No.

PE connection element for mounting rail 2000 mm	6ES7590-5AA00-0AA0
20 units	
Power supply	
For supplying the backplane bus of the S7-1500	
24 V DC input voltage, power 25 W	6ES7505-0KA00-0AB0
24/48/60 V DC input voltage, power 60 W	6ES7505-0RA00-0AB0
120/230 V AC input voltage, power 60 W	6ES7507-0RA00-0AB0
Power connector	6ES7590-8AA00-0AA0
With coding element for power supply module; spare part, 10 units	
Load power supply	
24 V DC/3A	6EP1332-4BA00
24 V DC/8A	6EP1333-4BA00
Power supply connector	
Spare part; for connecting the 24 V DC supply voltage	
• with push-in terminals	6ES7193-4JB00-0AA0
PROFIBUS FastConnect bus connector RS485 with 90° cable outlet	
with insulation displacement, max. transmission rate 12 Mbit/s	
without PG interface, grounding via control cabinet contact surface; 1 unit	6ES7972-0BA70-0XA0
with PG interface, grounding via control cabinet contact surface; 1 unit	6ES7972-0BB70-0XA0
PROFIBUS FC Standard Cable GP	6XV1830-0EH10
Standard type with special design for fast mounting, 2-core, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	
PROFIBUS FC Robust Cable	6XV1830-0JH10
2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	
PROFIBUS FC Flexible Cable	6XV1831-2K
2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	
PROFIBUS FC Trailing Cable	
2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	
Sheath color: Petrol	6XV1830-3EH10
Sheath color: Violet	6XV1831-2L
PROFIBUS FC Food Cable	6XV1830-0GH10
2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	
PROFIBUS FC Ground Cable	6XV1830-3FH10
2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	

Safety integrated automation

CPUs for factory automation

CPU 1518F-4 PN/DP

	Article No.
PROFIBUS FC FRNC Cable GP 2-wire, shielded, flame-retardant, with copolymer outer sheath FRNC; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	6XV1830-0LH10
PROFIBUS FastConnect Stripping Tool Preadjusted stripping tool for fast stripping of PROFIBUS FastConnect bus cables	6GK1905-6AA00
IE FC RJ45 plugs RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables	
IE FC RJ45 Plug 180 180° cable outlet 1 unit 10 units 50 units	6GK1901-1BB10-2AA0 6GK1901-1BB10-2AB0 6GK1901-1BB10-2AE0
IE FC TP Standard Cable GP 2x2 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug; PROFINET-compliant; with UL approval; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	6XV1840-2AH10
IE FC TP Trailing Cable 2 x 2 (Type C) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug 180/90 for use as trailing cable; PROFINET-compatible; with UL approval; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	6XV1840-3AH10
IE FC TP Marine Cable 2 x 2 (Type B) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug 180/90 with marine approval; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	6XV1840-4AH10
IE FC Stripping Tool Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables	6GK1901-1GA00
Display for CPU 1518-4 PN/DP; spare part	6ES7591-1BA00-0AA0

	Article No.
STEP 7 Professional V13 Target system: SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC Requirement: Windows 7 Professional SP1 (64 bit), Windows 7 Enterprise SP1 (64 bit), Windows 7 Ultimate SP1 (64 bit), Windows 8.1 (64 bit), Windows 8.1 Professional (64 bit), Windows 8.1 Enterprise (64 bit), Windows Server 2008 R2 StdE (full installation), Windows Server 2012 StdE (full installation) Form of delivery: German, English, Chinese, Italian, French, Spanish STEP 7 Professional V13, Floating License STEP 7 Professional V13, Floating License, software download incl. license key ¹⁾ E-mail address required for delivery	6ES7822-1AA03-0YA5 6ES7822-1AE03-0YA5
STEP 7 Safety Advanced V13 Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-1500F, S7-300F, S7-400F, S7-1500F, WinAC RTX F, ET200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco Requirement: STEP 7 Professional V13 Floating License for 1 user Floating License for 1 user, license key download without software or documentation ¹⁾ ; email address required for delivery	6ES7833-1FA13-0YA5 6ES7833-1FA13-0YH5

¹⁾ For up-to-date information and download availability, see:
<http://www.siemens.com/tia-online-software-delivery>

More information

Further information and downloads

Safety Integrated

Information on functional safety, also for S7-1500F Controllers:

<http://www.siemens.com/safety-integrated>

Manuals

The SIMATIC S7-1500 manuals can be downloaded free of charge from the Internet (SIMATIC Customer Support, <http://www.siemens.com/automation/support>).

General information

<http://www.siemens.com/S7-1500>

SIMATIC Selection Tool

<http://www.siemens.com/tia-selection-tool>

Brochures

Information material for downloading can be found on the Internet:

<http://www.siemens.com/simatic/printmaterial>

Safety integrated automation

CPUs for factory automation

Fail-safe S7-300 CPUs
CPU 315F-2 DP

Overview



- Based on the SIMATIC CPU 315-2 DP
- For setting up a fail-safe automation system in plants with increased safety requirements
- Complies with safety requirements up to SIL 3 according to IEC 61508 and up to Cat. 4 according to EN 954-1
- Distributed fail-safe I/O modules can be connected through the integral PROFIBUS DP interface (PROFIsafe)
- Fail-safe I/O modules of the ET 200M range can also be centrally connected
- Central and distributed use of standard modules for non safety-oriented applications

SIMATIC Micro Memory Card required for operation of CPU.

SIPLUS versions

SIPLUS versions of this module are also available.

SIPLUS CPU 315F-2 DP		
SIPLUS module	6AG1315-6FF04-2AB0	6AG1315-6FF04-2AY0
based-on	6ES7315-6FF04-0AB0	
Permissible ambient operating temperature	-25 ... +60 °C	-25 ... +60 °C, Suits standard for "Electronic equipment used on rolling stock" (EN 50155): -25 ... +55 °C
Expanded ambient conditions		
• Permissible temperatures are valid for this air pressure range	T _{min} ... T _{max} at 1080 hPa ... 795 hPa (-1000 m ... +2000 m)	
Permitted relative humidity	100 %; RH incl. condensation/frost (no commissioning under condensation)	
Suits standard for "Electronic equipment used on rolling stock" (EN 50155)	No	Yes; T1 Cat. 1 KL. A/B horizontal installation
Capability of resistance EN 60721-3-3		
• against biologically active substances	Class 3B2 (mold and fungal spores, except fauna) ¹⁾	
• against chemically active substances	Class 3C4, incl. salt mist according to EN 60068-2-52 (severity level 3) ¹⁾	
• against mechanically active substances	Class 3S4 incl. sand and dust ¹⁾	

¹⁾ The connector covers (included in the delivery) must be attached to the unused interfaces.

SIPLUS CPU 315F-2 DP

Technical data

The technical data are identical with those of the based-on module, except for the ambient conditions.

Technical documentation for SIPLUS is available at:
www.siemens.com/siplus-extreme

Application

The CPU 315F-2 DP permits the design of a fail-safe automation system for plants with increased safety requirements, especially for production engineering.

Distributed I/O stations containing fail-safe I/O modules can be connected through the integrated PROFIBUS DP interface. The fail-safe I/O modules of ET 200M can also be centrally implemented safety-related.

Safety-related communication between the F CPU and the fail-safe I/O modules is performed on the basis of the PROFIsafe profile.

Design

The CPU 315F-2 DP features the following:

- Microprocessor;
the processor achieves a processing time of approximately 50 ns per binary instruction and 0.45 µs per floating-point operation.
- Memory:
384 KB high-speed RAM for safety-relevant and standard program sections; increased memory space requirements must be expected (5 times larger) if safety-relevant program sections are implemented. 128 KB data memory of the 384 KB main memory can be used for standard applications. SIMATIC Micro Memory Cards (max. 8 MB) as load memories for programs additionally permit storage of the project (including symbols and comments) in the CPU.
- Flexible expansion capability;
max. 32 modules, (4-tier configuration)
- MPI multi-point interface;
the integrated MPI interface can establish as many as 16 connections simultaneously to S7-300/400 or to programming device, PC, OP. Of these connections, one is always reserved for programming devices and another for OPs. The MPI makes it possible to set up a simple network with a maximum of 16 CPUs via "global data communication".
- PROFIBUS DP interface:
The CPU 315F-2 DP with PROFIBUS DP master/slave interface allows a distributed automation configuration offering high speed and ease of use. From the user's point of view, the distributed I/O is handled in the same manner as central I/O (identical configuration, addressing and programming). Distributed I/O stations with fail-safe I/O modules can be connected via the integral PROFIBUS DP interface. The fail-safe I/O modules of ET 200M can also be installed in central, safety-related configurations. The safety-oriented communication between the F-CPU and the fail-safe I/O modules is performed on the basis of the PROFIsafe profile.

Safety integrated automation

CPUs for factory automation

Fail-safe S7-300 CPUs CPU 315F-2 DP

Function

- Password protection;
a password concept protects the user program from unauthorized access.
- Diagnostics buffer;
the last 500 errors and interrupt events are saved in a buffer for diagnostic purposes.
- Maintenance-free data back-up;
all standard data is automatically written onto the SIMATIC Micro Memory Card by the CPU if there is a voltage interruption, and is available unchanged following voltage recovery.

Parameterizable properties

The S7 configuration as well as the properties and response of the CPUs can be parameterized using STEP 7:

- MPI multi-point interface;
determining station addresses
- Restart/cycle time behavior;
stipulation of maximum cycle time and loading as well as self-test functions
- Clock memory;
setting of addresses
- Protection level;
specifying the access rights to program and data
- System diagnostics;
determining handling and scope of the diagnostic alarms
- Watchdog interrupts;
setting of periodicity
- Clock interrupts;
setting of start date, start time and periodicity
- PROFIBUS DP master/slave interface;
user-defined address assignment for distributed I/O

Display and information functions

- Status and error indications;
LEDs indicate hardware, programming, time or I/O errors, and operating statuses such as RUN, STOP and start-up.
- Test functions;
the PG is used to indicate signal status during program execution, to modify process variables independently of the user program and to output the contents of stack memories.
- Information functions;
you can use the PG to obtain information about the storage capacity and operating mode of the CPU, the current utilization of the main and load memories as well as current cycle times and diagnostic buffer contents in plain text.

Integrated communication functions

- PG/OP communication
- Global data communication
- S7 basic communication
- S7 communication (server only)
- Routing
- Data block routing

Communication

The safety-related and standard communication between the central controller and the distributed stations is performed via PROFIBUS DP. The specially developed PROFIBUS profile *PROFIsafe* allows user data for the safety function to be transferred within the standard data message frame. Additional hardware components, such as special safety buses, are not necessary. The necessary software is either integrated in the hardware components as an expansion of the operating system or it is loaded into the CPU as a certified software block.

System functions

The CPU provides many extensive system functions for diagnostics, parameterization, synchronization, alerting, time measurement, etc.

For further details, see the manual.

Mode of operation

The safety functions of the F-CPU are included in the F program of the CPU and in the fail-safe signal modules.

The signal modules monitor the input and output signals through discrepancy analyses and the application of test signals.

The CPU checks that the controller is operating correctly by means of periodic self-tests, test instructions as well as logical and time-based program execution checks. The I/O is checked with requests for a sign of life.

If an error is diagnosed in the system, it is transferred to a safe state.

An F runtime license is not required for operating the S7-300F-2 DP.

Programming

The S7-300F is programmed in the same manner as the other SIMATIC S7 systems. The user program for non fail-safe system components is created using the familiar programming tools, e.g. STEP 7.

SIMATIC S7 Distributed Safety option package

The STEP 7 option package "SIMATIC S7 Distributed Safety" is required for programming the safety-related program sections. The package contains all the functions and blocks required to create the F program.

The F program with the safety functions is created in F-FBD or F-LAD or using special function blocks from the F library. Use of F-FBD or F-LAD simplifies configuration and programming of the plant and, due to the cross-plant, uniform presentation, also acceptance testing. The programmer can therefore concentrate entirely on configuring the safety-related application, without the need to use any additional tools.

SIMATIC S7 Distributed Safety (Classic) and SIMATIC Safety Advanced V13 (TIA Portal V13) option packages

The STEP 7 option packages "SIMATIC S7 Distributed Safety" (Classic) or SIMATIC Safety Advanced V13 (TIA Portal V13) are required for programming the safety-related program sections. The packages contain all the functions and blocks required to create the F program.

The F program with the safety functions is created in F-FBD or F-LAD or using special function blocks from the F library. Use of F-FBD or F-LAD simplifies configuration and programming of the plant and, due to the cross-plant, uniform presentation, also acceptance testing. The programmer can therefore concentrate entirely on configuring the safety-related application, without the need to use any additional tools.

Technical specifications

For technical data see page 3/13.

Selection and ordering data

For ordering data see page 3/16.

Safety integrated automation

CPUs for factory automation

Fail-safe S7-300 CPUs
CPU 317F-2 DP

Overview



- The fail-safe CPU with a large program memory and quantity framework for demanding applications
- For constructing a fail-safe automation system for plants with increased safety requirements
- Satisfies safety requirements up to SIL 3 acc. to IEC 61508 and up to Cat. 4 acc. to EN 954-1
- Fail-safe I/O modules can be connected in a distributed configuration to both integral PROFIBUS DP interfaces (PROFIsafe)
- Fail-safe I/O modules of the ET 200M range can also be centrally connected
- Central and distributed use of standard modules for non safety-relevant applications

SIMATIC Micro Memory Card required for operation of CPU.

SIPLUS version

A SIPLUS version of this module is also available.

SIPLUS CPU 317F-2 DP	
SIPLUS module	6AG1317-6FF04-2AB0
based-on	6ES7317-6FF04-0AB0
Permissible ambient operating temperature	-25 ... +60 °C
Expanded ambient conditions	
• Permissible temperatures are valid for this air pressure range	$T_{min} \dots T_{max}$ at 1080 hPa ... 795 hPa (-1000 m ... +2000 m)
Permitted relative humidity	100 %; RH incl. condensation/frost (no commissioning under condensation)
Suits standard for "Electronic equipment used on rolling stock" (EN 50155)	No
Capability of resistance EN 60721-3-3	
• against biologically active substances	Class 3B2 (mold and fungal spores, except fauna) ¹⁾
• against chemically active substances	Class 3C4, incl. salt mist according to EN 60068-2-52 (severity level 3) ¹⁾
• against mechanically active substances	Class 3S4 incl. sand and dust ¹⁾
Technical data	The technical data are identical with those of the based-on module, except for the ambient conditions.

¹⁾ The connector covers (included in the delivery) must be attached to the unused interfaces.

Technical documentation for SIPLUS is available at:

www.siemens.com/siplus-extreme

Application

The CPU 317F-2 DP allows a fail-safe automation system to be implemented for plants with increased safety requirements, especially in manufacturing automation.

Distributed I/O stations containing fail-safe I/O modules can be connected through the two integrated PROFIBUS DP interfaces. The fail-safe I/O modules of ET 200M can also be installed in central and safety-related configurations.

The safety-oriented communication between the F-CPU and the fail-safe I/O modules is performed on the basis of the PROFIsafe profile.

A SIMATIC Micro Memory Card is required for operation of the CPU.

Design

The CPU 317F-2 DP is equipped with the following:

- **Microprocessor;**
the processor achieves an execution time of approximately 25 ns per binary instruction and 160 µs per floating-point operation. The CPU 317F-2 DP is significantly superior regarding processing speed, particularly where word or double-word commands and 32 bit fixed-point commands are concerned
- **Memory;**
1.5 MB high-speed main memory for safety-relevant and standard program sections; increased memory space requirements must be expected (5 times larger) if safety-relevant program sections are implemented. SIMATIC Micro Memory Cards (8 MB max.) as load memory for the program also allow the project to be stored in the CPU (complete with symbols and comments) and can be used for data archiving and recipe management.
- **Flexible expansion**
up to 32 modules (four-tier configuration)
- **Combined MPI/DP interface**
The first MPI/DP integrated interface can establish as many as 32 connections simultaneously to S7-300/400 or connections to programming device, PC, OP. Among these connections, one is always reserved for programming devices and another for OPs. A simple network with up to 32 CPUs can be configured with the MPI interfaces and "global data communication".
- **The MPI interface can be reconfigured from an MPI to a DP interface.** The DP interface can be used as a DP master or as a DP slave.
- **PROFIBUS DP interface;**
The second integrated interface of the CPU 317F-2 DP is a pure PROFIBUS DP interface that can be used as a DP master or as a DP slave. It allows a distributed automation configuration with high speeds and simple handling. From the user's point of view, the distributed I/Os are treated the same as central I/Os (identical configuration, addressing and programming).
The PROFIBUS DP V1 standard is supported in full. This increases the scope of DP V1 standard slaves in terms of diagnostics and parameterization capability.
Limitation: It is impossible to operate both interfaces simultaneously as slaves.

Distributed I/O stations containing fail-safe I/O modules can be connected through the two integrated PROFIBUS DP interfaces. The fail-safe I/O modules of ET 200M can also be installed in central and safety-related configurations. The fail-safe I/O modules of ET 200M can also be centrally implemented. Safety-related communication is performed over PROFIBUS DP with the PROFIsafe profile.

Safety integrated automation

CPUs for factory automation

Fail-safe S7-300 CPUs CPU 317F-2 DP

Function

- Password protection; a password concept protects the user program from unauthorized access.
- Diagnostics buffer; the last 100 errors and interrupt events are saved in a buffer for diagnostics purposes.
- Maintenance-free data backup; the CPU automatically saves all data in case of power failure so that the data are available again unchanged when the power returns

Configurable attributes

STEP 7 can be used to parameterize both S7 configurations and the properties and responses of the CPUs:

- MPI multipoint interface; determination of node addresses.
- Restart/cycle time behavior; stipulation of maximum cycle time and loading.
- Clock bit memory; address setting
- Protection level; definition of access rights to program and data.
- System diagnostics; definition of the handling and scope of diagnostics messages.
- Watchdog interrupts; setting of periodicity
- Time-of-day interrupts; setting of date and time of start and periodicity
- PROFIBUS DP master/slave interface; user-oriented address allocation for distributed I/O.

Indication and information functions

- Status and error indications; LEDs indicate e.g. hardware, programming, time, I/O or bus errors, as well as operating states such as RUN, STOP and re-start
- Test functions; the PG can be used to display signal states in program execution, modify process variables independently of the user program, and read out the contents of stack memories.
- Information functions; you can use the PG to obtain information about the storage capacity and operating mode of the CPU as well as the current loading of the main and load memories, current cycle times and diagnostic buffer contents in plain text.

Integrated communication functions

- PG/OP communication
- Global data communication
- S7 basic communication
- S7 communication (server only)

Sequential function chart

The CPU provides many extensive system functions for diagnostics, parameterization, synchronization, alerting, time measurement, etc. Details are included in the manual.

Communication

The safety-related communication and standard communication between the central controller and the distributed stations is conducted over PROFIBUS DP. The specially developed PROFIBUS profile PROFIsafe allows the transmission of user data associated with the safety function within the standard data telegram. Additional hardware components, e.g. special safety buses, are unnecessary. The required software is either integrated in the hardware components as an extension of the operating system, or must be loaded into the CPU as a certified software component.

Mode of operation

The safety functions of the F CPU are contained in the CPU's F program and in the fail-safe signal modules. The signal modules monitor the output and input signals by means of discrepancy analyses and test signal injections. The CPU monitors proper operation of the PLC by performing regular self-tests, instruction tests and logic and sequential program flow control. In addition, the I/O is checked by requesting signs of life. If an error is diagnosed on the system, the latter is moved to a safe state. An F runtime license is not required for operation of the CPU 317F-2 DP.

Programming

The CPU 317F-2 DP is programmed in the same manner as other SIMATIC S7 systems. The user program for non fail-safe plant sections is created with the proven programming tools such as STEP 7.

SIMATIC S7 Distributed Safety option package

The "S7 F Distributed Safety" option package is required to program the safety-relevant parts of the program. The package contains all the functions and blocks required to create the F program. The F program with the safety functions is linked in F-FBD or F-LAD or using special function blocks from the F library. Use of F-FBD or F-LAD simplifies plant planning and programming and, because of the uniform and cross-vendor presentation, the acceptance test too. Programmers can concentrate completely on configuration of the safety-relevant application without having to use additional tools.

SIMATIC S7 Distributed Safety (Classic) and SIMATIC Safety Advanced V13 (TIA Portal V13) option packages

The STEP 7 option packages "SIMATIC S7 Distributed Safety" (Classic) or SIMATIC Safety Advanced V13 (TIA Portal V13) are required for programming the safety-related program sections. The packages contain all the functions and blocks required to create the F program.

The F program with the safety functions is created in F-FBD or F-LAD or using special function blocks from the F library. Use of F-FBD or F-LAD simplifies configuration and programming of the plant and, due to the cross-plant, uniform presentation, also acceptance testing. The programmer can therefore concentrate entirely on configuring the safety-related application, without the need to use any additional tools.

Technical specifications

[For technical data see page 3/13.](#)

Selection and ordering data

[For ordering data see page 3/16.](#)

Safety integrated automation

CPUs for factory automation

Fail-safe S7-300 CPUs
CPU 315F-2 PN/DP

Overview



- Based on CPU 315-2 PN/DP
- The CPU with medium-sized program memory and quantity structures for setting up a fail-safe automation system in plants with increased safety requirements
- Complies with safety requirements up to SIL 3 according to IEC 61508, PL e according to ISO 13849, and up to Cat. 4 according to EN 954-1
- Fail-safe I/O modules in distributed stations can be connected through the integrated PROFINET interface (PROFIsafe) and/or through the integrated PROFIBUS DP interface (PROFIsafe);
- Fail-safe I/O modules of the ET 200M range can also be centrally connected
- Central and distributed use of standard modules for non safety-relevant applications
- Component Based Automation (CBA) on PROFINET
- PROFINET IO Controller for operating distributed I/O on PROFINET
- PROFINET interface with 2-port switch
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component Based Automation (CBA)

SIMATIC Micro Memory Card required for operation of CPU.

SIPLUS versions

SIPLUS versions of this module are also available.

SIPLUS CPU 315F-2 PN/DP		
SIPLUS module	6AG1315-2FJ14-2AB0	6AG1315-2FJ14-2AY0
based-on	6ES7315-2FJ14-0AB0	
Permissible ambient operating temperature	-25 ... +60 °C	-25 ... +60 °C, Suits standard for "Electronic equipment used on rolling stock" (EN 50155): -25 ... +55 °C
Expanded ambient conditions		
• Permissible temperatures are valid for this air pressure range	T _{min} ... T _{max} at 1080 hPa ... 795 hPa (-1000 m ... +2000 m)	
Permitted relative humidity	100 %; RH incl. condensation/frost (no commissioning under condensation)	
Suits standard for "Electronic equipment used on rolling stock" (EN 50155)	No	Yes; T1 Cat. 1 KL. A/B horizontal installation

SIPLUS CPU 315F-2 PN/DP

Capability of resistance EN 60721-3-3

- | | |
|--|--|
| • against biologically active substances | Class 3B2 (mold and fungal spores, except fauna) ¹⁾ |
| • against chemically active substances | Class 3C4, incl. salt mist according to EN 60068-2-52 (severity level 3) ¹⁾ |
| • against mechanically active substances | Class 3S4 incl. sand and dust ¹⁾ |

Technical data
The technical data are identical with those of the based-on module, except for the ambient conditions.

¹⁾ The connector covers (included in the delivery) must be attached to the unused interfaces.

Technical documentation for SIPLUS is available at:
www.siemens.com/siplus-extreme

Application

The CPU 315F-2 PN/DP allows a fail-safe automation system to be implemented for plants with increased safety requirements, especially in manufacturing automation.

It can be implemented as a PROFINET IO Controller and as a standard PROFIBUS DP Master in the SIMATIC S7-300. The CPU 315F-2 PN/DP can also be implemented as distributed intelligence (DP slave).

Distributed I/O stations containing fail-safe I/O modules can be connected via the two integrated interfaces. The fail-safe I/O modules of ET 200M can also be installed in central, safety-related configurations.

The safety-oriented communication between the F-CPU and the fail-safe I/O modules is performed on the basis of the PROFIsafe profile.

A SIMATIC Micro Memory Card is required for operation of the CPU.

Design

The CPU 315F-2 PN/DP is equipped with the following:

- **Microprocessor:**
The processor achieves an execution time of approximately 50 ns per binary instruction and 450 ns per floating-point operation.
- **Memory:**
512 KB high-speed RAM for safety-relevant and standard program sections; increased memory space requirements must be expected (5 times larger) if safety-relevant program sections are implemented. SIMATIC Micro Memory Cards (max. 8 MB) as load memories for programs additionally permit storage of the project (including symbols and comments) in the CPU.
- **Flexible expansion capability:**
Max. 32 modules, (4-tier configuration)
- **Combined MPI/DP interface:**
The first MPI/DP integrated interface can establish as many as 16 connections simultaneously to S7-300/400 or connections to PG, PC, OP. Among these connections, one is always reserved for programming devices and another for OPs. A simple network with up to 32 CPUs can be configured with the MPI interfaces and "global data communication". The MPI interface can be reconfigured from an MPI to a DP interface. The DP interface can be used as a DP master or as a DP slave.
PROFIBUS DP interface:
The PROFIBUS DP V1 standard is fully supported. This increases the scope of DP V1 standard slaves in terms of diagnostics and parameterization capability.

Safety integrated automation

CPUs for factory automation

Fail-safe S7-300 CPUs CPU 315F-2 PN/DP

- Ethernet interface:
The second integral interface of the CPU 315-2 PN/DP is a PROFINET interface with 2-port switch based on Ethernet TCP/IP. It supports the following protocols:
 - S7 communication for data communication between SIMATIC controllers
 - PG/OP communication for programming, startup and diagnostics through STEP 7
 - PG/OP communication for interfacing to HMI and SCADA
 - Open TCP/IP communication over PROFINET and SIMATIC NET OPC server for communication with other controllers and I/O devices with a separate CPU

Function

- Password protection;
a password concept protects the user program from unauthorized access.
- Diagnostics buffer;
the last 500 error and interrupt events are stored in a buffer for diagnostic purposes.
- Maintenance-free data backup;
all data is automatically backed up by the CPU if the voltage is interrupted and is available unchanged after the voltage has been reconnected.

Parameterizable properties

The S7 configuration as well as the properties and response of the CPUs can be parameterized using STEP 7:

- Multi-Point Interface (MPI);
determination of node addresses.
- Start-up/cycle time behavior;
definition of maximum cycle time and loading.
- Clock memory;
setting of addresses.
- Protection level;
definition of access rights for program and data.
- System diagnostics;
definition of handling and scope of diagnostic messages.
- Watchdog interrupts;
setting of periodicity.
- Time-of-day interrupts;
setting of start date, start time, and periodicity.
- PROFIBUS DP master/slave interface;
user-oriented address allocation for distributed I/O.

Display and information functions

- Status and error indications;
LEDs indicate hardware, programming, time, I/O or bus errors and operating statuses such as RUN, STOP, start-up.
- Test functions;
the PG is used to indicate signal status during program execution, to modify process variables independently of the user program and to output the contents of stack memories.
- Information functions;
the PG can be used to obtain information about the memory capacity and operating mode of the CPU, the current loading of the work and load memory, current cycle times and diagnostics buffer content in plain text.

Integrated communication functions

- PG/OP communication
- Global data communication
- S7 basic communication
- S7 communication
- Open communication by means of TCP/IP
- PROFINET CBA
- Web server
- Data record routing

Communication

Safety-oriented and standard communication between the central controller and distributed stations takes place over PROFIBUS DP and/or PROFINET. The specially developed PROFIsafe profile supports the transfer of user data for the safety functions within the standard data message frame. Additional hardware components, e.g. special safety buses are not required. The necessary software is either integrated in the hardware components as an expansion of the operating system or loaded into the CPU later as a certified software block.

Mode of operation

The safety functions of the F-CPU are included in the F program of the CPU and in the fail-safe signal modules. The signal modules monitor the output and input signals by means of discrepancy analysis and the injection of test signals. The CPU checks the proper operation of the controller by means of periodic self-tests, command tests and logic-based and time-based program execution checks. Furthermore, the I/O is checked using requests for signs of life. If an error is diagnosed in the system, the system will be placed in a safe state. An F runtime license is not required to operate the CPU 319F-2 PN/DP.

Programming

The CPU 315F-2 PN/DP is programmed in the same manner as the other SIMATIC S7 systems. The user program for non-fail-safe plant sections is created using familiar programming tools, e.g. STEP 7.

SIMATIC S7 Distributed Safety option package

The STEP 7 option package "SIMATIC S7 Distributed Safety" is required for programming the safety-related program components. The package contains all the functions and blocks required to create an F program.

The F program with the safety functions is connected in F FBD or F LAD or using special function blocks from the F library. Use of F FBD or F LAD simplifies configuration and programming of the system and also acceptance testing thanks to the cross-system uniform presentation form. The programmer can concentrate on configuration of the safety-related application without the need to use additional tools.

SIMATIC S7 Distributed Safety (Classic) and SIMATIC Safety Advanced V13 (TIA Portal V13) option packages

The STEP 7 option packages "SIMATIC S7 Distributed Safety" (Classic) or SIMATIC Safety Advanced V13 (TIA Portal V13) are required for programming the safety-related program sections. The packages contain all the functions and blocks required to create the F program.

The F program with the safety functions is created in F-FBD or F-LAD or using special function blocks from the F library. Use of F-FBD or F-LAD simplifies configuration and programming of the plant and, due to the cross-plant, uniform presentation, also acceptance testing. The programmer can therefore concentrate entirely on configuring the safety-related application, without the need to use any additional tools.

Technical specifications

For technical data see page 3/13.

Selection and ordering data

For ordering data see page 3/16.

Safety integrated automation

CPUs for factory automation

Fail-safe S7-300 CPUs
CPU 317F-2 PN/DP

Overview



- Based on CPU 317-2 PN/DP
- The fail-safe CPU with a large program memory and quantity framework for demanding applications; for setting up a fail-safe automation system in plants with increased safety requirements.
- Complies with safety requirements up to SIL 3 according to IEC 61508, PL e according to ISO 13849-1, and up to Cat. 4 according to EN 954-1
- Fail-safe I/O modules in distributed stations can be connected through the integrated PROFINET interface (PROFIsafe) and/or through the integrated PROFIBUS DP interface (PROFIsafe)
- Fail-safe I/O modules of the ET 200M range can also be centrally connected
- Central and distributed use of standard modules for non safety-relevant applications
- Component Based Automation (CBA) on PROFINET
- PROFINET IO Controller for operating distributed I/O on PROFINET
- PROFINET interface with 2-port switch
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component Based Automation (CBA)

SIMATIC Micro Memory Card required for operation of CPU.

SIPLUS versions

SIPLUS versions of this module are also available.

SIPLUS CPU 317F-2 PN/DP		
SIPLUS module	6AG1317-2FK14-2AB0	6AG1317-2FK14-2AY0
based-on	6ES7317-2FK14-0AB0	
Permissible ambient operating temperature	-25 ... +60 °C	-25 ... +60 °C, Suits standard for "Electronic equipment used on rolling stock" (EN 50155): -25 ... +55 °C
Expanded ambient conditions	<ul style="list-style-type: none"> • Permissible temperatures are valid for this air pressure range 	
	T _{min} ... T _{max} at 1080 hPa ... 795 hPa (-1000 m ... +2000 m)	
Permitted relative humidity	100 %; RH incl. condensation/frost (no commissioning under condensation)	

SIPLUS CPU 317F-2 PN/DP

Suits standard for "Electronic equipment used on rolling stock" (EN 50155)	No	Yes; T1 Cat. 1 KL. A/B horizontal installation
Capability of resistance EN 60721-3-3	<ul style="list-style-type: none"> • against biologically active substances • against chemically active substances • against mechanically active substances 	
	Class 3B2 (mold and fungal spores, except fauna) ¹⁾	Class 3C4, incl. salt mist according to EN 60068-2-52 (severity level 3) ¹⁾
		Class 3S4 incl. sand and dust ¹⁾
Technical data	The technical data are identical with those of the based-on module, except for the ambient conditions.	

¹⁾ The connector covers (included in the delivery) must be attached to the unused interfaces.

Technical documentation for SIPLUS is available at:
www.siemens.com/siplus-extreme

Application

The CPU 317F-2 PN/DP allows a more complex fail-safe automation system to be implemented for plants with increased safety requirements, especially in manufacturing automation.

It can be implemented as a PROFINET IO Controller and as a standard PROFIBUS DP Master in the SIMATIC S7-300. The CPU 317F-2 PN/DP can also be implemented as distributed intelligence (DP slave).

Distributed I/O stations containing fail-safe I/O modules can be connected via the two integrated interfaces. The fail-safe I/O modules of ET 200M can also be installed in central, safety-related configurations.

The safety-oriented communication between the F-CPU and the fail-safe I/O modules is performed on the basis of the PROFIsafe profile.

A SIMATIC Micro Memory Card is required to operate the CPU.

Design

The CPU 317F-2 PN/DP is equipped with the following:

- **Microprocessor:**
The processor achieves an execution time of approximately 25 ns per binary instruction and 160 ns per floating-point operation.
- **Memory:**
1.5 MB high-speed main memory for safety-relevant and standard program sections; increased memory space requirements must be expected (5 times larger) if safety-relevant program sections are implemented. SIMATIC Micro Memory Cards (max. 8 MB) as load memories for programs additionally permit storage of the project (including symbols and comments) in the CPU.
- **Flexible expansion capability:**
Max. 32 modules, (4-tier configuration)
- **Combined MPI/DP interface:**
The first MPI/DP integrated interface can establish as many as 16 connections simultaneously to S7-300/400 or connections to PG, PC, OP. Of the connections, one is permanently reserved for programming devices and one for OPs. The MPI supports simple networking of up to 32 CPUs over "Global data communication". This interface can be reconfigured from MPI interface to DP interface. The DP interface can be used as a DP master or as a DP slave.
PROFIBUS DP interface:
The PROFIBUS DP V1 standard is fully supported. This increases the scope of DP V1 standard slaves in terms of diagnostics and parameterization capability.

Safety integrated automation

CPUs for factory automation

Fail-safe S7-300 CPUs CPU 317F-2 PN/DP

- Ethernet interface:
The second integral interface of the CPU 317F-2 PN/DP is a PROFINET interface with 2-port switch based on Ethernet TCP/IP. It supports the following protocols:
 - S7 communication for data communication between SIMATIC controllers;
 - PG/OP communication for programming, startup and diagnostics through STEP 7;
 - PG/OP communication for interfacing to HMI and SCADA;
 - Open TCP/IP communication over PROFINET and SIMATIC NET OPC server for communication with other controllers and I/O devices with a separate CPU.

Function

- Password protection;
a password concept protects the user program from unauthorized access.
- Diagnostics buffer;
the last 500 error and interrupt events are stored in a buffer for diagnostic purposes.
- Maintenance-free data backup;
all data is automatically backed up by the CPU if the voltage is interrupted and is available unchanged after the voltage has been reconnected.

Parameterizable properties

The S7 configuration as well as the properties and response of the CPUs can be parameterized using STEP 7:

- Multi-Point Interface (MPI);
determination of node addresses.
- Start-up/cycle time behavior;
definition of maximum cycle time and loading.
- Clock memory;
setting of addresses.
- Protection level;
definition of access rights for program and data.
- System diagnostics;
definition of handling and scope of diagnostic messages.
- Watchdog interrupts;
setting of periodicity.
- Time-of-day interrupts;
setting of start date, start time, and periodicity.
- PROFIBUS DP master/slave interface;
user-oriented address allocation for distributed I/O.

Display and information functions

- Status and error indications;
LEDs indicate hardware, programming, time, I/O or bus errors and operating statuses such as RUN, STOP, start-up.
- Test functions;
the PG is used to indicate signal status during program execution, to modify process variables independently of the user program and to output the contents of stack memories.
- Information functions;
the PG can be used to obtain information about the memory capacity and operating mode of the CPU, the current loading of the work and load memory, current cycle times and diagnostics buffer content in plain text.

Integrated communication functions

- PG/OP communication
- Global data communication
- S7 basic communication
- S7 communication
- Open communication by means of TCP/IP
- PROFINET CBA
- Web server
- Data record routing

Communication

Safety-oriented and standard communication between the central controller and distributed stations takes place over PROFIBUS DP and/or PROFINET. The specially developed PROFIsafe profile supports the transfer of user data for the safety functions within the standard data message frame. Additional hardware components, e.g. special safety buses are not required. The necessary software is either integrated in the hardware components as an expansion of the operating system or loaded into the CPU later as a certified software block.

Mode of operation

The safety functions of the F-CPU are included in the F program of the CPU and in the fail-safe signal modules. The signal modules monitor the output and input signals by means of discrepancy analysis and the injection of test signals.

The CPU checks the proper operation of the controller by means of periodic self-tests, command tests and logic-based and time-based program execution checks. Furthermore, the I/O is checked using requests for signs of life.

If an error is diagnosed in the system, the system will be placed in a safe state.

An F runtime license is not required to operate the CPU 317F-2 PN/DP.

Programming

The CPU 317F-2 PN/DP is programmed in the same manner as the other SIMATIC S7 systems. The user program for non-fail-safe plant units is created using tried and tested programming tools, e.g. STEP 7.

SIMATIC S7 Distributed Safety option package

The STEP 7 option package "SIMATIC S7 Distributed Safety" is required for programming the safety-related program components. The package contains all the functions and blocks required to create an F program.

The F program with the safety functions is connected in F FBD or F LAD or using special function blocks from the F library. Use of F FBD or F LAD simplifies configuration and programming of the system and also acceptance testing thanks to the cross-system uniform presentation form. The programmer can concentrate on configuration of the safety-related application without the need to use additional tools.

SIMATIC S7 Distributed Safety (Classic) and SIMATIC Safety Advanced V13 (TIA Portal V13) option packages

The STEP 7 option packages "SIMATIC S7 Distributed Safety" (Classic) or SIMATIC Safety Advanced V13 (TIA Portal V13) are required for programming the safety-related program sections. The packages contain all the functions and blocks required to create the F program.

The F program with the safety functions is created in F-FBD or F-LAD or using special function blocks from the F library. Use of F-FBD or F-LAD simplifies configuration and programming of the plant and, due to the cross-plant, uniform presentation, also acceptance testing. The programmer can therefore concentrate entirely on configuring the safety-related application, without the need to use any additional tools.

Technical specifications

[For technical data see page 3/13.](#)

Selection and ordering data

[For ordering data see page 3/16.](#)

Safety integrated automation

CPUs for factory automation

Fail-safe S7-300 CPUs
CPU 319F-3 PN/DP

Overview



- The fail-safe CPU with high-performance command processing, large program memory and large quantity structure for demanding applications
- For constructing a fail-safe automation system for plants with increased safety requirements
- Complies with safety requirements up to SIL 3 according to IEC 61508, PL e according to 13849-1, and up to Cat. 4 according to EN 954-1
- Fail-safe I/O modules can be connected decentralized over the integrated PROFINET interface (PROFIsafe) and/or over the integrated PROFIBUS DP interface (PROFIsafe);
- Fail-safe I/O modules of ET200M can also be connected centrally
- Standard modules for non-safety-related applications can be operated centrally and decentralized
- Distributed intelligence in Component Based Automation (CBA) on PROFINET
- Isochronous mode on PROFIBUS
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component based Automation (CBA)

SIMATIC Micro Memory Card required for operation of CPU.

Application

The CPU 319F-3 PN/DP is the fastest S7-300 CPU with a large program memory. It is ideally suited to plants with extensive automation tasks and stringent safety requirements.

It can be used as a PROFINET IO controller and as a standard PROFIBUS DP master in the SIMATIC S7-300. The CPU 319F-3 PN/DP can also be used as distributed intelligence (DP slave).

Distributed I/O devices with fail-safe I/O modules can be connected over the three integrated interfaces. The fail-safe I/O modules of the ET200M can also be used centrally for safety-related applications.

The integrated communication options of the CPU support networked automation solutions (also fail-safe) without the need for additional components.

Design

The CPU 319F-3 PN/DP features:

- High command processing and communication performance
- 2.5 MB main memory;
The extensive main memory for runtime-relevant program sections offers sufficient space for user programs. In the case of safety-related program sections, increased memory requirements (5 times larger) must be expected. SIMATIC Micro Memory Cards (8 MB max.) as load memory for the program also allow the project to be stored in the CPU (complete with symbols and comments) and can be used for data archiving and recipe management.
- Flexible expansion capability;
max. 32 modules (4-tier configuration)
- Combined MPI/DP interface;
The first integrated MPI/DP interface can establish up to 32 connections simultaneously to the S7-300/400 or connections to PGs, PCs and OPs. One of the connections is permanently reserved for the PG and one for the OP.
With MPI, a simple network can be constructed with up to 32 CPUs using "global data communication". This interface can be reconfigured from an MPI to a DP interface. The DP interface can be used as a DP master or as a DP slave.
PROFIBUS DP interface:
The PROFIBUS DP V1 standard is supported in full. This enhances the diagnostics and parameterization capability of DP V1 standard slaves.
- DP interface;
the second integrated DP interface can establish up to 32 connections simultaneously to the S7-300/400 or connections to PGs, PCs and OPs. One of the connections is permanently reserved for the PG and one for the OP.
The DP interface can also be used as a DP master or as a DP slave. PROFIBUS DP slaves can be operated isochronously on this interface. The PROFIBUS DP V1 standard is supported in full. This enhances the diagnostics and parameterization capability of DP V1 standard slaves.
- Ethernet interface;
the third integrated interface of the CPU 319F-3 PN/DP is a PROFINET interface based on Ethernet TCP/IP. It supports the following protocols:
 - S7 communication for the exchange of data between SIMATIC controllers
 - PG/OP communication for programming, start-up and diagnostics through STEP 7
 - PG/OP communication for connection to HMI and SCADA
 - Open TCP/IP, UDP and ISO-on-TCP (RFC1006) communication over PROFINET
 - SIMATIC NET OPC server for communication with other controllers and I/O devices with an integrated CPU

Function

- Password protection;
a password concept protects the user program from unauthorized access.
- Diagnostics buffer;
the last 100 error and interrupt events are stored in a buffer for diagnostic purposes.
- Maintenance-free data back-up;
all data (up to 700 KB) are automatically backed up by the CPU if the voltage is interrupted and are available unchanged after the voltage has been reconnected.

Safety integrated automation

CPUs for factory automation

Fail-safe S7-300 CPUs CPU 319F-3 PN/DP

Parameterizable properties

The S7 configuration as well as the properties and response of the CPUs can be parameterized using STEP 7:

- MPI multipoint interface;
determining station addresses
- Start-up/cyclic response;
determining maximum cycle time and loading
- Isochronous interrupts;
setting of DP master system, partial process image number and delay time
- Clock bit memory;
setting of addresses
- Retentivity;
setting of retentive areas
- Clock interrupts;
setting of start date, start time and periodicity
- Watchdog interrupts;
setting of periodicity
- System diagnostics;
determining handling and scope of the diagnostic alarms
- Clock;
setting the type of synchronization in the AS or on the MPI
- Protection level;
specifying the access rights to program and data
- Operation;
selection of either test operation or process operation
- Communication;
reserving the connection resources
- PROFIBUS DP master/slave interfaces;
user-oriented address assignment for distributed I/O
- PROFINET interface;
parameterization of time synchronization with NTP procedure

Information and display functions

- Status and error indications;
LEDs indicate hardware, programming, time, I/O and bus errors and operating statuses such as RUN, STOP and starting.
- Test functions;
the PG is used to indicate signal status during program execution, to modify process variables independently of the user program and to output the contents of stack memories.
- Information functions;
the PG can be used to obtain information about the memory capacity and operating mode of the CPU, the current loading of the work and load memory, current cycle times and diagnostics buffer content in plain text.

Integrated communication functions

- PG/OP communication
- Global data communication
- S7 basic communication
- S7 communication
- S5-compatible communication
- Routing
- PROFIBUS DP master/slave
- Open communication over TCP/IP, UDP and ISO-on-TCP (RFC1006)
- PROFINET IO controller
- PROFINET CBA
- System functions;
the CPU offers a number of comprehensive system functions for diagnosis, parameterization, synchronization, interrupts, time measurement, etc.
Further details can be found in the manual.

Communication

The safety related and standard communication between the central controller and the distributed stations takes place over PROFIBUS DP and/or PROFINET. The specially developed PRO-Flsafe profile supports the transfer of user data for the safety functions within the standard data message frame. Additional hardware components, e.g. special safety buses are not required. The necessary software is either integrated in the hardware components as an expansion of the operating system or loaded into the CPU later as a certified software block.

Mode of operation

The safety functions of the F-CPU are included in the F program of the CPU and in the fail-safe signal modules. The signal modules monitor the output and input signals by means of discrepancy analysis and the injection of test signals.

The CPU checks the proper operation of the controller by means of periodic self-tests, command tests and logic-based and time-based program execution checks. Furthermore, the I/O is checked using requests for signs of life.

If an error is diagnosed in the system, the system will be placed in a safe state.

An F runtime license is not required to operate the CPU 319F-3 PN/DP.

Programming

The CPU 319F-3 PN/DP is programmed in the same manner as the other SIMATIC S7 systems. The user program for non-fail-safe plant sections is created using familiar programming tools, e.g. STEP 7.

SIMATIC S7 Distributed Safety option package

The STEP 7 option package "SIMATIC S7 Distributed Safety" is required for programming the safety-related program components. The package contains all the functions and blocks required to create an F program.

The F program with the safety functions is connected in F FBD or F LAD or using special functions from the F library. Use of F FBD or F LAD simplifies configuration and programming of the plant and also acceptance testing thanks to the non-plant-specific uniform presentation form. The programmer can concentrate on configuration of the safety-related application without the need to use additional tools.

SIMATIC S7 Distributed Safety (Classic) and SIMATIC Safety Advanced V13 (TIA Portal V13) option packages

The STEP 7 option packages "SIMATIC S7 Distributed Safety" (Classic) or SIMATIC Safety Advanced V13 (TIA Portal V13) are required for programming the safety-related program sections. The packages contains all the functions and blocks required to create the F program.

The F program with the safety functions is created in F-FBD or F-LAD or using special function blocks from the F library. Use of F-FBD or F-LAD simplifies configuration and programming of the plant and, due to the cross-plant, uniform presentation, also acceptance testing. The programmer can therefore concentrate entirely on configuring the safety-related application, without the need to use any additional tools.

Technical specifications

For technical data see page 3/13.

Selection and ordering data

For ordering data see page 3/16.

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Technical data for fail-safe S7-300 CPUs

Technical data

	6ES7315-6FF04-0AB0 CPU 315F-2 DP	6ES7315-2FJ14-0AB0 CPU315F-2 PN/DP	6ES7317-6FF04-0AB0 CPU317F-2 DP	6ES7317-2FK14-0AB0 CPU 317F-2 PN/DP	6ES7318-3FL01-0AB0 CPU319F-3 PN/DP
General information					
• Engineering with programming package	STEP 7 V5.5 + SP1 or higher or STEP7 V5.2 + SP1 or higher with HSP 218 + Distributed Safety From STEP 7 Professional V13 SP1: STEP 7 Safety Advanced V13	STEP 7 V 5.5 or higher, Distributed Safety V 5.4 SP4 From STEP 7 Professional V13 SP1: STEP 7 Safety Advanced V13	STEP 7 V5.5 + SP1 or higher or STEP7 V5.2 + SP1 or higher with HSP 202 + Distributed Safety From STEP 7 Professional V13 SP1: STEP 7 Safety Advanced V13	STEP 7 V 5.5 or higher, Distributed Safety V 5.4 SP4 From STEP 7 Professional V13 SP1: STEP 7 Safety Advanced V13	STEP 7 V 5.5 or higher, Distributed Safety V 5.4 SP4 From STEP 7 Professional V13 SP1: STEP 7 Safety Advanced V13
Supply voltage	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC
Power losses, typical	4.5 W	4.65 W	4.5 W	4.65 W	14 W
Main Memory					
• integrated	384 kbyte	512 kbyte	1 536 kbyte	1 536 kbyte	2 560 kbyte
• Size of retentive memory for retentive data blocks	128 kbyte	128 kbyte	256 kbyte	256 kbyte	700 kbyte
Load memory					
• pluggable (MMC), max.	8 Mbyte	8 Mbyte	8 Mbyte	8 Mbyte	8 Mbyte
CPU processing times					
for bit operations, typ.	0.05 µs	0.05 µs	0.025 µs	0.025 µs	0.004 µs
for word operations, typ.	0.09 µs	0.09 µs	0.03 µs	0.03 µs	0.01 µs
for fixed point arithmetic, typ.	0.12 µs	0.12 µs	0.04 µs	0.04 µs	0.01 µs
for floating point arithmetic, typ.	0.45 µs	0.45 µs	0.16 µs	0.16 µs	0.04 µs
Counters, timers and their retentivity					
S7 counters	256	256	512	512	2 048
IEC counter	Yes	Yes	Yes	Yes	Yes
S7 timers	256	256	512	512	2 048
IEC timer	Yes	Yes	Yes	Yes	Yes
Data areas and their retentivity					
Flag					
• Number, max.	2 048 byte	2 048 byte	4 096 byte	4 096 byte	8 192 byte
Address area					
I/O address area					
• Inputs	2 048 byte	2 048 byte	8 192 byte	8 192 byte	8 192 byte
• Outputs	2 048 byte	2 048 byte	8 192 byte	8 192 byte	8 192 byte
Process image					
• Inputs, adjustable	2 048 byte	2 048 byte	8 192 byte	8 192 byte	8 192 byte
• Outputs, adjustable	2 048 byte	2 048 byte	8 192 byte	8 192 byte	8 192 byte
Time of day					
• Hardware clock (real-time clock)	Yes	Yes	Yes	Yes	Yes
Operating hours counter					
• Number	1	1	4	4	4
1st interface					
Type of interface	Integrated RS 485 interface	Integrated RS 485 interface	Integrated RS 485 interface	Integrated RS 485 interface	Integrated RS 485 interface
Physics	RS 485	RS 485	RS 485	RS 485	RS 485
Functionality					
• MPI	Yes	Yes	Yes	Yes	Yes
• DP master	No	Yes	Yes	Yes	Yes
• DP slave	No	Yes	Yes; A DP slave at both interfaces simultaneously is not possible	Yes	Yes; A DP slave at both interfaces simultaneously is not possible
• Point-to-point connection	No	No	No	No	No

Safety integrated automation

CPUs for factory automation

Technical data for fail-safe S7-300 CPUs

	6ES7315-6FF04-0AB0 CPU 315F-2 DP	6ES7315-2FJ14-0AB0 CPU315F-2 PN/DP	6ES7317-6FF04-0AB0 CPU317F-2 DP	6ES7317-2FK14-0AB0 CPU 317F-2 PN/DP	6ES7318-3FL01-0AB0 CPU319F-3 PN/DP
DP master					
• Number of DP slaves, max.		124	124	124	124
2nd interface					
Type of interface	Integrated RS 485 interface	PROFINET	Integrated RS 485 interface	PROFINET	Integrated RS 485 interface
Physics	RS 485	Ethernet RJ45	RS 485	Ethernet RJ45	RS 485
Number of ports		2		2	
Functionality					
• MPI	No	No	No	No	No
• DP master	Yes	No	Yes	No	Yes
• DP slave	Yes	No	Yes; A DP slave at both interfaces simultaneously is not possible	No	Yes; A DP slave at both interfaces simultaneously is not possible
• PROFINET IO Controller		Yes; Also simultaneously with IO-Device functionality		Yes; Also simultaneously with IO-Device functionality	No
• PROFINET IO Device		Yes; Also simultaneously with IO Controller functionality		Yes; Also simultaneously with IO Controller functionality	No
• PROFINET CBA		Yes		Yes	No
DP master					
• Number of DP slaves, max.	124; Per station		124		124
PROFINET IO Controller					
• Max. number of connectable IO devices for RT		128		128	
• Number of IO devices with IRT and the option "high flexibility"		128		128	
• Number of IO Devices with IRT and the option "high performance", max.		64		64	
3rd interface					
Type of interface					PROFINET
Physics					Ethernet RJ45
Number of ports					2
Functionality					
• MPI					No
• DP master					No
• DP slave					No
• PROFINET IO Controller					Yes; Also simultaneously with I-Device functionality
• PROFINET IO Device					Yes; Also simultaneously with IO Controller functionality
• PROFINET CBA					Yes
PROFINET IO Controller					
• Max. number of connectable IO devices for RT					256
• Number of IO devices with IRT and the option "high flexibility"					256
• Number of IO Devices with IRT and the option "high performance", max.					64

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Technical data for fail-safe S7-300 CPUs

	6ES7315-6FF04-0AB0 CPU 315F-2 DP	6ES7315-2FJ14-0AB0 CPU315F-2 PN/DP	6ES7317-6FF04-0AB0 CPU317F-2 DP	6ES7317-2FK14-0AB0 CPU 317F-2 PN/DP	6ES7318-3FL01-0AB0 CPU319F-3 PN/DP
Isochronous mode					
Isochronous operation (application synchronized up to terminal)	Yes	Yes; Via PROFIBUS DP or PROFINET interface		Yes; Via PROFIBUS DP or PROFINET interface	Yes; Via 2nd PROFIBUS DP or PROFINET interface
Communication functions					
PG/OP communication	Yes	Yes	Yes	Yes	Yes
Data record routing	Yes	Yes	Yes	Yes	Yes
Global data communication					
• supported	Yes	Yes	Yes	Yes	Yes
S7 basic communication					
• supported	Yes	Yes	Yes	Yes	Yes
S7 communication					
• supported	Yes	Yes	Yes	Yes	Yes
S5-compatible communication					
• supported	Yes; via CP and loadable FC	Yes; via CP and loadable FC	Yes; via CP and loadable FC	Yes; via CP and loadable FC	Yes; via CP and loadable FC
Open IE communication					
• TCP/IP		Yes; via integrated PROFINET interface and loadable FBs		Yes; via integrated PROFINET interface and loadable FBs	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.		8		16	32
• ISO-on-TCP (RFC1006)		Yes; via integrated PROFINET interface and loadable FBs		Yes; via integrated PROFINET interface and loadable FBs	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.		8		16	32
• UDP		Yes; via integrated PROFINET interface and loadable FBs		Yes; via integrated PROFINET interface and loadable FBs	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.		8		16	32
Web server					
• supported		Yes; only read function		Yes	Yes
Number of connections					
• overall	16	16	32	32	32
Ambient conditions					
Operating temperature	0 °C ... 60 °C	0 °C ... 60 °C	0 °C ... 60 °C	0 °C ... 60 °C	0 °C ... 60 °C
Configuration					
• Programming language					
- LAD, FBD, STL, SCL, CFC, GRAPH, HiGraph®	Yes	Yes	Yes	Yes	Yes
Know-how protection					
• User program protection/password protection	Yes	Yes	Yes	Yes	Yes
• Block encryption	Yes; With S7 block Privacy	Yes; With S7 block Privacy	Yes; With S7 block Privacy	Yes; With S7 block Privacy	Yes; With S7 block Privacy
Dimensions					
Width x Height x Depth (mm)	40 x 125 x 130	40 x 125 x 130	40 x 125 x 130	40 x 125 x 130	140 x 125 x 130
Weight, approx.	290 g	340 g	360 g	340 g	1 250 g

Safety integrated automation

CPUs for factory automation

Ordering data for fail-safe S7-300 CPUs

	Article No.
STEP 7 Safety Advanced Upgrade	
Upgrade from STEP 7 Safety Advanced V11 to STEP 7 Safety Advanced V13.	6ES7833-1FA13-0YE5
Floating License for one User, Software and documentation on CD	
Distributed Safety V5.4 SP5 to Safety Advanced V13 Combo.	6ES7833-1FA13-0YF5
Combo License for parallel operation of Distributed Safety V5.4 and STEP 7 Safety Advanced V13.	
Software and documentation on CD	
SIMATIC Micro Memory Card	
64 KB	6ES7953-8LF20-0AA0
128 KB	6ES7953-8LG20-0AA0
512 KB	6ES7953-8LJ30-0AA0
2 MB	6ES7953-8LL31-0AA0
4 MB	6ES7953-8LM20-0AA0
8 MB	6ES7953-8LP20-0AA0
MPI cable	6ES7901-0BF00-0AA0
for connection of SIMATIC S7 and PG via MPI; 5 m in length	
Slot number plates	6ES7912-0AA00-0AA0
S7-300 manual	
Design, CPU data, module data, instruction list	
• German	6ES7398-8FA10-8AA0
• English	6ES7398-8FA10-8BA0
SIMATIC Manual Collection	6ES7998-8XC01-8YE0
Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	
SIMATIC Manual Collection update service for 1 year	6ES7998-8XC01-8YE2
Current "Manual Collection" DVD and the three subsequent updates	
Power supply connector	6ES7391-1AA00-0AA0
10 units, spare part	
PC adapter USB A2	6GK1571-0BA00-0AA0
For connecting a PG/PC or notebook to PROFIBUS or MPI; USB cable included in scope of delivery	

	Article No.
PROFIBUS bus components	
PROFIBUS DP bus connector RS 485	
• with 90° cable outlet, max. transfer rate 12 Mbit/s	6ES7972-0BA12-0XA0
- without PG interface	6ES7972-0BB12-0XA0
- with PG interface	
• with 90° cable outlet for FastConnect connection system, max. transfer rate 12 Mbit/s	6ES7972-0BA52-0XA0
- without PG interface, 1 unit	6ES7972-0BA52-0XB0
- without PG interface, 100 units	6ES7972-0BB52-0XA0
- with PG interface, 1 unit	6ES7972-0BB52-0XB0
- with PG interface, 100 units	6GK1500-0EA02
• with axial cable outlet for SIMATIC OP, for connecting to PPI, MPI, PROFIBUS	
PROFIBUS Fast Connect bus cable	6XV1830-0EH10
Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m	
RS 485 repeater for PROFIBUS	6ES7972-0AA02-0XA0
Transmission rate up to 12 Mbit/s; 24 V DC; IP20 enclosure	
PROFINET bus components	
IE FC TP Standard Cable GP 2x2	6XV1840-2AH10
4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug; PROFINET-compatible; with UL approval; sold by the meter	
FO Standard Cable GP (50/125)	6XV1873-2A
Standard cable, splittable, UL approval, sold by the meter	
SCALANCE X204-2 Industrial Ethernet Switch	6GK5204-2BB10-2AA3
Industrial Ethernet Switches with integral SNMP access, web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbit/s RJ45 ports and two FO ports	

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Ordering data for fail-safe S7-300 CPUs

	Article No.
CSM 377 Compact Switch Module Unmanaged switch for connecting a SIMATIC S7-300, ET200 M and up to three other stations to Industrial Ethernet with 10/100 Mbit/s; 4 x RJ45 ports; external 24 V DC power supply, LED diagnostics, S7-300 module incl. electronic manual on CD-ROM	6GK7377-1AA00-0AA0
IE FC RJ45 plugs RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables	
IE FC RJ45 plug 145 145° cable outlet 1 unit 10 units 50 units	6GK1901-1BB30-0AA0 6GK1901-1BB30-0AB0 6GK1901-1BB30-0AE0
IE FC RJ45 plug 180 180° cable outlet 1 unit 10 units 50 units	6GK1901-1BB10-2AA0 6GK1901-1BB10-2AB0 6GK1901-1BB10-2AE0
PROFIBUS/PROFINET bus components For establishing MPI/PROFIBUS/PROFINET communication	See catalogs IK PI, CA 01

1) For up-to-date information and download availability, see:
www.siemens.com/tia-online-software-delivery

Safety integrated automation

CPUs for factory automation

Fail-safe S7-300 technology CPU
CPU 317TF-3 PN/CP

Overview



- Fail-safe SIMATIC CPU with integral Technology/Motion Control functionality
- With full functionality of the standard CPU 317-2 PN/DP and CPU 317F-2 PN/DP (except for CBA)
- For cross-industry automation tasks in series machine, special machine and plant construction
- Ideal for synchronized motion, such as coupling to a virtual/real master, gear synchronization, cam disk, path interpolation, or print mark compensation
- 3D path interpolation with different kinematics
- Position and pressure-regulated hydraulic axes
- Used as central controller in production lines with central and distributed I/O
- With integrated I/O for high-speed technology functions (e.g. camming, reference point acquisition)
- PROFIBUS DP (DRIVE) interface for isochronous connection of drive components
- PROFINET interface with 2-port switch
- PROFINET I/O controller for operating distributed I/O on PROFINET
- One common S7 user program for control and motion control tasks (no additional programming language necessary for motion control)
- "S7 Technology" option package required (version V4.2 SP3 and higher)
- "S7 Distributed Safety" option package required (version V5.4 SP5 and higher)

SIMATIC Micro Memory Card (8 MB) required for operation of the CPU.

Application

The CPU 317TF-3 PN/DP is a controller that enables motion control, standard and safety tasks to be performed in one controller. It is used in machines where a controller with a large program memory and high processing speed is confronted by motion control requirements at the same time, e.g.:

- Processing/assembly lines
- Carton erectors
- Palletizers
- Handling systems
- Flying shears
- Bottling plants

- Wrapping
- Labeling machines
- Roll feeds
- Portals with interpolation

The typical application for motion control functions is for 3-8 axes. The maximum number of axes is 32. Along with accurate single axis positioning, the module is suitable primarily for complex motion sequences such as coupling to form a virtual or actual master, gearing, cam, path interpolation or print mark correction.

The quantitative framework of the CPU 317TF-3 PN/DP makes it ideal for the use of SIMATIC Engineering Tools, e.g.:

- Programming with SCL
- Machining step programming with S7-GRAPH

Design

The CPU 317TF-3 PN/DP has the same functionality as the high-performance CPU 317 as well as additional integrated functions for technology/motion control. Integrated, fast I/O for technical functions such as cam switching or home position detection round off the module. Thanks to the integration of Safety Integrated, the controller for safety-oriented applications complies with the high safety requirements according to the relevant standards EN 954-1 up to Cat. 4, IEC 62061 up to SIL 3, and EN ISO 13849-1 up to PL e.

For the fail-safe applications, the STEP 7 option package Distributed Safety provides ready-made TÜV-certified library blocks, e.g. for emergency-stop, two-hand control, muting and door monitoring.

The CPU 317TF-3 PN/DP features:

- Microprocessor;
the processor can handle execution times of approx. 0.025 μ s per binary instruction and 0.16 μ s per floating-point instruction. The CPU 317TF-3 PN/DP reaches very high processing speeds, particularly where word or double-word commands and 32 bit fixed-point commands are concerned.
- 1.5 MB main memory;
The extensive main memory for runtime-relevant program sections offers sufficient space for user programs. SIMATIC Micro Memory Cards (8 MB) as load memory for the program also allow the project to be stored in the CPU (complete with symbols and comments) and can be used for data archiving and recipe management.
- Integrated inputs and outputs
4 digital inputs and 8 digital outputs, can be used for technical functions such as home position detection (BERO) or rapid cam switching signals.
The digital inputs can also be used (with some restrictions) in the STEP 7 user program.
- Flexible expansion;
up to 8 modules (single-tier configuration)
- Combined MPI/DP interface;
The first MPI/DP integrated interface can establish as many as 32 connections simultaneously to S7-300/400 or connections to PG, PC, OP. Among these connections, one is always reserved for programming devices and another for OPs. A simple network with up to 32 CPUs can be configured with the MPI and "global data communication".
This interface can be reconfigured from an MPI to a PROFIBUS DP interface. The DP interface can be used as a DP master or as a DP slave.
- PROFIBUS DP (DRIVE) interface:
The PROFIBUS DP (DRIVE) interface supports isochronous mode and therefore provides an essential requirement to control high-speed and time-critical operations, such as are found in distributed axes in synchronized applications. The interface can only be used as a DP master. It serves to connect drive components. DP-V0 slaves can also be operated on the DP

Safety integrated automation

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Fail-safe S7-300 technology CPU CPU 317TF-3 PN/CP

(DRIVE) spur on a limited basis in addition to drive systems. The connectable drives are specified in the technical specifications.

A list of the drives that can be operated on the DP-Drive can be found at:

<http://support.automation.siemens.com>

• PROFINET

The third integral interface of the CPU 317TF-3 PN/DP is a PROFINET interface with 2-port switch, based on Ethernet TCP/IP.

It supports the following protocols:

- S7 communication for data communication between SIMATIC controllers
- PG/OP communication for programming, commissioning and diagnostics through STEP 7
- PG/OP communication for interfacing to HMI and SCADA
- Open TCP/IP, UDP and ISO-on-TCP (RFC1006) communication over PROFINET
- SIMATIC NET OPC-Server for communication with other controllers and I/O devices with own CPU

Function

The CPU 317TF-3 PN/DP has the full functionality of the CPU 317F-2 PN/DP (except for CBA). In addition, high-performance motion control functions are available.

The programming is carried out with STEP 7 as well as the option package S7-Technology.

The following kinematics are supported:

- Cartesian (two and three-dimensional)
- Roll picker
- Scara
- Articulated arm
- Delta2D picker
- Delta3D picker

The following motion control functions can be used with the CPU 317TF-3 PN/DP:

- Basic functions
 - MC_ReadSysParameter
 - MC_Reset
 - MC_WriteParameter
- Single-axis functions
 - MC_ChangeDataset
 - MC_Halt
 - MC_Home
 - MC_MoveAbsolute
 - MC_MoveAdditive
 - MC_MoveRelative
 - MC_MoveSuperImposed
 - MC_MoveToEndPos
 - MC_MoveVelocity
 - MC_Power
 - MC_SetTorqueLimit
 - MC_Stop
- Synchronous operation functions
 - MC_CamIn
 - MC_CamOut
 - MC_GearIn
 - MC_GearOut
 - MC_Phasing
- Superimposed synchronous operation functions
 - MC_CamInSuperImposed
 - MC_CamOutSuperImposed
 - MC_GearInSuperImposed
 - MC_GearOutSuperImposed
 - MC_PhasingSuperImposed

- Cam functions
 - MC_CamClear
 - MC_CamInterpolate
 - MC_CamSectorAdd
 - MC_GetCamPoint
- Other functions
 - MC_CamSwitch
 - MC_CamSwitchTime
 - MC_ExternalEncoder
 - MC_MeasuringInput
 - MC_ReadPeriphery
 - MC_ReadRecord
 - MC_WritePeriphery
 - MC_WriteRecord
- Drive functions
 - MC_DriveDiagnostics
 - MC_ReadDriveParameter
 - MC_WriteDriveParameter
- Pressure/Force commands
 - MC_ForceLimiting
 - MC_ForceControl
- Path commands
 - MC_SetCartesianTransform
 - MC_GroupStop
 - MC_GroupInterrupt
 - MC_GroupContinue
 - MC_MoveLinearAbsolute
 - MC_MoveLinearRelative
 - MC_MoveCircularAbsolute
 - MC_MoveCircularRelative
 - MC_MovePath
 - MC_PathSelect
 - MC_MovePolynomialAbsolute
 - MC_MovePolynomialRelative
 - MC_ZoneCheck
 - MC_GroupSyncConveyorBelt
 - MC_RedefineTrackingPos
 - MC_MoveCircles

Safety integrated automation

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Fail-safe S7-300 technology CPU
CPU 317TF-3 PN/CP

Technical specifications

6ES7317-7UL10-0AB0	
General information	
Hardware product version	01
Firmware version	CPU: V3.2; integrated technology V4.1.5
Supply voltage	
Input current	
Current consumption (rated value)	1 100 mA
Current consumption (in no-load operation), typ.	270 mA
Inrush current, typ.	6.5 A
I _q	1 A ² ·s
Power losses	
Power loss, typ.	8.5 W
Memory	
Type of memory	other
Main memory	
• integrated	1 536 kbyte
• expandable	No
• Size of retentive memory for retentive data blocks	256 kbyte
Load memory	
• pluggable (MMC)	Yes
• pluggable (MMC), max.	8 Mbyte
• Data management on MMC (after last programming), min.	10 a
Backup	
• present	Yes; Guaranteed by MMC (maintenance-free)
• without battery	Yes; Program and data
CPU processing times	
for bit operations, typ.	0.025 µs
for word operations, typ.	0.03 µs
for fixed point arithmetic, typ.	0.04 µs
for floating point arithmetic, typ.	0.16 µs
CPU-blocks	
Number of blocks (total)	2 048; (DBs, FCs, FBs); the maximum number of loadable blocks can be reduced by the MMC used.
DB	
• Number, max.	2 048; Number range: 1 to 16000
• Size, max.	64 kbyte
FB	
• Number, max.	2 048; Number range: 0 to 7999
• Size, max.	64 kbyte
FC	
• Number, max.	2 048; Number range: 0 to 7999
• Size, max.	64 kbyte
OB	
• Size, max.	64 kbyte
Nesting depth	
• per priority class	16
• additional within an error OB	4

6ES7317-7UL10-0AB0	
Counters, timers and their retentivity	
S7 counter	
• Number	512
• Retentivity	
- adjustable	Yes
- lower limit	0
- upper limit	511
- preset	Z 0 to Z 7
• Counting range	
- adjustable	Yes
- lower limit	0
- upper limit	999
IEC counter	
• present	Yes
• Type	SFB
• Number	Unlimited (limited only by RAM capacity)
S7 times	
• Number	512
• Retentivity	
- adjustable	Yes
- lower limit	0
- upper limit	511
- preset	No retentivity
• Time range	
- lower limit	10 ms
- upper limit	9 990 s
IEC timer	
• present	Yes
• Type	SFB
• Number	Unlimited (limited only by RAM capacity)
Data areas and their retentivity	
retentive data area, total	All, max. 256 KB
Flag	
• Number, max.	4 096 byte
• Retentivity available	Yes; MB 0 to MB 4095
• Retentivity preset	MB 0 to MB 15
• Number of clock memories	8; 1 memory byte
Data blocks	
• Retentivity adjustable	Yes; via non-retain property on DB
• Retentivity preset	Yes
Local data	
• per priority class, max.	32 768 byte; Max. 2048 bytes per block
Address area	
I/O address area	
• Inputs	8 192 byte
• Outputs	8 192 byte
• of which, distributed	
- Inputs	8 192 byte
- Outputs	8 192 byte
Process image	
• Inputs, adjustable	8 192 byte
• Outputs, adjustable	8 192 byte
• Inputs, default	1 024 byte

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Fail-safe S7-300 technology CPU CPU 317TF-3 PN/CP

6ES7317-7UL10-0AB0	
• Outputs, default	1 024 byte
• Default addresses of the integrated channels	
- Digital inputs	66
- Digital outputs	66
Subprocess images	
• Number of subprocess images, max.	1; With PROFINET IO, the length of the user data is limited to 1600 bytes
Digital channels	
• Inputs	65 536
• Outputs	65 536
• Inputs, of which central	256
• Outputs, of which central	256
Analog channels	
• Inputs	4 096
• Outputs	4 096
• Inputs, of which central	64
• Outputs, of which central	64
Hardware configuration	
Expansion devices, max.	0
• Racks, max.	1
• Modules per rack, max.	8
Number of DP masters	
• integrated	2; 1 DP and 1 DP (drive)
• via CP	2; for DP
Number of operable FMs and CPs (recommended)	
• FM	8
• CP, point-to-point	8
• CP, LAN	8
Time of day	
Clock	
• Hardware clock (real-time clock)	Yes
• battery-backed and synchronizable	Yes
• Deviation per day, max.	10 s; Typ.: 2 s
• Backup time	6 wk; At 40 °C ambient temperature
• Behavior of the clock following POWER-ON	Clock continues running after POWER OFF
• Behavior of the clock following expiry of backup period	Clock continues to run with the time at which the power failure occurred
Operating hours counter	
• Number	4
• Number/Number range	0 to 3
• Range of values	0 to 2 ³¹ hours (when using SFC 101)
• Granularity	1 hour
• retentive	Yes; Must be restarted at each restart
Clock synchronization	
• supported	Yes
• to MPI, master	Yes
• to MPI, slave	Yes
• to DP, master	Yes
• to DP, slave	Yes; Only time-of-day slave

6ES7317-7UL10-0AB0	
• in AS, master	Yes
• in AS, slave	Yes
• on Ethernet via NTP	Yes; as client
Digital inputs	
Number of digital inputs	4
• of which, inputs usable for technological functions	4
Input characteristic curve in accordance with IEC 61131, type 1	Yes
Number of simultaneously controllable inputs	
• horizontal installation	
- up to 40 °C, max.	4
- up to 60 °C, max.	4
• vertical installation	
- up to 40 °C, max.	4
Input voltage	
• Rated value, DC	24 V
• for signal "0"	-3 to +5 V
• for signal "1"	15 to 30 V
Input current	
• for signal "1", typ.	7 mA
Input delay (for rated value of input voltage)	
• for counter/technological functions	
- at "0" to "1", max.	10 µs
- at "1" to "0", max.	10 µs
Cable length	
• Cable length, shielded, max.	1 000 m
Digital outputs	
Number of digital outputs	8
• of which high-speed outputs	8
Functions	For technology functions, e.g. high-speed cam switch signals
Product function	Yes
• Response threshold, typ.	1.0 A
Limitation of inductive shutdown voltage to	48 V
Controlling a digital input	No
Switching capacity of the outputs	
• Lamp load, max.	5 W
Load resistance range	
• lower limit	48 Ω
• upper limit	4 kΩ
Output voltage	
• for signal "0", max.	3 V; (2L+)
• for signal "1", min.	Rated voltage -2.5 V
Output current	
• for signal "1" rated value	0.5 A
• for signal "1" permissible range for 0 to 60 °C, min.	5 mA
• for signal "1" permissible range for 0 to 60 °C, max.	0.6 A
• for signal "0" residual current, max.	0.3 mA

Safety integrated automation

CPUs for factory automation

Fail-safe S7-300 technology CPU
CPU 317TF-3 PN/CP

6ES7317-7UL10-0AB0	
Parallel switching of 2 outputs	
• for increased power	No
• for redundant control of a load	No
Switching frequency	
• with resistive load, max.	100 Hz
• with inductive load, max.	0.2 Hz; to IEC 947-5-1, DC13
• on lamp load, max.	100 Hz
Aggregate current of outputs (per group)	
• horizontal installation	
- up to 40 °C, max.	4 A
- up to 60 °C, max.	3 A
• all other mounting positions	
- up to 40 °C, max.	4 A
Cable length	
• Cable length, shielded, max.	1 000 m
Analog inputs	0
Analog outputs	0
Encoder	
Connectable encoders	
• 2-wire sensor	No
1st interface	
Type of interface	Integrated RS 485 interface
Physics	RS 485
Isolated	Yes
Power supply to interface (15 to 30 V DC), max.	200 mA
Functionality	
• MPI	Yes
• DP master	Yes
• DP slave	Yes
• Point-to-point connection	No
MPI	
• Transmission rate, max.	12 Mbit/s
• Services	
- PG/OP communication	Yes
- Routing	Yes
- Global data communication	Yes
- S7 basic communication	Yes
- S7 communication	Yes
- S7 communication, as client	No; but via CP and loadable FB
- S7 communication, as server	Yes
DP master	
• Transmission rate, max.	12 Mbit/s
• Number of DP slaves, max.	124
• Services	
- PG/OP communication	Yes
- Global data communication	No
- S7 basic communication	Yes; I blocks only
- S7 communication	Yes
- S7 communication, as client	No
- S7 communication, as server	Yes
- Equidistance mode support	Yes
- Isochronous mode	Yes; OB 61; isochronous mode can only be used alternatively on PROFIBUS DP or PROFINET IO
- SYNC/FREEZE	Yes

6ES7317-7UL10-0AB0	
- Activation/deactivation of DP slaves	Yes
- Number of DP slaves that can be simultaneously activated/deactivated, max.	8
- Direct data exchange (slave-to-slave communication)	Yes; As subscriber
- DPV1	Yes
• Address area	
- Inputs, max.	8 kbyte
- Outputs, max.	8 kbyte
• User data per DP slave	
- Inputs, max.	244 byte
- Outputs, max.	244 byte
DP slave	
• Transmission rate, max.	12 Mbit/s
• Automatic baud rate search	Yes; only with passive interface
• Address area, max.	32
• User data per address area, max.	32 byte
• Services	
- PG/OP communication	Yes
- Global data communication	No
- S7 basic communication	No
- S7 communication	Yes
- S7 communication, as client	No
- S7 communication, as server	Yes; Connection configured on one side only
- Direct data exchange (slave-to-slave communication)	Yes
- DPV1	No
• Transfer memory	
- Inputs	244 byte
- Outputs	244 byte
2nd interface	
Type of interface	Integrated RS 485 interface
Physics	RS 485
Isolated	Yes
Power supply to interface (15 to 30 V DC), max.	200 mA
Functionality	
• MPI	No
• DP master	Yes; DP(DRIVE)-Master
• DP slave	No
• Local Operating Network	No
DP master	
• Transmission rate, max.	12 Mbit/s
• Number of DP slaves, max.	64
• Services	
- PG/OP communication	No
- Global data communication	No
- S7 basic communication	No
- S7 communication	No
- Equidistance mode support	Yes
- Isochronous mode	Yes
- SYNC/FREEZE	No
- Activation/deactivation of DP slaves	Yes
- DPV1	No
• Address area	
- Inputs, max.	1 024 byte
- Outputs, max.	1 024 byte

Safety integrated automation

CPUs for factory automation

Fail-safe S7-300 technology CPU CPU 317TF-3 PN/CP

6ES7317-7UL10-0AB0	
• User data per DP slave	
- Inputs, max.	244 byte
- Outputs, max.	244 byte
DP slave	
• Transmission rate, max.	12 Mbit/s
3rd interface	
Type of interface	PROFINET
Physics	Ethernet RJ45
Isolated	Yes
Integrated switch	Yes
Number of ports	2
Automatic detection of transmission speed	Yes; 10/100 Mbit/s
Autonegotiation	Yes
Autocrossing	Yes
Change of IP address at runtime, supported	Yes
Media redundancy	
• supported	Yes
• Switchover time on line break, typically	200 ms; PROFINET MRP
• Number of stations in the ring, max.	50
Functionality	
• MPI	No
• DP master	No
• DP slave	No
• PROFINET IO Controller	Yes; Also simultaneously with IO-Device functionality
• PROFINET IO Device	Yes; Also simultaneously with IO Controller functionality
PROFINET IO Controller	
• Transmission rate, max.	100 Mbit/s
• Number of connectable IO devices, max.	128
• Max. number of connectable IO devices for RT	128
- of which in line, max.	128
• Number of IO Devices with IRT and the option "high performance", max.	64
- of which in line, max.	64
• Shared device, supported	Yes
• Prioritized startup supported	Yes
- Number of IO Devices, max.	32
• Activation/deactivation of IO Devices	Yes
- Maximum number of IO devices that can be activated/deactivated at the same time.	8
• IO Devices changing during operation (partner ports), supported	Yes
- Max. number of IO devices per tool	8
• Device replacement without swap medium	Yes
• Updating time	250 µs to 512 ms (depending on the operating mode, see Manual "S7-300 CPU 31xC and CPU 31x, Technical Data" for more details)
• Services	
- PG/OP communication	Yes

6ES7317-7UL10-0AB0	
- S7 communication	Yes; with loadable FBs, max. configurable connections: 16, max. number of instances: 32
- Isochronous mode	Yes; OB 61; isochronous mode can only be used alternatively on PROFIBUS DP or PROFINET IO
- Open IE communication	Yes; Via TCP/IP, ISO on TCP, and UDP
• Address area	
- Inputs, max.	8 kbyte
- Outputs, max.	8 kbyte
- User data consistency, max.	1 024 byte
PROFINET IO Device	
• Services	
- PG/OP communication	Yes
- Routing	Yes
- S7 communication	Yes; with loadable FBs, max. configurable connections: 16, max. number of instances: 32
- Isochronous mode	No
- Open IE communication	Yes; Via TCP/IP, ISO on TCP, and UDP
- IRT, supported	Yes
- PROFINergy, supported	Yes; With SFB 73 / 74 prepared for loadable PROFINergy standard FB for I-Device
- Shared device, supported	Yes
- Number of IO controllers with shared device, max.	2
• Transfer memory	
- Inputs, max.	1 440 byte; Per IO Controller with shared device
- Outputs, max.	1 440 byte; Per IO Controller with shared device
• Submodules	
- Number, max.	64
- User data per submodule, max.	1 024 byte
Open IE communication	
• Open IE communication, supported	Yes
• Number of connections, max.	16
• Local port numbers used at the system end	0, 20, 21, 23, 25, 80, 102, 135, 161, 443, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535
• Keep-alive function, supported	Yes
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	Yes; Via PROFIBUS DP or PROFINET interface
Communication functions	
PG/OP communication	Yes
Data record routing	Yes
Global data communication	
• supported	Yes
• Number of GD loops, max.	8
• Number of GD packets, max.	8
• Number of GD packets, transmitter, max.	8
• Number of GD packets, receiver, max.	8
• Size of GD packets, max.	22 byte
• Size of GD packet (of which consistent), max.	22 byte

Safety integrated automation

CPUs for factory automation

Fail-safe S7-300 technology CPU CPU 317TF-3 PN/CP

6ES7317-7UL10-0AB0	
S7 basic communication	
• User data per job, max.	76 byte
• User data per job (of which consistent), max.	76 byte; 76 bytes (with X_SEND or X_RCV); 64 bytes (with X_PUT or X_GET as server)
S7 communication	
• as server	Yes
• as client	Yes; via integrated PROFINET interface and loadable FB or via CP and loadable FB
• User data per job, max.	See online help of STEP 7 (shared parameters of the SFBs/FBs and of the SFCs/FCs of S7 Communication)
S5-compatible communication	
• supported	Yes; via CP and loadable FC
Open IE communication	
• TCP/IP	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.	16
- Data length for connection type 01H, max.	1 460 byte
- Data length for connection type 11H, max.	32 768 byte
- Several passive connections per port, supported	Yes
• ISO-on-TCP (RFC1006)	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.	16
- Data length, max.	32 768 byte
• UDP	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.	16
- Data length, max.	1 472 byte
Web server	
• supported	Yes
• Number of HTTP clients	5
• User-defined websites	Yes
PROFINET CBA (at set setpoint communication load)	
• PROFIBUS proxy functionality	
- supported	Yes
- Number of linked PROFIBUS devices	16
- Data length per connection, max.	240 byte; Slave-dependent
Number of connections	
• overall	32
• Max. total number of instances	32
• usable for routing	X1 as MPI: max. 10; X1 as DP master: max. 24; X1 as DP slave (active): max. 14; X2 as PROFINET: 24 max.
S7 message functions	
Number of login stations for message functions, max.	32; Depending on the configured connections for PG/OP and S7 basic communication
Process diagnostic messages	Yes
simultaneously active Alarm-S blocks, max.	300
Test commissioning functions	
Status block	Yes; Up to 2 simultaneously
Single step	Yes

6ES7317-7UL10-0AB0	
Number of breakpoints	4; without continuation
Status/control	
• Status/control variable	Yes
• Variables	Inputs, outputs, memory bits, DB, times, counters
• Number of variables, max.	30
• of which status variables, max.	30
• of which control variables, max.	14
Forcing	
• Forcing	Yes
• Force, variables	Inputs, outputs
• Number of variables, max.	10
Diagnostic buffer	
• present	Yes
• Number of entries, max.	500
- adjustable	No
- Of which powerfail-proof	100; Only the last 100 entries are retained
• Number of entries readable in RUN, max.	499
- adjustable	Yes; From 10 to 499
- preset	10
Galvanic isolation	
Galvanic isolation digital inputs	
• between the channels and the backplane bus	Yes
Galvanic isolation digital outputs	
• between the channels and the backplane bus	Yes
Permissible potential difference	
between different circuits	75 V DC / 60 V AC
Isolation	
Isolation checked with	500 V DC
Ambient conditions	
Operating temperature	
• Min.	0 °C
• max.	60 °C
Configuration	
• Command set	see instruction list
• Nesting levels	8
• Programming language	
- LAD	Yes
- FBD	Yes
- STL	Yes
- SCL	Yes
- CFC	Yes
- GRAPH	Yes
- HiGraph®	Yes
Know-how protection	
• User program protection/ password protection	Yes
• Block encryption	Yes; With S7 block Privacy
Dimensions	
Width x Height x Depth (mm)	120 x 125 x 130
Weight, approx.	640 g

Safety integrated automation

CPUs for factory automation

Fail-safe S7-300 technology CPU CPU 317TF-3 PN/CP

Selection and ordering data

	Article No.		Article No.
CPU 317TF-3 PN/DP 1.5 MB main memory, 24 V DC power supply, MPI, PROFIBUS DP master/slave interface, PROFIBUS DP(DRIVE) interface, Ethernet/PROFINET interface with 2-port switch; with technology/motion control functions; MMC required	6ES7317-7UL10-0AB0	SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	6ES7998-8XC01-8YE2
S7-Technology V4.2 V4.2 SP3 and higher can be used for CPU 317T-3 PN/DP Task: Option package for configuring and programming technology tasks with the SIMATIC S7 CPU 31xT and SIMATIC S7 CPU 317TF Requirement: STEP 7 V5.5 SP5 and higher Delivery form: incl. up-to-date Service Pack; on DVD; incl. documentation for CPU 31xT-2 DP, CPU 317TF-2 DP (also on DVD)		Power supply connector 10 units, spare part	6ES7391-1AA00-0AA0
<ul style="list-style-type: none"> • Full version on DVD • Upgrade-Version from V4.1 (on DVD) • Trial version (on DVD) • License key (Download) 	6ES7864-1CC42-0YA5 6ES7864-1CC42-0YE5 6ES7864-1CC42-0YA7 6ES7864-1CC42-0YG7	Labeling strips 10 units, spare part	6ES7392-2XX00-0AA0
SIMATIC Micro Memory Card 8 MB	6ES7953-8LP20-0AA0	Label cover 10 units, spare part	6ES7392-2XY00-0AA0
MPI cable for connection of SIMATIC S7 and PG via MPI; 5 m in length	6ES7901-0BF00-0AA0	Labeling sheets for machine inscription <ul style="list-style-type: none"> • for 16-channel signalling modules, DIN A4, for printing with laser printer; 10 units <ul style="list-style-type: none"> - petrol - light-beige - yellow - red • for 32-channel signalling modules, DIN A4, for printing with laser printer; 10 units <ul style="list-style-type: none"> - petrol - light-beige - yellow - red 	6ES7392-2AX00-0AA0 6ES7392-2BX00-0AA0 6ES7392-2CX00-0AA0 6ES7392-2DX00-0AA0
Front connectors 40-pin, with screw contacts <ul style="list-style-type: none"> • 1 unit • 100 units 40-pin, with spring-loaded contacts <ul style="list-style-type: none"> • 1 unit • 100 units 	6ES7392-1AM00-0AA0 6ES7392-1AM00-1AB0 6ES7392-1BM01-0AA0 6ES7392-1BM01-1AB0	PC adapter USB for connecting a PC to SIMATIC S7-200/300/400 via USB; with USB cable (5 m)	6ES7972-0CB20-0XA0
Slot number plates	6ES7912-0AA00-0AA0	PROFIBUS bus components	
S7-300 manual Design, CPU data, module data, instruction list German English	6ES7398-8FA10-8AA0 6ES7398-8FA10-8BA0	PROFIBUS DP bus connector RS 485 <ul style="list-style-type: none"> • with 90° cable outlet, max. transfer rate 12 Mbit/s <ul style="list-style-type: none"> - without PG interface - with PG interface • with 90° cable outlet for FastConnect connection system, max. transfer rate 12 Mbit/s <ul style="list-style-type: none"> - without PG interface, 1 unit - without PG interface, 100 units - with PG interface, 1 unit - with PG interface, 100 units • with axial cable outlet for SIMATIC OP, for connecting to PPI, MPI, PROFIBUS 	6ES7972-0BA12-0XA0 6ES7972-0BB12-0XA0 6ES7972-0BA52-0XA0 6ES7972-0BA52-0XB0 6ES7972-0BB52-0XA0 6ES7972-0BB52-0XB0 6GK1500-0EA02
SIMATIC Manual Collection Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	6ES7998-8XC01-8YE0	PROFIBUS Fast Connect bus cable Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m	6XV1830-0EH10
		RS 485 repeater for PROFIBUS Transmission rate up to 12 Mbit/s; 24 V DC; IP20 enclosure	6ES7972-0AA02-0XA0

Safety integrated automation

CPUs for factory automation

Fail-safe S7-300 technology CPU
CPU 317TF-3 PN/CP

	Article No.
PROFINET bus components	
IE FC TP Standard Cable GP 2x2 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug; PROFINET-compatible; with UL approval; sold by the meter	6XV1840-2AH10
FO Standard Cable GP (50/125) Standard cable, splittable, UL approval, sold by the meter	6XV1873-2A
SCALANCE X204-2 Industrial Ethernet Switch Industrial Ethernet Switches with integral SNMP access, Web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbit/s RJ45 ports and two FO ports	6GK5204-2BB10-2AA3
Compact Switch Module CSM 377 Unmanaged Switch for connecting a SIMATIC S7-300, ET200 M and up to three other stations to Industrial Ethernet with 10/100 Mbit/s; 4 x RJ45 ports; external 24 V DC power supply, LED diagnostics, S7-300 module incl. electronic manual on CD.	6GK7377-1AA00-0AA0
IE FC RJ45 Plugs RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables	
IE FC RJ45 Plug 180 180° cable outlet 1 unit 10 units 50 units	6GK1901-1BB10-2AA0 6GK1901-1BB10-2AB0 6GK1901-1BB10-2AE0
Other PROFIBUS/PROFINET bus components For establishing MPI/PROFIBUS/PROFINET communication	See IK PI, CA 01 catalogs

¹⁾ For up-to-date information and download availability, see: www.siemens.com/tia-online-software-delivery

Safety integrated automation

CPUs for factory automation

Fail-safe S7-400 CPUs CPU 414F-3 PN/DP

Overview



- For constructing a fail-safe automation system for plants with increased safety requirements
- CPUs for high demands in the mid-level performance range
- Applicable for plants with additional demands on programming scope and processing speed
- Satisfies safety requirements up to SIL 3 acc. to IEC 61508 and Cat. 4 acc. to EN 954-1
- Standard and safety-related tasks can be performed with a single CPU
- Integrated PROFINET functions in CPU 414F-3 PN/DP
- Multi-processor mode is possible
- Safety-related communication with distributed I/O devices over PROFIBUS DP or PROFINET IO with PROFIsafe profile
- Fail-safe I/O modules can be connected in a distributed manner via the integrated interfaces (DP and PN with CPU 416F-3 PN/DP) and/or through communication modules (CP 443-5 Extended and CP 443-1 Adv.)
- Central and distributed use of standard modules for non-safety-oriented applications

Application

The CPU 414F-3 PN/DP is a CPU for high demands in the mid-level performance range. They meet higher demands for program scope and instruction processing speed. It permits the design of a fail-safe automation system for plants with increased safety requirements.

The integrated PROFIBUS DP interfaces make it possible to connect directly to the PROFIBUS DP fieldbus as a master or slave.

An additional DP master system can be connected via the IF 964-DP interface module.

For the PROFINET interface of the CPU 414F-3 PN/DP, the switch functionality permits the formation of two externally accessible PROFINET ports. In addition to hierarchical network topologies, this also enables the creation of line structures in the new S7-400 controllers.

Note:

Only the interface module 6ES7964-2AA04-0AB0 can be used.

Design

The CPU 414-3 PN/DP is equipped with the following:

- **Powerful processor:**
The CPU achieves command execution times as low as 0.045 µs per binary instruction.
- **4 MB RAM** (of which 2 MB each for program and data); fast RAM for parts of the user program relevant to execution.
- **Flexible expansion:**
Up to 131072 digital and 81932 analog inputs/outputs.
- **Multi-point interface MPI:**
With the MPI it is possible to establish simple networking of max. 32 stations at a data transmission rate of up to 12 Mbit/s. The CPUs can establish up to 32 connections to stations of the communication bus (C bus) and the MPI.
- **Mode selector switch:**
Designed as toggle switch.
- **Diagnostics buffer:**
The last error and interrupt events are retained in a ring buffer for diagnostic purposes. The number of entries can be parameterized.
- **Real-time clock:**
The date and time are appended to diagnostic messages of the CPUs.
- **Memory card:**
For expansion of the integrated load memory. The information in the load memory comprises S7-400 parameterization data in addition to the program and therefore requires twice as much memory space. The result is:
 - The integral load memory for large programs is not sufficient, therefore a memory card is frequently required. RAM and EPROM cards (EEPROM for retentive storage) are available.
- **PROFIBUS DP interface and combined MPI/DP interface:**
The PROFIBUS DP master interface allows a distributed automation configuration offering high speed and ease of use. From the user's point of view, the distributed I/O is treated as central I/O (same configuring, addressing and programming). Mixed configuration: SIMATIC S5 and SIMATIC S7 as PROFIBUS master according to EN 50170.
- **Additional module slot:**
An additional PROFIBUS DP master system can be connected via the IF 964-DP interface module.
- **PROFINET interface with 2 ports (switch):**
 - PROFINET I/O, 256 IO devices connectable
 - PROFINET CBA

Safety integrated automation

CPUs for factory automation

Fail-safe S7-400 CPUs
CPU 414F-3 PN/DP

Function

- Block protection:
A password concept protects the user program from unauthorized access.
- Integrated HMI services:
In the case of HMI devices, the user only has to specify the source and destination of the data. These are automatically transferred cyclically by the system.
- Integrated communication functions:
 - PG/OP communication
 - Global data communication
 - S7 basic communication
 - S7 communication
- Firmware update over the network
- Open communication over TCP/IP, UDP and ISO-on-TCP (RFC1006)
- Distributed intelligence in Component Based Automation (CBA) on PROFINET
- Additional diagnostic option with integrated web server

Parameterizable properties

The STEP 7 tool "Hardware Configuration" can be used to program the properties and response of the S7-400 including the CPUs, e.g.

- Multi-point interface MPI:
 - Determining station addresses.
 - Startup/cyclic behavior.
 - Definition of maximum cycle time and communication load.
- Address assignment:
Addressing of the I/O modules.
- Retentive areas:
Definition of the number of retentive bit memories, counters, timers, data blocks and clock memories.
- Size of the process image, local data.
- Length of the diagnostic buffer.
- Protection level:
Definition of access authorization to program and data.
- System diagnostics:
Determination of handling and scope of diagnostics messages.
- Cyclic interrupts:
Setting periodicity.
- PROFINET interface
- Parameterization of time synchronization with NTP procedure

Display and information functions

- Status and fault indicators:
LEDs indicate, for example, internal and external errors and operating states such as RUN, STOP, start-up and test functions.
- Test Functions:
The programming device can be used to display signal states in the program execution sequence, modify process variables independently of the user program, output contents of stack memories, run through program steps individually, and disable program sections.
- Information functions:
The user can obtain information about the memory capacity and operating mode of the CPU, and the current utilization of the RAM and load memory.

Communication

The safety related and standard communication between the central controller and the fail-safe ET 200 modules takes place over PROFIBUS DP and/or PROFINET. The specially developed PROFIBUS profile PROFIsafe allows the transmission of user data associated with the safety function within the standard data telegram. Additional hardware components, e.g. special safety buses, are not required. The necessary software is either integrated into the hardware components as an expansion, or re-loaded into the CPU as a certified software block.

Mode of operation

The safety functions of the F-CPU are included in the F program of the CPU and in the fail-safe signal modules.

The signal modules monitor output and input signals by means of discrepancy analyses and test signal injections.

The CPU checks the proper operation of the controller with regular self-tests, command tests, and logical and chronological program execution checks. In addition, the I/O is checked by means of sign-of-life requests.

If a fault is diagnosed in the system, the system is brought to a safe state.

An F-Runtime license is not required to operate the CPU 414F-3 PN/DP.

Programming

The CPU 414F-3 PN/DP is programmed in the same manner as the other SIMATIC S7 systems. The user program for non-fail-safe plant sections is created with the field-proven programming tools, e.g. STEP 7.

SIMATIC S7 Distributed Safety option package

The STEP 7 option package "SIMATIC S7 Distributed Safety" is required for programming the safety-related program components. The package contains all the necessary functions and blocks for creating the F program.

The F program with the safety functions is connected in F FBD or F LAD or using special function blocks from the F library. Use of F FBD or F LAD simplifies configuration and programming of the system and also acceptance testing thanks to the cross-system uniform presentation form. Programmers can concentrate fully on the safety-related application without having to use additional tools.

SIMATIC S7 Distributed Safety (Classic) and SIMATIC Safety Advanced V13 (TIA Portal V13) option packages

The STEP 7 option packages "SIMATIC S7 Distributed Safety" (Classic) or SIMATIC Safety Advanced V13 (TIA Portal V13) are required for programming the safety-related program sections. The packages contain all the functions and blocks required to create the F program.

The F program with the safety functions is created in F-FBD or F-LAD or using special function blocks from the F library. Use of F-FBD or F-LAD simplifies configuration and programming of the plant and, due to the cross-plant, uniform presentation, also acceptance testing. The programmer can therefore concentrate entirely on configuring the safety-related application, without the need to use any additional tools.

Safety integrated automation

CPUs for factory automation

Fail-safe S7-400 CPUs CPU 414F-3 PN/DP

Technical specifications

	6ES7414-3FM06-0AB0 CPU 414F-3 PN/DP
General information	
Engineering with	
• Programming package	STEP7 V5.5 or higher/iMap V3.0 + iMap STEP7 Add-on V3.0 SP5 or higher
Supply voltage	
24 V DC	No; Power supply via system power supply
Power losses	
Power loss, typ.	6.5 W
Memory	
Main memory	
• integrated	4 Mbyte
• integrated (for program)	2 Mbyte
• integrated (for data)	2 Mbyte
Load memory	
• expandable FEPRM, max.	64 Mbyte
• integrated RAM, max.	512 kbyte
• expandable RAM, max.	64 Mbyte
CPU processing times	
for bit operations, typ.	45 ns
for word operations, typ.	45 ns
for fixed point arithmetic, typ.	45 ns
for floating point arithmetic, typ.	135 ns
Counters, timers and their retentivity	
S7 counter	
• Number	2 048
IEC counter	
• present	Yes
S7 times	
• Number	2 048
IEC timer	
• present	Yes
Data areas and their retentivity	
Flag	
• Number, max.	8 kbyte; Size of bit memory address area
Address area	
I/O address area	
• Inputs	8 kbyte
• Outputs	8 kbyte
Process image	
• Inputs, adjustable	8 kbyte
• Outputs, adjustable	8 kbyte
Time of day	
Clock	
• Hardware clock (real-time clock)	Yes
Operating hours counter	
• Number	16
1st interface	
Type of interface	integrated

	6ES7414-3FM06-0AB0 CPU 414F-3 PN/DP
Physics	RS 485 / PROFIBUS + MPI
Functionality	
• MPI	Yes
• DP master	Yes
• DP slave	Yes
DP master	
• Number of DP slaves, max.	32
2nd interface	
Type of interface	PROFINET
Physics	Ethernet RJ45
Number of ports	2
Functionality	
• DP master	No
• DP slave	No
• PROFINET IO Controller	Yes
• PROFINET IO Device	Yes
• PROFINET CBA	Yes
PROFINET IO Controller	
• Max. number of connectable IO devices for RT	256
• Number of IO devices with IRT and the option "high flexibility"	256
• Number of IO Devices with IRT and the option "high performance", max.	64
3rd interface	
Type of interface	Pluggable interface module (IF)
Plug-in interface modules	IF 964-DP (MLFB: 6ES7964-2AA04-0AB0)
Physics	RS 485 / PROFIBUS
Functionality	
• MPI	No
• DP master	Yes
• DP slave	Yes
DP master	
• Number of DP slaves, max.	96
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	Yes; Via PROFIBUS DP or PROFINET interface
Communication functions	
PG/OP communication	Yes
Data record routing	Yes
Global data communication	Yes
S7 basic communication	Yes
S7 communication	Yes
• supported	
S5-compatible communication	
• supported	Yes; Via FC AG_SEND and AG_RECV, max. via 10 CP 443-1or 443-5
Standard communication (FMS)	
• supported	Yes; Via CP and loadable FB

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Fail-safe S7-400 CPUs
CPU 414F-3 PN/DP

Article No.

6ES7414-3FM06-0AB0 CPU 414F-3 PN/DP	
Open IE communication	
• TCP/IP	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.	62
• ISO-on-TCP (RFC1006)	Yes; Via integrated PROFINET interface or CP 443-1 Adv. and loadable FBs
- Number of connections, max.	62
• UDP	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.	62
Web server	Yes
Number of connections	64
Configuration	
• Programming language	
- LAD	Yes
- FBD	Yes
- STL	Yes
- SCL	Yes
- CFC	Yes
- GRAPH	Yes
- HiGraph®	Yes
Know-how protection	
• User program protection/pass-word protection	Yes
• Block encryption	Yes; With S7 block Privacy
Dimensions	
Width x height x depth (mm)	50 x 290 x 219
Required slots	2
Weight, approx.	900 g

Selection and ordering data

	Article No.
CPU 414F-3 PN/DP	6ES7414-3FM06-0AB0
For setting up safety-related automation system; main memory 4 MB, power supply 24 V DC, MPI/PROFIBUS DP master interface, PROFINET interface, slot for memory card, module slot for 1 IF module, incl. slot number labels	
Distributed Safety V5.4 programming tool	
Task: Configuration software for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco	
Requirement: STEP 7 V5.3 SP3 and higher	
• Floating license	6ES7833-1FC02-0YA5
• Floating license for 1 user, license key download without software or documentation ¹⁾ ; email address required for delivery	6ES7833-1FC02-0YH5
Distributed Safety Upgrade	
From V5.x to V5.4; Floating license for 1 user	6ES7833-1FC02-0YE5

STEP 7 Safety Advanced V13

Task:
Engineering tool for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, S7-1500F, WinAC RTX F, ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco

Requirement:
STEP 7 Professional V13 SP1

- Floating license for 1 user
- Floating License für 1 User, License Key Download without software and Docu¹⁾; Email address required

6ES7833-1FA13-0YA5**6ES7833-1FA13-0YH5**

STEP 7 Safety Advanced Upgrade

Upgrade for STEP 7 Safety Advanced V11 to STEP 7 Safety Advanced V13.

Floating License for one User, Software and docu on CD

Distributed Safety V5.4 SP5 to Safety Advanced V13 Combo.
Combo License for parallel use Distributed Safety V5.4 and STEP 7 Safety Advanced V13.
Software and docu on CD

6ES7833-1FA13-0YE5**6ES7833-1FA13-0YF5**

Memory Card RAM

64 KB	6ES7952-0AF00-0AA0
256 KB	6ES7952-1AH00-0AA0
1 MB	6ES7952-1AK00-0AA0
2 MB	6ES7952-1AL00-0AA0
4 MB	6ES7952-1AM00-0AA0
8 MB	6ES7952-1AP00-0AA0
16 MB	6ES7952-1AS00-0AA0
64 MB	6ES7952-1AY00-0AA0

FEPRM memory card

64 KB	6ES7952-0KF00-0AA0
256 KB	6ES7952-0KH00-0AA0
1 MB	6ES7952-1KK00-0AA0
2 MB	6ES7952-1KL00-0AA0
4 MB	6ES7952-1KM00-0AA0
8 MB	6ES7952-1KP00-0AA0
16 MB	6ES7952-1KS00-0AA0
32 MB	6ES7952-1KT00-0AA0
64 MB	6ES7952-1KY00-0AA0

MPI cable

for connection of SIMATIC S7 and PG via MPI; 5 m in length

6ES7901-0BF00-0AA0

IF 964-DP interface module

For connecting an additional DP line

6ES7964-2AA04-0AB0

Slot number plates

1 set (spare part)

6ES7912-0AA00-0AA0

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Fail-safe S7-400 CPUs CPU 414F-3 PN/DP

	Article No.
SIMATIC Manual Collection	6ES7998-8XC01-8YE0
Electronic manuals on DVD, multi-lingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	
SIMATIC Manual Collection update service for 1 year	6ES7998-8XC01-8YE2
Current "Manual Collection" DVD and the three subsequent updates	
PROFIBUS bus components	
RS 485 bus connector with 90° cable outlet	
Max. transfer rate 12 Mbit/s	
• without PG interface	6ES7972-0BA12-0XA0
• With PG interface	6ES7972-0BB12-0XA0
RS 485 bus connector with angled cable outlet	
Max. transfer rate 12 Mbit/s	
• Without PG interface	6ES7972-0BA42-0XA0
• With PG interface	6ES7972-0BB42-0XA0
RS 485 bus connector with 90° cable outlet for FastConnect connection system	
Max. transfer rate 12 Mbit/s	
• Without PG interface	6ES7972-0BA52-0XA0
- 1 unit	6ES7972-0BA52-0XB0
- 100 units	
• With PG interface	6ES7972-0BB52-0XA0
- 1 unit	6ES7972-0BB52-0XB0
- 100 units	
RS 485 bus connector with axial cable outlet	
For SIMATIC OP, for connection to PPI, MPI, PROFIBUS	6GK1500-0EA02
PROFIBUS FastConnect bus cable	
Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m	6XV1830-0EH10
RS 485 repeater for PROFIBUS	6ES7972-0AA02-0XA0
Transmission rate up to 12 Mbit/s; 24 V DC; IP20 enclosure	

¹⁾ For up-to-date information and download availability, see:
www.siemens.com/tia-online-software-delivery

	Article No.
PROFINET bus components	
IE FC TP standard cable GP 2x2	6XV1840-2AH10
4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug; PROFINET-compatible; with UL approval;	
Sold by the meter	
FO Standard Cable GP (50/125)	6XV1873-2A
Standard cable, splittable, UL approval, sold by the meter	
SCALANCE X204-2 Industrial Ethernet Switch	6GK5204-2BB10-2AA3
Industrial Ethernet Switches with integral SNMP access, Web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbit/s RJ45 ports and two FO ports	
IE FC RJ45 plugs	
RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables	
IE FC RJ45 plug 180	
180° cable outlet	
1 unit	6GK1901-1BB10-2AA0
10 units	6GK1901-1BB10-2AB0
50 units	6GK1901-1BB10-2AE0
PROFIBUS/PROFINET bus components	See Industry Mall and catalogs IK PI, CA 01
For establishing MPI/ PROFIBUS/PROFINET communication	

Safety integrated automation

CPUs for factory automation

Fail-safe S7-400 CPUs
CPU 416F

Overview



- For constructing a fail-safe automation system for plants with increased safety requirements
- High-performance CPU in the top-end performance range
- Satisfies safety requirements up to SIL 3 acc. to IEC 61508 and Cat. 4 acc. to EN 954-1
- Standard and safety-related tasks can be performed with a single CPU
- Multi-processor mode is possible
- Safety-related communication with distributed I/O devices over PROFIBUS DP with the *PROFIsafe* profile
- Fail-safe I/O modules can be connected decentralized over the integrated interfaces (DP and PN with CPU416F-3 PN/DP) and/or through communication modules (CP443-5 Ext. and CP443-1 Adv.)
- Standard modules for non-safety-related applications can be operated centrally and decentralized

Application

The CPU 416F-2 and the CPU 416F-3 PN/DP are high-performance CPUs of the SIMATIC S7-400. They allow a fail-safe automation system to be constructed for plants with increased safety requirements.

The integrated PROFIBUS DP interfaces of CPU 416F-2 support direct connection to the PROFIBUS DP fieldbus as a master or as a slave.

Another DP master system can be connected in the case of the CPU 416F-3 PN/DP through the IF 964-DP interface module.

The integrated PROFINET interface of the CPU 416F-3 PN/DP implements switch functionality by using the ERTEC 400 ASIC. This forms the basis for provision of 2 externally accessible PROFINET ports. This means that apart from hierarchic network topologies, line structures can also be implemented with the new S7-400 controllers.

Note:

Only interface module 6ES7964-2AA04-0AB0 can be used.

Fail-safe I/O modules can be connected to all integrated interfaces, to IF 964-DP and/or through communication modules (CP443-5 Ext. and CP443-1 Advanced). Safety-related communication is performed over PROFIBUS DP with the *PROFIsafe* profile.

Design

Both CPUs feature:

- High-performance processor:
The CPUs achieve command runtimes down to 0.03 µs per binary instruction.
- CPU 416F-2: 5.6 MB working memory (of which 2.8 MB each for program and data);
CPU 416F-3 PN/DP: 11.2 MB working memory (of which 5.6 MB each for program and data);
faster working memory for sections of the user program that are significant for execution.
- Flexible expansion possibilities:
Max. 262144 digital, 16384 analog inputs/outputs.
- MPI multi-point interface:
The MPI allows a simple network to be established with up to 32 stations and a data transmission rate of up to 12 Mbit/s. The CPUs can establish up to 44 connections to stations of the communications bus (C bus) and MPI.
- Mode selector:
Implemented as a toggle switch.
- Diagnostics buffer:
The last 120 error and interrupt events are stored in a ring buffer for diagnostic purposes. The number of entries can be adjusted.
- Real-time clock:
Diagnostic alarms of the CPU are tagged with the date and time.
- Memory card:
To expand the integrated load memory. RAM and FEPRAM cards (FEPRAM for saving even at zero voltage).
- Combined MPI/DP interface and integrated PROFIBUS DP interface (with CPU 416F-2):
The PROFIBUS DP master interface allows a distributed automation configuration offering high speed and ease of use. The distributed I/O is treated like a central I/O from the point of view of the user (same configuring, addressing and programming).
Mixed installation: SIMATIC S5 and SIMATIC S7 as PROFIBUS master acc. to EN 50170.

CPU 416F-3 PN/DP also features:

- Submodule socket:
Using the IF 964-DP interface module, an additional PROFIBUS DP master system can be connected.
- PROFINET interface with 2 ports (switch)
 - PROFINET I/O, 256 IO devices can be connected
 - PROFINET CBA

Fail-safe I/O modules can be connected to all integrated interfaces, to IF 964-DP and/or through communication modules (CP443-5 Ext. and CP443-1 Advanced). Safety-related communication is performed over PROFIBUS DP with the *PROFIsafe* profile.

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Fail-safe S7-400 CPUs CPU 416F

Function

- Block protection:
A password concept protects the user program from unauthorized access.
- Integrated HMI services:
For HMI devices, the user only has to specify the source and destination for the data. They are then cyclically transported by the system automatically.
- Integrated communication functions:
 - PG/OP communication
 - Global data communication
 - S7 basic communication
 - S7 communication
- Firmware update over the network

CPU 416-3 PN/DP additionally:

- Open communication over TCP/IP, UDP and ISO-on-TCP (RFC1006)
- Distributed intelligence in Component Based Automation (CBA) on PROFINET
- Additional diagnostic option with integrated web server

Parameterizable properties

Using the STEP 7 hardware configuration tool, properties and responses of the S7-400 including the CPUs can be parameterized, e.g.:

- MPI multi-point interface:
 - Determining station addresses.
 - Start-up/cyclic response.
 - Determining the maximum cycle time and communication load.
- Address assignment:
Addressing the I/O modules.
- Retentive areas:
Determining the number of retentive bit memories, counters, timers, data blocks and clock bit memories
- Size of the process image, local data.
- Length of the diagnostic buffer.
- Protection level:
Specifying the access rights to program and data.
- System diagnostics:
Determining handling and scope of the diagnostic alarms.
- Cyclic interrupts:
Setting of periodicity

CPU 416F-3 PN/DP additionally:

- PROFINET interface
- Parameterization of time synchronization with NTP procedure

Information and display functions

- Status and error LEDs:
LEDs indicate, for example, internal and external errors and operating states such as RUN, STOP, start-up and test functions.
- Test functions:
The PG is used to indicate signal states during program execution, to modify process variables independently of the user program, to output the contents of stack memories, to execute individual program steps, and to block program sections.
- Information functions:
The PG can be used to obtain information about the memory capacity and operating mode of the CPU and the current loading of the work and load memory.

Communication

The safety related and standard communication between the central controller and the fail-safe ET 200 modules takes place over PROFIBUS DP and/or PROFINET. The specially developed PROFIBUS profile *PROFIsafe* supports the transfer of user data for the safety functions within the standard data message frame. Additional hardware components, e.g. special safety buses are not required. The necessary software is either integrated in the hardware components as an expansion of the operating system or loaded into the CPU later as a certified software block.

Mode of operation

The safety functions of the F-CPU are included in the F program of the CPU and in the fail-safe signal modules.

The signal modules monitor the output and input signals by means of discrepancy analysis and the injection of test signals.

The CPU checks the proper operation of the controller by means of periodic self-tests, command tests and logic-based and time-based program execution checks. Furthermore, the I/O is checked using requests for signs of life.

If an error is diagnosed in the system, the system will be placed in a safe state.

An F runtime license is not required to operate the CPU 416F-2 and CPU416F-3 PN/DP.

Programming

The CPU 416F-2 and the CPU416F-3 PN/DP are programmed in the same manner as the other SIMATIC S7 systems. The user program for non-fail-safe plant sections is created using familiar programming tools, e.g. STEP 7.

SIMATIC S7 Distributed Safety option package

The STEP 7 option package "SIMATIC S7 Distributed Safety" is required for programming the safety-related program components. The package contains all the functions and blocks required to create an F program.

The F program with the safety functions is connected in F FBD or F LAD or using special functions from the F library. Use of F FBD or F LAD simplifies configuration and programming of the plant and also acceptance testing thanks to the non-plant-specific uniform presentation form. The programmer can concentrate on configuration of the safety-related application without the need to use additional tools.

SIMATIC S7 Distributed Safety (Classic) and SIMATIC Safety Advanced V13 (TIA Portal V13) option packages

The STEP 7 option packages "SIMATIC S7 Distributed Safety" (Classic) or SIMATIC Safety Advanced V13 (TIA Portal V13) are required for programming the safety-related program sections. The packages contains all the functions and blocks required to create the F program.

The F program with the safety functions is created in F-FBD or F-LAD or using special function blocks from the F library. Use of F-FBD or F-LAD simplifies configuration and programming of the plant and, due to the cross-plant, uniform presentation, also acceptance testing. The programmer can therefore concentrate entirely on configuring the safety-related application, without the need to use any additional tools.

Technical specifications

	6ES7416-2FN05-0AB0 CPU 416F-2	6ES7416-3FS06-0AB0 CPU416F-3 PN/DP
General information		
• Engineering with Programming package	STEP 7 V5.3 SP2 or higher with hardware update, Distributed Safety V5.2 SP2 or higher	STEP7 V5.5 or higher/iMap V3.0 + iMap STEP7 Add-on V3.0 SP5 or higher
Supply voltage 24 V DC	No; Power supply via system power supply	No; Power supply via system power supply
Power losses, typical	4.5 W	6.5 W
Memory		
Main memory		
• integrated	5.6 Mbyte	16 Mbyte
• integrated (for program)	2.8 Mbyte	8 Mbyte
• integrated (for data)	2.8 Mbyte	8 Mbyte
Load memory		
• expandable FEPRM, max.	64 Mbyte	64 Mbyte
• integrated RAM, max.	1 Mbyte	1 Mbyte
• expandable RAM, max.	64 Mbyte	64 Mbyte
CPU processing times		
for bit operations, typ.	30 ns	30 ns
for word operations, typ.	30 ns	30 ns
for fixed point arithmetic, typ.	30 ns	30 ns
for floating point arithmetic, typ.	90 ns	90 ns
Counters, timers and their retentivity		
S7 counters	2 048	2 048
IEC counter	Yes	Yes
S7 times	2 048	2 048
IEC timers	Yes	Yes
Data areas and their retentivity		
Flags	16 kbyte; Size of bit memory address area	16 kbyte; Size of bit memory address area
Address area		
I/O address area		
• Inputs	• 16 kbyte	• 16 kbyte
• Outputs	• 16 kbyte	• 16 kbyte
Process image		
• Inputs, adjustable	16 kbyte	16 kbyte
• Outputs, adjustable	16 kbyte	16 kbyte
Time of day		
Clock		
• Hardware clock (real-time clock)	Yes	Yes
Operating hours counter		
• Number	16	16
1st interface		
Type of interface	integrated	integrated
Physics	RS 485 / PROFIBUS + MPI	RS 485 / PROFIBUS + MPI
Functionality		
• MPI	Yes	Yes
• DP master	Yes	Yes
• DP slave	Yes	Yes
DP master		
• Number of DP slaves, max.	32	32

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Fail-safe S7-400 CPUs CPU 416F

	6ES7416-2FN05-0AB0 CPU 416F-2	6ES7416-3FS06-0AB0 CPU416F-3 PN/DP
2nd interface		
Type of interface	integrated	PROFINET
Physics	RS 485 / PROFIBUS	Ethernet RJ45
Number of ports		2
Functionality		
• DP master	Yes	No
• DP slave	Yes	No
• PROFINET IO Controller		Yes
• PROFINET IO Device		Yes
• PROFINET CBA		Yes
DP master		
• Number of DP slaves, max.	125	
PROFINET IO Controller		
• Max. number of connectable IO devices for RT		256
• Number of IO devices with IRT and the option "high flexibility"		256
• Number of IO Devices with IRT and the option "high performance", max.		64
3rd interface		
Type of interface		Pluggable interface module (IF)
Plug-in interface modules		IF 964-DP (MLFB: 6ES7964-2AA04-0AB0)
Physics		RS 485 / PROFIBUS
Functionality		
• MPI		No
• DP master		Yes
• DP slave		Yes
DP master		
• Number of DP slaves, max.		125
Isochronous mode		
Isochronous operation (application synchronized up to terminal)	Yes; For PROFIBUS only	Yes; Via PROFIBUS DP or PROFINET interface
Communication functions		
PG/OP communication	Yes	Yes
Data record routing	Yes	Yes
Global data communication		
• supported	Yes	Yes
S7 basic communication		
• supported	Yes	Yes
S7 communication		
• supported	Yes	Yes
S5-compatible communication		
• supported	Yes; Via FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5	Yes; Via FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5
Standard communication (FMS)		
• supported	Yes; Via CP and loadable FB	Yes; Via CP and loadable FB
Open IE communication		
• TCP/IP		Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.		94
• ISO-on-TCP (RFC1006)	Via CP 443-1 and loadable FB	Yes; Via integrated PROFINET interface or CP 443-1 and loadable FBs
- Number of connections, max.		94

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Fail-safe S7-400 CPUs
CPU 416F

	6ES7416-2FN05-0AB0 CPU 416F-2	6ES7416-3FS06-0AB0 CPU416F-3 PN/DP
• UDP		Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.		94
Web server		
• supported	No	Yes
Number of connections		
• overall	64	96
Configuration		
• Programming language		
- LAD	Yes	Yes
- FBD	Yes	Yes
- STL	Yes	Yes
- SCL	Yes	Yes
- CFC	Yes	Yes
- GRAPH	Yes	Yes
- HiGraph®	Yes	Yes
Know-how protection		
• User program protection/ password protection	Yes	Yes
• Block encryption		Yes; With S7 block Privacy
Dimensions		
Width x Height x Depth (mm)	25 x 290 x 219	50 x 290 x 219
Required slots	1	2
Weight, approx.	0.7 kg	0.9 kg

Selection and ordering data

	Article No.		Article No.
CPU 416F-2	6ES7416-2FN05-0AB0	S7 Distributed Safety upgrade	
For configuring safety-related automation systems; 5.6 MB RAM, 24 V DC power supply, MPI/PROFIBUS DP master interface, PROFIBUS DP master interface, slot for memory card, incl. slot number labels		From V5.x to V5.4; Floating license for 1 user	6ES7833-1FC02-0YE5
CPU 416F-3 PN/DP	6ES7416-3FS06-0AB0	STEP 7 Safety Advanced V13	
For configuring safety-related automation systems; main memory 16 MB, 24 V DC power supply, MPI/PROFIBUS DP master interface, PROFINET interface, PROFIBUS DP master interface, receptacle for 1 IF submodule, slot for memory card, incl. slot number labels		Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, S7-1500F, WinAC RTX F, ET 200S, ET 200SP, ET 200M, ET 200iSP, ET 200pro, ET 200eco	
S7 Distributed Safety V5.4 programming tool		Requirement: STEP 7 Professional V13 SP1	
Task: Configuration software for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco		• Floating license for 1 user	6ES7833-1FA13-0YA5
Requirement: STEP 7 V5.3 SP3 and higher		• Floating license for 1 user, license key download without software or documentation ¹⁾ ; email address required for delivery	6ES7833-1FA13-0YH5
• Floating license	6ES7833-1FC02-0YA5	STEP 7 Safety Advanced Upgrade	
• Floating license for 1 user, license key download without software or documentation ¹⁾ ; email address required for delivery	6ES7833-1FC02-0YH5	Distributed Safety V5.4 SP5 and STEP 7 Safety Advanced V13 for parallel use; incl. software on CD; Combo License for 1 user	6ES7833-1FA13-0YE5
		Distributed Safety V5.4 SP5 and STEP 7 Safety Advanced V13 for parallel use; includes software on CD; combo license for 1 user, license key download without software or documentation ¹⁾ ; email address required for delivery.	6ES7833-1FA12-0YK5

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	Article No.
Memory card RAM	
64 KB	6ES7952-0AF00-0AA0
256 KB	6ES7952-1AH00-0AA0
1 MB	6ES7952-1AK00-0AA0
2 MB	6ES7952-1AL00-0AA0
4 MB	6ES7952-1AM00-0AA0
8 MB	6ES7952-1AP00-0AA0
16 MB	6ES7952-1AS00-0AA0
64 MB	6ES7952-1AY00-0AA0
FEPROM memory card	
64 KB	6ES7952-0KF00-0AA0
256 KB	6ES7952-0KH00-0AA0
1 MB	6ES7952-1KK00-0AA0
2 MB	6ES7952-1KL00-0AA0
4 MB	6ES7952-1KM00-0AA0
8 MB	6ES7952-1KP00-0AA0
16 MB	6ES7952-1KS00-0AA0
32 MB	6ES7952-1KT00-0AA0
64 MB	6ES7952-1KY00-0AA0
MPI cable	6ES7901-0BF00-0AA0
for connection of SIMATIC S7 and PG via MPI; 5 m in length	
IF 964-DP interface module	6ES7964-2AA04-0AB0
For connecting an additional DP line	
Slot number plates	6ES7912-0AA00-0AA0
1 set (spare part)	
SIMATIC Manual Collection	6ES7998-8XC01-8YE0
Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	
SIMATIC Manual Collection update service for 1 year	6ES7998-8XC01-8YE2
Current "Manual Collection" DVD and the three subsequent updates	
PROFIBUS bus components	
RS 485 bus connector with 90° cable outlet	
Max. transfer rate 12 Mbit/s	
• without PG interface	6ES7972-0BA12-0XA0
• With PG interface	6ES7972-0BB12-0XA0
RS 485 bus connector with angled cable outlet	
Max. transfer rate 12 Mbit/s	
• without PG interface	6ES7972-0BA42-0XA0
• With PG interface	6ES7972-0BB42-0XA0

	Article No.
RS 485 bus connector with 90° cable outlet for FastConnect system	
Max. transfer rate 12 Mbit/s	
• without PG interface	6ES7972-0BA52-0XA0
- 1 unit	6ES7972-0BA52-0XB0
- 100 units	
• with PG interface	6ES7972-0BB52-0XA0
- 1 unit	6ES7972-0BB52-0XB0
- 100 units	
RS 485 bus connector with axial cable outlet	
For SIMATIC OP, for connection to PPI, MPI, PROFIBUS	6GK1500-0EA02
PROFIBUS FastConnect bus cable	
Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m	6XV1830-0EH10
RS 485 repeater for PROFIBUS	6ES7972-0AA02-0XA0
Transmission rate up to 12 Mbit/s; 24 V DC; IP20 enclosure	
PROFINET bus components	
IE FC TP standard cable GP 2x2	6XV1840-2AH10
4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug; PROFINET-compatible; with UL approval; Sold by the meter	
FO Standard Cable GP (50/125)	6XV1873-2A
Standard cable, splittable, UL approval, sold by the meter	
SCALANCE X204-2 Industrial Ethernet Switch	6GK5204-2BB10-2AA3
Industrial Ethernet Switches with integral SNMP access, web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbit/s RJ45 ports and two FO ports	
IE FC RJ45 plugs	
RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables	
IE FC RJ45 plug 180	
180° cable outlet	
1 unit	6GK1901-1BB10-2AA0
10 units	6GK1901-1BB10-2AB0
50 units	6GK1901-1BB10-2AE0
PROFIBUS/PROFINET bus components	See IK PI, CA 01 catalogs
For establishing MPI/PROFIBUS/PROFINET communication	

1) For up-to-date information and download availability, see:
www.siemens.com/tia-online-software-delivery

Safety integrated automation

CPUs for factory and process automation

High-availability S7-400 CPUs

Overview

With SIMATIC® S7-400H, Siemens offers a system that minimizes the probability of a production failure – and thereby makes a crucial contribution toward maximum productivity:

- Bumpless switchover in the event of a fault
- Integrated detection of faults before they have an effect on the process
- Online repair, i.e. replacement of defective components during plant operation
- Configuration changes, i.e. plant expansions, during operation
- Automatic synchronization of events
- Highly-available communication
- Redundant connection of I/O devices

Benefits

- Avoidance of downtimes that a controller failure would cause – specifically in production, energy and water supply, airfield navigation lighting, marshalling yard systems, etc.
- Avoidance of high restart costs as a consequence of data loss following plant failure – specifically in baggage handling, high-bay storage, tracking & tracing etc.
- Protection of plant, workpieces and materials in the event of a plant or machine standstill – especially in furnaces, the semiconductor industry, ships' rudders, etc.
- Safeguarding of operations without supervisory or maintenance personnel – specially in wastewater treatment plants, tunnels, waterway locks, building systems, etc.

Integration

Central units (see Fig. 3/1)

- Configuration with segmented rack
- Configuration with 2 separate racks if the systems have to be completely separated for availability reasons. In this case the distance between the systems may be up to 10 km.
- If a particularly high level of availability is required, 2 redundant power supplies are used.

Connection of the I/O

Flexible connection options via PROFIBUS and PROFINET

- PROFIBUS makes the unilateral interface (normal availability) or the switched interface (increased availability) available (see Fig. 3/2).
- PROFINET makes the unilateral interface (normal availability) or the system-redundant connection via open ring available. The availability in the open ring is increased if devices are connected that support the PROFINET system redundancy, such as the SIMATIC ET 200M distributed I/O (see Fig. 3/3).
- PROFIBUS and PROFINET configurations can be combined with one another.

Communications

High-available communication (Fig. 3/4) for redundant connections is already integrated into the SIMATIC S7-400H. In the event of a fault, the high-available communication link takes over automatically and invisibly as far as the user is concerned.

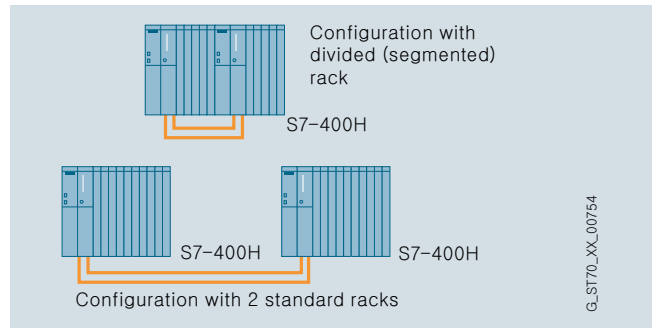


Fig. 3/1 Configuration of the central units

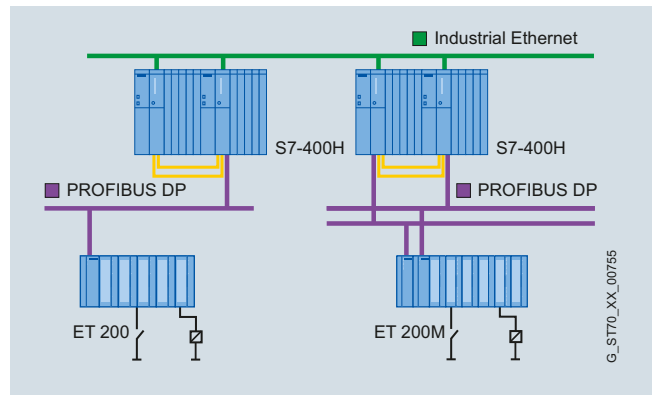


Fig. 3/2 One-sided (left) or switched (right) I/O interface via PROFIBUS

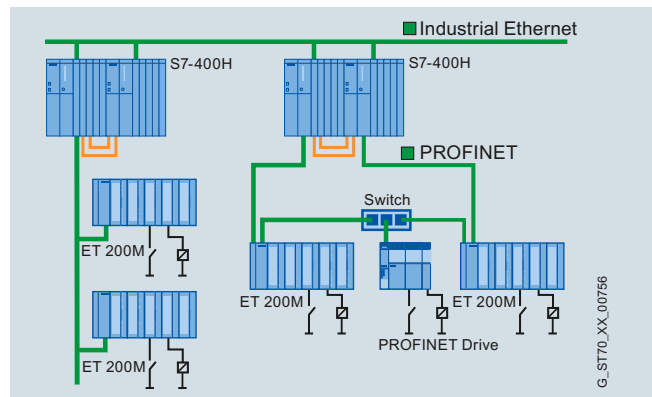


Fig. 3/3 One-sided (left) or system-redundant (right) I/O interface via PROFINET

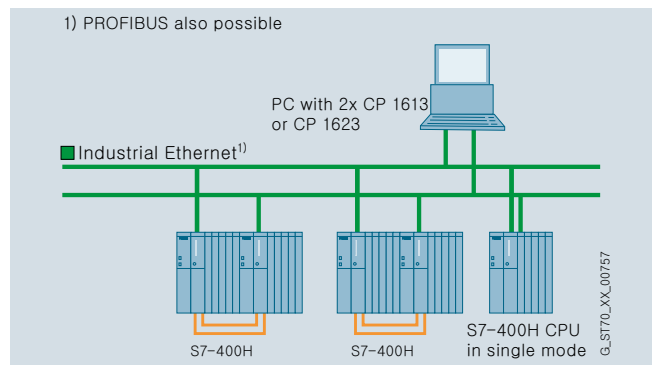


Fig. 3/4 Highly-available communication

Safety integrated automation

CPUs for factory and process automation

High-availability S7-400 CPUs
CPU 412-5H

Overview



- CPU for SIMATIC S7-400H and S7-400F/FH
- Can be used in S7-400H high-availability systems
- Can be used with F runtime license as F-capable CPU in S7-400F/FH safety-related systems
- With integrated PROFIBUS DP master and combined MPI/PROFIBUS DP master interface
- With integrated PROFINET interface (2-port switch)
- Features 2 slots for sync modules

SIPLUS Version

A SIPLUS version of this module is also available. [See page 3/69.](#)

Application

The CPU 412-5H can be used for the SIMATIC S7-400H and S7-400F/FH. It enables the establishment of an S7-400H high-availability system. It can also be used for the S7-400F/FH fail-safe automation system in conjunction with the F runtime license.

The integrated PROFIBUS DP interfaces enable direct connection as master to the PROFIBUS DP fieldbus.

The integrated PROFINET interface with switch functionality forms the basis for providing 2 externally accessible PROFINET ports. In this way, linear or ring structures can be implemented.

Design

The CPU 412-5H has:

- A powerful processor:
The CPU achieves command execution times as low as 31.25 ns per binary command.
- 1 MB RAM (512 KB for program, 512 KB for data);
Load memory for user programs and parameterization data of the S7-400H F/FH automation system; high-speed RAM for sequence-relevant sections of the user program
- A memory card:
For expanding the integrated load memory. In addition to the program itself, the information contained in the load memory also includes configuration data for the S7-400H F/FH, which is why it requires about twice as much memory space. The result is that:
 - The integrated load memory is not sufficient for large programs, which is why the memory card is often required.
 RAM and FEPRAM cards are available (FEPRAM for saving data even when power supply is disconnected).
- Flexible expansion options:
Up to 131 072 digital and 81 932 analog inputs/outputs.
- Combined MPI/PROFIBUS DP interface:
The MPI enables the creation of a simple network with up to 32 nodes and a data transfer rate of 187.5 kbit/s. The CPU can establish up to 64 connections to nodes on the communication bus (C bus) and the MPI.
The PROFIBUS DP master interface enables a distributed automation configuration with high speed and simple handling. From the user's point of view, the distributed I/Os are treated like centralized I/Os (same configuring, addressing and programming).
- PROFIBUS DP interface:
The PROFIBUS DP interface allows a redundant, distributed automation configuration offering high speed and ease of use. From the user's point of view, the distributed I/Os are treated like centralized I/Os (same configuring, addressing and programming).
- PROFINET interface with 2 ports (switch):
Support of system redundancy and MRP (Media Redundancy Protocol)
- Mode selector:
Designed as a toggle switch.
- Diagnostics buffer:
The last 120 alarm and interrupt events are stored in a ring buffer for diagnostic purposes.
- Real-time clock:
Diagnostics reports from the CPU are provided with the date and time.

Safety integrated automation

CPUs for factory and process automation

High-availability S7-400 CPUs
CPU 412-5H

Function

- Block protection:
In addition to the keylock switch, a password concept protects the user program from unauthorized access. User blocks can also be protected by an encryption process.
- Integrated HMI services:
In the case of HMI devices, the user only has to specify the source and destination of the data. These are automatically transferred cyclically by the system.
- Integrated communications functions:
 - PG/OP communication
 - Extended communication (simple and high-availability)
- Master-spare switchover programmed by user.

Parameterizable properties

With the STEP 7 tool "Hardware Configuration" and the installed option package S7-400H, the properties and behavior of the S7-400H including the CPUs can be parameterized, e.g.:

- Multi-point interface MPI:
 - Determining node addresses.
 - Startup/cyclic behavior.
 - Definition of maximum cycle time and communication load.
- Address assignment:
Addressing of the I/O modules.
- Retentive areas:
Definition of the number of retentive bit memories, counters, timers, data blocks and clock memories.
- Protection level:
Definition of access authorization to program and data.
- System diagnostics:
Determination of handling and scope of diagnostics messages.
- Watchdog interrupts:
Setting the periodicity.
- Configuring of H stations.

Safety-related functions

With the F runtime license, the safety-related F user program can be compiled and run on the CPU. One license is required for each S7-400F/FH system. The scope of delivery includes 2 TÜV (German technical inspectorate) adhesive labels.

Display and information functions

- Status and fault indicators:
LEDs indicate, for example, internal and external faults and operating statuses such as RUN, STOP, startup, "Master" operating mode, redundancy errors, and test function.
- Test functions:
The programming device can be used to display signal states in the program execution sequence, modify process variables independently of the user program, output contents of stack memories, run through program steps individually, and disable program sections.
- Information functions:
The user can obtain information about the memory capacity and operating mode of the CPU, and the current utilization of the RAM and load memory.

Technical specifications

Technical specifications see page 3/60.

Selection and ordering data

Selection and ordering data see page 3/51.

Safety integrated automation

CPUs for factory and process automation

High availability S7-400 CPUs
CPU 414-5H

Overview



- CPU for SIMATIC S7-400H and S7-400F/FH
- Can be used in S7-400H high-availability systems
- Can be used with F runtime license as F-capable CPU in S7-400F/FH safety-related systems
- With integrated PROFIBUS DP master and combined MPI/PROFIBUS DP master interface
- With integrated PROFINET interface (2-port switch)
- Features 2 slots for sync modules

SIPLUS Versions

SIPLUS versions of this module are also available. [See page 3/59.](#)

Application

The CPU 414-5H can be used for the SIMATIC S7-400H and S7-400F/FH. It enables the establishment of an S7-400H high-availability system. It can also be used for the S7-400F/FH fail-safe automation system in conjunction with the F runtime license.

The integrated PROFIBUS DP interfaces enable direct connection as master to the PROFIBUS DP fieldbus.

The integrated PROFINET interface with switch functionality forms the basis for providing 2 externally accessible PROFINET ports. In this way, linear or ring structures can be implemented.

Design

The CPU 414-5H provides:

- A powerful processor:
The CPU achieves command execution times as low as 18.75 ns per binary command.
- 4 MB main memory (2 MB for programs, 2 MB for data); load memory for user programs and configuration data for the S7-400H F/FH automation system; fast main memory for sub-routines of the user program that are relevant to the process
- A memory card:
For expanding the integrated load memory. In addition to the program itself, the information contained in the load memory also includes configuration data for the S7-400H F/FH, which is why it requires about twice as much memory space. The result is that:
 - The integrated load memory is not sufficient for large programs, which is why the memory card is often required.
 RAM and FEPRAM cards are available (FEPRAM for saving data even when power supply is disconnected).
- Flexible expansion options:
Up to 131 072 digital and 81 932 analog inputs/outputs.
- Multi-point interface MPI:
The MPI enables the creation of a simple network with up to 32 nodes and a data transfer rate of 187.5 kbit/s. The CPU can establish up to 64 connections to nodes on the communication bus (C bus) and the MPI.

Note:
If PROFIBUS DP and MPI interfaces are being used simultaneously, only the following bus connectors can be connected to the MPI interface:

 - With socket: **6ES7972-0BB41-0XA0**
 - Without socket: **6ES7972-0BA41-0XA0**
- PROFIBUS DP interface:
The PROFIBUS DP interface allows a redundant, distributed automation configuration offering high speed and ease of use. From the user's point of view, the distributed I/Os are treated like centralized I/Os (same configuring, addressing and programming).
- PROFINET interface with 2 ports (switch):
Support of system redundancy and MRP (Media Redundancy Protocol)
- Mode selector:
Designed as a toggle switch.
- Diagnostics buffer:
The last 120 alarm and interrupt events are stored in a ring buffer for diagnostic purposes.
- Real-time clock:
Diagnostics reports from the CPU are provided with the date and time.
- PROFIBUS DP interface:
The CPU 414-5H with PROFIBUS DP master interface enables distributed automation to be established at high speed and with easy operation. From the user's point of view, the distributed I/Os are treated like centralized I/Os (same configuring, addressing and programming).

Note:
If PROFIBUS DP and MPI interfaces are being used simultaneously, only the following bus connectors can be connected to the MPI interface:

 - With socket: **6ES7972-0BB41-0XA0**
 - Without socket: **6ES7972-0BA41-0XA0**

Safety integrated automation

CPUs for factory and process automation

High availability S7-400 CPUs
CPU 414-5H

Function

- Block protection:
In addition to the keylock switch, a password concept protects the user program from unauthorized access. User blocks can also be protected by an encryption process.
- Integrated HMI services:
In the case of HMI devices, the user only has to specify the source and destination of the data. These are automatically transferred cyclically by the system.
- Integrated communications functions:
 - PG/OP communication
 - Extended communication (simple and high-availability)
- Master-spare switchover programmed by user.

Parameterizable properties

With the STEP 7 tool "Hardware Configuration" and the installed option package S7-400H, the properties and behavior of the S7-400H including the CPUs can be parameterized, e.g.:

- Multi-point interface MPI:
 - Determining node addresses.
 - Startup/cyclic behavior.
 - Definition of maximum cycle time and communication load.
- Address assignment:
Addressing of the I/O modules.
- Retentive areas:
Definition of the number of retentive bit memories, counters, timers, data blocks and clock memories.
- Protection level:
Definition of access authorization to program and data.
- System diagnostics:
Determination of handling and scope of diagnostics messages.
- Watchdog interrupts:
Setting the periodicity.
- Configuring of H stations.

Safety-related functions

With the F runtime license, the safety-related F user program can be compiled and run on the CPU. One license is required for each S7-400F/FH system. The scope of delivery includes 2 TÜV (German technical inspectorate) adhesive labels.

Display and information functions

- Status and fault indicators:
LEDs indicate, for example, internal and external faults and operating statuses such as RUN, STOP, startup, "Master" operating mode, redundancy errors, and test function.
- Test functions:
The programming device can be used to display signal states in the program execution sequence, modify process variables independently of the user program, output contents of stack memories, run through program steps individually, and disable program sections.
- Information functions:
The user can obtain information about the memory capacity and operating mode of the CPU, and the current utilization of the RAM and load memory.

Technical specifications

[Technical specifications see page 3/60.](#)

Selection and ordering data

[Selection and ordering data see page 3/51.](#)

Safety integrated automation

CPUs for factory and process automation

High availability S7-400 CPUs CPU 416-5H

Overview

- CPU for SIMATIC S7-400H and S7-400F/FH
- Can be used in S7-400H high-availability systems
- Can be used with F runtime license as F-capable CPU in S7-400F/FH safety-related systems
- With integrated PROFIBUS DP master and combined MPI/PROFIBUS DP master interface
- With integrated PROFINET interface (2-port switch)
- Features 2 slots for sync modules

SIPLUS Versions

SIPLUS versions of this module are also available. [See page 3/61.](#)

Application

The CPU 416-5H can be used for SIMATIC S7-400H and S7-400F/FH. It enables the establishment of an S7-400H high-availability system. It can also be used for the S7-400F/FH fail-safe automation system in conjunction with the F runtime license.

The integrated PROFIBUS DP interfaces enable direct connection as master to the PROFIBUS DP fieldbus.

The integrated PROFINET interface with switch functionality forms the basis for providing 2 externally accessible PROFINET ports. In this way, linear or ring structures can be implemented.

Design

The CPU 416-5H provides:

- A powerful processor:
The CPU achieves command execution times as low as 12.5 ns per binary command.
- 16 MB RAM (6 MB for programs, 10 MB for data):
Load memory for user programs and configuration data for the S7-400H automation system; Fast main memory for subroutines of the user program that are relevant to the process.
- A memory card:
For expanding the integrated load memory. In addition to the program itself, the information contained in the load memory also includes configuration data for the S7-400H, which is why it takes up twice as much space in the memory. The result is that:
 - The integrated load memory is not sufficient for large programs, which is why the memory card is often required.
 - RAM and FEPRM cards are available (FEPRM for saving data even when power supply is disconnected).
- Flexible expansion options:
Up to 262 144 digital and 16 384 analog inputs/outputs.
- Multi-point interface MPI:
The MPI enables the creation of a simple network with up to 32 nodes and a data transfer rate of 187.5 kbit/s. The CPU can establish up to 64 connections to nodes on the communication bus (C bus) and the MPI.

Note:
If PROFIBUS DP and MPI interfaces are being used simultaneously, only the following bus connectors can be connected to the MPI interface:

 - With socket: **6ES7972-0BB41-0XA0**
 - Without socket: **6ES7972-0BA41-0XA0**
- PROFIBUS DP interface:
The PROFIBUS DP interface allows a redundant, distributed automation configuration offering high speed and ease of use. From the user's point of view, the distributed I/Os are treated like centralized I/Os (same configuring, addressing and programming).
- PROFINET interface with 2 ports (switch):
Support of system redundancy and MRP (Media Redundancy Protocol)
- Mode selector:
Designed as a toggle switch.
- Diagnostics buffer:
The last 120 alarm and interrupt events are stored in a ring buffer for diagnostic purposes.
- Real-time clock:
Diagnostics reports from the CPU are provided with the date and time.
- PROFIBUS DP interface:
The CPU 417-4H with PROFIBUS DP master interface enables distributed automation to be established at high speed and with easy operation. From the user's point of view, the distributed I/Os are treated like centralized I/Os (same configuring, addressing and programming).

Note:
If PROFIBUS DP and MPI interfaces are being used simultaneously, only the following bus connectors can be connected to the MPI interface:

 - With socket: **6ES7972-0BB41-0XA0**
 - Without socket: **6ES7972-0BA41-0XA0**

Safety integrated automation

CPUs for factory and process automation

High availability S7-400 CPUs
CPU 416-5H

Function

- Block protection:
In addition to the keylock switch, a password concept protects the user program from unauthorized access. User blocks can also be protected by an encryption process.
- Integrated HMI services:
In the case of HMI devices, the user only has to specify the source and destination of the data. These are automatically transferred cyclically by the system.
- Integrated communications functions:
 - PG/OP communication
 - Extended communication (simple and high-availability)
- Master-spare switchover programmed by user.

Parameterizable properties

With the STEP 7 tool "Hardware Configuration" and the installed option package S7-400H, the properties and behavior of the S7-400H including the CPUs can be parameterized, e.g.:

- Multi-point interface MPI:
 - Determining node addresses.
 - Startup/cyclic behavior.
 - Definition of maximum cycle time and communication load.
- Address assignment:
Addressing of the I/O modules.
- Retentive areas:
Definition of the number of retentive bit memories, counters, timers, data blocks and clock memories.
- Protection level:
Definition of access authorization to program and data.
- System diagnostics:
Determination of handling and scope of diagnostics messages.
- Watchdog interrupts:
Setting the periodicity.
- Configuring of H stations.

Safety-related functions

With the F runtime license, the safety-related F user program can be compiled and run on the CPU. One license is required for each S7-400F/FH system. The scope of delivery includes 2 TÜV (German technical inspectorate) adhesive labels.

Display and information functions

- Status and fault indicators:
LEDs indicate, for example, internal and external faults and operating statuses such as RUN, STOP, startup, "Master" operating mode, redundancy errors, and test function.
- Test functions:
The programming device can be used to display signal states in the program execution sequence, modify process variables independently of the user program, output contents of stack memories, run through program steps individually, and disable program sections.
- Information functions:
The user can obtain information about the memory capacity and operating mode of the CPU, and the current utilization of the RAM and load memory.

Technical specifications

Technical specifications see page 3/60.

Selection and ordering data

Selection and ordering data see page 3/51.

Safety integrated automation

CPUs for factory and process automation

High availability S7-400 CPUs
CPU 417-5H

Overview



- CPU for SIMATIC S7-400H and S7-400F/FH
- Can be used in S7-400H high-availability systems
- Can be used with F runtime license as F-capable CPU in S7-400F/FH safety-related systems
- With integrated PROFIBUS DP master interface and combined MPI/PROFIBUS DP master interface
- With integrated PROFINET interface (2-port switch)
- Features 2 slots for sync modules

SIPLUS Versions

SIPLUS versions of this module are also available. [See page 3/62.](#)

Application

The CPU 417-5H is the most powerful CPU for the SIMATIC S7-400H and S7-400F/FH. It enables the establishment of an S7-400H high-availability system. It can also be used for the S7-400F/FH fail-safe automation system in conjunction with the F runtime license.

The integrated PROFIBUS DP interfaces enable direct connection as master to the PROFIBUS DP fieldbus.

The integrated PROFINET interface with switch functionality forms the basis for providing 2 externally accessible PROFINET ports. In this way, linear or ring structures can be implemented.

Design

The CPU 417-5H provides:

- A powerful processor:
The CPU achieves command execution times as low as 7.5 ns per binary command.
- 32 MB RAM (16 MB for programs, 16 MB for data):
Load memory for user programs and configuration data for the S7-400H automation system; Fast main memory for subroutines of the user program that are relevant to the process.
- A memory card:
For expanding the integrated load memory. In addition to the program itself, the information contained in the load memory also includes configuration data for the S7-400H, which is why it takes up twice as much space in the memory. The result is that:
 - The integrated load memory is not sufficient for large programs, which is why the memory card is often required.
 RAM and FEPRAM cards are available (FEPRAM for saving data even when power supply is disconnected).
- Flexible expansion options:
Up to 262 144K digital and 16 384 analog inputs/outputs.
- Multi-point interface MPI:
The MPI enables the creation of a simple network with up to 32 nodes and a data transfer rate of 187.5 kbit/s. The CPU can establish up to 64 connections to nodes on the communication bus (C bus) and the MPI.

Note:
If PROFIBUS DP and MPI interfaces are being used simultaneously, only the following bus connectors can be connected to the MPI interface:

 - With socket: **6ES7972-0BB41-0XA0**
 - Without socket: **6ES7972-0BA41-0XA0**
- PROFIBUS DP interface:
The PROFIBUS DP interface allows a redundant, distributed automation configuration offering high speed and ease of use. From the user's point of view, the distributed I/Os are treated like centralized I/Os (same configuring, addressing and programming).
- PROFINET interface with 2 ports (switch):
Support of system redundancy and MRP (Media Redundancy Protocol)
- Mode selector:
Designed as a toggle switch.
- Diagnostics buffer:
The last 120 alarm and interrupt events are stored in a ring buffer for diagnostic purposes.
- Real-time clock:
Diagnostics reports from the CPU are provided with the date and time.
- PROFIBUS DP interface:
The CPU 417-4H with PROFIBUS DP master interface enables distributed automation to be established at high speed and with easy operation. From the user's point of view, the distributed I/Os are treated like centralized I/Os (same configuring, addressing and programming).

Note:
If PROFIBUS DP and MPI interfaces are being used simultaneously, only the following bus connectors can be connected to the MPI interface:

 - With socket: **6ES7972-0BB41-0XA0**
 - Without socket: **6ES7972-0BA41-0XA0**

Safety integrated automation

CPUs for factory and process automation

High availability S7-400 CPUs
CPU 417-5H

Function

- Block protection:
In addition to the keylock switch, a password concept protects the user program from unauthorized access. User blocks can also be protected by an encryption process.
- Integrated HMI services:
In the case of HMI devices, the user only has to specify the source and destination of the data. These are automatically transferred cyclically by the system.
- Integrated communications functions:
 - PG/OP communication
 - Extended communication (simple and high-availability)
- Master-spare switchover programmed by user.

Parameterizable properties

With the STEP 7 tool "Hardware Configuration" and the installed option package S7-400H, the properties and behavior of the S7-400H including the CPUs can be parameterized, e.g.:

- Multi-point interface MPI:
 - Determining node addresses.
 - Startup/cyclic behavior.
 - Definition of maximum cycle time and communication load.
- Address assignment:
Addressing of the I/O modules.
- Retentive areas:
Definition of the number of retentive bit memories, counters, timers, data blocks and clock memories.
- Protection level:
Definition of access authorization to program and data.
- System diagnostics:
Determination of handling and scope of diagnostics messages.
- Watchdog interrupts:
Setting the periodicity.
- Configuring of H stations.

Safety-related functions

With the F runtime license, the safety-related F user program can be compiled and run on the CPU. One license is required for each S7-400F/FH system. The scope of delivery includes 2 TÜV (German technical inspectorate) adhesive labels.

Display and information functions

- Status and fault indicators:
LEDs indicate, for example, internal and external faults and operating statuses such as RUN, STOP, startup, "Master" operating mode, redundancy errors, and test function.
- Test functions:
The programming device can be used to display signal states in the program execution sequence, modify process variables independently of the user program, output contents of stack memories, run through program steps individually, and disable program sections.
- Information functions:
The user can obtain information about the memory capacity and operating mode of the CPU, and the current utilization of the RAM and load memory.

Technical specifications

Technical specifications see page 3/60.

Selection and ordering data

Selection and ordering data see page 3/51.

Safety integrated automation

CPUs for factory and process automation

High availability S7-400 CPUs Technical specifications

Technical specifications

	6ES7412-5HK06-0AB0 CPU 412-5H PN/DP	6ES7414-5HM06-0AB0 CPU 414-5H PN/DP	6ES7416-5HS06-0AB0 CPU 416-5H PN/DP	6ES7417-5HT06-0AB0 CPU 417-5H PN/DP
General information				
Engineering with				
• Programming package	As of STEP 7 V5.5 SP2 with HF1	As of STEP 7 V5.5 SP2 with HF1	As of STEP 7 V5.5 SP2 with HF1	As of STEP 7 V5.5 SP2 with HF1
Supply voltage				
24 V DC	No; Power supply via system power supply	No; Power supply via system power supply	No; Power supply via system power supply	No; Power supply via system power supply
Power losses				
Power loss, typ.	7.5 W	7.5 W	7.5 W	7.5 W
Memory				
Main memory				
• integrated	1 Mbyte	4 Mbyte	16 Mbyte	32 Mbyte
• integrated (for program)	512 kbyte	2 Mbyte	6 Mbyte	16 Mbyte
• integrated (for data)	512 kbyte	2 Mbyte	10 Mbyte	16 Mbyte
Load memory				
• expandable FEPRM, max.	64 Mbyte	64 Mbyte	64 Mbyte	64 Mbyte
• integrated RAM, max.	512 kbyte	512 kbyte	1 Mbyte	1 Mbyte
• expandable RAM, max.	64 Mbyte	64 Mbyte	64 Mbyte	64 Mbyte
CPU processing times				
for bit operations, typ.	31.25 ns	18.75 ns	12.5 ns	7.5 ns
for word operations, typ.	31.25 ns	18.75 ns	12.5 ns	7.5 ns
for fixed point arithmetic, typ.	31.25 ns	18.75 ns	12.5 ns	7.5 ns
for floating point arithmetic, typ.	62.5 ns	37.5 ns	25 ns	15 ns
Counters, timers and their retentivity				
S7 counter				
• Number	2 048	2 048	2 048	2 048
IEC counter				
• present	Yes	Yes	Yes	Yes
S7 times				
• Number	2 048	2 048	2 048	2 048
IEC timer				
• present	Yes	Yes	Yes	Yes
Data areas and their retentivity				
Flag				
• Number, max.	8 192 byte	8 192 byte	16 384 byte	16 384 byte
Address area				
I/O address area				
• Inputs	8 kbyte	8 kbyte	16 kbyte	16 kbyte
• Outputs	8 kbyte	8 kbyte	16 kbyte	16 kbyte
Process image				
• Inputs, adjustable	8 kbyte	8 kbyte	16 kbyte	16 kbyte
• Outputs, adjustable	8 kbyte	8 kbyte	16 kbyte	16 kbyte
Time of day				
Clock				
• Hardware clock (real-time clock)	Yes	Yes	Yes	Yes
Operating hours counter				
• Number	16	16	16	16

Safety integrated automation

CPU for factory and process automation

High availability S7-400 CPUs
Technical specifications

	6ES7412-5HK06-0AB0 CPU 412-5H PN/DP	6ES7414-5HM06-0AB0 CPU 414-5H PN/DP	6ES7416-5HS06-0AB0 CPU 416-5H PN/DP	6ES7417-5HT06-0AB0 CPU 417-5H PN/DP
1st interface				
Type of interface	integrated	integrated	integrated	integrated
Physics	RS 485 / PROFIBUS + MPI	RS 485 / PROFIBUS + MPI	RS 485 / PROFIBUS + MPI	RS 485 / PROFIBUS + MPI
Functionality				
• MPI	Yes	Yes	Yes	Yes
• DP master	Yes	Yes	Yes	Yes
• DP slave	No	No	No	No
DP master				
• Number of DP slaves, max.	32	32	32	32
2nd interface				
Type of interface	PROFINET	PROFINET	PROFINET	PROFINET
Physics	Ethernet RJ45	Ethernet RJ45	Ethernet RJ45	Ethernet RJ45
Number of ports	2	2	2	2
Functionality				
• DP master	No	No	No	No
• DP slave	No	No	No	No
• PROFINET IO Controller	Yes	Yes	Yes	Yes
• PROFINET IO Device	No	No	No	No
• PROFINET CBA	No	No	No	No
PROFINET IO Controller				
• Max. number of connectable IO devices for RT	256	256	256	256
3rd interface				
Type of interface	integrated	integrated	integrated	integrated
Physics	RS 485 / PROFIBUS	RS 485 / PROFIBUS	RS 485 / PROFIBUS	RS 485 / PROFIBUS
Functionality				
• DP master	Yes	Yes	Yes	Yes
• DP slave	No	No	No	No
DP master				
• Number of DP slaves, max.	64	96	125	125
4th interface				
Type of interface	Pluggable synchronization submodule (FO)	Pluggable synchronization submodule (FO)	Pluggable synchronization submodule (FO)	Pluggable synchronization submodule (FO)
Plug-in interface modules	Synchronization modules 6ES7960-1AA06-0XA0 or 6ES7960-1AB06-0XA0	Synchronization modules 6ES7960-1AA06-0XA0 or 6ES7960-1AB06-0XA0	Synchronization modules 6ES7960-1AA06-0XA0 or 6ES7960-1AB06-0XA0	Synchronization modules 6ES7960-1AA06-0XA0 or 6ES7960-1AB06-0XA0
5th Interface				
Type of interface	Pluggable synchronization submodule (FO)	Pluggable synchronization submodule (FO)	Pluggable synchronization submodule (FO)	Pluggable synchronization submodule (FO)
Plug-in interface modules	Synchronization modules 6ES7960-1AA06-0XA0 or 6ES7960-1AB06-0XA0	Synchronization modules 6ES7960-1AA06-0XA0 or 6ES7960-1AB06-0XA0	Synchronization modules 6ES7960-1AA06-0XA0 or 6ES7960-1AB06-0XA0	Synchronization modules 6ES7960-1AA06-0XA0 or 6ES7960-1AB06-0XA0
Isochronous mode				
Isochronous operation (application synchronized up to terminal)	No	No	No	No

Safety integrated automation

CPUs for factory and process automation

High availability S7-400 CPUs

Technical specifications

	6ES7412-5HK06-0AB0 CPU 412-5H PN/DP	6ES7414-5HM06-0AB0 CPU 414-5H PN/DP	6ES7416-5HS06-0AB0 CPU 416-5H PN/DP	6ES7417-5HT06-0AB0 CPU 417-5H PN/DP
Communication functions				
PG/OP communication	Yes	Yes	Yes	Yes
Data record routing	Yes	Yes	Yes	Yes
S7 routing	Yes	Yes	Yes	Yes
Global data communication				
• supported	No	No	No	No
S7 basic communication				
• supported	No	No	No	No
S7 communication				
• supported	Yes	Yes	Yes	Yes
S5-compatible communication				
• supported	Yes; (via CP max. 10 and FC AG_SEND and FC AG_RECV)	Yes; (via CP max. 10 and FC AG_SEND and FC AG_RECV)	Yes; (via CP max. 10 and FC AG_SEND and FC AG_RECV)	Yes; (via CP max. 10 and FC AG_SEND and FC AG_RECV)
Standard communication (FMS)				
• supported	Yes; Via CP and loadable FB	Yes; Via CP and loadable FB	Yes; Via CP and loadable FB	Yes; Via CP and loadable FB
Open IE communication				
• TCP/IP	Yes; via integrated PROFINET interface and loadable FBs	Yes; via integrated PROFINET interface and loadable FBs	Yes; via integrated PROFINET interface and loadable FBs	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.	46	62	94	118
• ISO-on-TCP (RFC1006)	Yes; Via integrated PROFINET interface or CP 443-1 and loadable FBs	Yes; Via integrated PROFINET interface or CP 443-1 and loadable FBs	Yes; Via integrated PROFINET interface or CP 443-1 and loadable FBs	Yes; Via integrated PROFINET interface or CP 443-1 and loadable FBs
- Number of connections, max.	46	62	94	118
• UDP	Yes; via integrated PROFINET interface and loadable FBs	Yes; via integrated PROFINET interface and loadable FBs	Yes; via integrated PROFINET interface and loadable FBs	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.	46	62	94	118
Web server				
• supported	No	No	No	No
Number of connections				
• overall	48	64	96	120
Configuration				
programming				
• Programming language				
- LAD	Yes	Yes	Yes	Yes
- FBD	Yes	Yes	Yes	Yes
- STL	Yes	Yes	Yes	Yes
- SCL	Yes	Yes	Yes	Yes
- CFC	Yes	Yes	Yes	Yes
- GRAPH	Yes	Yes	Yes	Yes
- HiGraph®	Yes	Yes	Yes	Yes
Know-how protection				
• User program protection/pass-word protection	Yes	Yes	Yes	Yes
• Block encryption	Yes; With S7 block Privacy	Yes; With S7 block Privacy	Yes; With S7 block Privacy	Yes; With S7 block Privacy
Dimensions				
Width	50 mm	50 mm	50 mm	50 mm
Height	290 mm	290 mm	290 mm	290 mm
Depth	219 mm	219 mm	219 mm	219 mm
Required slots	2	2	2	2
Weight				
Weight, approx.	995 g	995 g	995 g	995 g

Safety integrated automation

CPUs for factory and process automation

High availability S7-400 CPUs
Ordering data

Selection and ordering data

Article No.		Article No.	
CPU 412-5H	6ES7412-5HK06-0AB0	CPU 416-5H system bundle	
For S7-400H and S7-400F/FH; 1 MB RAM, 1 combined MPI/PROFIBUS DP master inter- face, 1 PROFIBUS DP interface, 2 PROFINET interfaces (switches), 2 slots for sync mod- ules, slot for memory card, incl. slot number labels		Not assembled, consisting of: UR2-H rack, 2 x PS 405/407 power supply units, 2 x CPU 416-5H, 4 x Sync mod- ules (for max. 10 m), 2 x fiber optic cables for sync modules (1 m), 4 x backup batteries; two additional memory cards required (to be ordered separately)	
CPU 412-5H system bundle		<ul style="list-style-type: none"> • 416-5H system bundle, 120/230 V AC, 10 A 	6ES7400-0HR03-4AB0
Not assembled, consisting of: UR2-H rack, 2 x PS 405/407 power supply units, 2 x CPU 412-5H, 4 x Sync mod- ules (for max. 10 m), 2 x fiber optic cables for sync modules (1 m), 4 x backup batteries; addi- tional two memory cards required (to be ordered separately)		<ul style="list-style-type: none"> • 416-5H system bundle, 24/48/60 V DC, 10 A 	6ES7400-0HR53-4AB0
<ul style="list-style-type: none"> • 412-5H system bundle, 120/230 V AC, 10 A 	6ES7400-0HR01-4AB0	CPU 417-5H	6ES7417-5HT06-0AB0
<ul style="list-style-type: none"> • 412-5H system bundle, 24/48/60 V DC, 10 A 	6ES7400-0HR51-4AB0	For S7-400H and S7-400F/FH; 32 MB RAM, 1 combined MPI/PROFIBUS DP master inter- face, 1 PROFIBUS DP interface, 2 PROFINET interfaces (switches), 2 slots for sync mod- ules, slot for memory card, incl. slot number labels	
CPU 414-5H	6ES7414-5HM06-0AB0	CPU 417-5H system bundle	
For S7-400H and S7-400F/FH; 4 MB RAM, 1 combined MPI/PROFIBUS DP master inter- face, 1 PROFIBUS DP interface, 2 PROFINET interfaces (switches), 2 slots for sync mod- ules, slot for memory card, incl. slot number labels		Not assembled, consisting of: UR2-H rack, 2 x PS 405/407 power supply units, 2 x CPU 417-5H, 4 x Sync mod- ules (for max. 10 m), 2 x fiber optic cables for sync modules (1 m), 4 x backup batteries; two additional memory cards required (to be ordered separately)	
CPU 414-5H system bundle		<ul style="list-style-type: none"> • 417-5H system bundle, 120/230 V AC, 10 A 	6ES7400-0HR04-4AB0
Not assembled, consisting of: UR2-H rack, 2 x PS 405/407 power supply units, 2 x CPU 414-5H, 4 x Sync mod- ules (for max. 10 m), 2 x fiber optic cables for sync modules (1 m), 4 x backup batteries; two additional memory cards required (to be ordered separately)		<ul style="list-style-type: none"> • 417-5H system bundle, 24/48/60 V DC, 10 A 	6ES7400-0HR54-4AB0
<ul style="list-style-type: none"> • 414-5H system bundle, 120/230 V AC, 10 A 	6ES7400-0HR02-4AB0	Memory card RAM	
<ul style="list-style-type: none"> • 414-5H system bundle, 24/48/60 V DC, 10 A 	6ES7400-0HR52-4AB0	1 MB	6ES7952-1AK00-0AA0
CPU 416-5H	6ES7416-5HS06-0AB0	2 MB	6ES7952-1AL00-0AA0
For S7-400H and S7-400F/FH; 16 MB RAM, 1 combined MPI/PROFIBUS DP master inter- face, 1 PROFIBUS DP interface, 2 PROFINET interfaces (switches), 2 slots for sync mod- ules, slot for memory card, incl. slot number labels		4 MB	6ES7952-1AM00-0AA0
		8 MB	6ES7952-1AP00-0AA0
		16 MB	6ES7952-1AS00-0AA0
		64 MB	6ES7952-1AY00-0AA0
		FEPR0M memory card	
		1 MB	6ES7952-1KK00-0AA0
		2 MB	6ES7952-1KL00-0AA0
		4 MB	6ES7952-1KM00-0AA0
		8 MB	6ES7952-1KP00-0AA0
		16 MB	6ES7952-1KS00-0AA0
		32 MB	6ES7952-1KT00-0AA0
		64 MB	6ES7952-1KY00-0AA0

Note:

A new CPU, the SIMATIC PCS7 CPU 410-5H process automation, is now available.

Please look up catalog SIMATIC PCS 7 for information on versions and bundles (Edition June 2013).

Safety integrated automation

CPUs for factory and process automation

High availability S7-400 CPUs

Ordering data

	Article No.
MPI cable for connection of SIMATIC S7 and PG via MPI; 5 m in length	6ES7901-0BF00-0AA0
Slot number plates 1 set (spare part)	6ES7912-0AA00-0AA0
S7 F Systems RT License For processing safety-related user programs, for one S7 400H-based system each with CPU 412-5H, CPU 414-5H, CPU 416-5H or CPU 417-5H	6ES7833-1CC00-6YX0
S7 F Systems V6.1 Programming and configuring environment for creating and operating safety-related STEP 7 programs for an S7 400H-based target system, floating license for 1 user, runs under Windows XP Prof SP2, Windows XP Prof SP2/SP3, Windows Server 2003 SP2 2 languages (English, German) <i>Type of delivery:</i> License certificate as well as software and electronic documentation on CD	6ES7833-1CC02-0YA5
S7 F systems upgrade from V5.x/V6.0 to V6.1 2 languages (English, German), floating license for 1 user <i>Type of delivery:</i> License certificate as well as software and electronic documentation on CD	6ES7833-1CC02-0YE5
SIMATIC Manual Collection Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	6ES7998-8XC01-8YE0

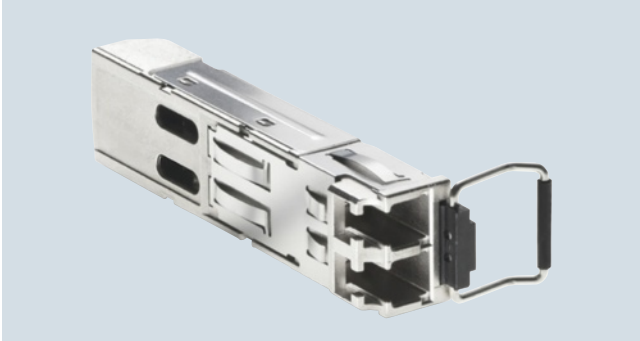
	Article No.
SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	6ES7998-8XC01-8YE2
RS 485 bus connector with 90° cable outlet Max. transfer rate 12 Mbit/s • Without PG interface • With PG interface	6ES7972-0BA12-0XA0 6ES7972-0BB12-0XA0
RS 485 bus connector with angled cable outlet • Max. transfer rate 12 Mbit/s - Without PG interface - With PG interface • Max. transfer rate 1.5 Mbit/s - Without PG interface	6ES7972-0BA42-0XA0 6ES7972-0BB42-0XA0 6ES7972-0BA30-0XA0
Bus connector RS 485 with 90° cable outlet for FastConnect connection technology Max. transfer rate 12 Mbit/s Without PG interface • 1 unit • 100 units With PG interface • 1 unit • 100 units	6ES7972-0BA52-0XA0 6ES7972-0BA52-0XB0 6ES7972-0BB52-0XA0 6ES7972-0BB52-0XB0
RS 485 bus connector with axial cable outlet For SIMATIC OP, for connection to PPI, MPI, PROFIBUS	6GK1500-0EA02
PROFIBUS FastConnect bus cable Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m	6XV1830-0EH10

Safety integrated automation

CPUs for factory and process automation

Sync-module for coupling the CPU 41xH

Overview



- For coupling the two CPU 41xH in the S7-400H subunits.
- Can be plugged direct into the CPU

SIPLUS Version

A SIPLUS version of this module is also available.

[See page 3/64](#)

Application

The Sync module is required for connecting the two CPU 41xH in the S7-400H subunits.

Design

The Sync module is plugged directly into the slot of the CPU 41xH reserved for it. Two Sync modules are required for each CPU. Modules in the subunits are connected by means of fiber-optic connecting cables.

- Sync module 6ES7960-1AA06-0XA0 for fiber-optic cables up to 10 m in length (patch cable).
- Sync module 6ES7960-1AB06-0XA0 for fiber-optic cables up to 10 km in length (patch cable or installation cable).

Technical specifications

	6ES7960-1AA06-0XA0	6ES7960-1AB06-0XA0
Input current from CPU, max.	220 mA	240 mA
Power losses Power loss, typ.	0.77 W	0.83 W
Dimensions, weight Width	13 mm	13 mm
Height	14 mm	14 mm
Depth	58 mm	58 mm
Weight, approx.	14 g	14 g

Selection and ordering data

	Article No.
Sync module for coupling the CPU 41xH for S7-400H/F/FH; 2 modules required per CPU; for patch cable, can be used with fiber-optic cables up to 10 m for patch and installation cables, can be used with fiber-optic cables up to 10 km	6ES7960-1AA06-0XA0 6ES7960-1AB06-0XA0
Fiber-optic connecting cable For Sync module 6ES7960-1Ax04-0XA0 • 1 m • 2 m • 10 m For Sync module 6ES7960-1AB06-0XA0; fiber-optic monomode LC/LC duplex crossed 9/125 μ (max. 10 km)	6ES7960-1AA04-5AA0 6ES7960-1AA04-5BA0 6ES7960-1AA04-5KA0 On request

Safety integrated automation

CPUs for factory and process automation

Y-link for S7-400H

Overview



- Transceiver for the transition from a redundant PROFIBUS DP master system to a single-channel PROFIBUS DP master system
- To connect devices with a single PROFIBUS DP interface to the redundant PROFIBUS DP master system of the SIMATIC S7-400H

SIPLUS Version

A SIPLUS version of this module is also available. [See page 3/66.](#)

Application

The Y-Link is a transceiver for the transition from a redundant PROFIBUS master system to a single-channel PROFIBUS DP master system. It is used to connect devices with a single PROFIBUS DP interface as switched I/O to S7-400H.

Design

The Y-Link comprises:

- Two IM 153-2 interface modules
- One Y-Coupler
- One BM IM/IM bus module
- One BM Y-Coupler bus module

Snapped on mounting rails for setup with active bus modules.

Configuration options and limitations

A redundant PROFIBUS DP master system can be extended by means of Y-Links in the following way:

- The number of Y-Links on a redundant DP master system is only limited by the maximum number of stations. The maximum number of connectable slaves depends on the length of the user data and configuration message frames. The total length of each may not exceed 244 byte (see slave technical specifications).
Generally, the following applies:
 - max. 64 stations in the lower-level DP master system
 - max. 236 slots in the lower-level DP master system
- Y-Link configuration and user data message frames comprise message frame contents of the lower-level slaves. Therefore, the maximum message frame length is 244 byte.
- Direct communication and equidistance not possible in the lower-level master system

Function

Y-Link

- Transmission rates for the redundant master system: 9.6 Kbit/s to 12 Mbit/s.
- Bumpless switchover of the redundant PROFIBUS DP master system's active channel.
- Supports system changes on a SIMATIC S7-400H during operation.
- Diagnostics using LEDs and the user program

Y-Coupler

- Transmission rates for the lower-level master system (independent of redundant DP master system): 187.5 Kbit/s to 12 Mbit/s.
- Electrical isolation between lower-level DP master system and power supply via the coupler.
- Degree of protection IP20

Principle of operation

The Y-Link maps the lower-level DP master system on the redundant PROFIBUS DP master system as a switched PROFIBUS DP slave.

The Y-Coupler and the lower-level DP master system form an independent bus system and operate decoupled from the redundant bus system.

The Y-Link as a DP slave on the redundant DP master system acts as a proxy for the stations on the lower-level DP master system with regard to data.

Configuration

The Y-Link can be configured with STEP 7 as of Version 5.2. It is not necessary to configure the Y-Coupler.

When STEP 7 calculates the bus parameters, the stations connected on the lower-level DP master system as well as the Y-Link itself are taken into account.

Parameter assignment for the DP slaves

The redundant DP master system assigns the parameters for the DP slaves in the lower-level DP master system via the Y-Link.

Safety integrated automation

CPUs for factory and process automation

Y-link for S7-400H

Technical specifications

6ES7153-2BA02-0XB0 IM 153-2 interface module	
General information	
Vendor identification (VendorID)	801Eh
Supply voltage	24 V DC
Permissible range (DC)	20.4 V ... 28.8 V
External protection for supply cables (recommendation)	2.5 A
Mains buffering	5 ms
Input current	
Current consumption, max.	650 mA
Inrush current, typ.	3 A
I^2t	0.1 A ² ·s
Output voltage, rated value	5 V DC
Output current	
for backplane bus (5 V DC), max.	1.5 A
Power losses, typ.	5.5 W
Address area inputs/outputs	244 byte/244 byte
Hardware configuration	
Number of modules per DP slave interface, max.	12
Time stamping	
Accuracy	1 ms; 1ms at up to 8 modules; 10ms at up to 12 modules
Number of message buffers	15
Messages per message buffer	20
Number of stampable digital inputs, max.	128; Max. 128 signals/station; max. 32 signals/slot
Time format	RFC 1119
Time resolution	0.466 ns
Time interval for transmitting the message buffer if a message is present	1 000 ms
Time stamp on signal change	rising / falling edge as signal entering or exiting
Interfaces	
PROFIBUS DP	
• Node addresses	1 to 125 permitted
• Automatic detection of transmission speed	Yes
• PROFIBUS DP, output current	max. 70 mA
• Transmission rate, max.	12 Mbit/s
• Transmission procedure	RS 485
• SYNC capability	Yes
• FREECE capability	Yes
• Direct data exchange (slave-to-slave communication)	Yes; Sender
• PROFIBUS DP	9-pin sub D
1st interface	
DP slave	
• GSD file	SI04801.GSG
• Automatic baud rate search	Yes
Communication functions	
Bus protocol/transmission protocol	PROFIBUS DP to EN 50170

6ES7153-2BA02-0XB0 IM 153-2 interface module	
Isolation	
Isolation checked with	Isolation voltage 500 V
Degree and class of protection	
IP20	Yes
Ambient conditions	
Operating temperature	
• Min.	0 °C
• max.	60 °C
Air pressure	
• Operating altitude above sea level, max.	3 000 m
Dimensions	
Width x height x depth (mm)	40 x 125 x 117
Weight, approx.	360 g

6ES7197-1LB00-0XA0 Y-coupler	
General information	
Requirements for DP master system	
• Length of parameter assignment message	244 byte
Supply voltage	
Description	via bus module
permissible range, lower limit (DC)	20.4 V
permissible range, upper limit (DC)	28.8 V
Interfaces	
PROFIBUS DP	
• Properties of the lower-level DP master systems	
- Transmission rate, max.	12 Mbit/s; 45.45 kbit/s to 12 Mbit/s
- Termination of lower-level DP master system	Active terminating resistor (Bus Terminator)
- Use of OLM/OBT	Yes
- Use of RS 485 repeaters, max.	9
- Number of DP slaves, max.	31; 64 when using RS 485 repeaters or OLM/OBT
Protocols	
PROFIBUS DP	Yes
Interrupts/diagnostics/status information	
Status indicator	No
Alarms	
• Alarms	No
Diagnostic messages	
• Diagnostic functions	Yes
Galvanic isolation	
to lower-level DP master system	Yes
Dimensions	
Width x height x depth (mm)	40 x 125 x 130
Weight, approx.	200g

Safety integrated automation

CPUs for factory and process automation

Y-link for S7-400H

Selection and ordering data

	Article No.
For use with STEP 7 from V5.4 or PCS 7 from V7.0	
Y link For connecting single-channel DP slaves to SIMATIC S7-400H; consisting of 2 IM 153 interface modules (6ES7153-2BA02-0XB0), 1 Y coupler (6ES7197-1LB00-0XA0), 1 BM IM/IM bus module (6ES7195-7HD80-0XA0), 1 BM Y coupler bus module (6ES7654-7HY00-0XA0)	6ES7197-1LA04-0XA0
For use with PCS 7 V6.0 or higher	
Y link For connecting single-channel DP slaves to SIMATIC S7-400H; consisting of 2 IM 153 interface modules (6ES7153-2BA82-0XB0), 1 Y coupler (6ES7197-1LB00-0XA0), 1 BM IM/IM bus module (6ES7195-7HD80-0XA0), 1 BM Y coupler bus module (6ES7654-7HY00-0XA0)	6ES7197-1LA11-0XA0
Accessories	
Mounting rail For assembling the Y link with active bus modules <ul style="list-style-type: none"> • Length 483 mm • Length 530 mm 	6ES7195-1GA00-0XA0 6ES7195-1GF30-0XA0

Safety integrated automation

CPUs for factory and process automation

SIPLUS High Availability CPUs
SIPLUS CPU 412H

Overview



- CPU for SIMATIC S7-400H and S7-400F/FH
- Usable in high-availability systems such as the S7-400H
- Usable with F runtime license as F-capable CPU in S7-400F/FH safety-related systems
- Features a combined MPI/PROFIBUS DP master interface
- Features 2 slots for sync modules

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

Technical specifications

The technical data correspond to those of the based-on modules apart from the values listed in the table:

SIPLUS module	6AG1412-3HJ14-4AB0	6AG1412-2EK06-2AB0	6AG1412-5HK06-7AB
Based on	6ES7412-3HJ14-0AB0	6ES7412-2EK06-0AB0	6ES7412-5HK06-0AB0
Ambient conditions			
Extended ambient conditions			
<ul style="list-style-type: none"> • Relative to ambient temperature-atmospheric pressure-installation altitude 	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m). For "F-Systems" applications max. +2000 m above sea level permissible
<ul style="list-style-type: none"> • Relative humidity <ul style="list-style-type: none"> - with condensation 	100 %; Relative humidity, incl. condensation / frost permitted (no commissioning under condensation conditions)	100 %; Relative humidity, incl. condensation / frost permitted (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)
<ul style="list-style-type: none"> • Resistance <ul style="list-style-type: none"> - to biologically active substances - to chemically active substances - to mechanically active substances 	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! Yes; Class 3C4 incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation in corrosive atmospheres! Yes; Class 3C4 incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!
Mechanical and climatic conditions during operation			
Climatic conditions in operation			
<ul style="list-style-type: none"> • Temperature <ul style="list-style-type: none"> - Min. - max. 	0 °C; = Tmin 60 °C; = Tmax	-25 °C; = Tmin 60 °C; = Tmax	-25 °C 70 °C; For "F-Systems" applications max. +60 °C permissible

Safety integrated automation

CPUs for factory and process automation

SIPLUS High Availability CPUs SIPLUS CPU 412H

Selection and ordering data

	Article No.
SIPLUS CPU 412-3H (suitable for exposure) for S7-400H and S7-400F/FH; 768 KB main memory, combined MPI/PROFIBUS DP master inter- face, 2 slots for sync modules, slot for memory card, including the mounting position labels	6AG1412-3HJ14-4AB0
SIPLUS S7-400 CPU 412-2 PN (suitable for extended tempera- ture range and exposure) For S7-400H and S7-400F/FH; 1 MB main memory (512 KB for code, 512 KB for data). 2 interfaces: MPI/DP 12 Mbit/s (X1) Ethernet/PROFINET (X5)	6AG1412-2EK06-2AB0
SIPLUS S7-400 CPU 412-5H (suitable for exposure) For S7-400H and S7-400F/FH; 1 MB main memory (512 KB for code, 512 KB for data). 5 interfaces: 1 x MPI/DP 1 x DP 1 x PN 2 x for sync modules	6AG1412-5HK06-7AB0

	Article No.
Accessories	
Memory card RAM (suitable for exposure) 2 MB 4 MB 8 MB 16 MB 64 MB	6AG1952-1AL00-4AA0 6AG1952-1AM00-7AA0 6AG1952-1AP00-7AA0 6AG1952-1AS00-7AA0 6AG1952-1AY00-7AA0
FEPRM memory card (suitable for exposure) 32 MB	6AG1952-1KT00-4AA0
RS 485 bus connector with 90° cable outlet (extended temperature range and exposure) Max. transfer rate 12 Mbit/s • without PG interface • with PG interface	6AG1972-0BA12-2XA0 6AG1972-0BB12-2XA0
RS 485 bus connector with angled cable outlet (extended temperature range - 40°C ... +70°C and exposure) Max. transfer rate 12 Mbit/s • Without PG interface • With PG interface	6AG1972-0BA42-7XA0 6AG1972-0BB42-7XA0
Further accessories	See page 3/39

Safety integrated automation

CPUs for factory and process automation

SIPLUS High Availability CPUs
SIPLUS CPU 414H

Overview



CPU for SIMATIC S7-400H and S7-400F/FH

- Usable in high-availability systems such as the S7-400H
- Usable with F runtime license as F-capable CPU in S7-400F/FH safety-related systems
- With integral PROFIBUS DP master interface
- Features 2 slots for sync modules

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

Technical specifications

SIPLUS module	6AG1414-4HM14-4AB0	6AG1414-3EM06-7AB0	6AG1414-5HM06-7AB0
Based on	6ES7414-4HM14-0AB0	6ES7414-3EM06-0AB0	6ES7414-5HM06-0AB0
Ambient conditions			
Extended ambient conditions			
<ul style="list-style-type: none"> • Relative to ambient temperature -atmospheric pressure-installation altitude 	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m). For "F-Systems" applications max. +2000 m above sea level permissible
<ul style="list-style-type: none"> • Relative humidity <ul style="list-style-type: none"> - with condensation 	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; Relative humidity, incl. condensation / frost permitted (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)
<ul style="list-style-type: none"> • Resistance <ul style="list-style-type: none"> - to biologically active substances - to chemically active substances - to mechanically active substances 	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation in corrosive atmospheres! Yes; Class 3C4 incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!
Mechanical and climatic conditions during operation			
Climatic conditions in operation			
<ul style="list-style-type: none"> • Temperature <ul style="list-style-type: none"> - Min. - max. 	0 °C; = Tmin 60 °C; = Tmax	-25 °C; = Tmin 70 °C; = Tmax	-25 °C 70 °C; For "F-Systems" applications max. +60 °C permissible

Safety integrated automation

CPUs for factory and process automation

SIPLUS High Availability CPUs SIPLUS CPU 414H

Selection and ordering data

	Article No.
SIPLUS CPU 414-4H (suitable for exposure) For S7-400H and S7-400F/FH; 2.8 MB main memory, MPI/PROFIBUS DP master inter- face, 2 slots for sync modules, slot for memory card, incl. slot number labels	6AG1414-4HM14-4AB0
SIPLUS S7-400 CPU 414-3 PN/DP (extended temperature range and exposure) 4 MB main memory (2 MB for code, 2 MB for data) 3 interfaces: MPI/DP 12 Mbit/s (X1), Ethernet/PROFINET (X5), IF 964-DP pluggable (IF1)	6AG1414-3EM06-7AB0
SIPLUS S7-400 CPU 414-5H (extended temperature range and exposure) For S7-400H and S7-400F/FH; 1 MB main memory (512 KB for code, 512 KB for data) 5 interfaces: 1 x MPI/DP 1 x DP 1 x PN 2 x for sync modules	6AG1414-5MH06-7AB0

	Article No.
Accessories	
Memory Card RAM (suitable for exposure) 2 MB (extended temperature range and exposure) 4 MB 8 MB 16 MB 64 MB	6AG1952-1AL00-4AA0 6AG1952-1AM00-7AA0 6AG1952-1AP00-7AA0 6AG1952-1AS00-7AA0 6AG1952-1AY00-7AA0
FEPRM memory card (suitable for exposure) 32 MB	6AG1952-1KT00-4AA0
RS 485 bus connector with 90° cable outlet (extended temperature range and exposure) Max. transfer rate 12 Mbit/s • Without PG interface • With PG interface	6AG1972-0BA12-2XA0 6AG1972-0BB12-2XA0
RS 485 bus connector with angled cable outlet (extended temperature range and exposure) Max. transfer rate 12 Mbit/s • Without PG interface • With PG interface	6AG1972-0BA42-7XA0 6AG1972-0BB42-7XA0
Further accessories	See page 3/39

Safety integrated automation

CPUs for factory and process automation

SIPLUS High Availability CPUs
SIPLUS CPU 416H

Overview

- CPU for SIMATIC S7-400H and S7-400F/FH
- Usable in high-availability systems such as the S7-400H
- Usable with F runtime license as F-capable CPU in S7-400F/FH safety-related systems
- With integrated PROFIBUS DP master and combined MPI/PROFIBUS DP master interface
- With integrated PROFINET interface (2-port switch)
- Features 2 slots for sync modules

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

Technical specifications

The technical data correspond to those of the based-on module apart from the values listed in the table:

SIPLUS module	6AG1416-5HS06-7AB0
based on	6ES7416-5HS06-0AB0
Ambient conditions	
Extended ambient conditions	
<ul style="list-style-type: none"> • Relative to ambient temperature-atmospheric pressure-installation altitude 	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m), in F-system applications the max. altitude is +2000m above sea level
<ul style="list-style-type: none"> • Relative humidity <ul style="list-style-type: none"> - with condensation 	100 %; Relative humidity, incl. condensation / frost permitted (no commissioning under condensation conditions)
<ul style="list-style-type: none"> • Resistance <ul style="list-style-type: none"> - to biologically active substances 	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
<ul style="list-style-type: none"> - to chemically active substances 	Yes; Class 3C4 incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
<ul style="list-style-type: none"> - to mechanically active substances 	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!
Mechanical and climatic conditions during operation	
Climatic conditions in operation	
<ul style="list-style-type: none"> • Temperature <ul style="list-style-type: none"> - Min. - Max. 	-25 °C 70 °C; in F-system applications the max. permissible temperature is +60°C

Selection and ordering data

	Article No.
SIPLUS S7-400 CPU 416-5H (suitable for exposure) For S7-400H and S7-400F/FH; 16 MB main memory Interfaces: <ul style="list-style-type: none"> • 1 x combined MPI/PROFIBUS DP master interface • 1 x PROFIBUS DP interface • 2 x PROFINET interfaces (switches) • 2 x for sync modules • Slot for memory card, incl. slot number labels 	6AG1416-5HS06-7AB0
Accessories	
Memory card RAM (suitable for exposure) <ul style="list-style-type: none"> 2 MB 4 MB 8 MB 16 MB 64 MB 	6AG1952-1AL00-4AA0 6AG1952-1AM00-7AA0 6AG1952-1AP00-7AA0 6AG1952-1AS00-7AA0 6AG1952-1AY00-7AA0
FEPRAM memory card (suitable for exposure) <ul style="list-style-type: none"> 32 MB 	6AG1952-1KT00-4AA0
RS 485 bus connector with 90° cable outlet (extended temperature range and exposure) Max. transfer rate 12 Mbit/s <ul style="list-style-type: none"> • Without PG interface • With PG interface 	6AG1972-0BA12-2XA0 6AG1972-0BB12-2XA0
RS 485 bus connector with angled cable outlet (extended temperature range - 40°C ... +70°C and exposure) Max. transmission rate 12 Mbit/s <ul style="list-style-type: none"> • Without PG interface • With PG interface 	6AG1972-0BA42-7XA0 6AG1972-0BB42-7XA0
Further accessories	See page 3/39

Safety integrated automation

CPUs for factory and process automation

SIPLUS High Availability CPUs
SIPLUS CPU 417H

Overview



CPU for SIMATIC S7-400H and S7-400F/FH

- Usable in high-availability systems such as the S7-400H
- Usable with F runtime license as F-capable CPU in S7-400F/FH safety-related systems
- With integral PROFIBUS DP master interface
- Features 2 slots for sync modules

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

Technical specifications

SIPLUS module	6AG1417-4HT14-4AB0	6AG1417-4XT05-4AB0	6AG1417-5HT06-7AB0
Based on	6ES7417-4HT14-0AB0	6ES7417-4XT05-0AB0	6ES7417-5HT06-0AB0
Ambient conditions			
Extended ambient conditions			
<ul style="list-style-type: none"> • Relative to ambient temperature-atmospheric pressure-installation altitude 	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m). For "F-Systems" applications max. +2000 m above sea level permissible
<ul style="list-style-type: none"> • Relative humidity <ul style="list-style-type: none"> - with condensation 	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)
<ul style="list-style-type: none"> • Resistance <ul style="list-style-type: none"> - to biologically active substances - to chemically active substances - to mechanically active substances 	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! Yes; Class 3C4 incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!
Mechanical and climatic conditions during operation			
Climatic conditions in operation			
<ul style="list-style-type: none"> • Temperature <ul style="list-style-type: none"> - Min. - max. 	0 °C; = Tmin 60 °C; = Tmax	0 °C; = Tmin 60 °C; = Tmax	-25 °C 70 °C; For "F-Systems" applications max. +60 °C permissible

Safety integrated automation

CPUs for factory and process automation

SIPLUS High Availability CPUs
SIPLUS CPU 417H

Selection and ordering data

	Article No.
SIPLUS CPU 417H (suitable for exposure) for S7-400H and S7-400F/FH; 30 MB main memory, MPI/PROFIBUS DP master inter- face, 2 slots for sync modules, slot for memory card, incl. slot number plates	6AG1417-4HT14-4AB0
SIPLUS S7-400 CPU417-4 (suitable for exposure) For S7-400H and S7-400F/FH. Based on 6ES7417-4XT05-0AB0	6AG1417-4XT05-4AB0
SIPLUS S7-400 CPU 417-5H (suitable for exposure) For S7-400H and S7-400F/FH; 1 MB main memory (512 KB for code, 512 KB for data) 5 interfaces: 1 x MPI/DP 1 x DP 1 x PN 2 x for sync modules	6AG1417-5HT06-7AB0

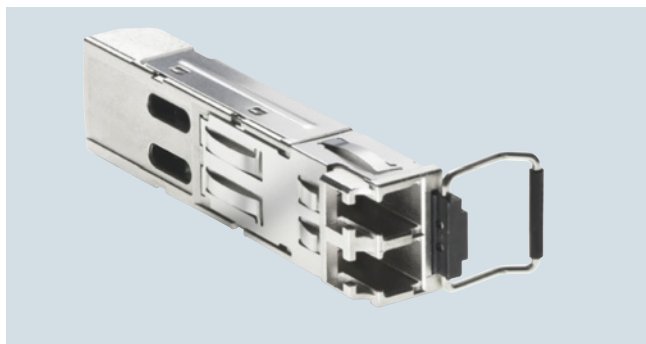
	Article No.
Accessories	
Memory card RAM (suitable for exposure) 2 MB 4 MB 8 MB 16 MB 64 MB	6AG1952-1AL00-4AA0 6AG1952-1AM00-7AA0 6AG1952-1AP00-7AA0 6AG1952-1AS00-7AA0 6AG1952-1AY00-7AA0
FEPR0M memory card (suitable for exposure) 32 MB	6AG1952-1KT00-4AA0
RS 485 bus connector with 90° cable outlet (extended temperature range and exposure) Max. transmission rate 12 Mbit/s • Without PG interface • With PG interface	6AG1972-0BA12-2XA0 6AG1972-0BB12-2XA0
RS 485 bus connector with angled cable outlet (extended temperature range -40 °C ... +70 °C and exposure) Max. transfer rate 12 Mbit/s • Without PG interface • With PG interface	6AG1972-0BA42-7XA0 6AG1972-0BB42-7XA0
Further accessories	See page 3/51.

Safety integrated automation

CPUs for factory and process automation

SIPLUS sync module
for connecting the CPU 41xH

Overview



- For linking the two CPUs 414-4H/417-4H in the subunits of the S7-400H
- Can be plugged directly into the CPU

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

Technical specifications

SIPLUS module	6AG1960-1AA04-4XA0	6AG1960-1AB04-4XA0	6AG1960-1AA06-7XA0	6AG1960-1AB06-7XA0
based on	6ES7960-1AA04-0XA0	6ES7960-1AB04-0XA0	6ES7960-1AA06-0XA0	6ES7960-1AB06-0XA0
Current consumption from CPU, max.	210 mA	250 mA	220 mA	240 mA
Power dissipation, typ.	1.1 mW	1.3 mW	0.77 mW	0.83 mW
Extended range of environmental conditions				
• Temperatures	0 °C ... 60 °C	0 °C ... 60 °C	-25 °C ... +70 °C	-25 °C ... +70 °C
• Temperatures with reference to ambient temperature, air pressure and altitude	0 °C ... +60 °C at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) 0 °C ... +50 °C at 795 hPa ... 658 hPa (+2000 m ... +3500 m) 0 °C ... +40 °C at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	0 °C ... +60 °C at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) 0 °C ... +50 °C at 795 hPa ... 658 hPa (+2000 m ... +3500 m) 0 °C ... +40 °C at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	-25 °C ... +70 °C at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) -25 °C ... +60 °C at 795 hPa ... 658 hPa (+2000 m ... +3500 m) -25 °C ... +50 °C at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	25 °C ... +70 °C at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) -25 °C ... +60 °C at 795 hPa ... 658 hPa (+2000 m ... +3500 m) -25 °C ... +50 °C at 658 hPa ... 540 hPa (+3500 m ... +5000 m)
Relative humidity (with condensation / maximum)	100 %, incl. condensation/frost (no commissioning in bedewed state)	100 %, incl. condensation/frost (no commissioning in bedewed state)	100 %, incl. condensation/frost (no commissioning in bedewed state)	100 %, incl. condensation/frost (no commissioning in bedewed state)
Resistance ¹⁾				
• to biologically active substances / compliance with EN 60721-3-3	Yes; Class 3B2 mold and fungal spores (excluding fauna).	Yes; Class 3B2 mold and fungal spores (excluding fauna).	Yes; Class 3B2 mold and fungal spores (excluding fauna).	Yes; Class 3B2 mold and fungal spores (excluding fauna).
• to chemically active substances / compliance with EN 60721-3-3	Yes; Class 3C4 (relative humidity < 75 %) incl. salt spray in accordance with EN 60068-2-52 (degree of severity 3).	Yes; Class 3C4 (relative humidity < 75 %) incl. salt spray in accordance with EN 60068-2-52 (degree of severity 3).	Yes; Class 3C4 (relative humidity < 75 %) incl. salt spray in accordance with EN 60068-2-52 (degree of severity 3).	Yes; Class 3C4 (relative humidity < 75 %) incl. salt spray in accordance with EN 60068-2-52 (degree of severity 3).
• to mechanically active substances, compliance with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust.	Yes; Class 3S4 incl. sand, dust.	Yes; Class 3S4 incl. sand, dust.	Yes; Class 3S4 incl. sand, dust.
Dimensions				
• Width	25 mm	25 mm	13 mm	13 mm
• Height	53 mm	53 mm	14 mm	14 mm
• Depth	140 mm	140 mm	58 mm	58 mm
Cable length, max.	10 m	10 km	10 m	10 km
Weight, approx.	65 g	65 g	14 g	14 g

¹⁾ The supplied plug covers must remain in place over the unused interfaces during operation.

Safety integrated automation
CPUs for factory and process automation

SIPLUS sync module
for connecting the CPU 41xH

Selection and ordering data

	Article No.		Article No.
SIPLUS sync module (suitable for exposure) for coupling the CPU 41xH for S7-400H/F/FH; 2 modules required per CPU; • for patch cable, can be used with fiber-optic cables up to 10 m • for patch and installation cables, can be used with fiber-optic cables up to 10 km	6AG1960-1AA04-4XA0 6AG1960-1AB04-4XA0	Accessories SIPLUS S7-400 optical fiber cable 1MHF-S 1 m 2 m 10 m	See SIMATIC Sync module, page 3/65 6AG1960-1AA04-7AA0 6AG1960-1AA04-7BA0 6AG1960-1AA04-7KA0
SIPLUS sync module (extended temperature range -25 °C ... +70 °C and exposure) • for patch cable, can be used with fiber-optic cables up to 10 m • for patch and installation cables, can be used with fiber-optic cables up to 10 km	6AG1960-1AA06-7XA0 6AG1960-1AB06-7XA0		

Safety integrated automation

CPUs for factory and process automation

SIPLUS Y-Link for S7-400H

Overview



- Bus coupler for transition from a redundant PROFIBUS DP master system to a single-channel PROFIBUS DP master system
- For connection of devices with only one PROFIBUS DP interface to the redundant PROFIBUS DP master system of the SIMATIC S7-400H

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

SIPLUS module	SIPLUS Y-Link for S7-400H	SIPLUS S7 bus module BM Y coupler
Article No.	6AG1197-1LA11-4XA0	6AG1654-7HY00-7XA0
Article No. based on	6ES7197-1LA11-0XA0	6ES7654-7HY00-0XA0
Ambient temperature range	0 °C ... +60 °C	-25 °C ... +70 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	
Ambient conditions		
Relative humidity	100%, condensation/frost permissible. No commissioning if condensation present.	
Biologically active substances, compliance with EN 60721-3-3	Class 3B2 mold and fungal spores (excluding fauna). The supplied plug covers must remain in place over the unused interfaces during operation!	
Chemically active substances, compliance with EN 60721-3-3	Class 3C4 incl. salt spray in accordance with EN60068-2-52 (degree of severity 3). The supplied plug covers must remain in place over the unused interfaces during operation!	
Mechanically active substances, compliance with EN 60721-3-3	Class 3S4 incl. sand, dust. The supplied plug covers must remain in place over the unused interfaces during operation!	
Air pressure (depending on the highest positive temperature range specified)	1 080 ... 795 hPa (-1 000 ... +2 000 m) see ambient temperature range 795 ... 658 hPa (+2 000 ... +3 500 m) derating 10 K 658 ... 540 hPa (+3 500 ... +5 000 m) derating 20 K	

For technical documentation on SIPLUS, see:
www.siemens.com/siplus-extreme

Selection and ordering data

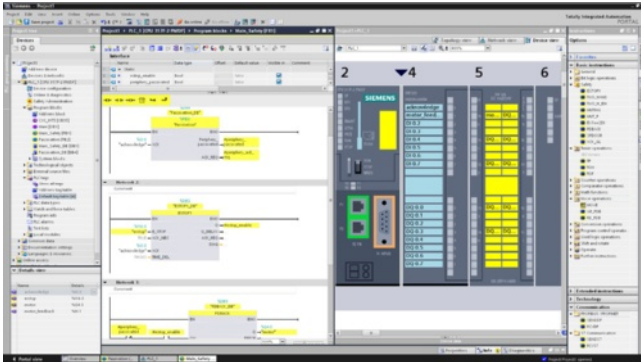
	Article No.		Article No.
For use with STEP 7 from V5.4 or PCS 7 from V7.0:		Accessories	
SIPLUS Y-Link for S7-400H	6AG1197-1LA11-4XA0	SIPLUS S7 bus module BM Y-coupler	6AG1654-7HY00-7XA0
(suitable for exposure)		(suitable for exposure)	
for connecting single-channel DP slaves to SIMATIC S7-400H; consisting of 2 IM 153 interface modules, 1 Y-coupler, 1 BM IM/IM bus module, 1 BM Y-coupler bus module		Additional accessories	See Y-Link, page 3/66

Safety integrated automation

Safety integrated software

STEP 7 Safety Advanced V13

Overview



- For creating safety-related programs in the STEP 7 operator interface
- For seamless and easy to use integration of safety-related functions into the standard automation
- All the required configuration and programming tools are integrated into the STEP7 operator interface and utilize a common project structure

Benefits

STEP 7 Safety Advanced also makes the advantages of the TIA Portal available for fail-safe automation:

- Intuitive operation and the uniform operating concept (as with standard programming) enable a fast introduction to the creation of fail-safe programs.
- The F system is configured in the same way as standard automation.
- Ready-to-start: The F runtime group is set up automatically on insertion of the F-CPU.
- In connection with special signatures for the device parameters, the library concept supports in-house standardization and simplifies the validation of safety-oriented applications.
- The Safety Administrator Editor provides central support for the administration, display and modification of safety-related parameters.
- Uniform and integrated identification of all safety-related objects provides an instant overview.

Applications

The STEP 7 Safety Advanced engineering tool allows the implementation of safety-related automation applications in the TIA Portal.

The languages LAD and FBD, as well as ready-made certified blocks, are used for programming the safety programs..

Function

STEP 7 Safety Advanced provides extensive functions for the generation of safety-related automation applications in the F system SIMATIC Safety.

SIMATIC Safety is certified for use in safety mode up to:

- Safety class SIL3 (Safety Integrity Level) in compliance with IEC 61508: 2010
- Performance Level (PL) e nach ISO 13849-1: 2006 oder nach EN ISO 13849-1: 2008

The documentation of the safety application is part of the acceptance documentation in accordance with the Machinery Directive or IEC 61508 and corresponding applicable standards. STEP 7 Safety Advanced supports validation of the safety program with standard-compliant program documentation that is generated automatically at the press of a button.

Further functions:

- Library with a host of fail-safe logic and application blocks
- Separation of time-critical and non-time-critical tasks by 2 runtime groups
- Interconnection to modules by dragging and dropping from the program editor
- Inheritance of module parameters by reusing via project library
- Unambiguous marking of fail-safe components, parameters, blocks, etc.
- Safety Administration Editor for support in the following tasks:
 - Display of Status and signature of the safety program
 - Display of safety mode status
 - Creation/organization of F runtime groups
 - Display of information about F blocks
 - Definition/modification of access protection
 - Definition/modification of general settings for the safety program

Projects created with Distributed Safety V5.4 SP5 can continue to be used with STEP 7 Safety Advanced V13.

System prerequisites

STEP 7 Safety Advanced V13 can run under STEP 7 Professional V13 SP1.

Safety integrated automation

Safety integrated software

STEP 7 Safety Advanced V13

Overview Software Update Service

- Service for automatic dispatch of all new software versions during contract lifetime
- Reduced logistics effort thanks to automatic contract extension
- Reduced costs as updates are provided free of charge

Ordering

- The Software Update Service is ordered in the same way as any other product. The corresponding Article number is given in the ordering information of the software product in question.
- You must own the current version of the software.
- One Software Update Service is ordered for each software license installed.
- The Software Update Service runs for 1 year from date of order.
- It is extended automatically by a further year in each case, as long as it is not canceled 3 months before it expires.
- An annual lump sum is invoiced per license.

SIMATIC software is continuously enhanced and improved. The **Software Update Service** is the easiest way to regularly take advantage of these improvements. This service automatically sends new software updates when they are released so you always have the latest version.

The Software Update Service

- Saves time and effort:
Once it is ordered, the Software Update Service is automatically renewed every year.
- Lowers costs:
The service pays for itself after the first update as it costs less than an individually ordered update.
- Makes budgeting easier:
Software expenditures can be accounted for early in the budgeting process and they are easier to write off..

Scope of delivery

- All software versions released after ordering the Software Update Service (usually several consignments per year)
- SIMATIC Customer Support Knowledge Base CD-ROM with FAQs, tips & tricks and downloads (several issues per year)

Selection and ordering data

	Article No.
STEP 7 Safety Advanced V13 Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, S7-1500F, WinAC RTX F, ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco Requirement: STEP 7 Professional V13 SP1 <ul style="list-style-type: none"> • Floating license for 1 user • Floating license for 1 user, license key download without software or documentation²⁾; email address required for delivery 	6ES7833-1FA13-0YA5 6ES7833-1FA13-0YH5
Software Update Service (Standard Edition)¹⁾ The delivery is implemented according to the number of ordered SUS products (e.g. 10 upgrade packages with 10 DVDs, 10 USB flash drives, etc.) Requires the current software version.	6ES7833-1FC00-0YX2
Software Update Service (Compact Edition)¹⁾ The delivery items are combined. For several contracts, only 1 package with 1 data medium set, 1 USB flash drive with the corresponding number of licenses and the corresponding number of COLs will be supplied. The deliveries that are to be grouped together must be ordered as one item. Requires the current software version. Minimum order quantity: 5 units	6ES7833-1FC00-0YM2
STEP 7 Safety Advanced Upgrade Upgrade from STEP 7 Safety Advanced V11 to STEP 7 Safety Advanced V13. Floating License for one User, Software and Docu on CD Distributed Safety V5.4 SP5 to Safety Advanced V13 Combo. Combo License for parallel use Distributed Safety V5.4 and STEP 7 Safety Advanced V13. Software and documentation on CD	6ES7833-1FA13-0YE5 6ES7833-1FA13-0YF5

¹⁾ For more information on the software update service, see left column.

²⁾ For up-to-date information and download availability, see: www.siemens.com/tia-online-software-delivery

Safety integrated automation

Safety integrated software

S7 distributed safety

Overview

- For creating safety-oriented automation applications with SIMATIC S7 in LAD or FBD (STEP 7 required)
- Implementation of safety functions by making simple connections between function blocks
- With preconfigured function block library
- User-defined blocks can be created
- Optimum embedding in the automation world due to guaranteed integration with STEP 7 tools
- Scope of supply:
 - Distributed Safety editor
 - Code generator
 - Debugger
 - Libraries of standard blocks

Benefits

Technological requirements can be quickly and easily converted into finished executable process automation programs. The output for creating programs in LAD or FBD only changes slightly:

- The automation problem can already be solved by configuring. Implementation of the configuring data is made automatically.
- Safety functions are programmed by interconnecting function blocks (AND, OR, etc.). Time-consuming programming is no longer necessary. Of course, FBs created with other STEP 7 programming languages can also be integrated.
- Optimal embedding into the world of automation through guaranteed continuity with the STEP 7 tools (also to the HMI tools), automatic expansion of STEP 7 project management, sharing of signal data with STEP 7, and integration with classical programming languages, e.g. through the import of standard function blocks and FCs written in LAD.
- An executable code is generated virtually at the push of a button and transmitted online into the automation system. To generate codes, STEP 7 needs to be installed on the programming device.

Application

The Distributed Safety engineering tool can be used to generate safety-related automation applications with SIMATIC S7 in LAD or FBD. A library of prefabricated blocks is available for this purpose. Users can also program their own blocks and add them to the library.

Design

The scope of supply of Distributed Safety includes:

- Distributed Safety editor
- Code generator
- Debugger
- Standard function block libraries

Function

- catalog containing an extensive set of standard blocks, including:
 - Logic blocks
 - Pulse blocks
 - Counter
 - Timers

- Facilitation of test and startup through integral online monitoring and debugging.
- The CPU status is displayed in test mode. The display encompasses the statements online/offline and RUN and STOP online.
- Added documentation options:
 - Linking to project-wide documentation system DOCPRO.
- Message configuring for WinCC.

Expandable libraries:

The standard libraries can be expanded by means of separate application/technology-oriented blocks in the STL, LAD, FBD, S7-GRAPH and S7-HiGraph programming languages (for SIMATIC S7 in each case). Blocks can have as many as 160 inputs/outputs.

The F standard libraries can be expanded in the F-LAD and F-FBD programming languages by means of separate application-specific or technology-related blocks. The F blocks are called up and processed in a dedicated F runtime group using the F call function. The maximum interval between two calls can be parameterized in this case.

- Syntax check:
 - To detect program errors already when creating blocks.
- Display and operation attributes optimize the handling of the blocks.

Test and debug functions

In test and debug mode, all STEP 7 test functions are available.

Password protection

Distributed Safety V5.1 and higher completely supports password protection of the CPU.

Software requirements

- Distributed Safety V5.2 executes with STEP 7 V5.1 SP6 and higher.
- Distributed Safety V5.4 executes with STEP 7 V5.3 SP3 and higher.

Selection and ordering data

	Article No.
S7 Distributed Safety V5.4 programming tool Task: Configuration software for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco Requirement: STEP 7 V5.3 SP3 and higher Floating license for 1 user Floating License for 1 user, license key download without software or documentation ²⁾ ; email address required for delivery	6ES7833-1FC02-0YA5 6ES7833-1FC02-0YH5
S7 Distributed Safety upgrade From V5.x to V5.4; Floating license for 1 user	6ES7833-1FC02-0YE5

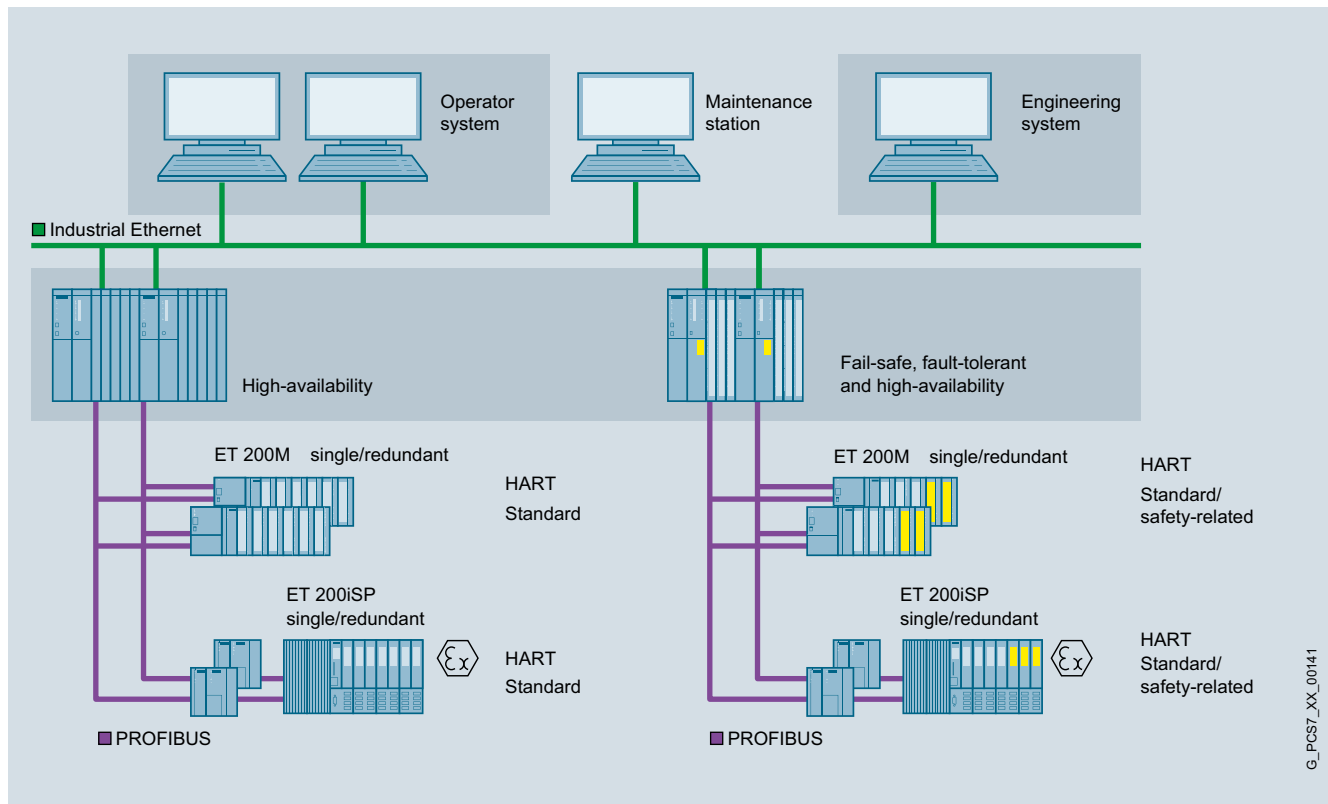
1) For up-to-date information and download availability, see: www.siemens.com/tia-online-software-delivery

Safety integrated automation

Safety integrated software

S7 F/FH systems

Overview



Common engineering system for basic process control system and safety instrumented system

The process industry frequently features complex technological sequences with high safety demands, and faults and failures in the process automation could have fatal consequences for personnel, machines, plants and the environment. Therefore process safety is of particular significance. The safety technology used must reliably detect errors in the process and also its own internal errors, and automatically set the plant/application to a safe state if an error is detected.

S7 F/FH Systems is the comprehensive range of products and services from Siemens for safe, fault-tolerant applications in the process industry. This is characterized by:

- Safe communication via PROFIBUS with PROFIsafe
- Safe communication also via PROFIBUS PA with PROFIsafe
- ET 200 distributed I/O systems with safety-related I/O modules
- User-friendly process visualization, including safety-relevant fault messages, via the optional operator system (see catalog ST PCS 7, chapter "Operator System", section "OS software").
- Engineering system with S7 F Systems software package and SIMATIC Safety Matrix
- AS 412F/FH, AS 414F/FH and AS 417F/FH safety-related automation systems
The safety-related automation systems of the S7 F/FH-System are based on the hardware of the CPU 412H, CPU 414H or CPU 417H automation systems that are extended with the S7 F Systems software package to include safety functions. All F/FH systems listed are TÜV-certified and comply with the safety requirements up to SIL 3 according to IEC 61508. There are two design variants:
 - Single-channel (with one CPU, safety-related)
 - High-availability (with redundant CPUs, safety-related and fault-tolerant)

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Benefits

S7 F/FH Systems permits complete integration of safety engineering into the SIMATIC PCS 7 process control system. The Basic Process Control System (BPCS) and Safety Instrumented System fuse together to form a uniform and innovative complete system. The advantages of this fusion are quite clear:

- One common controller platform
- One common engineering system
- No separate safety bus – standard and safety-related communication take place on the same fieldbus (PROFIBUS with PROFIsafe)
- Mixed operation of standard and safety-related I/O modules in remote I/O stations
- Uniform data management – no complex data exchange between BPCS and safety system
- Integration of safety-related applications into process visualization on the operator station
- Automatic integration of safety-related fault messages with time tagging into the process control system
- Integration of safety-related hardware into the SIMATIC PCS 7 asset management for diagnostics and preventive maintenance

Using the S7 F Systems engineering tool, you can parameterize the AS 412F/FH, AS 414F/FH and AS 417F/FH automation systems as well as the safety-related F-modules of the ET 200 I/O systems.

Alternatively, the S7 F Systems engineering tool can also be used with STEP 7 incl. the CFC option package.

Using Continuous Function Charts (CFC) and predefined function blocks from the F-block library of S7 F Systems, you can configure safety-related applications simply, efficiently and without any time-consuming familiarization.

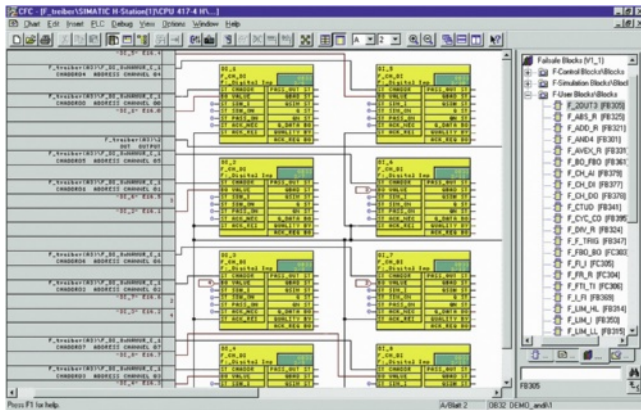
However, this is even simpler, more convenient and faster using the SIMATIC Safety Matrix based on CFC. The configuration tool functioning according to the principle of a Cause&Effect matrix automatically creates complex safety programs once you have assigned the events (causes) occurring during a process to exactly defined reactions (effects).

Safety integrated automation

Safety integrated software

S7 F systems

Overview



The S7 F Systems engineering tool integrated in the SIMATIC Manager can be used to configure an S7 F/FH System. With this tool you can:

- Parameterize CPU and F-signal modules
- Create safety-related applications in the CFC.

Predefined, TÜV-approved blocks are available for this purpose. The safety-related blocks save the user having to perform redundant programming for detecting and reacting to errors.

Configuration

S7 F Systems supports configuration by means of functions for

- Comparison of safety-oriented F programs
- Recognition of changes in the F program using the checksum
- Separation of safety-related and standard functions

Access to the F functions can be password-protected.

The F-block library integrated in S7 F Systems contains predefined function blocks for generation of safety-related applications with the CFC or the SIMATIC Safety Matrix based on it. The certified F blocks are extremely robust and intercept programming errors such as division by zero or out-of-range values. They avoid the need for diverse programming tasks for detecting and reacting to errors.

Selection and ordering data

	Article No.
S7 F Systems RT license For processing safety-related application programs, for one AS 412F/FH, AS 414F/FH or AS 417F/FH	6ES7833-1CC00-6YX0
S7 F Systems V6.1 Programming and configuring environment for creating and operating safety-related STEP 7 programs for an S7 400H-based target system, floating license for 1 user, executable under Windows XP Prof SP2/SP3, Windows Server 2003 SP2 2 languages (German, English) Type of supply: Certificate of license as well as software and electronic documentation on CD	6ES7833-1CC02-0YA5
S7 F systems upgrade from V5.x/V6.0 to V6.1 2 languages (German, English), floating license for 1 user Type of supply: Certificate of license as well as software and electronic documentation on CD	6ES7833-1CC02-0YE5

Note:

In the case of an S7 F Systems Upgrade from V5.x to V6.1, the type of S7 F Systems license changes from single license to floating license.

Options

S7 F ConfigurationPack

When using the safety-related SM 326F/336F I/O modules (AI, DI, DO) as standard I/Os (without F-functionality), an S7 F ConfigurationPack is required for engineering. This is included in S7 F Systems V6.0 and is also available in the Internet for downloading.

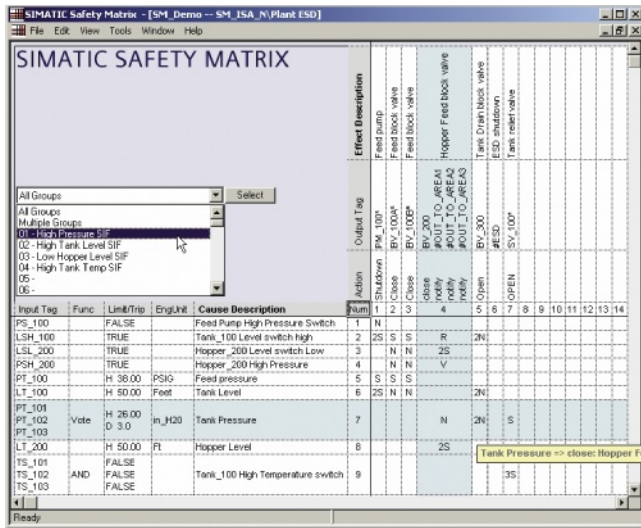
<http://support.automation.siemens.com/WW/view/en/15208817>

Safety integrated automation

Safety integrated software

SIMATIC safety matrix

Overview



The SIMATIC Safety Matrix which can be used in addition to the CFC is an innovative safety lifecycle tool from Siemens that can be used not only for user-friendly configuration of safety applications, but also for their operation and service. The tool, which is based on the proven principle of a cause & effect matrix, is ideally suited to processes where defined statuses require specific safety reactions.

The SIMATIC Safety Matrix not only means that programming of the safety logic is significantly simpler and more convenient, but also much faster than in the conventional manner. During the risk analysis of a plant, the configuration engineer can assign exactly defined reactions (effects) to events (causes) which may occur during a process.

Benefits

The advantages of the SIMATIC Safety Matrix in the implementation phase:

- Simple programming using Cause&Effect method
- No programming knowledge required
- Automatic generation of CFCs including driver blocks
- Automatic version tracking
- Integrated change tracking
- 1-to-1 printout of Cause&Effect matrix

Design

In the context of SIMATIC PCS 7, the following individual products are offered for the SIMATIC Safety Matrix:

- **SIMATIC Safety Matrix Tool** for configuration of safety functions on the SIMATIC PCS 7 engineering system
- **SIMATIC Safety Matrix Editor** for creating and debugging the Safety Matrix logic in an external computer, independent of the engineering system (can be optionally used additive to the SIMATIC Safety Matrix Tool)
- **SIMATIC Safety Matrix Viewer for SIMATIC PCS 7** for operation and monitoring of the SIMATIC Safety Matrix using the SIMATIC PCS 7 operator system ([see catalog ST PCS 7, chapter "Operator System", section "OS software"](#)).

System requirements

	Hardware requirement	Software requirement
SIMATIC Safety Matrix Tool	AS 412F/FH, AS 414F/FH or AS 417F/FH	<ul style="list-style-type: none"> • S7 F Systems V5.2 SP1 or higher • F-library Failsafe Blocks (V1.2) or S7 F Systems Lib V1.3
SIMATIC Safety Matrix Editor		<ul style="list-style-type: none"> • Windows XP SP2 or SP3 • Windows 2003 Server SP1 or SP2
SIMATIC Safety Matrix Viewer	AS 412F/FH, AS 414F/FH or AS 417F/FH	<ul style="list-style-type: none"> • PCS 7 V6.1 SP3, or • PCS 7 V7.0 SP3 or higher or • PCS 7 V7.1 HF1 or higher

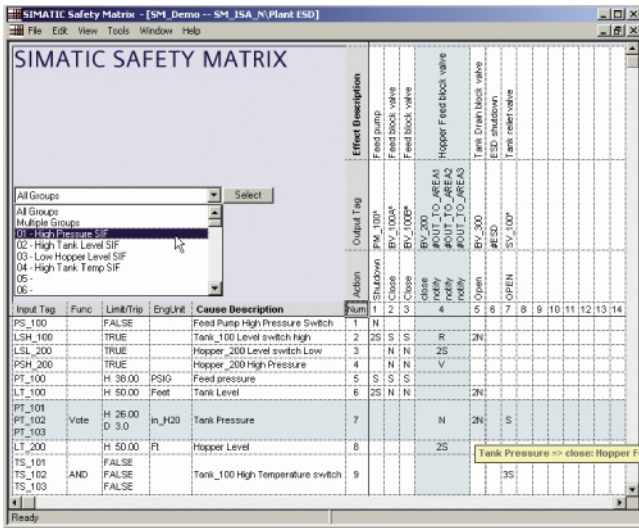
The SIMATIC Safety Matrix Editor offers the advantage that the Safety Matrix can also be created, processed further and debugged outside the SIMATIC PCS 7 engineering system. The SIMATIC Safety Matrix Editor can be used on a computer with Windows 2000 Professional SP2 or higher or Windows XP Professional. However, generation of the safety-related CFC program as well as compilation and downloading to the automation system are only possible by means of the SIMATIC engineering system with the SIMATIC Safety Matrix Tool.

Safety integrated automation

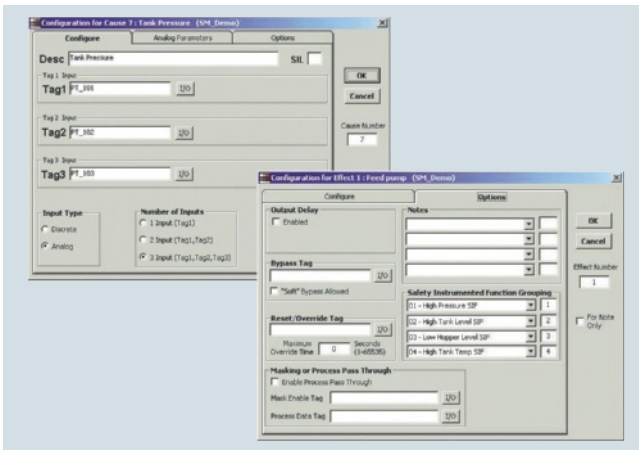
Safety integrated software

SIMATIC safety matrix

Function



Safety Matrix: intersections define the linking of causes and effects



Configuration of analog or digital causes and their digital effects

The matrix table is comparable with a spreadsheet program, and the configuration engineer first enters the possible process events (inputs) in the horizontal lines, and then configures their type and number, logical links, possible delays and interlocks, and any tolerable faults. In the vertical columns, he subsequently defines the reactions (outputs) to a particular event.

Events and reactions are linked simply by clicking the cell at the intersection of the row and column. Using these data, the SIMATIC Safety Matrix automatically generates complex, safety-related CFC programs. No special programming knowledge is required of the configuration engineer, and he can completely concentrate on the safety requirements of the plant.

Selection and ordering data

Article No.

SIMATIC Safety Matrix Tool V6.2

Creation, configuration, compilation, loading and online monitoring of the Safety Matrix in a SIMATIC PCS 7 environment

Including SIMATIC Safety Matrix Viewer for SIMATIC PCS 7, for operation and monitoring of the Safety Matrix in a SIMATIC PCS 7 environment with several operator control levels

1 language (English), executes with Windows XP Professional,

Type of supply: Certificate of License and authorization diskette for Safety Matrix Tool and Safety Matrix Viewer; software and electronic documentation on CD

- Floating License for 1 installation
- Floating License upgrade from V5.x/V6.x to V6.2

6ES7833-1SM02-0YA5

6ES7833-1SM02-0YE5

SIMATIC Safety Matrix Editor V6.2

Creation and checking of the Safety Matrix logic on an external computer without a SIMATIC PCS 7 or STEP 7 environment

1 language (English), executes with Windows 2000 Professional or Windows XP Professional, single license for 1 installation

Type of supply: Certificate of License and authorization diskette; software and electronic documentation on CD

6ES7833-1SM42-0YA5

SIMATIC Safety Matrix Viewer V6.2 for SIMATIC PCS 7

Operation and monitoring of the Safety Matrix in the SIMATIC PCS 7 environment with several operating levels
Bilingual (English/German), runs on Windows 2000 Professional or Windows XP Professional, Windows 2003 Server

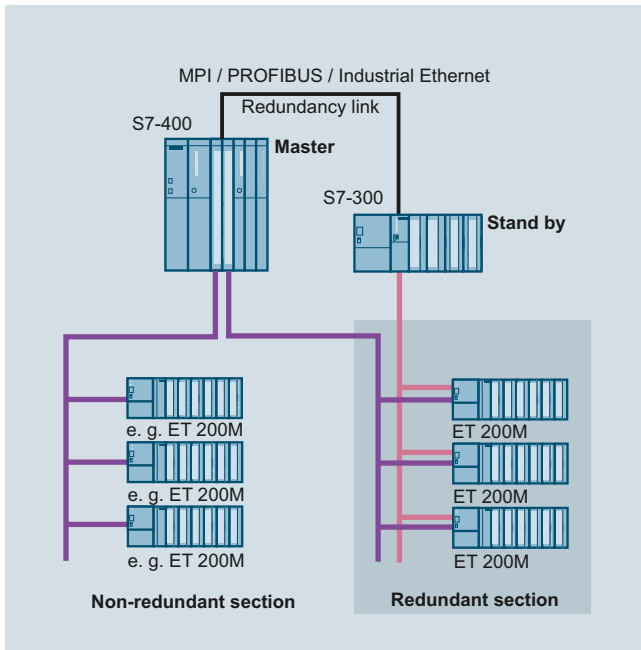
Type of supply: Certificate of License and authorization diskette; software and electronic documentation on CD

- Floating License for 1 installation
- Floating License upgrade from V6.x to V6.2

6ES7833-1SM62-0YA5

6ES7833-1SM62-0YE5

Overview



- Software package for assembling fault-tolerant control systems based on software
- Designed for control systems with single-channel distributed I/O
- For use in applications with low demands on changeover speed, such as the control of hydroelectric power plants, cooling circuits, traffic flows, level control, measured data acquisition
- Inexpensive thanks to the use of standard S7-300 and S7-400 components
- I/O linking with PROFIBUS DP in redundant configuration
- Optional control via WinCC operator station

Application

With the "Software Redundancy" software package, fault-tolerant control systems can be assembled at low cost with standard hardware components of the S7-300 and S7-400.

Software redundancy can be used for applications which do not make high demands for changeover speed, such as:

- Control of waterworks or water treatment plants
- Control of cooling circuits
- Monitoring and control of traffic flows
- Monitoring/control of temperature or levels

Depending on the application, the entire process or only parts of it can be redundantly designed.

The following failures are controlled:

- The failure of redundant components (PROFIBUS DP master interface, power supply) in a central controller
- The failure of a CPU on account of hardware faults or software errors
- Interruption of the redundancy link between both central controllers
- Interruption of one of the redundant PROFIBUS DP links to distributed I/O

Design

A control system with redundancy is assembled as follows using the Software Redundancy package:

- Two S7-300 (CPU 313C-2 DP, CPU 314C-2 DP, CPU 315-2 DP, CPU 316-2 DP, CPU 318-2 DP or higher) or S7-400 (master and reserve, all CPUs) central controllers, can also be used in combination; user program and software redundancy program package on both devices
- Single-channel distributed I/O, switched, comprising ET 200M distributed I/O devices with two IM 153-2
- Redundant linking of the central controllers: Via MPI, PROFIBUS DP or Industrial Ethernet; existing communication links can be used.
- Optional: Non-redundant I/O, central or distributed
- Optional: WinCC operator station for user-friendly operator control and monitoring of the redundancy functions (WinCC picture block included in the supply)

Function

Software redundancy:

- Automatic switchover from failed central controller (master) to standby central controller.

Operation with WinCC operator station:

- Request switchover
- Switch redundancy on/off (activate/disable switchover)
- Display status of redundant coupling
- Display status of ET 200M slaves

Mode of operation

In the event of a fault, the "software redundancy" package initiates a switchover from the master central controller to the standby:

- During switchover: no effect on process since the controller outputs remain frozen
- Following switchover: continuation of process based on last data received. Data may be several cycles old, therefore only useable for slower processes.

The switchover time between failure of the master and continuation of the process on the standby controller depends on several factors:

- Communication performance of the CPUs used
- Communication medium for master/standby coupling, type of connection and transmission rate
- Quantity of data to be transmitted
- Cause of fault
- Transmission rate of redundant PROFIBUS DP
- Number of slaves on the redundant PROFIBUS DP

For example, the following switchover times result for a system comprising two 414-2 DP CPUs and four ET 200 stations with 4 KB data to be transmitted:

- If the CPUs are coupled via PROFIBUS DP: 1.2 s.
- If the CPUs are coupled via MPI: 1.5 s.

Safety integrated automation

Safety integrated software

Software redundancy

Technical specifications

Hardware requirements	
CPU	S7-300: CPU 313C-2 DP, 314C-2 DP, 315-2 DP, 316-2 DP, 318-2 DP S7-400: all CPUs
Redundancy link of the CPUs	MPI, PROFIBUS, Industrial Ethernet; existing connections can also be used.
Suitable modules for ET 200M	IM 153-2; all DI/O, AI/O for ET 200M; FM 350-1 counter module CP 341
Software requirements	
Configuring/programming	STEP 7 V4.0
Communication configuration for redundant PROFIBUS DP	NCM S7 for PROFIBUS

Selection and ordering data

Article No.	
Program package software redundancy V1.2 Task: Configuring a redundant control. Target system: SIMATIC S7-300, S7-400 Requirement: STEP 7 V5.2, NCM S7 for PROFIBUS Delivery package: incl. electronic documentation (English, German, French, Spanish, Italian), 4 application examples and faceplate for WinCC on CD-ROM <ul style="list-style-type: none"> • Single license (for 2 CPUs) • Single license, without software and documentation 	6ES7862-0AC01-0YA0 6ES7862-0AC01-0YA1
SIMATIC Manual Collection Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	6ES7998-8XC01-8YE0
SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	6ES7998-8XC01-8YE2

Safety integrated automation

PC-based Control

SIMATIC WinAC RTX F

Overview



- SIMATIC WinAC RTX F:
Optimized for applications that demand a high degree of flexibility and integration capability and that must also satisfy safety requirements up to SIL 3 (IEC 61508).
- The software solution for tasks that require hard deterministic behavior and high performance.
- With real-time expansion for assuring deterministic behavior for the control section.
- Distributed I/O can be connected over PROFIBUS and/or PROFINET, also safety-related over PROFI-safe.

New features:

- SIMATIC IPC427D and IPC477D are fully supported
 - Communication via onboard CP 5622
 - Retentive memory
 - LED display of the operating status
- Support for the new PROFIBUS CP 5612 (PCI) and CP 5622 (PCIe)

Benefits

- Hard real-time and maximum performance up to SIL 3 according to IEC 61508/62061 or according to EN ISO 13849-1 up to PL e
- Implementation of fast, S7-compatible control solutions with low processor loading.
Alongside the control task, sufficient processor capability is available for processing complex, demanding PC applications in parallel.

Application

WinAC RTX F is a fail-safe software controller approved by the German Technical Inspectorate for standard and safety-related applications. The STEP 7 option package "S7 Distributed Safety" is used for programming the safety-related (F) program part. SIMATIC WinAC RTX F is particularly suited to tasks requiring a high level of flexibility and effective integration in the overall solution. This also includes close interlinking with data processing systems or logistics systems and integration in the safety control.

WinAC RTX F is equally suited to implementation on cost-effective PC platforms with single-core processors and on high-end PCs, e.g. with QuadCore processors. WinAC RTX F is optimized for operation on embedded PC platforms such as the S7-modular Embedded Controller, the SIMATIC IPC427C, or the SIMATIC HMI IPC477C. These platforms offer, with their diskless and fanless design, significantly enhanced ruggedness for an automation task. Non-volatile memory is also available which permits storage of up to 512 KB retentive data (S7-mEX, EC31) on a voltage dip, independently of the file system. The I/O is connected via the leading fieldbus standards of PROFINET or PROFIBUS. With the S7-mEC, EC31, operation is also possible with the cen-

tral signal modules (SM) of S7-300.

The support of the integral PROFINET or PROFIBUS interfaces of the SIMATIC IPCs, as well as the excellent performance result in an excellent price/performance ratio for the PC-based automation.

The WinAC ODK is used for expansion of the PLC functionality with application specific C/C++ applications. In the standard program part, it supports:

- Integration of complex high-level language algorithms in the control program
- Access to the Windows API or Windows system resources
- Access to external HW and software components
- Read-only access is permitted in the safety program part.

Design

SIMATIC WinAC RTX F comprises the following components:

- Windows Failsafe Logic Controller (WinLC RTX F V4.6)
- WinAC TimeSynchronization
- SIMATIC NET SOFTNET-S7 Lean
- Real-time driver for PROFINET and PROFIBUS interfaces
- IntervalZero RTX real-time core for ensuring real-time and a deterministic response

Optional:

- Interfaces for connection to PROFIBUS DP:
 - CP 5612 or the integral PROFIBUS interface of the SIMATIC IPC
 - CP 5622
 - CP 5613 A2
 - CP 5603
 - CP 5623
- Interfaces for connection to PROFINET:
 - CP 1616 (HW version 8 and above) or integral CP 161 onboard interface of the SIMATIC IPC
 - Integral CP 1616 onboard interfaces of the SIMATIC IPC
 - Integrated standard Ethernet interfaces of selected SIMATIC IPCs (e.g. SIMATIC IPC427D and HMI IPC477D)
- WinAC Open Development Kit (ODK):
 - For integrating C/C++ code in WinAC RTX
 - Integration of external software (technology programs) or PC components (e.g. barcode scanner, PC cards for measured value acquisition)

Safety integrated automation

PC-based Control

SIMATIC WinAC RTX F

Function

Windows Failsafe Logic Controller (WinLC RTX F)

The Windows Failsafe Logic Controller is responsible for the actual control job and execution of the control program. It coordinates the associated input and output of process values via the lower-level PROFINET or PROFIBUS fieldbus system and makes the process values available for visualization and data processing tasks.

Fail-safe programs are created with the STEP 7 option package S7 Distributed Safety.

A safety control can be built up using fail-safe signal modules. This opens up

- Classical safety applications in the field of machine safety and press automation as well as
- Applications in process engineering and chemicals.

The I/O can be connected over PROFINET IO or PROFIBUS DP. The PROFIsafe profile supports fail-safe communication over the fieldbuses for this purpose.

The functional safety is implemented by means of targeted safety functions in the software. Safety functions are implemented with S7 Distributed Safety, to place the plant in a safe state or to hold it in a safe state. The safety functions are mainly contained within the following components:

- In the safety-related user program (safety program) in WinLC RTX F
- In the fail-safe inputs and outputs (F I/O).

The F I/O ensures safety-related processing of the field information (emergency stop pushbutton, light barriers, motor pre-control). It features all the hardware and software components required for reliable processing, according to the required safety class.

The user only programs the user safety functions. The safety functions for the process can be implemented with a user safety function or a system-internal fault reaction function. If the F system is unable to execute the actual user safety function, it will execute the fault response function: e.g. deactivation of the associated outputs and, if appropriate, F-CPU in STOP.

Interface to visualization

SIMATIC WinAC RTX F is easy to use with the SIMATIC HMI systems SIMATIC WinCC flexible or SIMATIC WinCC.

Visualization systems from third-party suppliers can be connected via the included SIMATIC NET OPC server.

Communication

The programming of the Windows Logic Controller with STEP 7 and also the visualization with SIMATIC HMI can be implemented both locally in the same PC and remotely using the standard SIMATIC networks Ethernet or PROFIBUS.

WinAC RTX F can exchange data via these networks:

- With additional WinAC stations
- With S7 controllers as well as
- With safety-oriented S7 controllers (safe PLC-to-PLC communication)

A SOFTNET S7 Lean license is included for Industrial Ethernet communication over the integral Ethernet interfaces of the SIMATIC PC.

Technical specifications

6ES7671-1RC08-0YA0 SIMATIC WinAC RTX F 2010	
General information	
Hardware product version	-
Firmware version	V4.6
Engineering with	
• Programming package	STEP 7 V5.5 or higher + hardware update / iMap V3.0 SP1 / option package S7 Distributed Safety V5.4 + SP5 / S7 F Configuration Pack V5.5 + SP6 + HF1
Memory	
Type of memory	RAM
Main memory	
• integrated (for program)	4 Mbyte; Adjustable; depends on Non Paged Memory Pool
• integrated (for data)	4 Mbyte; Adjustable; depends on Non Paged Memory Pool
Load memory	
• integrated RAM, max.	Adjustable; depends on Non Paged Memory Pool
CPU processing times	
for bit operations, typ.	0.004 µs
for fixed point arithmetic, typ.	0.003 µs
for floating point arithmetic, typ.	0.004 µs
Reference platform	Pentium IV, 2.4 GHz
CPU-blocks	
DB	
• Number, max.	65 535; Limited only by RAM set for data
• Size, max.	64 kbyte
FB	
• Number, max.	65 536; Limited only by RAM set for code
• Size, max.	64 kbyte
FC	
• Number, max.	65 536; Limited only by RAM set for code
• Size, max.	64 kbyte
OB	
• Size, max.	64 kbyte
Nesting depth	
• per priority class	24
• additional within an error OB	24
Counters, timers and their retentivity	
S7 counter	
• Number	2 048
• Retentivity	
- adjustable	Yes
- lower limit	0
- upper limit	2 047
- preset	8
• Counting range	
- adjustable	Yes
- lower limit	0
- upper limit	999

Safety integrated automation

PC-based Control

SIMATIC WinAC RTX F

6ES7671-1RC08-0YA0 SIMATIC WinAC RTX F 2010	
IEC counter	
• present	Yes
• Type	SFB
• Number	Unlimited (limited only by RAM capacity)
S7 times	
• Number	2 048
• Retentivity	
- adjustable	Yes
- lower limit	0
- upper limit	2 047
- preset	0
• Time range	
- lower limit	10 ms
- upper limit	9 990 s
IEC timer	
• present	Yes
• Type	SFB
• Number	Unlimited (limited only by RAM capacity)
Data areas and their retentivity	
Retentivity without UPS and PS Extension Board	128 kbyte with SIMATIC IPC427C and HMI IPC477C; further SIMATIC PCs on request
Retentivity with UPS	all data
Flag	
• Number, max.	16 kbyte
• Retentivity preset	MB 0 to MB 15
• Number of clock memories	8
Data blocks	
• Retentivity adjustable	Yes; via non-retain property on DB
• Retentivity preset	Yes
Local data	
• adjustable, max.	64 kbyte
• preset	32 kbyte
• per priority class, max.	61 440 byte
Address area	
I/O address area	
• Inputs	16 kbyte
• Outputs	16 kbyte
• of which, distributed	
- DP interface, inputs	16 kbyte
- DP interface, outputs	16 kbyte
- PN interface, inputs	16 kbyte
- PN interface, outputs	16 kbyte
Process image	
• Inputs, adjustable	8 kbyte
• Outputs, adjustable	8 kbyte
• Inputs, default	512 byte
• Outputs, default	512 byte
Subprocess images	
• Number of subprocess images, max.	15
Digital channels	
• Inputs	128 000
• Outputs	128 000

6ES7671-1RC08-0YA0 SIMATIC WinAC RTX F 2010	
Analog channels	
• Inputs	8 000
• Outputs	8 000
Hardware configuration	
Submodules	
• Number of submodules, max	4
• of which PROFIBUS, max.	4; Supported interfaces: see 1st and 2nd interface
• of which Industrial Ethernet, max.	1; Supported interfaces: see 3rd and 4th interface
Number of operable FMs and CPs (recommended)	
• FM	4; FM distributed: FM 350-1, FM 350-2, FM 351, FM 352 / FM 352-5, FM 353, FM 354, FM 355, FM 355-2
• CP, point-to-point	2; CP 340, CP 341 distributed
• CP, LAN	Over PC CP
Time of day	
Clock	
• Hardware clock (real-time clock)	Yes
• battery-backed and synchronizable	Yes
Operating hours counter	
• Number	8
Clock synchronization	
• supported	Yes
• to PC-CP, slave	Yes
• on Ethernet via NTP	Yes
1st interface	
Type of interface	CP 5611-A2, CP 5621, integrated PB interface of the SIMATIC PC
Max. no. of simultaneously operable CPs	1
Physics	RS 485 / PROFIBUS
Isolated	Yes
Power supply to interface (15 to 30 V DC), max.	does not exist
Number of connection resources	8
Functionality	
• MPI	No
• DP master	Yes
• DP slave	No
DP master	
• Number of connections, max.	8
• Transmission rate, max.	12 Mbit/s
• Number of DP slaves, max.	64
• Services	
- PG/OP communication	Yes
- Global data communication	No
- S7 basic communication	No
- S7 communication	Yes
- S7 communication, as client	Yes
- S7 communication, as server	Yes
- Equidistance mode support	Yes; Only in conjunction with isochronous mode
- Isochronous mode	Yes
- SYNC/FREEZE	Yes

Safety integrated automation

PC-based Control

SIMATIC WinAC RTX F

	6ES7671-1RC08-0YA0 SIMATIC WinAC RTX F 2010
- Activation/deactivation of DP slaves	Yes
- Direct data exchange (slave-to-slave communication)	Yes
- DPV1	Yes
• Address area	
- Inputs, max.	16 kbyte
- Outputs, max.	16 kbyte
• User data per DP slave	
- Inputs, max.	244 byte
- Outputs, max.	244 byte
2nd interface	
Type of interface	CP 5613, CP 5613-A2, CP 5603, CP 5623
Max. no. of simultaneously operable CPs	4
Physics	RS 485 / PROFIBUS
Isolated	Yes
Functionality	
• MPI	No
• DP master	Yes
• DP slave	No
DP master	
• Number of connections, max.	50
• Transmission rate, max.	12 Mbit/s
• Number of DP slaves, max.	125
• Services	
- PG/OP communication	Yes
- Global data communication	No
- S7 basic communication	No
- S7 communication	Yes
- S7 communication, as client	Yes
- S7 communication, as server	Yes
- Equidistance mode support	Yes; Only in conjunction with isochronous mode
- Isochronous mode	Yes
- SYNC/FREEZE	Yes
- Activation/deactivation of DP slaves	Yes
- Direct data exchange (slave-to-slave communication)	Yes
- DPV1	Yes
• Address area	
- Inputs, max.	16 kbyte
- Outputs, max.	16 kbyte
• User data per DP slave	
- Inputs, max.	244 byte
- Outputs, max.	244 byte
3rd interface	
Type of interface	PROFINET
Max. no. of simultaneously operable CPs	1; Intel Pro/1000 (Intel 82571EB, 82573L, 82574L, 82541PI; non-shared IRQ required); integrated IE interface SIMATIC PC 4x7B, 6x7B, 8x7B, IPC4x7C, IPC6x7C, IPC8x7C
Physics	Ethernet
Isolated	Yes

	6ES7671-1RC08-0YA0 SIMATIC WinAC RTX F 2010
Integrated switch	No
Number of ports	1
Automatic detection of transmission speed	Yes; 10/100 Mbit/s
Autonegotiation	Yes
Autocrossing	Yes
Media redundancy	
• supported	No
Functionality	
• PROFINET IO Controller	Yes
• PROFINET IO Device	No
• PROFINET CBA	Yes
PROFINET IO Controller	
• Transmission rate, min.	100 Mbit/s
• Transmission rate, max.	100 Mbit/s
• Number of connectable IO devices, max.	128
• Max. number of connectable IO devices for RT	128
- of which in line, max.	128
• IRT, supported	No
• Prioritized startup supported	Yes
- Number of IO Devices, max.	32
• Activation/deactivation of IO Devices	Yes
- Maximum number of IO devices that can be activated/deactivated at the same time.	8
• IO Devices changing during operation (partner ports), supported	Yes
• Device replacement without swap medium	Yes
• Send cycles	1 ms
• Updating time	1 - 512 ms (minimum value depends on communication share set for PROFINET I/O, on the number of I/O devices, and on the volume of configured user data)
• Services	
- PG/OP communication	Yes
- S7 communication	Yes
- Isochronous mode	No
- Open IE communication	Yes
• Address area	
- Inputs, max.	16 kbyte
- Outputs, max.	16 kbyte
- User data per address area, max.	2 kbyte
- User data consistency, max.	256 byte
Open IE communication	
• Open IE communication, supported	Yes
• Number of connections, max.	32
• Local port numbers used at the system end	0, 20, 21, 23, 25, 80, 102, 135, 161, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535
• Keep-alive function, supported	Yes

Safety integrated automation

PC-based Control

SIMATIC WinAC RTX F

6ES7671-1RC08-0YA0 SIMATIC WinAC RTX F 2010	
4th interface	
Type of interface	PROFINET
Max. no. of simultaneously operable CPs	1; CP 1616 (HW release 8 or above), CP 1604 (HW release 7 or higher), integrated PN interface of SIMATIC PC and S7-mEC
Physics	Ethernet
Isolated	Yes
Integrated switch	Yes
Number of ports	3
Automatic detection of transmission speed	Yes; 10/100 Mbit/s
Autonegotiation	Yes
Autocrossing	Yes
Change of IP address at runtime, supported	Yes
Number of connection resources	32
Media redundancy	
• supported	Yes
• Switchover time on line break, typically	200 ms
• Number of stations in the ring, max.	50
Functionality	
• PROFINET IO Controller	Yes
• PROFINET IO Device	No
• PROFINET CBA	Yes
PROFINET IO Controller	
• Transmission rate, max.	100 Mbit/s
• Max. number of connectable IO Devices for RT	256
- of which in line, max.	256
• Number of IO devices with IRT and the option "high flexibility"	64
- of which in line, max.	32
• Number of IO Devices with IRT and the option "high performance", max.	64
- of which in line, max.	64
• IRT, supported	Yes
• Prioritized startup supported	Yes
- Number of IO Devices, max.	32
• Activation/deactivation of IO Devices	Yes
- Maximum number of IO devices that can be activated/deactivated at the same time.	8
• IO Devices changing during operation (partner ports), supported	Yes
• Device replacement without swap medium	Yes
• Send cycles	250 µs, 500 µs, 1 ms
• Updating time	0.25...512 depending on the send cycle
• Services	
- PG/OP communication	Yes
- S7 communication	Yes
- Isochronous mode	Yes
- Open IE communication	Yes

6ES7671-1RC08-0YA0 SIMATIC WinAC RTX F 2010	
• Address area	
- Inputs, max.	16 kbyte
- Outputs, max.	16 kbyte
- User data per address area, max.	2 kbyte
- User data consistency, max.	256 byte
Open IE communication	
• Open IE communication, supported	Yes
• Number of connections, max.	32
• Local port numbers used at the system end	0, 20, 21, 25, 80, 102, 135, 161, 34962, 34963, 34964, 65532, 65533, 65534, 65535
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	Yes
Number of DP masters with isochronous mode	2
User data per isochronous slave, max.	128 byte
equidistance	Yes
shortest clock pulse	2.2 ms; 2.2 ms without partial process image; 2.2 ms with partial process image
Communication functions	
PG/OP communication	Yes
Data record routing	Yes; Only with CP 5611 or integrated PROFIBUS interface of the SIMATIC PC
Global data communication	
• supported	No
S7 basic communication	
• supported	No
S7 communication	
• supported	Yes
• as server	Yes
• as client	Yes
• User data per job, max.	64 kbyte; Depends on which block is used: BSEND/USEND or PUT/GET
Open IE communication	
• TCP/IP	Yes
- Number of connections, max.	32
- Data length for connection type 01H, max.	Not supported
- Data length for connection type 11H, max.	65 534 byte
- Data length, max.	65 534 byte
• ISO-on-TCP (RFC1006)	Yes
- Number of connections, max.	32
- Data length, max.	65 534 byte
• UDP	Yes
- Number of connections, max.	32
- Data length, max.	1 472 byte
Web server	
• supported	Yes
• Number of HTTP clients	2
• User-defined websites	No

Safety integrated automation

PC-based Control

SIMATIC WinAC RTX F

6ES7671-1RC08-0YA0 SIMATIC WinAC RTX F 2010	
PROFINET CBA (at set setpoint communication load)	
• Setpoint for the CPU communication load	20 %
• Number of remote interconnection partners	64
• Number of functions, master/slave	30
• Total of all Master/Slave connections	1 000
• Data length of all incoming connections master/slave, max.	6 800 byte
• Data length of all outgoing connections master/slave, max.	6 800 byte
• Number of device-internal and PROFIBUS interconnections	500
• Data length of device-internal und PROFIBUS interconnections, max.	4 000 byte
• Data length per connection, max.	1 400 byte
• Remote interconnections with acyclic transmission	
- Sampling frequency: Sampling time, min.	500 ms
- Number of incoming interconnections	100
- Number of outgoing interconnections	100
- Data length of all incoming interconnections, max.	2 000 byte
- Data length of all outgoing interconnections, max.	2 000 byte
- Data length per connection, max.	1 400 byte
• Remote interconnections with cyclic transmission	
- Transmission frequency: Transmission interval, min.	10 ms
- Number of incoming interconnections	200
- Number of outgoing interconnections	200
- Data length of all incoming interconnections, max.	4 800 byte
- Data length of all outgoing interconnections, max.	4 800 byte
- Data length per connection, max.	250 byte
• HMI variables via PROFINET (acyclic)	
- Number of stations that can log on for HMI variables (PN OPC/iMap)	3
- HMI variable updating	500 ms
- Number of HMI variables	200
- Data length of all HMI variables, max.	2 000 byte
• PROFIBUS proxy functionality	
- supported	Yes
- Number of linked PROFIBUS devices	16
- Data length per connection, max.	240 byte; Slave-dependent

6ES7671-1RC08-0YA0 SIMATIC WinAC RTX F 2010	
Number of connections	
• overall	96
S7 message functions	
Number of login stations for message functions, max.	62
SCAN procedure	No
Process diagnostic messages	Yes; ALARM_S, ALARM_SQ, ALARM_D, ALARM_DQ
simultaneously active Alarm-S blocks, max.	20; of a total of 20 for all SFCs
Alarm 8-blocks	Yes
• Number of instances for alarm 8 and S7 communication blocks, max.	4 000
Process control messages	No
Test commissioning functions	
Status block	Yes
Single step	Yes
Number of breakpoints	20
Status/control	
• Status/control variable	Yes
Forcing	
• Forcing	No
Diagnostic buffer	
• present	Yes
• Number of entries, max.	
- adjustable	Yes
- preset	120
Hardware requirements	
Hardware required	PC with color monitor, keyboard, mouse or pointing device for Windows
Main memory, min.	1 Gbyte
Required memory on hard disk, min.	100 Mbyte
Processor	Intel Celeron M 900 MHz or compatible (older PC systems with Programmable Interrupt Controllers (PIC) are not suitable for WinAC RTX F 2010.)
• Multi-processor system	No
• Hyper-threading	Yes
Operating systems	
Windows NT 4.0	No
Windows 2000	No
Windows XP	Yes; Professional, SP2 and SP3
Windows XP embedded	Yes
• Supported HAL types under Windows XP	ACPI uniprocessor PC, ACPI multiprocessor PC, MPS multiprocessor PC
Windows Vista	No
Windows 7	Yes; Professional, Enterprise, Ultimate (only 32 bits)
Windows embedded Standard 7	No

Safety integrated automation

PC-based Control

SIMATIC WinAC RTX F

6ES7671-1RC08-0YA0 SIMATIC WinAC RTX F 2010	
Configuration	
• Nesting levels	8
• Programming language	
- LAD	Yes
- FBD	Yes
- STL	Yes
- SCL	Yes
- CFC	Yes
- GRAPH	Yes
- HiGraph®	Yes
• Software libraries	
- Easy Motion Control	Yes
Know-how protection	
• User program protection/pass-word protection	Yes
• Block encryption	No
Open Development interfaces	
• CCX (Custom Code Extension)	Yes; WinAC ODK V4.2 or higher
• CMI (Controller Management Interface)	Yes; WinAC ODK V4.2 or higher
• SMX (Shared Memory Extension)	Yes; WinAC ODK V4.2 or higher
- Inputs	4 kbyte
- Outputs	4 kbyte
Weight, approx.	100 g; Weight incl. packaging

Selection and ordering data

	Article No.
SIMATIC WinAC RTX F 2010	6ES7671-1RC08-0YA0
SIMATIC WinAC RTX F 2010 upgrade	6ES7671-1RC08-0YE0
CP 5612 A2 communications processor PCI card (32 bit) for connection of a programming device or PC to PROFIBUS	6GK1561-1AA01
CP 5621 communications processor PCI Express x1 card (32 bit) for connection of a programming device or PC to PROFIBUS	6GK1562-1AA00
PCI Express x1 card (32 bit) CP 5621 and MPI cable, 5 m	6GK1562-1AM00
CP 5603 Microbox Package Comprising CP 5603 module and Microbox expansion rack	6GK1560-3AU00
CP 5613 A2 communications processor PCI card (32 bit; 3.3 V/5 V) for connection to PROFIBUS incl. DP-Base software with NCM PC; DP-RAM interface for DP master, incl. PG and FDL protocol; single license for 1 installation, runtime software, software and electronic manual on CD-ROM, Class A, for 32 bit Windows 2000 Professional/Server, Windows XP Professional, German/English	6GK1561-3AA01
CP 5623 communications processor PCI Express x1 card (32 bit) for connection to PROFIBUS incl. DP-Base software with NCM PC; DP-RAM interface for DP master or DP slave, incl. PG and FDL protocols; single license for 1 installation, runtime software, software and electronic manual on CD-ROM, Class A, for operating system support see SIMATIC NET software; German/English	6GK1562-3AA00
CP 1616 communications processor PCI Card (32 bit; 3.3/5 V universal key) with ASIC ERTEC 400 for connecting PCs to PROFINET IO with 4-port real-time switch (RJ45); incl. IO-Base software for PROFINET IO controller (RT operation) and NCM PC; single license for one installation, runtime software, software and electronic manual on CD-ROM, Class A, for 32 bit Windows XP Professional; German/English	6GK1161-6AA02
CP 1604 Microbox Package Package for using the CP 1604 in SIMATIC Microbox PC; consisting of CP 1604, Connection Board, Power Supply and expansion rack for Microbox PC	6GK1160-4AU00

Safety integrated automation

SIMATIC ET 200SP fail-safe distributed IO

SIMATIC IM 155-6 interface module

Overview



SIMATIC ET 200SP interface module without CPU

SIMATIC IM155-6PN Standard with PROFINET interface:

- As package with preassembled BusAdapter BA 2xRJ45, including server module
- As IM155-6PN Standard including server module; the BusAdapter must be ordered separately: BA2xRJ45 or BA2xFC

SIMATIC IM155-6PN High Feature with PROFINET interface:

- As IM155-6PN High Feature including server module; the BusAdapter must be ordered separately: BA2xRJ45 or BA2xFC

SIMATIC IM155-6DP High Feature with PROFIBUS interface:

- As package with enclosed PROFIBUS connector, including server module

Important properties of IM 155-6 PN

- Interface module for linking the ET 200SP to PROFINET or PROFIBUS
- Handles all data exchange with the controller
- BusAdapter (BA) for individual PROFINET connection
- Integrated 2-port switch for line configuration
- Depending on the selected interface module
 - Up to a maximum of 64 I/O modules per station
 - Replacement of I/O modules during operation
- Operation with gaps (non-equipped BaseUnits) possible
- Replacement of an I/O module possible during operation (single hot-swap)
- Load group formation without power module

Application

IM 155-6PN Standard

The interface module enables the connection of the ET 200SP to PROFINET and handles the communication between the modules and the higher-level PROFINET I/O controller autonomously.

The PROFINET interface module IM155-6PN Standard offers a configuration with up to 32 modules with a maximum data volume of 244 bytes.

IM155-6PN High Feature

The PROFINET interface module offers a higher quantity framework, faster response times, and additional functions as compared to the Standard version.

Design

The IM 155-6 interface module is snapped directly onto the standard mounting rail.

The IM 155-6PN Standard features:

- Diagnostics displays for errors (Error), operation (RUN), power supply (PWR) and one link LED per port
- Optional labeling using light gray and yellow labeling strips. There is a choice of 2 materials:
 - Foil and roll with 500 strips, for thermal transfer roll printer
 - Paper (280 g/m²), DIN A4 sheets with 100 strips each, for laser printer
- The interface module can be equipped with a reference ID label
- Different connection types of the PROFINET by means of BusAdapter
 - Under standard ambient conditions, BA 2xRJ45 for connection via RJ45 plug
 - In the case of mechanical loading during operation and/or an increased EMC requirements BA 2xFC for direct connection of the PROFINET cable

Available versions:

- Interface module including server module and installed BusAdapter BA 2xRJ45
- Interface module including server module (BusAdapter must be ordered separately)

Safety integrated automation

SIMATIC ET 200SP fail-safe distributed IO

SIMATIC IM 155-6 interface module

Technical specifications

	6ES7155-6AA00-0BN0	6ES7155-6AU00-0BN0	6ES7155-6AU00-0CN0	6ES7155-6BA00-0CN0
General information				
Product function	SIMATIC IM 155-6PN ST with BA 2xRJ45 and server module	SIMATIC IM 155-6PN ST with server module	SIMATIC IM 155-6PN HF with server module	SIMATIC IM155-6DP HF with PROFIBUS-connector and server module
• I&M data	Yes	Yes	Yes	Yes
Engineering with				
• STEP 7 TIA portal, configurable/integrated from version	V11.0 SP2 with HSP0024 / -	V13.0 / V13.0		V13 with GSD file/ -
• STEP 7 configurable/integrated from version	V5.5 SP2 with GSD file/ -	V5.5 SP3 / -		V5.5 SP3 with GSD file/ -
• PROFIBUS from GSD version/GSD revision				GSD from revision 5
• PROFINET from GSD version/GSD revision		V1.0 / V2.23	V2.3 / -	
Supply voltage				
Rated value (DC)	24 V	24 V	24 V	24 V
Reverse polarity protection	Yes	Yes	Yes	Yes
Mains buffering				
• Mains/voltage failure stored energy time	5 ms	5 ms	5 ms	5 ms
Hardware configuration				
Integrated power supply				
• Modules per rack, max.	32	32	64	
Interfaces				
Number of PROFINET interfaces	1	1	1	
Number of PROFIBUS interfaces				1
1st interface				
• Interface types				
- Number of ports	2	2	2	
- Integrated switch	Yes	Yes	Yes	
- RJ 45 (Ethernet)	Yes			Yes
- RS 485				
- Bus adapter (PROFINET)	Yes	Yes	Yes	
- Output current of the interface, max.				90 mA
• Protocols				
- PROFINET IO Device	Yes	Yes	Yes	
- Open IE communication	Yes	Yes	Yes	
- PROFIBUS DP slave				Yes
- Media redundancy	Yes	Yes	Yes	
Interface types				
RJ 45 (Ethernet)				
• 10 Mbps	Yes; for Ethernet services	Yes; for Ethernet services		
• 100 Mbps	Yes; PROFINET with 100 Mbit/s full duplex (100BASE-TX)	Yes; PROFINET with 100 Mbit/s full duplex (100BASE-TX)	Yes; PROFINET with 100 Mbit/s full duplex (100BASE-TX)	
• Transmission procedure	PROFINET with 100 Mbit/s full duplex (100BASE-TX)	PROFINET with 100 Mbit/s full duplex (100BASE-TX)	PROFINET with 100 Mbit/s full duplex (100BASE-TX)	
• Autonegotiation	Yes	Yes	Yes	
• Autocrossing	Yes	Yes	Yes	
RS 485				
• Transmission rate, max.				12 Mbit/s
Protocols				
Supports protocol for PROFINET IO	Yes	Yes	Yes	
PROFINET IO Device				

Safety integrated automation

SIMATIC ET 200SP fail-safe distributed IO

SIMATIC IM 155-6 interface module

	6ES7155-6AA00-0BN0	6ES7155-6AU00-0BN0	6ES7155-6AU00-0CN0	6ES7155-6BA00-0CN0
<ul style="list-style-type: none"> Services - Open IE communication - IRT, supported - PROFlenergy - Prioritized startup - Shared device - Number of IO controllers with shared device, max. 	Yes Yes; With send clock of 250 µs to 4 ms in steps of 125 µs Yes Yes Yes	Yes Yes; With send clock of 250 µs to 4 ms in steps of 125 µs Yes Yes Yes 2	Yes Yes; 250 µs, 500 µs, 1 ms, 2 ms, 4 ms additionally with IRT with high performance: 250 µs to 4 ms in 125 µs frame Yes Yes Yes 4	
Open IE communication				
<ul style="list-style-type: none"> TCP/IP SNMP LLDP 	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	
PROFIBUS				
<ul style="list-style-type: none"> Services - SYNC capability - FREECE capability - DPV0 - DPV1 				Yes Yes No Yes
Interrupts/diagnostics/status information				
Status indicator	Yes	Yes	Yes	Yes
Alarms				
<ul style="list-style-type: none"> Alarms 	Yes	Yes	Yes	Yes
Diagnostic messages				
<ul style="list-style-type: none"> Diagnostic functions 	Yes	Yes	Yes	Yes
Diagnostics indication LED				
<ul style="list-style-type: none"> RUN LED ERROR LED MAINT LED Monitoring the supply voltage Connection display LINK TX/RX Connection display DP 	Yes; Green LED Yes; Red LED Yes; yellow LED Yes; Green LED Yes Yes	Yes; Green LED Yes; Red LED Yes; yellow LED Yes; Green LED Yes; 2x green LED Yes	Yes; Green LED Yes; Red LED Yes; yellow LED Yes; green PWR LED Yes Yes	Yes; Green LED Yes; Red LED Yes; yellow LED Yes; green PWR LED Yes
Isolation checked with	707 V DC between supply voltage and electronics; 1500 V AC between Ethernet and electronics			707 V DC (type test)
Ambient conditions				
Operating temperature				
<ul style="list-style-type: none"> horizontal installation, min. horizontal installation, max. vertical installation, min. vertical installation, max. 	0 °C 60 °C 0 °C 50 °C	0 °C 60 °C 0 °C 50 °C	0 °C 60 °C 0 °C 50 °C	0 °C 60 °C 0 °C 50 °C
Dimensions				
Width x Height x Depth (mm)	50 x 117 x 74	50 x 117 x 74	50 x 117 x 74	50 x 117 x 74
Weight, approx.	191 g; IM155PN ST with BA 2xRJ45 (mounted)	147 g; without bus adapter	147 g; without bus adapter	150 g

Safety integrated automation

SIMATIC ET 200SP fail-safe distributed IO

SIMATIC IM 155-6 interface module

Selection and ordering data

	Article No.		Article No.
Interface module Standard		Communication modules	
• IM 155-6PN ST, with server module and installed BusAdapter BA 2xRJ45	6ES7155-6AA00-0BN0	Communication module CM 1xPtP Standard, for serial communication connections with RS232 and RS422 interfaces. RS485	6ES7137-6AA00-0BA0
• IM 155-6PN ST, with server module, without BusAdapter	6ES7155-6AU00-0BN0	Communication module CM 4xIO-Link Standard, for connecting up to 4 IO-Link devices	6ES7137-6BD00-0BA0
Interface module High Feature		Communication module CM AS-i Master ST, for plugging onto BaseUnit (also see page 3/211)	3RK7 137-6SA00-0BC1
• IM 155-6DP HF, with server module, with multi-hot-swap, incl. PROFIBUS connector	6ES7155-6BA00-0CN0	BusAdapter BA 2xRJ45	6ES7193-6AR00-0AA0
• IM 155-6PN HF, incl. server module, without BusAdapter	6ES7155-6AU00-0CN0	BusAdapter BA 2xFC	6ES7193-6AF00-0AA0
Accessories		Reference identification label	6ES7193-6LF30-0AW0
Digital input modules		10 sheets of 16 labels	
Digital input module DI 8x24 V DC Standard, BU type A0, color code CC01	6ES7131-6BF00-0BA0	Labeling strips	
Digital input module DI 8x24 V DC High Feature, BU type A0, color code CC01	6ES7131-6BF00-0CA0	• 500 labeling strips on roll, light gray	6ES7193-6LR10-0AA0
Digital input module DI 16x24 V DC Standard, BU type A0, color code CC00	6ES7131-6BH00-0BA0	• 500 labeling strips on roll, yellow	6ES7193-6LR10-0AG0
Digital output modules		• 1000 labeling strips DIN A4, light gray	6ES7193-6LA10-0AA0
Digital output module DQ 4x24 V DC/2 A Standard, BU type A0, color code CC02	6ES7132-6BD20-0BA0	• 1000 labeling strips DIN A4, yellow	6ES7193-6LA10-0AG0
Digital output module DQ 8x24 V DC/0.5 A Standard, BU type A0, color code CC02	6ES7132-6BF00-0BA0	IE FC RJ45 plugs	
Digital output module DQ 8x24 V DC/0.5 A High Feature, BU type A0, color code CC02	6ES7132-6BF00-0CA0	RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables	
Digital output module DQ 16x24 V DC/0.5 A Standard, BU type A0, color code CC00	6ES7132-6BH00-0BA0	IE FC RJ45 Plug 180	
Relay module RQ NO 4x120 V DC - 230 V AC/5 A Standard, normally-open, BU type B0, color code CC00	6ES7132-6HD00-0BB0	180° cable outlet	
Analog input modules		1 unit	6GK1901-1BB10-2AA0
Analog input module AI 4xI 2-/4-wire Standard, BU type A0 or A1, color code CC03, 16 bit, ± 0.3%	6ES7134-6GD00-0BA1	10 units	6GK1901-1BB10-2AB0
Analog input module AI 4xU/I 2-wire Standard, BU type A0 or A1, color code CC03, 16 bit, ± 0.3%	6ES7134-6HD00-0BA1	50 units	6GK1901-1BB10-2AE0
Analog input module AI 4xRTD/TC 2-/3-/4-wire High Feature BU type A0 or A1, color code CC00, 16 bit, ± 0.1%	6ES7134-6JD00-0CA1	DIN rail 35 mm	
Analog input module AI 2xU/I 2-/4-wire High Speed, BU type A0 or A1, color code CC00, 16 bit, ± 0.3%	6ES7134-6HB00-0DA1	• Length: 483 mm for 19" cabinets	6ES5710-8MA11
Analog input module AI Energy Meter Standard, BU type D0, color code CC00	6ES7134-6PA00-0BD0	• Length: 530 mm for 600 mm cabinets	6ES5710-8MA21
Analog output modules		• Length: 830 mm for 900 mm cabinets	6ES5710-8MA31
Analog output module AQ 4xU/I Standard, BU type A0 or A1, color code CC00, 16 bit, ± 0.3%	6ES7135-6HD00-0BA1	• Length: 2 m	6ES5710-8MA41
Analog output module AQ 2xU/I High Speed, BU type A0 or A1, color code CC00, 16 bit, ± 0.3%	6ES7135-6HB00-0DA1	Manuals for ET 200SP distributed I/O system	
		• ET 200SP System Manual	
		• Manuals for interface modules, BaseUnits and I/O modules	
		Manuals can be downloaded from the Internet as PDF files:	
		www.siemens.com/simatic-doku	
		SIMATIC Manual Collection	6ES7998-8XC01-8YE0
		Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	

Safety integrated automation

SIMATIC ET 200SP fail-safe distributed IO

SIMATIC IM 155-6 interface module

	Article No.
SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	6ES7998-8XC01-8YE2
Spare parts Power supply connector for interface module for connecting the 24 V DC supply voltage with push-in terminals (10 units) with screw-type terminals (10 units)	6ES7193-4JB00-0AA0 6ES7193-4JB50-0AA0

More information

Brochures

Information material for downloading can be found on the Internet:

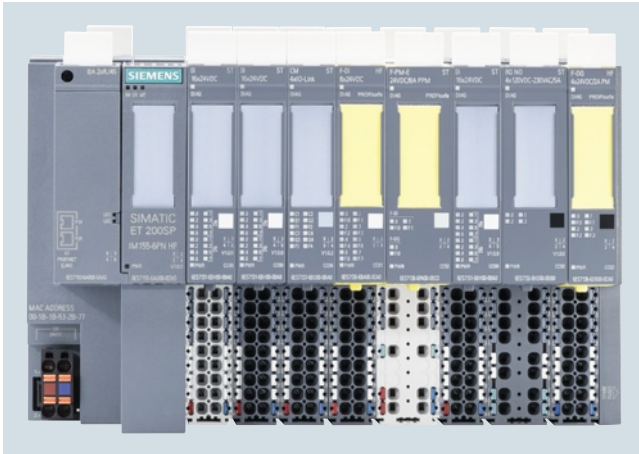
www.siemens.com/simatic/printmaterial

Safety integrated automation

SIMATIC ET 200SP fail-safe distributed IO

Fail-safe modules

Overview



The fail-safe modules of ET 200SP expand the range of the ET 200SP family. They are incorporated seamlessly into the Safety Integrated concept as with ET 200S / ET 200M / ET 200iSP and ET200pro. Safety-related communication via PROFIsafe is also supported. The fail-safe modules for digital inputs and outputs (DI and DQ) are the same size as the standard modules. Their functional safety is certified in accordance with EN 61508. They are designed for safety-related use up to SIL 3 according to EN 62061 and PL e according to ISO 13849.

One special feature of the F modules of SIMATIC ET 200SP is that the F addresses no longer have to be set manually by means of the DIP switches on the module. They are now assigned during commissioning using the engineering function. When replacing a module, the F address modules remain in the coding of the BaseUnit. If a new module is inserted, these F addresses are transferred automatically. New assignment of the F addresses is therefore unnecessary. This new feature simplifies the setting process and saves time.

Safety-related groups of standard or fail-safe DQ modules can be switched off using the SIMATIC ET 200SP fail-safe power module. Evaluation of the safety function is then carried out either in the F-CPU or in the F-PM-E power module. This fast and direct group switch-off can be carried out up to SIL 3 / PL e.

Totally Integrated Automation (TIA)

Safety technology (Safety Integrated) is a component of Totally Integrated Automation, which provides total integration of safety automation and standard automation.

Where standard automation (classical PLCs) and safety automation (electro-mechanics) are still separate today, these two worlds are growing together into a uniform, integrated overall system. Siemens is thus able to present itself as a complete supplier of automation technology, in which safety engineering is part of the standard automation and system-wide integration exists.

Safety Integrated

Information on functional safety, also for ET 200SP:

www.siemens.com/safety-integrated

More information

Brochures

Informative material for downloading can be found on the Internet:

www.siemens.com/simatic/printmaterial

Safety Integrated

Information on functional safety, also for ET 200SP, can be found here:

www.siemens.com/safety-integrated

Safety integrated automation

SIMATIC ET 200SP fail-safe distributed IO

Digital fail-safe input modules

Overview



Digital fail-safe input module
F-DI 8x24 V DC High Feature for BU type A0, color code CC01

Important properties:

- 8-channel digital fail-safe input module for the ET 200SP
- For fail-safe reading of sensor information (1 or 2 channels)
- Provides integral discrepancy evaluation for 2-out-of-2 signals
- 8 internal sensor supplies (incl. test function) onboard
- Certified up to SIL 3 (IEC 61508), PL e (ISO 13849)
- Can be plugged into type A0 BaseUnits (BU) with automatic coding
- LED display for error, operation, supply voltage and status
- Clear labeling on front of module
 - Plain text identification of the module type and function class
 - 2D matrix code (Article and serial number)
 - Connection diagram
 - Color coding of the module type DI: White
 - Hardware and firmware version
 - Color code CC for module-specific color coding of the potentials at the terminals of the BU
 - Complete Article number
- Optional labeling accessories
 - Labeling strips
 - Reference identification label
- Optional module-specific color identification of the terminals according to the color code CC
- The modules support PROFIsafe, both in PROFIBUS, and in PROFINET configurations. They can be used with all fail-safe SIMATIC S7 CPUs.

Application

The fail-safe modules of ET 200SP can be used to implement the safety-related application requirements as an integral part of the overall automation. The safety functions required for fail-safe operation are integrated in the modules. Communication to fail-safe SIMATIC S7 CPUs is performed by means of PROFIsafe.

The modules can be operated both in centralized and distributed configurations.

Design

Usable BaseUnits

For a single- or multi-conductor connection, BaseUnits with an appropriate number of terminals are available.

A light BaseUnit opens a new load group. The power supply to the sensors must be fed via this BU. The first BU next to the interface module must always be a light BU.

A dark BaseUnit forwards the power supply of the adjacent light BaseUnit on the left via self-assembling voltage buses. A new in-feed is therefore only required on the next light BaseUnit to the right.

All variants that correspond to the BU type of the I/O module can be used as BaseUnits.

Color identification of the terminals

The potentials at the terminals of the BaseUnit are defined by the I/O module. Optionally, the potentials of the terminals can be identified by module-specific color-coding labels to prevent wiring errors. The color-coded label that matches the respective I/O module is defined by the color code CCxx of the I/O module. This color code is also printed on the front of the module.

In BaseUnits with the 10 internally jumpered AUX terminals, these can also be identified with color coding labels. For the 10 AUX terminals, color-coding labels are available in red, blue, and yellow/green.

System-integrated shielded connection

For the connection of cable shields that is both space-saving as well as optimized in terms of EMC, a shield connection is available that is quick and easy to mount. This consists of one shield connection element that can be plugged onto the BaseUnit and one shield terminal for each module. The low-impedance connection to the functional ground (DIN rail) is achieved without any additional wiring by the user.

Safety integrated automation

SIMATIC ET 200SP fail-safe distributed IO

Digital fail-safe input modules

Technical specifications

6ES7136-6BA00-0CA0	
Designation	F-DI 8x24VDC HF
General information	
Product function	
• I&M data	Yes
Supply voltage	
Type of supply voltage	24 V DC
Rated value (DC)	24 V
Reverse polarity protection	Yes
Encoder supply	
Number of outputs	8
Output current	
• up to 60 °C, max.	0.3 A
• Short-circuit protection	Yes; Electronic (response threshold 0.7 A to 1.8 A)
24 V encoder supply	
• 24 V	Yes; min. L+ (-1.5 V)
• Short-circuit protection	Yes
• Output current, max.	800 mA
Digital inputs	
Number of digital inputs	8
m/p-reading	Yes; p-reading
Input characteristic curve in accordance with IEC 61131, type 1	Yes
Input voltage	
• Rated value, DC	24 V
• for signal "0"	-30 to +5 V
• for signal "1"	+15 V to +30 V
Input current	
• for signal "1", typ.	3.7 mA
Input delay (for rated value of input voltage)	
• for standard inputs - Parameterizable	Yes
• for counter/technological functions - Parameterizable	No
Cable length	
• Cable length, shielded, max.	1 000 m
• Cable length unshielded, max.	500 m

6ES7136-6BA00-0CA0	
Interrupts/diagnostics/status information	
Alarms	
• Diagnostic alarm	Yes
• Hardware interrupt	No
Diagnostics indication LED	
• RUN LED	Yes; Green LED
• ERROR LED	Yes; Red LED
• Monitoring the supply voltage	Yes; green PWR LED
• Channel status display	Yes; Green LED
• for channel diagnostics	Yes; Red LED
• for module diagnostics	Yes; green/red DIAG LED
Galvanic isolation	
Electrical isolation channels	
• between the channels and the backplane bus	Yes
Isolation	
Isolation checked with	707 V DC (type test)
Standards, approvals, certificates	
Suitable for safety functions	Yes
Highest safety class achievable in safety mode	
• Performance Level in accordance with EN ISO 13849-1:2008	PLe
• SIL according to IEC 61508:2010	SIL 3
Ambient conditions	
Operating temperature	
• min.	0 °C
• max.	60 °C
• horizontal installation, min.	0 °C
• horizontal installation, max.	60 °C
• vertical installation, min.	0 °C
• vertical installation, max.	50 °C
Dimensions	
Width	15 mm
Weights	
Weight, approx.	49 g

Safety integrated automation

SIMATIC ET 200SP fail-safe distributed IO

Digital fail-safe input modules

Selection and ordering data

	Article No.
Digital F input modules	
F-DI 8x24 V DC High Feature, BU type A0, color code CC01	6ES7136-6BA00-0CA0
Usable BaseUnits	
BU15-P16+A0+2D	6ES7193-6BP00-0DA0
BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A)	
BU15-P16+A0+2B	6ES7193-6BP00-0BA0
BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group	
BU15-P16+A10+2D	6ES7193-6BP20-0DA0
BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A)	
BU15-P16+A10+2B	6ES7193-6BP20-0BA0
BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group	

	Article No.
Accessories	
Reference identification label	6ES7193-6LF30-0AW0
10 sheets of 16 labels	
Labeling strips	
• 500 labeling strips on roll, light gray	6ES7193-6LR10-0AA0
• 500 labeling strips on roll, yellow	6ES7193-6LR10-0AG0
• 1000 labeling strips DIN A4, light gray	6ES7193-6LA10-0AA0
• 1000 labeling strips DIN A4, yellow	6ES7193-6LA10-0AG0
BU cover	
for covering empty slots (gaps); 5 units	
• 15 mm wide	6ES7133-6CV15-1AM0
• 20 mm wide	6ES7133-6CV20-1AM0
Shield connection	6ES7193-6SC00-1AM0
5 shield supports and 5 shield terminals	
Color-coding plates	
• Color code CC01, module-specific, for 16 push-in terminals; for BaseUnit type A0, A1; 10 units	6ES7193-6CP01-2MA0
• Color code CC71, for 10 AUX terminals 1 A to 10 A, for BU type A0, yellow/green, with push-in terminals; 10 units	6ES7193-6CP71-2AA0
• Color code CC72, for 10 AUX terminals 1 A to 10 A, for BU type A0, red, with push-in terminals; 10 units	6ES7193-6CP72-2AA0
• Color code CC73, for 10 AUX terminals 1 A to 10 A, for BU type A0, blue, with push-in terminals; 10 units	6ES7193-6CP73-2AA0

Safety integrated automation

SIMATIC ET 200SP fail-safe distributed IO

Digital fail-safe output modules

Overview



Digital fail-safe output module
F-DI 8x24 V DC High Feature, BU type A0, color code CC01

Other properties:

- 4-channel digital fail-safe output module for the ET 200SP
- Fail-safe 2-channel activation (sink/source output) by actuators
- Actuators can be controlled up to 2 A
- Certified up to SIL 3 (IEC 61508), PL e (ISO 13849)
- Can be plugged into type A0 BaseUnits (BU) with automatic coding
- LED display for error, operation, supply voltage and status
- Clear labeling on front of module
 - Plain text identification of the module type and function class
 - 2D matrix code (Article and serial number)
 - Connection diagram
 - Color coding of the module type DI: White
 - Hardware and firmware version
 - Color code CC for module-specific color coding of the potentials at the terminals of the BU
 - Complete Article No
- Optional labeling accessories
 - Labeling strips
 - Reference identification label
- Optional module-specific color identification of the terminals according to the color code CC
- The modules support PROFI-safe, both in PROFIBUS, and in PROFINET configurations.
- They can be used with all fail-safe SIMATIC S7 CPUs.

Application

The fail-safe modules of ET 200SP can be used to implement the safety-related application requirements as an integral part of the overall automation. The safety functions required for fail-safe operation are integrated in the modules. Communication to fail-safe SIMATIC S7 CPUs is performed by means of PROFI-safe.

The modules can be operated both in centralized and distributed configurations.

Design

Usable BaseUnits

For a single- or multi-conductor connection, BaseUnits with an appropriate number of terminals are available.

A light BaseUnit opens a new load group. The power supply to the sensors must be fed via this BU. The first BU next to the interface module must always be a light BU.

A dark BaseUnit forwards the power supply of the adjacent light BaseUnit on the left via self-assembling voltage buses. A new in-feed is therefore only required on the next light BaseUnit to the right.

All variants that correspond to the BU type of the I/O module can be used as BaseUnits.

Color identification of the terminals

The potentials at the terminals of the BaseUnit are defined by the I/O module. Optionally, the potentials of the terminals can be identified by module-specific color-coding labels to prevent wiring errors. The color-coded label that matches the respective I/O module is defined by the color code CCxx of the I/O module. This color code is also printed on the front of the module.

In BaseUnits with the 10 internally jumpered AUX terminals, these can also be identified with color coding labels. For the 10 AUX terminals, color-coding labels are available in red, blue, and yellow/green.

System-integrated shielded connection

For the connection of cable shields that is both space-saving as well as optimized in terms of EMC, a shield connection is available that is quick and easy to mount. This consists of one shield connection element that can be plugged onto the BaseUnit and one shield terminal for each module. The low-impedance connection to the functional ground (DIN rail) is achieved without any additional wiring by the user.

Safety integrated automation

SIMATIC ET 200SP fail-safe distributed IO

Digital fail-safe output modules

Technical specifications

6ES7136-6DB00-0CA0	
Designation	F-DQ 4x24VDC HF
General information	
Product info	
• I&M data	Yes; IM0 to IM3
Engineering mit	<ul style="list-style-type: none"> TIA-Portal STEP 7 Safety Advanced from Version V13.0 Distributed Safety from Version V5.4 SP5 and S7 configuration Pack from Version V5.5 SP11
Supply voltage	24 V DC
Rated value (DC)	24 V
Reverse polarity protection	Yes
Digital outputs	
Number of digital outputs	4
Can parameters be assigned to outputs?	Yes
Short circuit proof	Yes
Broken wire detection	Yes
Overload protection	Yes
Switching capability of outputs	
• with ohm load, max.	2 A
• with lamp load, max.	10 W
Resistance values for load	
• lower limit	12 Ω
• upper limit	2 000 Ω
Output voltage	
• Type of output voltage	DC
• for signal "1", min.	24 V; L+ (-0.5 V)
Output current	
• for Signal "1" rated value	2 A
• for Signal "0" residual current, max.	0.5 mA
Switching frequency	
• with ohm load, max.	30 Hz; symmetrical
• with inductive load, max.	0,1 Hz; in accordance with IEC 947-5-1, DC13, symmetrical
• with lamp load, max.	10 Hz; symmetrical
Sum current of outputs	
• max. current per channel	2 A; (note derating values described in manual)
• max. current per module	6 A; (note derating values described in manual)
Cable length	
• Cable length, shielded, max.	1 000 m
• Cable length, unshielded, max.	500 m

6ES7136-6DB00-0CA0	
Interrupts/diagnostics/status information	
Alarm	
• Diagnostic alarm	Yes
Diagnostic annunciations	
• Diagnostics	Yes, see Manual
Diagnostic LEDs	
• RUN-LED	Yes; green LED
• ERROR-LED	Yes; red LED
• Monitoring of supply voltage	Yes; green PWR-LED
• Channel status monitoring	Yes; green LED
• for channel diagnostics	Yes; red LED
• for module diagnostics	Yes; green / red DIAG-LED
Galvanic Isolation	
• between the channels and the backplane bus	Yes
Isolation	
Isolation tested with	DC 707 V (Type Test)
Standards, approvals, certificates	
SIL according to IEC 61508	SIL 3
Suitable for fail-safe functions	Yes
Highest safety class achievable in safety mode	
• Performance Level according to EN ISO 13849-1	PLe
• Low Demand (PFD) according to SIL3	< 2.00E-05 1/h
• High demand (PFH) according to SIL3	< 1.00E-09 1/h
Permissible ambient conditions	
Operating temperature	
• min.	0 °C
• max.	60 °C
• horizontal installation, min.	0 °C
• horizontal installation, max.	60 °C
• vertical installation, min.	0 °C
• vertical installation, max.	50 °C
Dimensions	
Width	15 mm
Weight	57 g

Safety integrated automation

SIMATIC ET 200SP fail-safe distributed IO

Digital fail-safe output modules

Selection and ordering data

	Article No.
Digital output modules	
F-DQ 4x24 V DC High Feature, BU type A0, color code CC01	6ES7136-6DB00-0CA0
Usable BaseUnits	
BU15-P16+A0+2D	6ES7193-6BP00-0DA0
BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A)	
BU15-P16+A0+2B	6ES7193-6BP00-0BA0
BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group	
BU15-P16+A10+2D	6ES7193-6BP20-0DA0
BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A)	
BU15-P16+A10+2B	6ES7193-6BP20-0BA0
BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group	
BU20-P12+A4+0B	6ES7193-6BP20-0BB0
BU type B0; BaseUnit (dark) with 12 process terminals (1...12) to the module and an additional 4 internally jumpered AUX terminals (1 A to 4 A); for continuing the load group	
Fail-safe relay modules ET 200SP F-RQ	6ES7136-6RA00-0BF0
Usable BaseUnits	
BU type F0	6ES7193-6BP20-0BF0

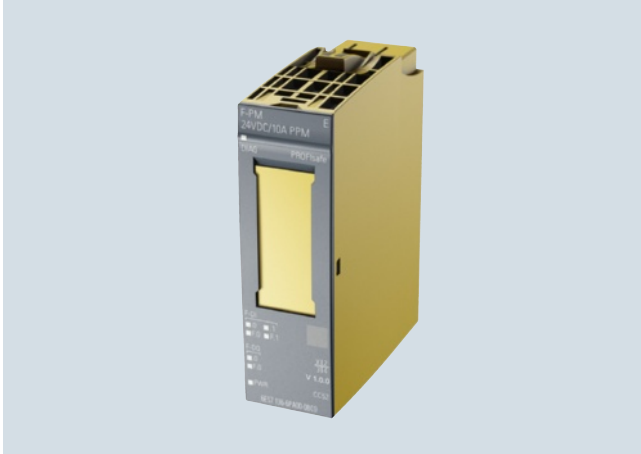
	Article No.
Accessories	
Reference identification label	6ES7193-6LF30-0AW0
10 sheets of 16 labels	
Labeling strips	
• 500 labeling strips on roll, light gray	6ES7193-6LR10-0AA0
• 500 labeling strips on roll, yellow	6ES7193-6LR10-0AG0
• 1000 labeling strips DIN A4, light gray	6ES7193-6LA10-0AA0
• 1000 labeling strips DIN A4, yellow	6ES7193-6LA10-0AG0
BU cover	6ES7133-6CV15-1AM0
for covering empty slots (gaps); 5 units	
• 15 mm wide	6ES7133-6CV15-1AM0
• 20 mm wide	6ES7133-6CV20-1AM0
Shield connection	6ES7193-6SC00-1AM0
5 shield supports and 5 shield terminals	
Color-coding plates	
• Color code CC02, module-specific, for 16 push-in terminals; for BaseUnit type A0, A1; 10 units	6ES7193-6CP02-2MA0
• Color code CC71, for 10 AUX terminals 1 A to 10 A, for BU type A0, yellow/green, with push-in terminals; 10 units	6ES7193-6CP71-2AA0
• Color code CC72, for 10 AUX terminals 1 A to 10 A, for BU type A0, red, with push-in terminals; 10 units	6ES7193-6CP72-2AA0
• Color code CC73, for 10 AUX terminals 1 A to 10 A, for BU type A0, blue, with push-in terminals; 10 units	6ES7193-6CP73-2AA0

Safety integrated automation

SIMATIC ET 200SP fail-safe distributed IO

Digital fail-safe power modules

Overview



Digital fail-safe power module
F-PM-E PPM 24 V DC/8 A for BU type C0, color code CC52

Important properties:

- Certified up to SIL 3 (IEC 61508), PL e (ISO 13849)
- Safety-related shutdown of output modules within the potential group of the F-PM-E
- Two fail-safe digital inputs, for reading of sensor information (1 or 2 channels)
- One fail-safe digital output onboard (ppm switching, up to 2 A, up to SIL 3/PL e)
- Fail-safe digital output and potential supply pp or pm switching can be parameterized
- Parameterizable onboard evaluation of the fail-safe inputs for control of the fail-safe digital outputs and of the potential group
- Digital standard output modules can be shut down up to PL d (ISO 13849) and SIL 2 (IEC61508) (up to 8 A). A list of all deployable modules is available at <http://support.automation.siemens.com/WW/view/en/83203124>
- Can be plugged into type C0 BaseUnits (BU) with automatic coding
- LED display for error, operation, supply voltage and status
- Clear labeling on front of module
 - Plain text identification of the module type and function class
 - 2D matrix code (Article and serial number)
 - Connection diagram
 - Color coding of the module type DI: White
 - Hardware and firmware version
 - Color code CC for module-specific color coding of the potentials at the terminals of the BU
 - Complete Article number
- Optional labeling accessories
 - Labeling strips
 - Reference identification label
- Optional module-specific color identification of the terminals according to the color code CC
- The modules support PROFIsafe in both PROFIBUS and PROFINET configurations. They can be used with all fail-safe SIMATIC S7 CPUs.

Application

The fail-safe modules of ET 200SP can be used to implement the safety-related application requirements as an integral part of the overall automation. The safety functions required for fail-safe operation are integrated in the modules. Communication to fail-safe SIMATIC S7 CPUs is performed by means of PROFIsafe. The modules can be operated both in centralized and distributed configurations.

Design

Usable BaseUnits

For a single- or multi-conductor connection, BaseUnits with an appropriate number of terminals are available.

A light BaseUnit opens a new load group. The power supply to the sensors must be fed via this BU. The first BU next to the interface module must always be a light BU.

A dark BaseUnit forwards the power supply of the adjacent light BaseUnit on the left via self-assembling voltage buses. A new in-feed is therefore only required on the next light BaseUnit to the right.

All variants that correspond to the BU type of the I/O module can be used as BaseUnits.

Color identification of the terminals

The potentials at the terminals of the BaseUnit are defined by the I/O module. Optionally, the potentials of the terminals can be identified by module-specific color-coding labels to prevent wiring errors. The color-coded label that matches the respective I/O module is defined by the color code CCxx of the I/O module. This color code is also printed on the front of the module.

In BaseUnits with the 10 internally jumpered AUX terminals, these can also be identified with color coding labels. For the 10 AUX terminals, color-coding labels are available in red, blue, and yellow/green.

System-integrated shielded connection

For the connection of cable shields that is both space-saving as well as optimized in terms of EMC, a shield connection is available that is quick and easy to mount. This consists of one shield connection element that can be plugged onto the BaseUnit and one shield terminal for each module. The low-impedance connection to the functional ground (DIN rail) is achieved without any additional wiring by the user.

Safety integrated automation

SIMATIC ET 200SP fail-safe distributed IO

Digital fail-safe power modules

Technical Specifications

6ES7136-6PA00-0BC0	
Designation	F-PM-E PPM 24VDC
General information	
• I&M data	Yes; IM0 to IM3
Engineering with	<ul style="list-style-type: none"> TIA-Portal STEP 7 Safety Advanced from version V13.0 Distributed Safety from version V5.4 SP5 and S7 configuration pack from version V5.5 SP11
Supply voltage	
Type of supply voltage	24 V DC
Rated value (DC)	24 V
Reverse polarity protection	Yes
Encoder supply	
Number of outputs	2
Output current	
• up to 60 °C, max.	0.3 A
• Short-circuit protection	Yes; electronic (response threshold 0.7 A to 2.1 A)
24 V encoder supply	
• 24 V	Yes; min. L+ (-1,5 V)
• Short-circuit protection	Yes
• Output current, max.	600 mA; summation current of all encoders
Digital inputs	
Number of inputs	2
m/p reading	Yes, p-reading
Input characteristic curve in accordance with IEC 61131, type 1	Yes
Input voltage	
• Type of input voltage	DC
• Rated value, DC	24 V
• for signal "0"	-30 bis +5 V
• for signal "1"	+15 V to +30 V
Input current	
• for signal "1", typ.	3.7 mA
Input delay (for rated value of input voltage)	
• for standard inputs - configurable	Yes
• for counters/technological functions - configurable	No
Cable length	
• Cable length, shielded, max.	1 000 m
• Cable length, unshielded, max.	500 m
Digital outputs	
Number of outputs	1
Digital outputs, configurable	Yes
Short-circuit protection	Yes
Open-circuit detection	Yes
Overload protection	Yes
Limitation of inductive shutdown voltage to	max 1.5 V
Switching capacity of the outputs	
• with resistive load, max.	8 A
• on lamp load, max.	100 W

6ES7136-6PA00-0BC0	
Load resistance range	
• lower limit	3 Ω
• upper limit	2 000 Ω
Output voltage	DC
• for signal "1", min.	24 V; L+ (-0.5 V)
Output current	
• for signal "1" rated value	8 A
• for signal "0" residual current, max.	1.5 mA; PP-switching: max. 1.5 mA; PM-switching: max. 1 mA
Switching frequency	
• with resistive load, max.	10 Hz; symmetrical
• with inductive load, max.	0,1 Hz; according to IEC 947-5-1, DC13, symmetrical
• on lamp load, max.	4 Hz; symmetrical
Aggregate current of the outputs	
• Max. current per channel	8 A; (note derating values described in manual)
• Max. current per module	8 A; (note derating values described in manual)
Cable length	
• Cable length, shielded, max.	1 000 m
• Cable length, unshielded, max.	500 m
Interrupts/diagnostics/status information	
Substitute values connectable	No
Interrupts	
• Diagnostic alarm	Yes
• Hardware interrupt	No
Diagnostics LED	
• RUN-LED	Yes, green LED
• ERROR-LED	Yes, red LED
• Monitoring the supply voltage	Yes, green PWR-LED
• Channel status display	Yes, green LED
• for channel diagnostics	Yes, red LED
• for module diagnostics	Yes; green / red DIAG-LED
Potenzialtrennung	
Potenzialtrennung Kanäle	
• zwischen den Kanälen und dem Rückwandbus	Ja
Isolation	
Isolation checked with	DC 707 V (Type Test)
Standards, approvals, certificates	
SIL according to IEC 61508	SIL 3
Suitable for safety functions	Yes
Highest safety class achievable in safety mode	
• Performance Level according to EN ISO 13849-1	PLe
• Low Demand (PFD) according to SIL3	< 2.00E-05 1/h
• High demand (PFH) according to SIL3	<1.00E-09 1/h
Dimensions	
Width x Height x Depth, in mm	20 x 72 x 55
Weight, approx.	70 g

Safety integrated automation

SIMATIC ET 200SP fail-safe distributed IO

Digital fail-safe power modules

Selection and ordering data

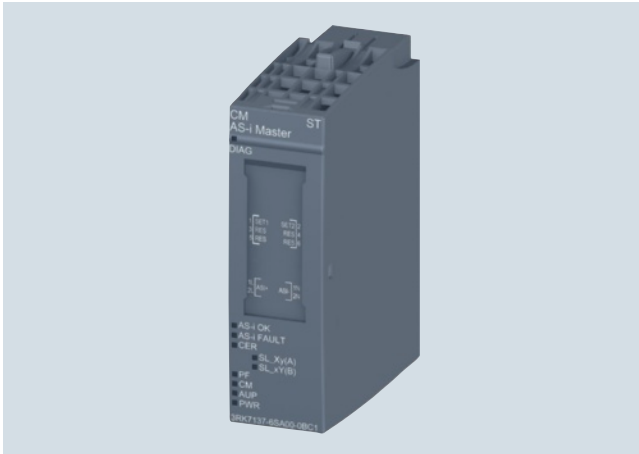
	Article No.
Digital F power module F-DQ 4x24 V DC High Feature, BU type C0, color code CC52	6ES7136-6PA00-0BC0
Type C0 BaseUnits	
BU20-P6+A2+4D BU type C0; BaseUnit (light) with 6 push-in terminals (1...6) to the module and an additional 2 AUX terminals; new load group	6ES7193-6BP20-0DC0
Accessories	
Reference identification label 10 sheets of 16 labels	6ES7193-6LF30-0AW0
Labeling strips 1000 labeling strips, yellow, 10 DIN A4 sheets	6ES7193-6LA10-0AG0
BU cover for covering empty slots (gaps); 5 units • 20 mm wide	6ES7133-6CV20-1AM0
Shield connection 5 shield supports and 5 shield terminals	6ES7193-6SC00-1AM0
Color-coding plates • Color code CC52, module-spe- cific, for 8 push-in terminals; 10 units	6ES7193-6CP52-2MC0

Safety integrated automation

SIMATIC ET 200SP fail-safe distributed IO

CM AS-i Master ST

Overview



CM AS-i Master ST for SIMATIC ET 200SP

The CM AS-i Master ST communication module is designed for use in the SIMATIC ET 200SP distributed I/O system and has the following features:

- Connection of up to 62 AS-Interface slaves
- Support for all AS-Interface master functions according to AS-Interface Specification V3.0
- User-friendly configuration with graphic display of the AS-i line in TIA Portal V13.0 or in other systems by using GSD
- Supply via AS-Interface cable
- Suitable for AS-i Power24V and for AS-Interface with 30 V voltage
- Integrated ground-fault monitoring for the AS-Interface cable
- Through connection to AS-Interface, the number of digital inputs and outputs available for the control system is greatly increased (max. 496 DI/496 DO on the AS-Interface per CM AS-i Master ST).
- Integrated analog value processing (all analog profiles)

Basic unit: ET 200SP distributed I/O system

SIMATIC ET 200SP is a scalable and highly flexible distributed I/O system for connecting the process signals to a central control system via PROFIBUS or PROFINET.

Up to eight CM AS-i Master STs can be plugged into a SIMATIC ET 200SP with the IM 155-6 PN standard interface module.

More information see the system manual "SIMATIC ET 200SP Distributed I/O System ET 200SP", <http://support.automation.siemens.com/WW/view/de/58649293>.

Design

The CM AS-i Master ST module features a 20 mm wide ET 200SP module housing. A C0 type BaseUnit (BU) is required for use in the ET 200SP.

The module has LED indicators for diagnostics, operation, AS-i voltage and AS-i slave status and offers informative front-side module inscription for

- Plain-text marking of the module type and function class
- 2D matrix code (Article No. and serial number)
- Circuit diagram
- Color coding of the CM module type: light gray
- Hardware and firmware version
- Complete Article No.

Function

The CM AS-i Master ST supports all specified functions of the AS-Interface Specification V3.0.

The input/output values of the digital AS-i slaves can be activated via the cyclic process image. The values of the analog AS-i slaves can be reached via data record transfer.

If required, master calls can be performed with the command interface, e.g. read/write parameters, read/write configuration.

Changeover of the operating mode, automatic application of the slave configuration and re-addressing of a connected AS-i slave can be implemented via the control panel of the CM AS-i Master ST in the TIA Portal.

Safety note

The use of this product requires suitable protective measures (e.g. network segmentation for IT security among others) in order to ensure safe plant operation, see www.siemens.com/industrialsecurity.

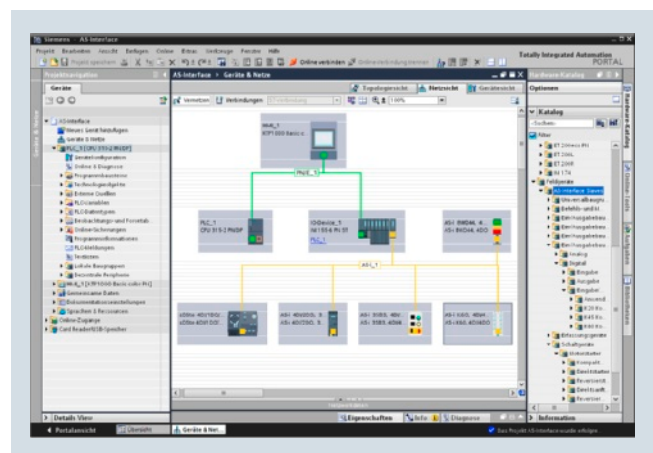
Configuration

The following software is required for configuration of the CM AS-i Master ST module:

- STEP 7 (classic), V5.5 SP3 HF4 or higher with HSP 2092 or
- STEP 7 (TIA Portal), V13 or higher or
- the GSD file of the ET 200SP with STEP 7 or another engineering tool

The TIA Portal enables user-friendly configuration and diagnostics of the AS-i master and, in the event of interfacing to a SIMATIC S7-300/S7-400 station, any connected slaves.

Alternatively, you can also apply the AS-Interface ACTUAL configuration as the DESIRED configuration at the "touch of a button" via the control panel integrated in the TIA Portal or connection of an optional button. Configuration with the GSD file is possible only with the button.



Configuration of an AS-Interface network with CM AS-i Master ST via TIA Portal

The CM AS-i Master ST module occupies 32 input bytes and 32 output bytes in the I/O data of the ET 200SP station.

Safety integrated automation

SIMATIC ET 200SP fail-safe distributed IO

CM AS-i Master ST

Benefits

The CM AS-i Master ST for ET 200SP communication module enables modular, simple and high-performance expansion of AS-Interface networks via engineering in the TIA Portal.

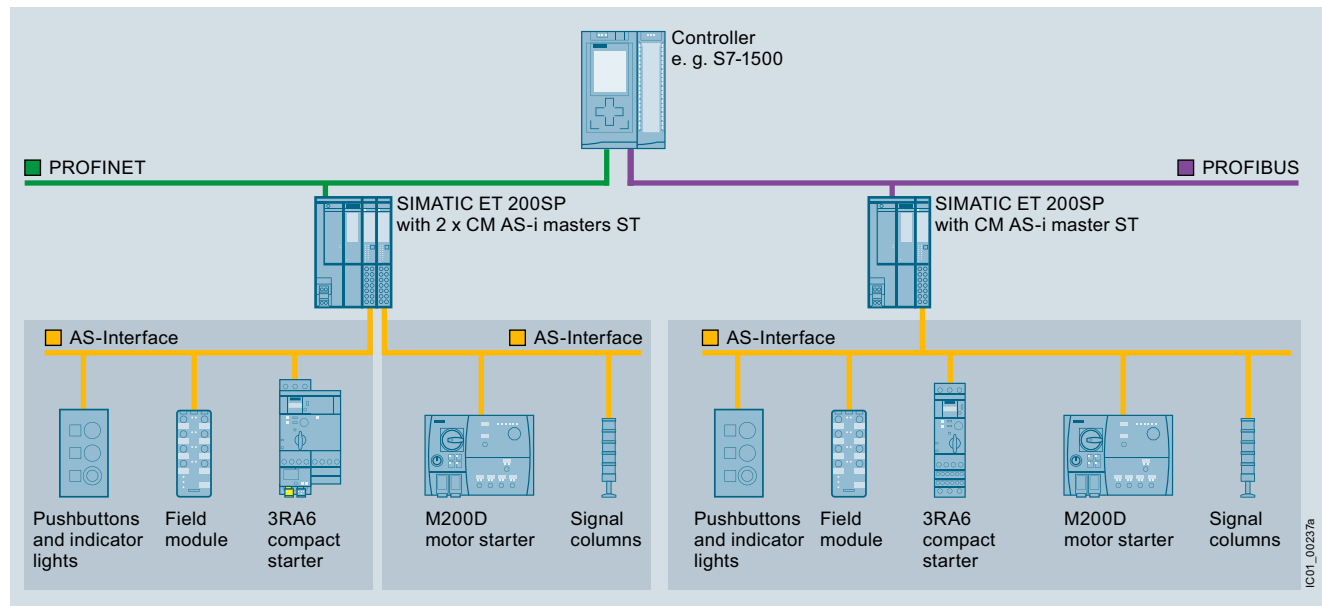
Up to eight CM AS-i Master ST units can be plugged into one ET 200SP station with IM 155-6 PN Standard. The maximum configuration depends on the interface module used.

Multiple masters as well as single masters can thus be implemented in the ET 200SP depending on the number of modules.

Together with the interface module, a scalable PROFINET/AS-i Link or PROFIBUS/AS-i Link can be assembled.


Application

Configuration examples of AS-Interface networks with CM AS-i Master ST for SIMATIC ET 200SP




Configuration of AS-Interface networks under a SIMATIC ET 200SP

Selection and ordering data

Version	DT	Article No.
 <p>CM AS-i Master ST communication module</p> <ul style="list-style-type: none"> AS-Interface master for SIMATIC ET 200SP, can be plugged onto BaseUnit type C0 Corresponds to AS-Interface Specification V3.0 Dimensions (W × H × D / mm): 20 × 73 × 58 	A	3RK7137-6SA00-0BC1

3RK7137-6SA00-0BC1

Accessories





Version	DT	Article No.
 <p>BaseUnit BU20-P6+A2+4D</p> <ul style="list-style-type: none"> BaseUnit (light), BU type C0 Suitable for the CM AS-i Master ST module For connection of AS-Interface cable to CM AS-i Master ST Beginning of an AS-i network, separation of the AS-i voltage to the left module 	A	6ES7193-6BP20-0DC0

6ES7193-6BP20-0DC0

Safety integrated automation

SIMATIC ET 200SP fail-safe distributed IO

CM AS-i Master ST

Version	DT	Article No.
 6ES7155-6AA00-0BN0		PROFINET interface modules IM 155-6 PN Standard Max. 32 I/O modules, max. 256 bytes of I/O data per station
		<ul style="list-style-type: none"> • Including server module and bus adapter 2 x RJ45 (delivered without RJ45 plug)
	A	6ES7155-6AA00-0BN0
	A	6ES7155-6AU00-0BN0
 6ES7155-6AU00-0CN0		PROFINET interface module IM 155-6 PN High Feature Max. 64 I/O modules, max. 1440 bytes of I/O data per station
		<ul style="list-style-type: none"> • Including server module (bus adapter must be ordered separately, see below)
	A	6ES7155-6AU00-0CN0
	A	6ES7155-6BA00-0CN0
 6ES7193-6AR00-0AA0		PROFIBUS interface module IM 155-6 DP High Feature Max. 32 I/O modules, max. 244 bytes of I/O data per station
		<ul style="list-style-type: none"> • Including server module and PROFIBUS connector
	A	6ES7155-6BA00-0CN0
	A	6ES7193-6AR00-0AA0
 6ES7193-6AF00-0AA0		Bus adapter for PROFINET For connection of the Ethernet cable to the PROFINET IM 155-6 PN interface module
	A	6ES7193-6AF00-0AA0

More information

Manuals

Manual "CM AS-i Master ST for SIMATIC ET 200SP" [see](http://support.automation.siemens.com/WW/view/de/71756485)
<http://support.automation.siemens.com/WW/view/de/71756485>.

Manual "SIMATIC ET 200SP BaseUnits" [see](http://support.automation.siemens.com/WW/view/de/59753521)
<http://support.automation.siemens.com/WW/view/de/59753521>.

System manual "SIMATIC ET 200SP Distributed I/O System ET 200SP" [see](http://support.automation.siemens.com/WW/view/de/58649293)
<http://support.automation.siemens.com/WW/view/de/58649293>.

Industry Mall

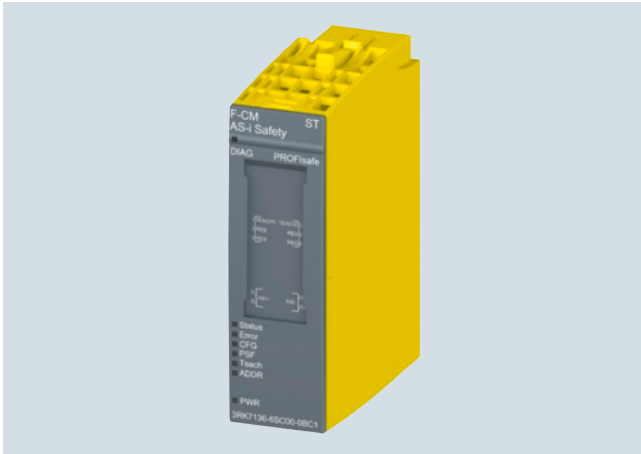
More information
[see Industry Mall at "Automation Technology" → "Industrial Communication" → "AS-Interface" → "Masters" → "Masters for SIMATIC ET 200"](#).

Safety integrated automation

SIMATIC ET 200SP fail-safe distributed IO

F-CM AS-i Safety ST

Overview



F-CM AS-i Safety ST for SIMATIC ET 200SP

The F-CM AS-i Safety ST fail-safe communication module supplements an AS-Interface network without additional wiring to produce a safety-related AS-i network.

Important features:

- Fail-safe communication module for the ET 200SP
 - 31 fail-safe input channels in the process image
 - 16 fail-safe output channels in the process image
 - Certified up to SIL 3 (IEC 62061/IEC 61508), PL e (EN ISO 13849-1)
 - Parameterization conforms with other fail-safe I/O modules of the ET 200SP
- The communication module supports PROFINET in PROFINET configurations. Suitable for use with fail-safe SIMATIC S7-300F/S7-416F CPUs.
- For reading up to 31 fail-safe AS-i input slaves
 - 2 sensor inputs/signals for each fail-safe AS-i input slave
 - Adjustable evaluation of sensor signals: 2-channel or 2 x 1-channel
 - Integrated discrepancy evaluation in the case of 2-channel signals
 - Integrated AND operation in the case of 2 x 1-channel signals
 - Input delay can be parameterized
 - Start-up test can be set
 - Sequence monitoring can be activated
- For control of up to 16 fail-safe AS-i output circuit groups
 - The output circuit groups are controlled independently of one another.
 - One output circuit group can act on one or more actuators (e.g. to switch drives simultaneously).
 - An actuator (e.g. a contactor) is interfaced via a fail-safe AS-i output module (e.g. safe SlimLine module S45F, Article No. 3RK1405-1SE15-0AA2; see [Catalog IC 10, chapter 2 "Industrial communication" → "ASIsafe" → "Fail-safe AS-Interface modules"](#)).
 - Simple fault acknowledgment via the process image
- Simple module replacement thanks to automatic importing of the safety parameters from the coding element
- Comprehensive diagnostic options
- Can be plugged onto type C1 or type C0 BaseUnits (BU)
- Supply via AS-Interface voltage
- 8 LED indicators for diagnostics, operating state, fault indication and supply voltage

- Informative front-side module inscription
 - Plain-text marking of the module type and function class
 - 2D matrix code (Article No. and serial number)
 - Circuit diagram
 - Color coding of the CM module type: light gray
 - Hardware and firmware version
 - Complete Article No.
- Optional labeling accessories
 - Labeling strips
 - Reference identification label

Design

The fail-safe F-CM AS-i Safety ST module has an ET 200SP module enclosure with a width of 20 mm.

One AS-i master according to the AS-i Specification V3.0 and fail-safe AS-i input slaves and/or fail-safe AS-i output modules are needed for operation. The CM AS-i Master ST communication module (Article No. 3RK7137-6SA00-0BC1) is recommended as the AS-i master for the ET 200SP, see [page 3/112](#).

SIMATIC AS-i F-Link

Simple combination of the CM AS-i Master ST and F-CM AS-i Safety ST modules in one ET 200SP station with PROFINET interfacing results in a powerful PN/AS-i F-Link, which can be expanded further in a modular fashion.



SIMATIC AS-i F-Link: Combination of an ET 200SP interface module, CM AS-i Master ST and F-CM AS-i Safety ST

With the digital and analog I/O modules of the ET 200SP, local inputs and outputs can be realized in the SIMATIC AS-i F-Link so as to ensure that the F-Link complies precisely with customer requirements. Expansion variants for almost every application are possible thanks to the selection of standard and fail-safe I/O modules.

Besides the single AS-i master, double, triple or generally multiple masters can be realized with or without fail-safe functionality.

Supported BaseUnits

With the recommended combination of the CM AS-i Master ST and F-CM AS-i Safety ST modules, the CM module is plugged onto a light type C0 BaseUnit and, directly on the right of it, the F-CM module is plugged onto a dark type C1 BaseUnit. The AS-i cable is connected only on the light BaseUnit of the CM module.

If the F-CM AS-i Safety ST module is not combined with the CM AS-i Master ST module, but another AS-i master is used instead, then the F-CM module is plugged onto a light type C0 BaseUnit. In this case, the AS-i cable is connected on the light BaseUnit of the F-CM module.

Safety integrated automation

SIMATIC ET 200SP fail-safe distributed IO

F-CM AS-i Safety ST

Safety note:

The use of this product requires suitable protective measures (e.g. network segmentation for IT security among others) in order to ensure safe plant operation, [see www.siemens.com/industrialsecurity](http://www.siemens.com/industrialsecurity).

Configuration

The following software is required for configuration of the F-CM AS-i Safety ST module:

- STEP 7 (classic), V5.5 SP3 HF4 or higher with HSP 2093 and Distributed Safety V5.4 SP5 or F-Configuration Pack SP11

Configuration and programming are done entirely in the STEP 7 user interface. No additional configuration software is needed for commissioning.

Data management – together with all other configuration data of the SIMATIC – is realized completely in the S7 project.

The input and output channels are assigned to the process image automatically and manual linking via configuration function blocks is not necessary.

If the F-CM AS-i Safety ST module is replaced, all necessary settings are automatically imported into the new module.

The F-CM AS-i Safety ST module occupies 16 input bytes and 8 output bytes in the I/O data of the ET 200SP station.

Application

Thanks to use of the fail-safe module in the ET 200SP, it is possible to fulfill the safety-related application requirements in a manner that is integrated in the overall automation solution.

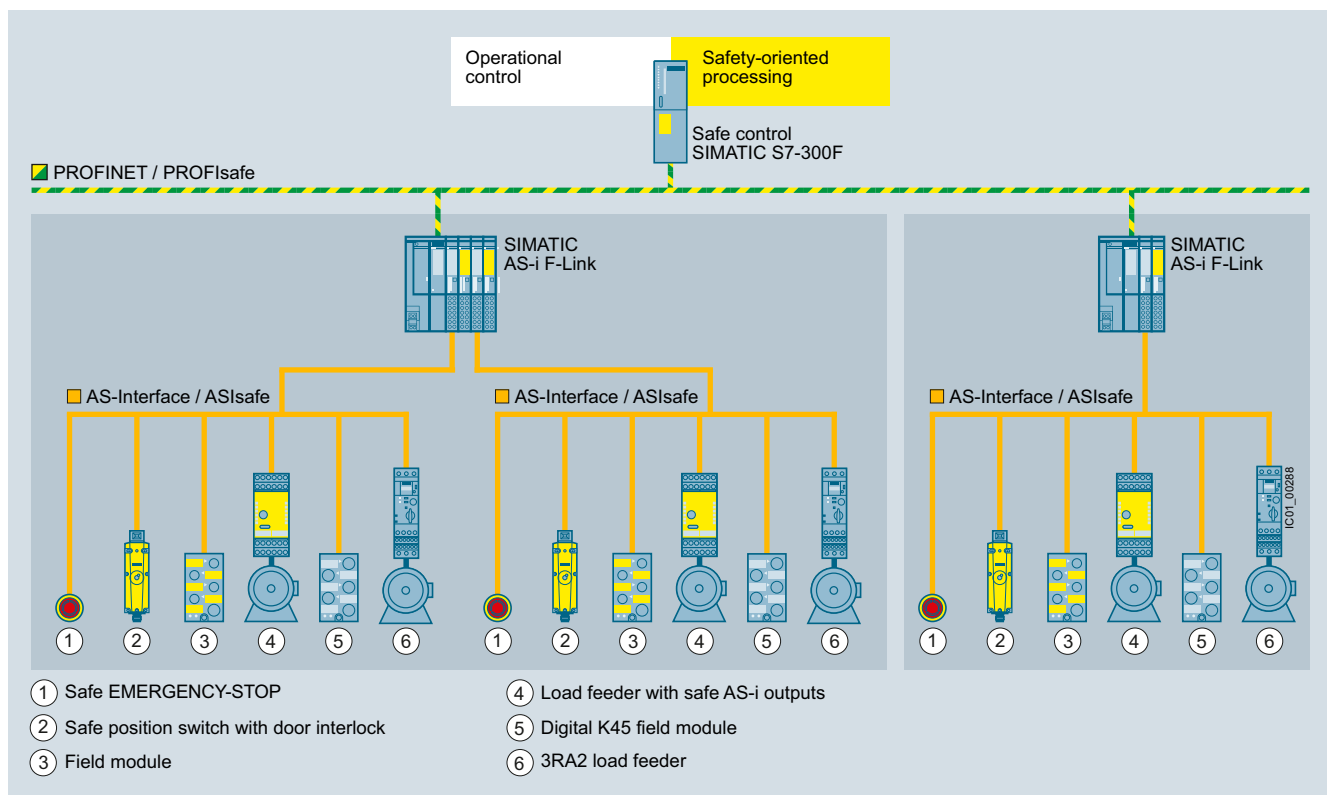
The safety functions required for fail-safe operation are integrated in the modules. Communication with the fail-safe SIMATIC S7 CPUs is realized via PROFIsafe.

The safety application is programmed in the SIMATIC S7 F-CPU with Distributed Safety. The fail-safe input signals of the ASIsafe slave modules are read via the AS-i bus line and are combined with any chosen further signals in the fail-safe program.

The fail-safe output signals can be output through fail-safe SIMATIC output modules or also directly via AS-i – with the aid of fail-safe AS-i output modules, e.g. 3RK1405-1SE15-0AA2 (see [Catalog IC 10, chapter 2 "Industrial Communication" → "ASIsafe" → "Fail-safe AS-Interface modules"](#)). No special functions are required for this in the program.

3

Configuration examples of AS-Interface networks with CM AS-i Master ST and F-CM AS-i Safety ST for SIMATIC ET 200SP




AS-Interface configuration with SIMATIC AS-i F-Link, consisting of an ET 200SP station with CM AS-i Master ST and F-CM AS-i Safety ST modules

Safety integrated automation



SIMATIC ET 200SP fail-safe distributed IO

F-CM AS-i Safety ST

Selection and ordering data

Version	DT	Article No.
 <p>3RK7136-6SC00-0BC1</p> <p>F-CM AS-i Safety ST communication module NEW</p> <ul style="list-style-type: none"> • Fail-safe module for SIMATIC ET 200SP, can be plugged onto BaseUnit type C1 (alternatively type C0) • Operation requires an AS-i master, e.g. CM AS-i Master ST (see page 3/112). • Can be used up to SIL 3 (IEC 62061/IEC 61508), PL e (EN ISO 13849-1) • Approved for use with the PROFINET interface modules IM 155-6 PN Standard and IM 155-6 PN High Feature, under CPU S7-300F or CPU S7-416F. More approvals on request. • Coding element type F (included in scope of supply) • Dimensions (W x H x D / mm): 20 x 73 x 58 	A	3RK7136-6SC00-0BC1

Accessories

Version	DT	Spring-type terminals 
Article No.		
 <p>6ES7193-6BP20-0BC1</p> <p>BaseUnit BU20-P6+A2+4B</p> <ul style="list-style-type: none"> • BaseUnit (dark), BU type C1 • Suitable for the F-CM AS-i Safety ST fail-safe module • Continuation of an AS-i network, connection to the AS-i voltage of the left module 	A	6ES7193-6BP20-0BC1
<p>Coding element type F (spare part)</p> <ul style="list-style-type: none"> • For the ET 200SP modules F-CM AS-i Safety ST, F-DI, F-DQ, F-PM-E • Packaging unit of 5 units 	A	6ES7193-6EF00-1AA0

More accessories [see page 3/113](#).

More information

Manuals

Manual "F-CM AS-i Safety ST Module for SIMATIC ET 200SP" [see http://support.automation.siemens.com/WW/view/de/90265988](http://support.automation.siemens.com/WW/view/de/90265988).

Manual "SIMATIC ET 200SP BaseUnits" [see http://support.automation.siemens.com/WW/view/de/59753521](http://support.automation.siemens.com/WW/view/de/59753521).

System manual "SIMATIC ET 200SP Distributed I/O System ET 200SP" [see http://support.automation.siemens.com/WW/view/de/58649293](http://support.automation.siemens.com/WW/view/de/58649293).

Industry Mall

More information [see Industry Mall at "Automation Technology" → "Industrial Communication" → "AS-Interface" → "Masters" → "Masters for SIMATIC ET 200"](#).

Safety integrated automation

SIMATIC ET 200S fail-safe distributed IO

Interface modules with fail-safe CPU
SIMATIC IM 151-7 F-CPU

Overview



- Interface module with integrated fail-safe CPU for SIMATIC ET 200S
- With DP/MPI interface
- For design of a fail-safe automation system for plants with increased safety requirements
- Complies with safety requirements up to SIL 3 according to IEC 61508, IEC 62061 and Cat. 4 according to EN 954-1
- Fail-safe I/O modules can be connected in a distributed configuration through DP master modules (PROFIsafe)
- The fail-safe I/O modules of ET200S PROFIsafe can be connected in a centralized configuration
- Standard modules can be used for non-safety-relevant applications

Note:

Micro Memory Card required for operation of CPU.

SIPLUS version

A SIPLUS version of this module is also available.

Interface module SIPLUS IM 151-7 F-CPU	
SIPLUS-Modul	6AG1151-7FA21-2AB0
based-on	6ES7151-7FA21-0AB0
Permissible ambient operating temperature	-25 ... +60 °C
Conformal coating	The circuit board and the electronic components are coated
Technical data	The technical data are identical with those of the based-on module, except for the ambient conditions.
Ambient conditions	
Relative humidity	100 %, condensation /frost is allowed. No commissioning in dewed condition

Technical information on SIPLUS is shown here:

www.siemens.com/siplus-extreme

Application

- The IM 151-7 F-CPU supports setting up a fail-safe automation system for plant with stringent safety requirements, particularly in production engineering.
- The intelligent ET 200S station can also be implemented standalone.
- As a PROFIBUS DP slave they can be used for distributed, fail-safe expansion of both the fail-safe and the standard versions of PROFIBUS DP masters.

Design

The CPU IM 151-7 F-CPU is equipped with the following:

- Microprocessor; execution time 100 ns per binary instruction
- 128 KB RAM
- Bit-modular expandability for maximum flexibility; up to 63 I/O modules (power, electronic, technology, and motor starter modules) in any combination
- Integrated multi-port interface PG, OP/DP, in RS 485 (Cu, 9-pin Sub-D socket), configurable as DP slave or MPI
- Password concept protects the user program from unauthorized access
- Diagnostics buffer for the last 100 errors and interrupt events
- SIMATIC MMC
 - For maintenance-free data backup without battery
 - Program backup (load memory)
 - Firmware update using MMC
 - External load memory on MMC
- Update using MMC
- Hardware clock; date and time can be appended to diagnostic messages of the CPU
- Integrated communications functions:
 - PG/OP communication
 - PROFIBUS DP slave/MPI
 - Global data communication
 - S7-Basic communication as server (Access from S7-CPU's via PROFIBUS with I-Put/I-Get to data of IM 151-7 CPU)
 - S7-communication as server
 - Routing (with DP master module)
 - Data routing (with DP master module)
- Alarm reaction time (OB40) of less than 10 ms.

Safety integrated automation

SIMATIC ET 200S fail-safe distributed IO

Interface modules with fail-safe CPU
SIMATIC IM 151-7 F-CPU

Function

Configurable and parameterizable attributes

- I/O configuration: Type and scope
- Startup and scan cycle response: Definition of maximum scan time and loading, in addition to self-test functions
- Definition of the number of retentive bit memories, counters, timers and data blocks
- Clock memory flag: Address settings
- Protective stage: Definition of access authorizations to programs and data
- Definition of the handling and scope of diagnostic messages
- Timed interrupts: Setting of periodic occurrence
- Schedulers: Start date, start time and periodicity settings

Mode of operation

The safety functions of the IM 151-7 F-CPU are present in the F program of the CPU and in the fail-safe signal modules. The signal modules monitor the output and input signals by means of discrepancy analyses and test signal injections.

The CPU checks proper operation of the PLC by performing regular self-tests, instruction tests and logic and sequential program flow control. In addition, the I/O is checked by requesting signs of life.

If an error is diagnosed on the system, the latter is moved to a safe state.

An F runtime license is not required for operation of the IM 151-7 F-CPU.

Display and information functions

- Status and error functions; LEDs indicate, for example, hardware, programming, time or I/O errors and the modes RUN, STOP, restart, etc.
- Test functions; the PG can be used to display signal states in program execution, modify process tags irrespective of the user program, and read out the contents of stack memories
- Information functions; you can use the PG to obtain information about the storage capacity and operating mode of the CPU as well as the current loading of work and load memories, current scan times and diagnostic buffer contents in plaintext

Programming

The IM 151-7 F-CPU is programmed in the same manner as the other SIMATIC S7 systems. The user program for non-fail-safe plant sections is created with the proven programming tools such as STEP 7.

SIMATIC S7 Distributed Safety option package

The STEP 7 option package "SIMATIC S7 Distributed Safety" is required to program the safety-relevant parts of the program. The package contains all the functions and blocks required to create the F program.

The F program with the safety functions is linked in the F-FBD or F-LAD or using special function blocks from the F library. Use of F-FBD or F-LAD simplifies plant planning and programming and, because of the uniform and cross-vendor presentation, the acceptance test. Programmers can concentrate completely on configuration of the safety-relevant application without having to use additional tools.

SIMATIC S7 Distributed Safety (Classic) and SIMATIC Safety Advanced V13 (TIA Portal V13) option packages

The STEP 7 option packages "SIMATIC S7 Distributed Safety" (Classic) or SIMATIC Safety Advanced V13 (TIA Portal V13) are required for programming the safety-related program sections. The packages contains all the functions and blocks required to create the F program.

The F program with the safety functions is created in F-FBD or F-LAD or using special function blocks from the F library. Use of F-FBD or F-LAD simplifies configuration and programming of the plant and, due to the cross-plant, uniform presentation, also acceptance testing. The programmer can therefore concentrate entirely on configuring the safety-related application, without the need to use any additional tools.

Safety integrated automation

SIMATIC ET 200S fail-safe distributed IO

Interface modules with fail-safe CPU
SIMATIC IM 151-7 F-CPU

Technical specifications

6ES7151-7FA21-0AB0	
General information	
Engineering with	
• Programming package	V5.5 + SP1 or higher or V5.2 + SP1 or higher + HSP 219 + Distributed Safety. STEP 7 Professional V13 SP1 or higher: STEP 7 Safety Advanced V13
Supply voltage	
24 V DC	Yes
Power losses	
Power loss, typ.	4.2 W
Memory	
Main memory	
• integrated	192 kbyte
• Size of retentive memory for retentive data blocks	64 kbyte
Load memory	
• pluggable (MMC), max.	8 Mbyte
CPU processing times	
for bit operations, typ.	0.06 µs
for word operations, typ.	0.12 µs
for fixed point arithmetic, typ.	0.16 µs
for floating point arithmetic, typ.	0.59 µs
Counters, timers and their retentivity	
S7 counter	
• Number	256
IEC counter	
• present	Yes
S7 times	
• Number	256
IEC timer	
• present	Yes
Data areas and their retentivity	
Flag	
• Number, max.	256 byte
Address area	
I/O address area	
• Inputs	2 048 byte
• Outputs	2 048 byte
Process image	
• Inputs, adjustable	2 048 byte
• Outputs, adjustable	2 048 byte
Time of day	
Clock	
• Hardware clock (real-time clock)	Yes
Operating hours counter	
• Number	1
1st interface	
Type of interface	Integrated RS 485 interface
Physics	RS 485

6ES7151-7FA21-0AB0	
Functionality	
• MPI	Yes
• DP master	No
• DP slave	Yes; active / passive
• Point-to-point connection	No
2nd interface	
Type of interface	External interface via master module 6ES7138-4HA00-0AB0
Physics	RS 485
Functionality	
• MPI	No
• DP master	Yes
• DP slave	No
DP master	
• Number of DP slaves, max.	32; Per station
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	No
Communication functions	
PG/OP communication	Yes
Data record routing	Yes; With DP master module
Global data communication	
• supported	Yes
S7 basic communication	
• supported	Yes
S7 communication	
• supported	Yes
Number of connections	
• overall	12
Configuration	
Configuration software	
• STEP 7 Lite	No
programming	
• Programming language	
- LAD	Yes
- FBD	Yes
- STL	Yes
- SCL	Yes; optional
- CFC	Yes; optional
- GRAPH	Yes; optional
- HiGraph®	Yes; optional
Know-how protection	
• User program protection/ password protection	Yes
• Block encryption	Yes; With S7 block Privacy
Dimensions	
Width	60 mm; DP master module: 35 mm
Height	119.5 mm
Depth	75 mm
Weight	
Weight, approx.	200 g; DP master module: Approx. 100 g

Safety integrated automation

SIMATIC ET 200S fail-safe distributed IO

Interface modules with fail-safe CPU SIMATIC IM 151-7 F-CPU

Selection and ordering data

	Article No.		Article No.
IM151-7 F-CPU interface module For configuring a fail-safe automation system 192 KB	6ES7151-7FA21-0AB0	STEP 7 Safety Advanced Upgrade Distributed Safety V5.4 SP5 and STEP 7 Safety Advanced V13 for parallel use; incl. software on CD; Combo License for 1 user	6ES7833-1FA13-0YE5
SIPLUS IM 151-7 F-CPU interface module As above, but suitable for extended temperature range and exposure For configuring a fail-safe automation system	6AG1151-7FA21-2AB0	Distributed Safety V5.4 SP5 and STEP 7 Safety Advanced V13 for parallel usage; incl. Software on CD; Combo License for 1 User, License Key download without software and documentation ¹⁾ ; Email address required for delivery.	6ES7833-1FA13-0YK5
Accessories		MMC 64 kByte For program backup	6ES7953-8LF20-0AA0
Distributed Safety V5.4 programming tool Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco Requirement: STEP 7 V5.3 SP3 and higher	6ES7833-1FC02-0YA5 6ES7833-1FC02-0YH5	MMC 128 kByte For program backup	6ES7953-8LG20-0AA0
<ul style="list-style-type: none"> Floating license Floating license for 1 user, license key download without software and documentation¹⁾; email address required for delivery 		MMC 512 kByte For program backup	6ES7953-8LJ30-0AA0
Distributed Safety Upgrade From V5.x to V5.4; Floating license for 1 user	6ES7833-1FC02-0YE5	MMC 2 MByte For program backup and/or firmware update	6ES7953-8LL31-0AA0
STEP 7 Safety Advanced V13 Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, S7-1500F, WinAC RTX F, ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco Requirement: STEP 7 Professional V13 SP1	6ES7833-1FA13-0YA5 6ES7833-1FA13-0YH5	MMC 4 MByte For program backup	6ES7953-8LM20-0AA0
<ul style="list-style-type: none"> Floating license for 1 user Floating License für 1 User, License Key Download without software and documentation¹⁾; Email address required. 		External prommer For MMC with USB interface	6ES7792-0AA00-0XA0
		Termination module Spare part for ET 200S	6ES7193-4JA00-0AA0
		SIMATIC S5, 35 mm DIN rail <ul style="list-style-type: none"> Length: 483 mm for 19" cabinets Length: 530 mm for 600 mm cabinets Length: 830 mm for 900 mm cabinets Length: 2 m 	6ES5710-8MA11 6ES5710-8MA21 6ES5710-8MA31 6ES5710-8MA41

¹⁾ For up-to-date information and download availability, see:
www.siemens.com/tia-online-software-delivery

More information

Brochures

Information material for downloading can be found in the Internet:

www.siemens.com/simatic/printmaterial

Safety integrated automation

SIMATIC ET 200S fail-safe distributed IO

Interface modules with fail-safe CPU
SIMATIC IM 151-8 F PN/DP CPU

Overview



- Interface module for SIMATIC ET 200S with integrated fail-safe CPU
- For constructing a fail-safe automation system for plants with increased safety requirements
- Complies with safety requirements up to SIL 3 according to IEC 61508, IEC 62061, up to PLe according to ISO 13849-1:2006 and Cat. 4 according to EN 954-1
- For high-performance control solutions in ET 200S
- Increase of the availability of systems and machines
- PROFINET IO-Controller for up to 128 IO-Devices
- PROFINET interface with integrated 3-port switch
- With many communication options:
PG/OP communication, PROFINET IO, PROFINET CBA, open IE communication (TCP, ISO-on-TCP and UDP), web server and S7-communication (with loadable FBs)
- Fast, simple and end-to-end programming of a system with modular programs via STEP 7
- Compact SIMATIC Micro Memory Card (MMC)
- Optional PROFIBUS master for 32 PROFIBUS DP slaves (with master interface 6ES7138-4HA00-0AB0)

Note:

SIMATIC Micro Memory Card required for operation of CPU.

SIPLUS version

A SIPLUS version of this module is also available.

Interface module SIPLUS IM 151-8 F-CPU	
SIPLUS module	6AG1151-8FB01-2AB0
based-on	6ES7151-8FB01-0AB0
Permissible ambient operating temperature	-25 ... +60 °C
Conformal coating	The circuit board and the electronic components are coated
Technical data	The technical data are identical with those of the based-on module, except for the ambient conditions.

Ambiebt conditions

Relative humidity	100 %, condensation /frost is allowed. No commissioning in dewed condition.
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Technical information on SIPLUS is shown here:

www.siemens.com/siplus-extreme

Application

The IM 151-8F PN/DP CPU can be used for remote, distributed automation solutions with average programming complexity. It enables remote preprocessing of the process data on site and only transmits required data to the higher-level control unit. This results in the following advantages:

- Relieves the central control unit
- Short response times to critical signals on site
- Low data volume relieves bus system
- Pretested units and parallel commissioning enable faster set-up
- Autonomous machine units increase availability and flexibility
- Clear configuration processes

The IM 151-8F PN/DP CPU operates completely independent of the central control unit. If it fails, the IM 151-8F PN/DP CPU simply continues to run.

The bit-modular design of the ET 200S I/O system together with the IM 151-8F PN/DP CPU enable functionally oriented station design.

Design

The IM 151-8F PN/DP CPU features the following:

- Microprocessor;
execution time 100 ns per binary instruction
- 256 KB main memory
- Bit-modular expandability for maximum flexibility;
up to 63 I/O modules (power, electronic, technology and motor starter modules) in any combination
- PROFINET interface with 3 integrated switch ports (RJ45)
- A password concept protects the user program from unauthorized access
- Diagnostics buffer for the last 500 errors and interrupt events (the last 100 entries are retentive)
- SIMATIC MMC;
for maintenance-free data backup without battery
 - Program backup (load memory)
 - Firmware update using MMC
 - External load memory on MMC
- Update via MMC or online update via networks
- Hardware clock;
date and time can be appended to diagnostic messages of the CPU
- Integrated communication functions:
 - PG/OP communication
 - PROFINET IO
 - Open IE communication (TCP, ISO-on-TCP and UDP)
 - Web server
 - PROFINET CBA
 - S7 communication (with loadable FBs)
- Alarm response time (OB40) less than 10 ms

Safety integrated automation

SIMATIC ET 200S fail-safe distributed IO

Interface modules with fail-safe CPU SIMATIC IM 151-8 F PN/DP CPU

Function

Configurable and programmable properties

- I/O setup:
Type and scope
- Startup and cycle behavior:
Stipulation of maximum cycle time and loading as well as self-test functions
- Definition of the number of retentive bit memories, counters, timers and data blocks
- Clock memory:
Address setting
- Protection level:
Specifying the access rights to programs and data
- Definition of the handling and scope of diagnostic messages
- Watchdog interrupts:
Setting of periodicity
- Time-of-day interrupts:
Setting of date and time of start and periodicity

Information and display functions

- Status and error functions;
LEDs indicate, for example, hardware, programming, time or I/O errors, as well as operating states such as RUN, STOP, re-start, etc.
- Test functions;
the PG is used to indicate signal status during program execution, to modify process variables independently of the user program and to output the contents of stack memories
- Information functions;
you can use the programming device to obtain information about the storage capacity and operating mode of the CPU as well as the current utilization of the main and load memories, current cycle times and diagnostic buffer contents in plain text

Programming, parameterization

The ET 200S with IM 151-8 PN/DP CPU can be universally programmed, configured and diagnosed from any point in the network. STEP 7, V5.4 SP4 or higher, is used for this.

SIMATIC S7 Distributed Safety option package

The STEP 7 option package "SIMATIC S7 Distributed Safety" is required to program the safety-related program components. The package includes all required functions and modules to create the F program.

The F program with safety functions is connected in F-FBD or F-LAD or with special function blocks from the F library. Using F-FBD or F-LAD simplifies system configuration and programming and, due to the universal and uniform display, also the acceptance. The programmer can concentrate completely on configuring the safety-related application without the need to use additional tools.

SIMATIC S7 Distributed Safety (Classic) and SIMATIC Safety Advanced V13 (TIA Portal V13) option packages

The STEP 7 option packages "SIMATIC S7 Distributed Safety" (Classic) or SIMATIC Safety Advanced V13 (TIA Portal V13) are required for programming the safety-related program sections. The packages contains all the functions and blocks required to create the F program.

The F program with the safety functions is created in F-FBD or F-LAD or using special function blocks from the F library. Use of F-FBD or F-LAD simplifies configuration and programming of the plant and, due to the cross-plant, uniform presentation, also acceptance testing. The programmer can therefore concentrate entirely on configuring the safety-related application, without the need to use any additional tools.

Technical specifications

6ES7151-8FB01-0AB0	
General information	
Engineering with	
• Programming package	STEP 7 V 5.5 or higher, Distributed Safety V 5.4 SP4 STEP 7 Professional V13 SP1 or higher: STEP 7 Safety Advanced V13
Supply voltage	
24 V DC	Yes
Power losses	
Power loss, typ.	5.5 W
Memory	
Main memory	
• integrated	256 kbyte; For program and data
• size of retentive memory for retentive data blocks	64 kbyte
Load memory	
• pluggable (MMC), max.	8 Mbyte
CPU processing times	
for bit operations, typ.	0.06 µs
for word operations, typ.	0.12 µs
for fixed point arithmetic, typ.	0.16 µs
for floating point arithmetic, typ.	0.59 µs

6ES7151-8FB01-0AB0	
Counters, timers and their retentivity	
S7 counters	256
IEC counters	Yes
S7 times	256
IEC timer	Yes
Data areas and their retentivity	
Flag	
• Number, max.	256 byte
Address area	
I/O address area	
• Inputs	2 048 byte
• Outputs	2 048 byte
Process image	
• Inputs, adjustable	2 048 byte
• Outputs, adjustable	2 048 byte

Safety integrated automation

SIMATIC ET 200S fail-safe distributed IO

Interface modules with fail-safe CPU
SIMATIC IM 151-8 F PN/DP CPU

6ES7151-8FB01-0AB0	
Time of day	
Clock	
• Hardware clock (real-time clock)	Yes
Operating hours counter	
• Number	1
1st interface	
Type of interface	PROFINET
Physics	Ethernet
Number of ports	3; RJ45
Functionality	
• MPI	No
• DP master	No
• DP slave	No
• PROFINET IO Device	Yes; Also simultaneously with IO Controller functionality
• PROFINET IO Controller	Yes; Also simultaneously with IO-Device functionality
• PROFINET CBA	Yes
• Point-to-point connection	No
PROFINET IO Controller	
• Max. number of connectable IO devices for RT	128
• Number of IO devices with IRT and the option "high flexibility"	128
• Number of IO Devices with IRT and the option "high performance", max.	64
2nd interface	
Type of interface	External interface via master module 6ES7138-4HA00-0AB0
Physics	RS 485
Functionality	
• MPI	No
• DP master	Yes
• DP slave	No
• PROFINET IO Controller	No
• PROFINET IO Device	No
• PROFINET CBA	No
DP master	
• Number of DP slaves, max.	32; Per station
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	No

6ES7151-8FB01-0AB0	
Communication functions	
PG/OP communication	Yes
Data record routing	Yes; With DP master module
Global data communication	
• supported	No
S7 basic communication	
• supported	Yes; I blocks
S7 communication	
• supported	Yes
Open IE communication	
• TCP/IP	Yes; via integrated PROFINET interface and loadable FBs 8
- Number of connections, max.	
• ISO-on-TCP (RFC1006)	Yes; via integrated PROFINET interface and loadable FBs 8
- Number of connections, max.	
• UDP	Yes; via integrated PROFINET interface and loadable FBs 8
- Number of connections, max.	
Web server	
• supported	Yes
Number of connections	
• overall	12
Configuration programming	
• Programming language	
- LAD	Yes
- FBD	Yes
- STL	Yes
- SCL	Yes; optional
- CFC	Yes; optional
- GRAPH	Yes; optional
- HiGraph®	Yes; optional
Know-how protection	
• User program protection/pass-word protection	Yes
• Block encryption	Yes; With S7 block Privacy
Dimensions	
Width	120 mm; DP master module: 35 mm
Height	119.5 mm
Depth	75 mm
Weight	
Weight, approx.	320 g; DP master module: Approx. 100 g

Safety integrated automation

SIMATIC ET 200S fail-safe distributed IO

Interface modules with fail-safe CPU SIMATIC IM 151-8 F PN/DP CPU

Selection and ordering data

	Article No.		Article No.
IM 151-8F PN/DP CPU interface module (256 K) Including termination module	6ES7151-8FB01-0AB0	MMC 2 MB ²⁾ for program backup and/or firm-ware update	6ES7953-8LL31-0AA0
SIPLUS IM 151-8F PN/DP CPU interface module (256 K) As above, but suitable for extended temperature range and exposure For configuring a fail-safe automation system, including termination module	6AG1151-8FB01-2AB0	MMC 4 MB ²⁾ for program backup	6ES7953-8LM20-0AA0
Distributed Safety V5.4 programming tool Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco Requirement: STEP 7 V5.3 SP3 and higher Floating license Floating license for 1 user, license key download without software and documentation ¹⁾ ; email address required for delivery.	6ES7833-1FC02-0YA5 6ES7833-1FC02-0YH5	MMC 8 MB ²⁾ for program backup	6ES7953-8LP20-0AA0
Distributed Safety Upgrade From V5.x to V5.4; Floating license for 1 user	6ES7833-1FC02-0YE5	External prommer e.g. for MMC with USB interface	6ES7792-0AA00-0XA0
STEP 7 Safety Advanced V13 Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, S7-1500F, WinAC RTX F, ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco Requirement: STEP 7 Professional V13 SP1 • Floating license for 1 user • Floating license for 1 user, license key download without software and documentation ¹⁾ ; email address required for delivery	6ES7833-1FA13-0YA5 6ES7833-1FA13-0YH5	PG with integrated MMC interface	On request
STEP 7 Safety Advanced Upgrade Upgrade from STEP 7 Safety Advanced V11 to STEP 7 ¹⁾ Safety Advanced V13. Floating License for one User, Software and documentation on CD Distributed Safety V5.4 SP5 to Safety Advanced V13 Combo. Combo License for parallel use Distributed Safety V5.4 and STEP 7 Safety Advanced V13. Software and documentation on CD Accessories	6ES7833-1FA13-0YE5 6ES7833-1FA13-0YF5	Label sheets DIN A4 (10 pieces) Each sheet contains 60 labeling strips for peripheral modules and 20 labeling strips for interface modules • petrol • red • yellow • light beige	6ES7193-4BH00-0AA0 6ES7193-4BD00-0AA0 6ES7193-4BB00-0AA0 6ES7193-4BA00-0AA0
MMC 64 KB ²⁾ for program backup	6ES7953-8LF20-0AA0	ET 200S distributed I/O system manuals are available on the Internet as PDF files: www.siemens.com/simatic-docu	
MMC 128 KB ²⁾ for program backup	6ES7953-8LG20-0AA0	Termination module as spare part for ET 200S	6ES7193-4JA00-0AA0
MMC 512 KB ²⁾ for program backup	6ES7953-8LJ30-0AA0	Power supply connector Spare part; for connecting the 24 V DC supply voltage • with push-in terminals	6ES7193-4JB00-0AA0
		SIMATIC S5, 35 mm DIN rail • Length: 483 mm for 19" cabinets • Length: 530 mm for 600 mm cabinets • Length: 830 mm for 900 mm cabinets • Length: 2 m	6ES5710-8MA11 6ES5710-8MA21 6ES5710-8MA31 6ES5710-8MA41
		Industrial Ethernet FC RJ45 Plug 90 RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 90° cable outlet • 1 unit • 10 units • 50 units	6GK1901-1BB20-2AA0 6GK1901-1BB20-2AB0 6GK1901-1BB20-2AE0
		Industrial Ethernet FastConnect installation cables • FastConnect standard cable • FastConnect trailing cable • FastConnect marine cable	6XV1840-2AH10 6XV1840-3AH10 6XV1840-4AH10
		Industrial Ethernet FastConnect stripping tool	6GK1901-1GA00

¹⁾ For up-to-date information and download availability, see: www.siemens.com/tia-online-software-delivery

²⁾ Micro Memory Card required for operation of CPU.

³⁾ For up-to-date information and download availability, see: www.siemens.com/tia-online-software-delivery

Safety integrated automation

SIMATIC ET 200S fail-safe distributed IO

Master interface module
for IM 151 CPU interface modules

Overview



PROFIBUS DP master interface module for IM 151-7(F) CPU / IM 151-8(F) PN/DP CPU interface modules

- Integrated 12 Mbit/s PROFIBUS DP master interface in copper design
- Facilitates parallel operation of two PROFIBUS DP interfaces on one IM 151-7 (F-)CPU
- Enables operation of a PROFIBUS DP interface on an IM 151-8(F) PN/DP CPU
- Increases the availability of plants and machinery
- Functionality corresponds to the interface of an S7-300 CPU 314-2 DP configured as DP master

Programming is with STEP7 from Version V5.2 with Service Pack 1.

SIPLUS version

A SIPLUS version of this module is also available.
See page 3/108.

Application

The master interface module adds a DP master interface to the IM 151-7(F-)CPU / IM 151-8(F) PN/DP CPU. A lower-level PROFIBUS DP line can thus be established. This results in the following advantages:

- Offloading of the central controller by means of distributed preprocessing
- IM 151-7 (F-)CPU / IM 151-8(F) PN/DP CPU is possible as DP master in stand-alone mode
- Use of the CPU in hierarchical networks, e.g. with IE/PB Link also on Ethernet (CBA, etc.)

Design

The master interface module has a 9-pin Sub-D connector (socket) for connecting to PROFIBUS DP.

Installation information:

The master interface module is to be plugged in to the right of the IM 151-7 (F-) CPU / IM 151-8(F) PN/DP CPU.

Function

The master interface module adds a DP master interface to the IM 151-7(F-)CPU / IM 151-8(F) PN/DP CPU. The functionality and quantity structures are defined by the IM 151-7 (F-)CPU / IM 151-8(F) PN/DP CPU.

The master interface module also enables connection of a programming device to its interface. This makes routing to bus nodes possible on the integral CPU interface possible if it is operated in active mode.

Technical specifications

	6ES7138-4HA00-0AB0
Hardware configuration	
Number of modules per CPU	1
Dimensions	
Width x height x depth (mm)	35 x 119.5 x 75
Weight, approx.	100 g

Selection and ordering data

	Article No.
Master interface module for IM 151-7F-CPU / IM 151-8F PN/DP CPU interface modules	6ES7138-4HA00-0AB0
Accessories	
PROFIBUS DP bus connector RS 485	
With 90° cable outlet, max. transfer rate 12 Mbit/s	
• without PG interface	6ES7972-0BA12-0XA0
• with PG interface	6ES7972-0BB12-0XA0
With 90° cable outlet for FastConnect connection system, max. transfer rate 12 Mbit/s	
• without PG interface, 1 unit	6ES7972-0BA52-0XA0
• without PG interface, 100 units	6ES7972-0BA52-0XB0
• with PG interface, 1 unit	6ES7972-0BB52-0XA0
• with PG interface, 100 units	6ES7972-0BB52-0XB0
PROFIBUS FastConnect bus cable	6XV1830-0EH10
Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m	
PROFIBUS bus components	See IK PI, CA 01 catalogs
For establishing MPI/PROFIBUS communication	
Label sheets DIN A4 (10 pieces)	
Each sheet contains 60 labeling strips for peripheral modules and 20 labeling strips for interface modules	
• petrol	6ES7193-4BH00-0AA0
• red	6ES7193-4BD00-0AA0
• yellow	6ES7193-4BB00-0AA0
• light beige	6ES7193-4BA00-0AA0
ET 200S distributed I/O system manuals	
are available on the Internet as PDF files:	
www.siemens.com/simatic-doku	

More information

Brochures

Information material for downloading can be found in the Internet:

www.siemens.com/simatic/printmaterial

Safety integrated automation

SIMATIC ET 200S fail-safe distributed IO

SIPLUS master interface modules for SIPLUS IM 151 CPU

Overview



PROFIBUS DP master interface module for SIPLUS interface module IM 151-7 (R) CPU / IM 151-8 (F) PN/DP CPU

- Integrated 12 Mbit/s PROFIBUS DP master interface in Cu version
- Allows parallel operation of two PROFIBUS DP interfaces on one IM 151-7 CPU
- Allows operation of one PROFIBUS DP interface with an IM 151-8 (F) PN/DP CPU
- Increase in availability of systems and machines
- Functionality in accordance with a DP master configured interface of an S7-314 CPU

Programming is performed with STEP 7 from version V5.2 with Service Pack 1.

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

SIPLUS module	SIPLUS master interface module for SIPLUS IM 151 CPU
SIPLUS module	6AG1138-4HA00-7AB0
based on	6ES7138-4HA00-0AB0
Ambient temperature range	-25 °C ... +70 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions.
Ambient conditions	
Relative humidity	100%, condensation/frost permissible. No commissioning if condensation present.
Biologically active substances, compliance with EN 60721-3-3	Class 3B2 mold and fungal spores (excluding fauna). The supplied plug covers must remain in place over the unused interfaces during operation!
Chemically active substances, compliance with EN 60721-3-3	Class 3C4 incl. salt spray in accordance with EN60068-2-52 (degree of severity 3). The supplied plug covers must remain in place over the unused interfaces during operation!
Mechanically active substances, compliance with EN 60721-3-3	Class 3S4 incl. sand, dust. The supplied plug covers must remain in place over the unused interfaces during operation!
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) See ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

For technical documentation on SIPLUS, see:
www.siemens.com/siplus-extreme

Selection and ordering data

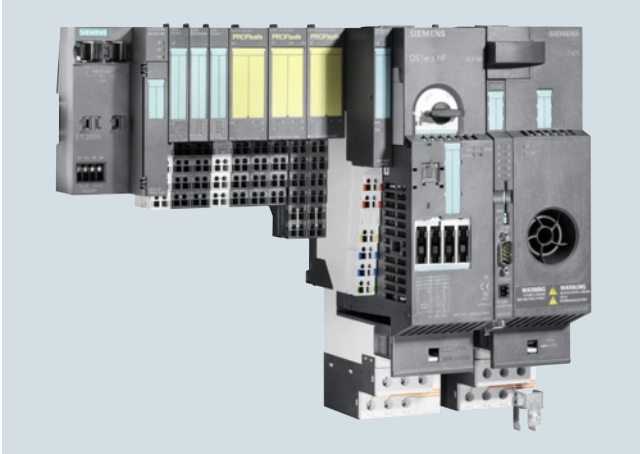
	Article No.
SIPLUS Master interface module for SIPLUS IM 151-7F-CPU IM 151-8F PN/DP CPU interface modules (extended temperature range and exposure)	6AG1138-4HA00-7AB0
Accessories	See SIMATIC master interface module on page 3/107

Safety integrated automation

SIMATIC ET 200S fail-safe distributed IO

Fail-safe I/O modules

Overview



The fail-safe SIMATIC S7 CPUs, plus the fail-safe signal modules of SIMATIC ET 200S / 200pro/ ET 200eco and ET 200M have been specially developed for distributed applications in manufacturing systems. Thanks to the discrete structure of the F I/Os, safety technology is only applied where actually required. The new system replaces conventional electromechanical components, such as:

- Freely programmable safe linking of sensors to actuators;
- Selective safe shutdown of actuators;
- Hybrid configurations of F modules (F stands for fail-safe) and standard modules in a station;
- Single-bus concept, F signals and standard signals are transferred over one bus medium (PROFIBUS DP, PROFINET).

Totally Integrated Automation (TIA)

Safety technology (Safety Integrated) is a component of Totally Integrated Automation resulting in the total integration of safety and standard automation (SIMATIC S7).

Whereas today, standard automation (conventional PLCs) and safety automation (electromechanics) are still separate, these two worlds are growing closer together to form one uniform, integrated overall system.

Siemens can therefore present itself as a complete supplier for automation engineering for which safety technology is part of the standard automation and uniformity exists throughout the complete system.

More information

Brochures

Information material for downloading can be found in the Internet:

www.siemens.com/simatic/printmaterial

Safety integrated automation

SIMATIC ET 200S fail-safe distributed IO

PM-E F PROFIsafe F power module

Overview



Fail-safe PM-E F PROFIsafe power modules for safety shutdown of standard digital output modules.

- Up to 2 fail-safe digital outputs onboard (source/sink outputs, up to 2 A, up to SIL3/Cat. 4)
- The standard digital output modules can be shut down up to Cat.3 (EN 954) and SIL 2 (IEC61508) up to 10 A. The following modules can be used down-circuit of the power modules.
 - 2DO / 0.5 A ST 6ES7132-4BB01-0AA0
 - 2 DO / 2 A ST 6ES7132-4BB31-0AA0
 - 2 DO / 0.5 A HF 6ES7132-4BB01-0AB0
 - 2 DO / 2 A HF 6ES7132-4BB31-0AB0
 - 4 DO / 0.5 A ST 6ES7132-4BD01-0AA0
 - 4 DO / 2 A ST 6ES7132-4BD31-0AA0

The modules support PROFIsafe, both in PROFIBUS, and in PROFINET configurations. They can be used with all fail-safe SIMATIC S7-CPU.

Application

Fail-safe PM-E F PROFIsafe power modules for safety shutdown of standard digital output modules.

The standard digital output modules are supplied over PM-E PROFIsafe and can be shut down with fail-safety using relay contacts according to Cat. 3/ SIL2.

The PM-E F pm PROFIsafe power module can be used for loads configured without a ground connection and has 2 additional fail-safe digital outputs onboard. These are source/sink outputs and can be used for safety circuits up to Cat. 4/ SIL 3.

The PM-E F pp PROFIsafe power modules can be used for loads that are connected to ground, e.g. for actuators that have to be connected to a central mass.

The modules can be operated both down-circuit of the IM151-7 F-CPU in a central configuration and down-circuit of the IM 151 High Feature and IM151-3 PROFINET High Feature in a distributed configuration.

Design

PM-E F PROFIsafe power modules are plugged into the TM-P terminal modules provided.

The first module adjacent to the IM 151 must be a power module.

Technical specifications

	6ES7138-4CF03-0AB0	6ES7138-4CF42-0AB0
Supply voltage		
Load voltage L+		
• Rated value (DC)	24 V	24 V
• Reverse polarity protection	No	No
Input current		
from load voltage L+ (without load), max.	typ. 100 mA	typ. 100 mA
from backplane bus 24 V DC, max.	28 mA	28 mA
Current carrying capacity		
Current carrying capacity up to 30 °C, max.		10 A
Current carrying capacity up to 40 °C, max.	10 A	8 A
Current carrying capacity up to 60 °C, max.	6 A	7 A
Power losses		
Power loss, typ.	4 W	4 W
Address area		
Address space per module		
• without packing	5 byte; Input and output in each case	5 byte; Input and output in each case
Digital inputs		
Cable length		
• Cable length, shielded, max.	200 m	200 m
• Cable length unshielded, max.	200 m	200 m

Safety integrated automation

SIMATIC ET 200S fail-safe distributed IO

PM-E F PROFIsafe F power module

	6ES7138-4CF03-0AB0	6ES7138-4CF42-0AB0
Digital outputs		
Number of digital outputs	2	1
Product function	Yes	No
• Response threshold, typ.	Response threshold (short-circuit): 5 to 12 A; response threshold (external short-circuit to ground): 5 to 12 A; response threshold (external short-circuit to P potential): 25 to 45 A	
Limitation of inductive shutdown voltage to	L+ (-2 x 47 V)	
Controlling a digital input	No	Yes
Switching capacity of the outputs		
• Lamp load, max.	10 W	100 W
Load resistance range		
• lower limit	12 Ω	
• upper limit	1 kΩ	
Output voltage		
• for signal "1", min.	L+ (-2,0 V), current sourcing switch: L+ (-1,5 V), voltage drop on current sinking switch: max. 0.5 V	
Output current		
• for signal "1" rated value	2 A	
• for signal "1" permissible range for 0 to 60 °C, min.	20 mA	
• for signal "1" permissible range for 0 to 60 °C, max.	2.4 A	
• for signal "0" residual current, max.	0.5 mA	
Parallel switching of 2 outputs		
for increased power	No	
for redundant control of a load	No	
Switching frequency		
with resistive load, max.	30 Hz	2 Hz
with inductive load, max.	0.1 Hz	0.1 Hz; with inductive load to IEC 947-5-1, 13 DC /15 AC
on lamp load, max.	10 Hz	2 Hz
Aggregate current of outputs (per group)		
horizontal installation		
- up to 40 °C, max.	10 A	10 A
- up to 55 °C, max.	7 A	8 A
- up to 60 °C, max.	6 A	7 A
vertical installation		
- up to 40 °C, max.	6 A	8 A
Relay outputs		
• Switching capacity of contacts		
- at ohmic load, up to 50 °C, max.	10 A	10 A
Cable length		
• Cable length, shielded, max.	200 m	
• Cable length unshielded, max.	200 m	
Interrupts/diagnostics/status information		
Diagnostic messages		
• Diagnostic functions	Yes	Yes
• Diagnostic information readable	Yes	Yes
• Diagnostics	Yes	
• Wire break	Yes	No
• Short circuit	Yes	Yes
• Missing load voltage	Yes	Yes

Safety integrated automation

SIMATIC ET 200S fail-safe distributed IO

PM-E F PROFIsafe F power module

	6ES7138-4CF03-0AB0	6ES7138-4CF42-0AB0
Diagnostics indication LED		
• Rated load voltage PWR (green)	Yes	Yes
• Group error SF (red)	Yes	Yes
• Status indicator digital output (green)	Yes	Yes
Galvanic isolation		
Galvanic isolation digital outputs		
• between the channels	No	No
• between the channels and the backplane bus	Yes	Yes
• between the channels and the load voltage L+	No	No
Isolation		
Isolation checked with	500 V DC	500 V DC
Tested with		
• Channels against backplane bus and load voltage L+	500 V DC	500 V DC
Standards, approvals, certificates		
Highest safety class achievable in safety mode	4	4
• acc. to EN 954	Up to SIL 3	With Std-DO: max. SIL 2, without Std-DO: max. SIL 3 depending on configuration
• acc. to IEC 61508		
Dimensions		
Width	30 mm	30 mm
Height	81 mm	81 mm
Depth	52 mm	52 mm
Weight, approx.	88 g	80 g

Safety integrated automation

SIMATIC ET 200S fail-safe distributed IO

PM-E F PROFIsafe F power module

Selection and ordering data

	Article No.		Article No.
Power module PM-E F pm PROFIsafe, 24 V DC	6ES7138-4CF03-0AB0	S7 Distributed Safety Upgrade	
For safe shutdown of digital output modules		From V5.x to V5.4; Floating license for 1 user	6ES7833-1FC02-0YE5
Power module PM-E F pp PROFIsafe, 24 V DC	6ES7138-4CF42-0AB0	STEP 7 Safety Advanced V13	
For safe shutdown of digital output modules		Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, S7-1500F, WinAC RTX F, ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco	
Accessories		Requirement: STEP 7 Professional V13 SP1	
IM 151-1 High Feature interface module	6ES7151-1BA02-0AB0	• Floating license for 1 user	6ES7833-1FA13-0YA5
For ET 200S; transfer rate up to 12 Mbit/s; data volumes 244 bytes each for I/O, up to 63 modules can be connected; connection of PROFIsafe modules, isochronous mode; bus connection via 9-pin Sub-D incl. terminating module		• Floating license for 1 user, license key download without software or documentation ¹⁾ ; email address required for delivery	6ES7833-1FA13-0YH5
IM 151-3 PN HF interface module	6ES7151-3BA23-0AB0	STEP 7 Safety Advanced Upgrade	
For ET 200S; transfer rate up to 100 Mbit/s; max. 63 I/O modules up to 2 m wide can be connected; 2 x bus connection via RJ45 connector, incl. terminating module		Upgrade from STEP 7 Safety Advanced V11 to STEP 7 Safety Advanced V13.	6ES7833-1FA13-0YE5
IM 151-3 PN FO interface module	6ES7151-3BB23-0AB0	Floating License for one User, Software and Docu on CD	
For ET 200S; 2 PROFINET FO interfaces, integrated 2-port switch, max. 63 I/O modules up to 2 m wide can be connected, incl. terminating module		Distributed Safety V5.4 SP5 to Safety Advanced V13 Combo.	6ES7833-1FA13-0YF5
Terminal modules for power modules		Combo License for parallel use Distributed Safety V5.4 and STEP 7 Safety Advanced V13.	
TM-P30S44-A0	6ES7193-4CK20-0AA0	Software and docu on CD	
Ordering unit 1 item 7 x 2 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, screw-type terminals for PM-E F PROFIsafe		SIMATIC Manual Collection	6ES7998-8XC01-8YE0
TM-P30C44-A0	6ES7193-4CK30-0AA0	Electronic manuals on DVD, five languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	
Ordering unit 1 item 7 x 2 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, spring-loaded terminals for PM-E F PROFIsafe		SIMATIC Manual Collection update service for 1 year	6ES7998-8XC01-8YE2
S7 Distributed Safety programming tool V5.4			
Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco			
Requirement: STEP 7 V5.3 SP3 and higher			
• Floating license	6ES7833-1FC02-0YA5		
• Floating license for 1 user, license key download without software and documentation ¹⁾ ; email address required for delivery	6ES7833-1FC02-0YH5		

¹⁾ For up-to-date information and download availability, see: www.siemens.com/tia-online-software-delivery

Safety integrated automation

SIMATIC ET 200S fail-safe distributed IO

F electronic modules

Overview



This module provides digital inputs/outputs for the fail-safe SIMATIC S7 systems

Fail-safe digital input module:

- For fail-safe reading of sensor information (1 or 2 channels)
- Provides integral discrepancy evaluation for 2-out-of-2 signals
- 2 internal sensor supplies (incl. test function) onboard
- Certified up to Cat. 4 (EN954-1), SIL 3 (IEC 61508), PL e (ISO 13849)

Fail-safe digital output module

- Fail-safe 2-channel activation (sink/source output) by actuators
- Actuators can be driven by up to 2 A
- Certified up to Cat. 4 (EN954-1), SIL 3 (IEC 61508), PL e (ISO 13849)

Fail-safe digital hybrid module

- 4 fail-safe inputs/3 fail-safe outputs
- Certified up to Cat. 3 (EN954-1), SIL 2 (IEC 61508), PL d (ISO 13849)

The modules support PROFIsafe, both in PROFIBUS, and in PROFINET configurations.

They can be used with all fail-safe SIMATIC S7 CPUs.

The module also supports: I&M Data, international Diagnostic buffer, FW-Update.

Application

The fail-safe modules of ET 200S can be used to implement the safety-related application requirements as an integral part of the overall automation. The safety functions required for fail-safe operation are integrated in the modules. The modules can be used for safety circuits up to Cat. 4/ SIL 3.

Communication to fail-safe SIMATIC S7 CPUs is performed by means of PROFIsafe.

The modules can be operated both down-circuit of the IM151-7 F-CPU in a central configuration and down-circuit of the IM 151 High Feature and IM151-3 PROFINET High Feature in a distributed configuration.

A standard power module is required to supply the modules.

Design

Digital input/output modules have the following features:

Compact design

The rugged plastic casing contains

- Green LEDs to display the signal states at the inputs/outputs
- Plug option for the front connector, protected behind the front door
- Labeling strip on the front door (yellow for fail-safe modules).

Simpleconnection

The modules are mounted on the standard rail and connected to neighboring modules via the bus connector. There are no slot rules and the addresses of the inputs are assigned via the slot.

By using them in the distributed I/O station ET 200M in combination with active bus modules, the modules can be replaced during operation with the equipment live. The remaining modules continue to operate.

User-friendly wiring

The modules are wired up via a front connector. When it is plugged in for the first time, a coding device latches in the connector so that the connector will only fit onto modules of this type. When the module is replaced, the fully wired front connector can be plugged into the new module of the same type.

In the case of fail-safe input modules, the necessary encoder power supply (test outputs) are provided. These test outputs can be activated via parameterization.

Technical specifications

6ES7138-4FA05-0AB0	
Supply voltage	24 V DC
Permissible range (DC)	20.4 V ... 28.8 V
Reverse polarity protection	No
Encoder supply	
Number of outputs	2
Output voltage	min. L+ (-1.5 V)
Output current, rated value	300 mA
Output current, permissible range	0 to 300 mA
Output current	
• Short-circuit protection	Yes; Electronic (response threshold 0.7 A to 1.8 A)
Power losses	
Power loss, typ.	4 W
Address area	
Occupied address area	
• Inputs	6 byte
• Outputs	4 byte
Digital inputs	
Number of digital inputs	8; 8 single channel, 4 two-channel
Input characteristic curve in accordance with IEC 61131, type 1	Yes
Number of simultaneously controllable inputs	8
Input voltage	
• Rated value, DC	24 V
• for signal "0"	-30 to +5 V
• for signal "1"	15 to 30 V
Input current	
• for signal "1", typ.	3.7 mA

Safety integrated automation

SIMATIC ET 200S fail-safe distributed IO

F electronic modules

6ES7138-4FA05-0AB0	
Input delay (for rated value of input voltage)	
<ul style="list-style-type: none"> for standard inputs - Parameterizable - at "0" to "1", min. - at "0" to "1", max. - at "1" to "0", min. - at "1" to "0", max. 	Yes 0.3 ms 17 ms 0.3 ms 17 ms
Cable length	
<ul style="list-style-type: none"> Cable length, shielded, max. Cable length unshielded, max. 	200 m 200 m
Encoder	
Connectable encoders	
<ul style="list-style-type: none"> 2-wire sensor 	No
Interrupts/diagnostics/status information	
Alarms	
<ul style="list-style-type: none"> Diagnostic alarm 	Yes
Diagnostic messages	
<ul style="list-style-type: none"> Diagnostic functions Diagnostic information readable Short circuit 	Yes Yes Yes
Diagnostics indication LED	
<ul style="list-style-type: none"> Group error SF (red) Status indicator digital input (green) 	Yes Yes
Galvanic isolation	
Galvanic isolation digital inputs	
<ul style="list-style-type: none"> between the channels between the channels and the backplane bus between the channels and the load voltage L+ 	No Yes No
Permissible potential difference	
between M internally and the inputs	75 V DC / 60 V AC
Isolation	
Isolation checked with	500 V DC
Standards, approvals, certificates	
Highest safety class achievable in safety mode	
<ul style="list-style-type: none"> acc. to EN 954 acc. to IEC 61508 	4 SIL 2 (single-channel), SIL 3 (two-channel)
Dimensions	
Width	30 mm
Height	81 mm
Depth	52 mm
Weight, approx.	78 g

6ES7138-4FB04-0AB0	
Supply voltage	
Load voltage L+	
<ul style="list-style-type: none"> Rated value (DC) Reverse polarity protection 	24 V No
Input current	
from load voltage L+ (without load), max.	typ. 100 mA
from backplane bus 3.3 V DC, max.	28 mA
Power losses	
Power loss, typ.	3.5 W
Digital outputs	
Number of digital outputs	4
Product function	Yes
Limitation of inductive shutdown voltage to	Typ. (2L+) -47 V
Controlling a digital input	No
Switching capacity of the outputs	
<ul style="list-style-type: none"> Lamp load, max. 	10 W
Load resistance range	
<ul style="list-style-type: none"> lower limit upper limit 	12 Ω 1 kΩ
Output voltage	
<ul style="list-style-type: none"> for signal "1", min. 	L+ (-2.0 V), current sourcing switch: L+ (-1.5 V), voltage drop on current sinking switch: max. 0.5 V
Output current	
<ul style="list-style-type: none"> for signal "1" rated value for signal "1" permissible range for 0 to 60 °C, min. for signal "1" permissible range for 0 to 60 °C, max. for signal "0" residual current, max. 	2 A 20 mA 2.4 A 0.5 mA; Current-sourcing: max. 0.5 mA; Current sinking: max. 4 mA
Parallel switching of 2 outputs	
<ul style="list-style-type: none"> for increased power for redundant control of a load 	No No
Switching frequency	
<ul style="list-style-type: none"> with resistive load, max. with inductive load, max. on lamp load, max. 	30 Hz 0.1 Hz 10 Hz
Aggregate current of outputs (per group)	
<ul style="list-style-type: none"> horizontal installation <ul style="list-style-type: none"> up to 40 °C, max. up to 55 °C, max. up to 60 °C, max. vertical installation <ul style="list-style-type: none"> up to 40 °C, max. 	6 A 5 A 4 A 4 A
Cable length	
<ul style="list-style-type: none"> Cable length, shielded, max. Cable length unshielded, max. 	200 m 200 m
Interrupts/diagnostics/status information	
<ul style="list-style-type: none"> Diagnostic functions Wire break Short circuit 	Yes Yes Yes

Safety integrated automation

SIMATIC ET 200S fail-safe distributed IO

F electronic modules

6ES7138-4FB04-0AB0	
Diagnostics indication LED	
• Group error SF (red)	Yes
• Status indicator digital output (green)	Yes
Galvanic isolation	
Galvanic isolation digital outputs	
• between the channels	No
• between the channels and the backplane bus	Yes
• between the channels and the load voltage L+	No
Isolation	
Isolation checked with	500 V DC
• Channels against backplane bus and load voltage L+ tested with	1500 V AC
Standards, approvals, certificates	
Highest safety class achievable in safety mode	
• acc. to EN 954/IEC 61508	4/SIL 3
Dimensions	
Width x Height x Depth (mm)	30 x 81 x 52
Weight, approx.	85 g

Selection and ordering data

	Article No.
Electronic module 4/8 F-DI PROFIsafe 24 V DC	6ES7138-4FA04-0AB0
30 mm construction width, up to PL e according to ISO 13849.1	
Electronic module 4 F-DO PROFIsafe 24 V DC/2A	6ES7138-4FB03-0AB0
30 mm construction width, up to PL e according to ISO 13849.1	
Electronic module 4 F-DI / 3 F-DO PROFIsafe 24 V DC/2 A	6ES7138-4FC01-0AB0
30 mm construction width, up to PL e according to ISO 13849.1 / SIL 2 (IEC 62061)	
Accessories	
Terminal modules for electronic modules	See F terminal modules, page 3/120
IM 151-1 High Feature interface module	6ES7151-1BA02-0AB0
For ET 200S; transmission rate up to 12 Mbit/s; max. 63 modules can be connected, with isochronous mode, bus connection via 9-pin Sub-D connector incl. terminating module	
IM 151-3 PN HF interface module	6ES7151-3BA23-0AB0
For ET 200S; transfer rate up to 100 Mbit/s; max. 63 I/O modules up to 2 m wide can be connected; 2 x bus connection via RJ45 connector, incl. terminating module	

Article No.

IM 151-3 PN FO interface module	6ES7151-3BB23-0AB0
For ET 200S; 2 PROFINET FO interfaces, integrated 2-port switch, max. 63 I/O modules up to 2 m wide can be connected, incl. terminating module	
S7 Distributed Safety programming tool V5.4	
Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco	
Requirement: STEP 7 V5.3 SP3 and higher	
• Floating license	6ES7833-1FC02-0YA5
• Floating license for 1 user, license key download without software and documentation ¹⁾ ; email address required for delivery	6ES7833-1FC02-0YH5
S7 Distributed Safety Upgrade	
From V5.x to V5.4; Floating license for 1 user	6ES7833-1FC02-0YE5
STEP 7 Safety Advanced V13	
Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, S7-1500F, WinAC RTX F, ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco	
Requirement: STEP 7 Professional V13 SP1	
• Floating license for 1 user	6ES7833-1FA13-0YA5
• Floating license for 1 user, license key download without software or documentation ¹⁾ ; email address required for delivery	6ES7833-1FA13-0YH5
STEP 7 Safety Advanced Upgrade	
Upgrade from STEP 7 Safety Advanced V11 to STEP 7 Safety Advanced V13.	6ES7833-1FA13-0YE5
Floating License for one User, Software and Docu on CD	
Distributed Safety V5.4 SP5 to Safety Advanced V13 Combo.	
Combo License for parallel use Distributed Safety V5.4 and STEP 7 Safety Advanced V13. Software and docu on CD	6ES7833-1FA13-0YF5
SIMATIC Manual Collection	6ES7998-8XC01-8YE0
Electronic manuals on DVD, multi-language: S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication)	
SIMATIC Manual Collection – Update service for 1 year	6ES7998-8XC01-8YE2
Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates	

¹⁾ For up-to-date information and download availability, see:
www.siemens.com/tia-online-software-delivery

Safety integrated automation

SIMATIC ET 200S fail-safe distributed IO

F electronic module relays

Overview



The digital electronics module 1 F-RO 24 V DC/5A 24 to 230 V AC/5A has the following characteristics

- 1 relay output (2 NO contacts)
- Output current 5 A.
- Rated load voltage 24 V DC and 24 to 230 V AC
- The control circuit of the two safety relays must be routed from the outside to the respective terminals.

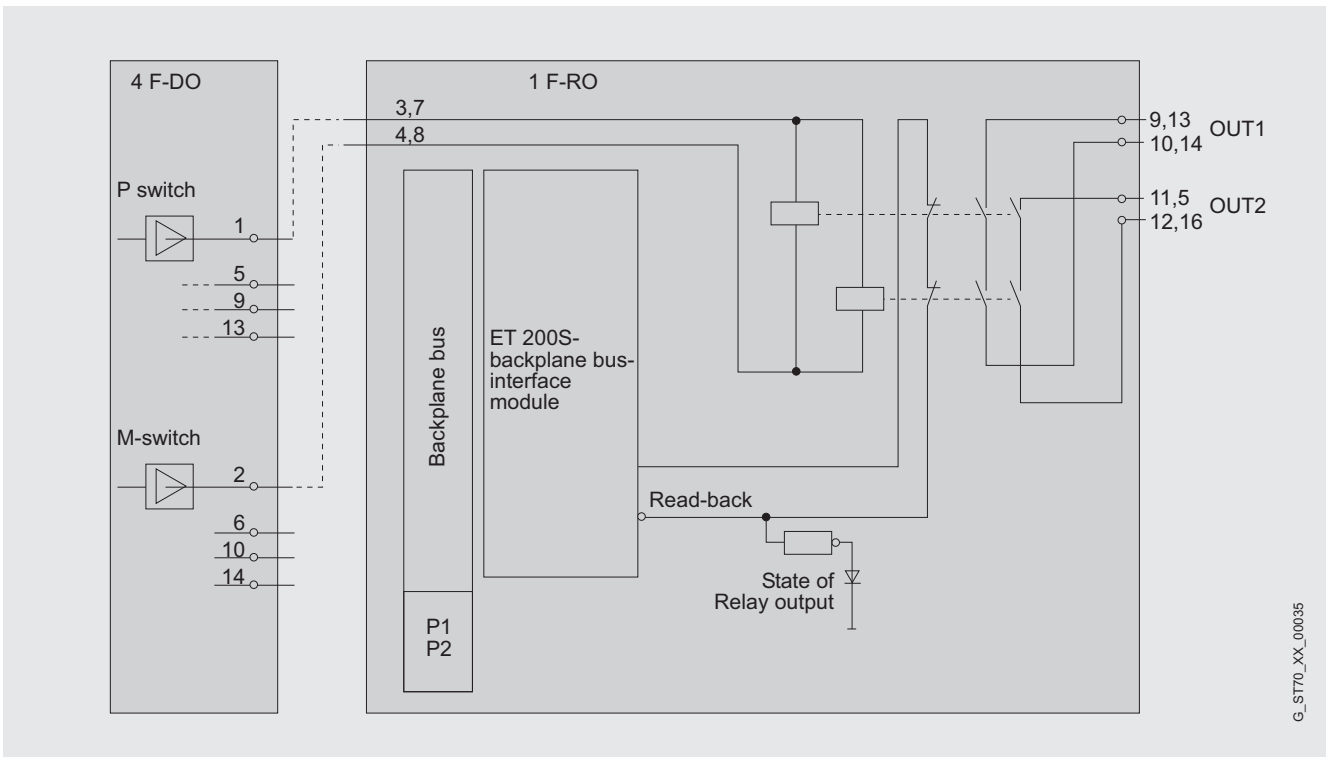
The attainable safety integrity level is SIL3 (IEC61508), when the control of the F-RO module is implemented via a fail-safe output (e.g. EM 4F-DO 24 V DC/2A PROFIsafe).

Application

The 1 F-RO module can be used in multiple ways, e.g.

- For switching of external voltages
- When floating signals are needed
- For controller enables
- When higher switching capacities (> 2 A) are needed

Design



The block diagram shows the control via 4F-DO 24 V DC/2 A PROFIsafe (6ES7138-4FB02-0AB0). The control circuit must be routed to the terminals 3, 4 or 7, 8. One channel of the F-DO can also be used for control of multiple F-RO modules (group shut-down).

Safety integrated automation

SIMATIC ET 200S fail-safe distributed IO

F electronic module relays

Technical specifications

6ES7138-4FR00-0AA0	
Supply voltage	
Load voltage L+	
• Rated value (DC)	24 V; Supply via fail-safe output, e.g. of an F-DO
• Rated value (AC)	24 V ... 230 V
Input current	
from load voltage L+ (without load), max.	100 mA; from control voltage max.
from backplane bus 3.3 V DC, max.	10 mA
Power losses	
Power loss, typ.	2.1 W
Address area	
Address space per module	
• with packing	2 bit
• without packing	1 byte
Digital outputs	
Number of digital outputs	1
Product function	No
Controlling a digital input	Yes
Output current	
• for signal "1" rated value	5 A
• for signal "1" minimum load current	5 mA
Switching frequency	
• with resistive load, max.	2 Hz
• with inductive load, max.	0.1 Hz
Aggregate current of outputs (per group)	
• horizontal installation	
- up to 40 °C, max.	8 A
- up to 55 °C, max.	6 A; At 50 °C
- up to 60 °C, max.	5 A; up to max. 24.8 V
• vertical installation	
- up to 40 °C, max.	6 A

6ES7138-4FR00-0AA0	
Relay outputs	
• Switching capacity of contacts	5 A
- Thermal continuous current, max.	
Cable length	
• Cable length, shielded, max.	200 m
• Cable length unshielded, max.	200 m
Interrupts/diagnostics/status information	
Diagnostics indication LED	
• Status indicator digital output (green)	Yes
Galvanic isolation	
Galvanic isolation digital outputs	
• between the channels	Yes
• between the channels and the backplane bus	Yes
• between the channels and the load voltage L+	Yes; between channels and control voltage
Standards, approvals, certificates	
Highest safety class achievable in safety mode	
• acc. to IEC 61508	Up to SIL 3
Dimensions	
Width	30 mm
Height	81 mm
Depth	52 mm
Weight, approx.	90 g

Safety integrated automation

SIMATIC ET 200S fail-safe distributed IO

F electronic module relays

Selection and ordering data

	Article No.
Electronics module 1 F-RO Relay output (2 NO contacts), Output current 5 A, load voltage 24 V DC and AC 24 ... 230 V AC; suitable for category 4/SIL3, provided control is over F-DO.	6ES7138-4FR00-0AA0
Accessories	
Terminal modules for electronic modules	See F terminal modules, page 3/120
IM 151-1 High Feature interface module For ET 200S; transmission rate up to 12 Mbit/s; max. 63 modules can be connected, with isochro- nous mode, bus connection via 9-pin Sub-D connector incl. termi- nating module	6ES7151-1BA02-0AB0
IM 151-3 PN HF interface module For ET 200S; transfer rate up to 100 Mbit/s; max. 63 I/O modules up to 2 m wide can be con- nected; 2 x bus connection via RJ45 connector, incl. terminating module	6ES7151-3BA23-0AB0
IM 151-3 PN FO interface module For ET 200S; 2 PROFINET FO interfaces, integrated 2-port switch, max. 63 I/O modules up to 2 m wide can be connected, incl. terminating module	6ES7151-3BB23-0AB0
S7 Distributed Safety programming tool V5.4 Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco Requirement: STEP 7 V5.3 SP3 and higher <ul style="list-style-type: none"> Floating license Floating license for 1 user, license key download without software and documentation¹⁾; email address required for deliv- ery 	6ES7833-1FC02-0YA5 6ES7833-1FC02-0YH5

	Article No.
S7 Distributed Safety Upgrade From V5.x to V5.4; Floating license for 1 user	6ES7833-1FC02-0YE5
STEP 7 Safety Advanced V13 Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, S7-1500F, WinAC RTX F, ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco Requirement: STEP 7 Professional V13 SP1 <ul style="list-style-type: none"> Floating license for 1 user Floating license for 1 user, license key download without software or documentation¹⁾; email address required for deliv- ery 	6ES7833-1FA13-0YA5 6ES7833-1FA13-0YH5
STEP 7 Safety Advanced Upgrade Upgrade from STEP 7 Safety Advanced V11 to STEP 7 Safety Advanced V13. Floating License for one User, Software and documentation on CD. Distributed Safety V5.4 SP5 to Safety Advanced V13 Combo. Combo License for parallel use Distributed Safety V5.4 and STEP 7 Safety Advanced V13. Software and documentation on CD.	6ES7833-1FA13-0YE5 6ES7833-1FA13-0YF5
SIMATIC Manual Collection Electronic manuals on DVD, multi-language: S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Soft- ware, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication)	6ES7998-8XC01-8YE0
SIMATIC Manual Collection – Update service for 1 year Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates	6ES7998-8XC01-8YE2

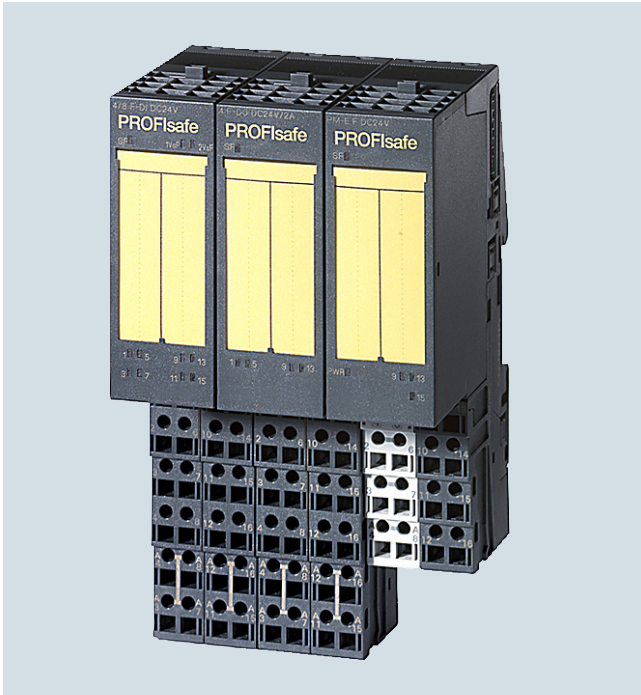
¹⁾ For up-to-date information and download availability,
see: www.siemens.com/tia-online-software-delivery

Safety integrated automation

SIMATIC ET 200S fail-safe distributed IO

F terminal modules

Overview



- Mechanical modules as receptacles for the electronic modules
- For setting up permanent wiring through self-configuring voltage buses
- Keyed connection technology to ensure an enhanced vibration resistance of up to 5 g
- Different versions to accommodate power modules and electronic modules
- Replaceable terminal box (even within the station network)
- Automatic coding of the electronic modules
- Self-shielding of the backplane bus for high data security
- Color coding facility for the terminals and for identifying the slot numbers
- Alternatively available with screw-type or spring-loaded terminals
- For up to 60 % faster process wiring also with FastConnect connection method (av. soon)

Application

Terminal modules are purely mechanical components for configuring the ET 200S. They accommodate the electronic modules and motor starter. The modules are automatically coded.

In the terminal modules, integral, self-configuring voltage buses, communications-capable motor starter and its self-configuring 40 A power bus considerably reduce wiring and control cabinet space requirements. The self-assembling shielding of the backplane bus increases data security.

Rugged construction and molded connections support use in a harsh industrial environment (e.g. vibration resistance up to 5 g).

Terminal modules are available in different versions:

- Terminal modules for power modules (TM-P):
To supply load/encoder voltage on two self-configuring potential buses. A third potential bus (AUX1, max. 230 V) can be used user-specifically, e.g. for continuous supply of light barriers or protective conductors. Power modules are plugged onto TP-M modules for the purpose of voltage monitoring and fusing. Power modules are plugged onto TP-M modules for the purpose of voltage monitoring and fusing. TM-P modules can be used as often as required at any location in the ET 200S. This means that the size of a voltage group can be determined individually. The first module behind the IM151 is always a TM-P with a connected power module
- Terminal modules for electronic modules (TM-E):
TM-E modules accept electronic modules (inputs/outputs, technology modules). The unused signal lines of exclusive OR sensors can also be connected. Dedicated double-width terminal modules accept safety-related PROFIsafe electronic modules (F-DI, F-DO and PM E-F).

Design

TM-P

- Connection through screw-type or spring-loaded terminals
- With or without terminal access to AUX1 rail
- With or without interruption of the AUX1 rail
- Light casing color to allow better differentiation

TM-E

- Connection through screw-type or spring-loaded terminals
- With or without terminal access to AUX1 rail
- Connection in 2, 3 or 4-wire technology
- Direct connection of non-equivalent sensors without additional terminal blocks

Safety integrated automation

SIMATIC ET 200S fail-safe distributed IO

F terminal modules

Selection and ordering data

	Article No.
F terminal modules for power modules	
TM-P15S23-A1 2 × 3 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals <ul style="list-style-type: none"> Ordering unit 1 item Ordering unit 5 items 	6ES7193-4CC20-0AA0 6ES7193-4CC20-1AA0
TM-P15C23-A1 2 × 3 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals <ul style="list-style-type: none"> Ordering unit 1 item Ordering unit 5 items 	6ES7193-4CC30-0AA0 6ES7193-4CC30-1AA0
TM-P15S23-A0 2 × 3 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, screw-type terminals <ul style="list-style-type: none"> Ordering unit 1 item Ordering unit 5 items 	6ES7193-4CD20-0AA0 6ES7193-4CD20-1AA0
TM-P15C23-A0 2 × 3 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, spring-loaded terminals <ul style="list-style-type: none"> Ordering unit 1 item Ordering unit 5 items 	6ES7193-4CD30-0AA0 6ES7193-4CD30-1AA0
TM-P15S22-01 2 × 2 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals <ul style="list-style-type: none"> Ordering unit 1 item Ordering unit 5 items 	6ES7193-4CE00-0AA0 6ES7193-4CE00-1AA0
TM-P15C22-01 2 × 2 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals <ul style="list-style-type: none"> Ordering unit 1 item Ordering unit 5 items 	6ES7193-4CE10-0AA0 6ES7193-4CE10-1AA0
TM-P30S44-A0 Ordering unit 1 item 7 × 2 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, screw-type terminals for PM-E F PROFIsafe	6ES7193-4CK20-0AA0
TM-P30C44-A0 Ordering unit 1 item 7 × 2 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, spring-loaded terminals for PM-E F PROFIsafe	6ES7193-4CK30-0AA0

	Article No.
F terminal modules for electronic modules	
TM-E30S44-01 Ordering unit 1 item 4 × 4 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals	6ES7193-4CG20-0AA0
TM-E30C44-01 Ordering unit 1 item 4 × 4 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals	6ES7193-4CG30-0AA0
TM-E30S46-A1 Ordering unit 1 item 4 × 6 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals	6ES7193-4CF40-0AA0
TM-E30C46-A1 Ordering unit 1 item 4 × 6 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals	6ES7193-4CF50-0AA0
Accessories	
Color coding plates Ordering unit 200 pieces for TM-P, TM-E <ul style="list-style-type: none"> white yellow yellow/green red blue brown turquoise 	6ES7193-4LA20-0AA0 6ES7193-4LB20-0AA0 6ES7193-4LC20-0AA0 6ES7193-4LD20-0AA0 6ES7193-4LF20-0AA0 6ES7193-4LG20-0AA0 6ES7193-4LH20-0AA0
Grounding terminal Ordering unit 1 item For cable cross-sections up to 25 mm ²	8WA2868
3 × 10 mm busbars Ordering unit 1 item	8WA2842
Labels, inscribed Ordering unit 1 set <ul style="list-style-type: none"> 200 items for slot numbering (1 to 20) 10 × 200 items for slot numbering (1 to 40) 5 × 200 items for slot numbering (1 to 64) 1 ×, (1 to 68) 2 × 	8WA8861-0AB 8WA8861-0AC 8WA8861-0DA
Labels, blank 200 items for slot numbering	8WA8848-2AY

More information

Brochures

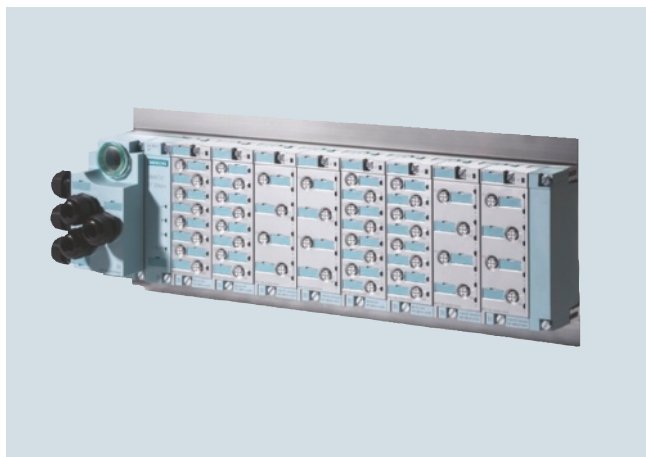
Information material for downloading can be found in the Internet: www.siemens.com/simatic/printmaterial

Safety integrated automation

SIMATIC ET 200pro fail-safe distributed IO

ET 200pro

Overview



- Distributed I/O system with IP65/67 degree of protection for cabinet-free use at the machine.
- Small, multifunctional complete solution: Digital inputs/outputs, fail-safe modules, motor starters up to 5.5 kW, etc.
- Communication over PROFIBUS or PROFINET
- Mixed arrangement of fail-safe and standard modules in the same station
- Freely selectable connection technique: Direct, ECOFAST or M12 7/8"
- Power module for easy implementation of load groups
- Module replacement during operation (hot swapping)
- Easy installation as well as permanent wiring
- Transmission rate for PROFIBUS DP up to 12 Mbit/s
- Extensive diagnostics: Module-specific or channel-specific
- Intelligent motor starters for starting and protection of motors and loads up to 5.5 kW
 - Versions: Direct and reversing starters - Standard and High-Feature
- Fail-safe motor starters
- Fail-safe modules with safety-related signal processing according to PROFIsafe
- Frequency converters
- RFID communication modules
- Pneumatic interface modules

Application

SIMATIC ET 200pro is the new modular I/O system with high degree of protection IP65/66/67 for local, cabinetless applications. ET 200pro distinguishes itself through a small frame size and an innovative installation concept. ET 200pro can be optimized and very flexibly adapted to the requirements of the corresponding automation task with respect to the connection method, required I/Os and fieldbus connection. New features such as the integrated PROFIsafe safety technology, the PROFINET interface and the ability to hotswap modules permit it to be used for a wide range of applications.

With the integrated motor starters, conveyor applications can be implemented optimally, or drives of up to 5.5 kW can be controlled without control cabinet.

Design

The tried and tested separation of module and bus/power connection technology, which has already been used for the ET 200eco, is now also used for the digital and analog expansion modules of the ET 200pro. For the interface module this allows use of the T-functionality for the bus and 24 V power supply, and for the expansion modules it permits pre-wiring of sensor/actuator connections. This permanent wiring allows exactly one electronics module to be hot-swapped in the event of a fault without having to switch off the whole station. It can continue to operate fault-free while the module is being replaced. This ensures very high plant availability. When an electronics component is replaced, the whole I/O wiring can remain on the connecting module and does not have to be marked or removed.

Modules

The modules of the ET 200pro usually have two or three components. Interface and power modules as well as digital and analog expansion modules comprise:

- One bus connector which constitutes the backplane bus of the system
- One electronics module or interface module
- One connecting module

A backplane bus module is required for operation of motor starters.

A station is constructed from:

- One rack
- One interface module for PROFIBUS DP
- One connecting module for the interface module for PROFIBUS DP
 - CM IM DP direct with up to 6 M20 screwed cable glands
 - CM IM DP ECOFAST Cu
 - CM IM DP M12 7/8"

Or optionally

- each with an interface module for PROFINET IO
- a terminal module for the PROFINET IO interface module:
 - CM IM PN M12 7/8"
 - CM IM PN 2 x RJ45
 - CM IM PN 2 x SCRJ FO

Or optionally

- one CPU or one F-CPU
- Max. 16 expansion modules that can be mounted in stations up to 1 m in width

Expansion modules

The following expansion modules are available:

- Digital I/Os
- Analog inputs
- Analog outputs
- Connecting modules IO
 - CM IO 8 x M8 for digital electronic modules
 - CM IO 4 x M12 inverse for digital electronic modules
 - CM IO 4x M12 for digital or analog electronic modules
 - CM IO 4 x M12 P for digital electronic modules
 - CM IO 8x M12 for digital electronic modules
 - CM IO 8x M12 P for digital electronic modules
 - CM IO 8 x M12 D for digital electronic modules
 - CM IO 2 x M12 for digital electronic modules
 - CM IO 1 x M23 for digital electronic modules
- Power module electronics
- Connecting modules for power modules
 - CM PM-E PP (Push Pull)
 - CM PM-E directly with up to 2 M20 screwed cable glands
 - CM PM-E ECOFAST Cu
 - CM PM-E 7/8"

Safety integrated automation

SIMATIC ET 200pro fail-safe distributed IO

ET 200pro

- Fail-safe electronic modules
- Motor starters
- Fail-safe motor starters
- Frequency converters
- RFID communication modules
- Pneumatic interface modules

Racks

Two different racks are available for mounting the ET 200pro:

- **Narrow rack**
The narrow rack supports complete pre-assembly on the workbench by means of two mounting flanges outside of the ET 200pro station.



- **Compact rack**
When the compact rack is used, the small footprint of the ET 200pro system can be used to best advantage.



Function

The SIMATIC ET 200pro is easily configured with STEP 7. A GSD file is available for interfacing with systems of other manufacturers.

Technical specifications

Fail-safe distributed IO	SIMATIC ET 200pro
General technical specifications	
Electronic modules	<ul style="list-style-type: none"> • Digital inputs/outputs • Analog inputs • Analog outputs
Motor starter	
Cables and connections	M12 and M8 round connector with standard assignment for actuator/sensor
Transmission rate, max.	12 Mbit/s (PROFIBUS DP), 100 Mbit/s (PROFINET IO)
Supply voltage	24 V DC
Current consumption of one ET 200pro (internal and encoder supply, non-switched voltage), up to 55 °C, max.	≤ 5 A
Current consumption of one ET200pro per infeed (IM, PM, switched voltage, up to 55 °C, max.)	10 A
For overall configuration with looping through (several ET 200pro), up to 55 °C, max.	16 A (with connecting module, directly)
Degree of protection	IP65/66/IP67 for interface, digital and analog modules
Material	Thermoplastic (reinforced with glass fiber)
Ambient conditions	
Temperature	from 0 ... 55 °C (-25 °C on request)
Relative humidity	from 5 ... 100%
Atmospheric pressure	from 795 ... 1080 hPa
Mechanical stress	
<ul style="list-style-type: none"> • Vibrations 	<ul style="list-style-type: none"> • Vibration test conforming to IEC 60068, Part 2-6 (sinusoidal) • Constant acceleration 5 g, occasionally 10 g for interface, digital and analog modules • 2 g motor starters
<ul style="list-style-type: none"> • Shock 	<ul style="list-style-type: none"> • Shock test according to IEC 680068 Part 2 - 27, half-sine, 30 g, 18 ms duration for interface, digital and analog modules • 15 g, 11 ms duration for motor starters
Approvals	UL, CSA or cULus

Safety integrated automation

SIMATIC ET 200pro fail-safe distributed IO

SIMATIC IM 154-2 DP High Feature

Overview



Interface modules for handling communication between the ET 200pro and the higher-level master over PROFIBUS DP.

Application

The IM 154-2 DP High Feature interface module handles the communication between the ET 200pro and higher-level masters over PROFIBUS DP.

Design

Connecting modules for DP interface modules (must be ordered separately):

- CM IM DP direct
- CM IM DP ECOFAST Cu
- CM IM DP M12 7/8"

All connecting modules contain a PROFIBUS address adjuster that is visible and adjustable from the outside as well as a selectable, segmenting terminating resistor.

The IM 154-2 DP High Feature interface module must be implemented in PROFIsafe applications.

Function

The IM 154-2 DP High Feature interface modules are configured using STEP 7 V5.3 SP3. A hardware support package is available for STEP 7 V5.3 SP2 and higher.

Integration into older versions is possible via GSD.

Technical specifications

6ES7154-2AA01-0AB0	
General information	
Vendor identification (VendorID)	8119H
Supply voltage	
Permissible range (DC)	20.4 V ... 28.8 V
Short-circuit protection	Yes; over exchangeable fuses
Load voltage 1L+	
• Rated value (DC)	24 V
• Reverse polarity protection	Yes; against destruction
Input current	
from supply voltage 1L+, max.	200 mA
Power losses	
Power loss, typ.	5 W
Address area	
Addressing volume	
• Inputs	244 byte
• Outputs	244 byte

6ES7154-2AA01-0AB0	
Interfaces	
PROFIBUS DP	
• Automatic detection of transmission speed	Yes
1st interface	
Type of interface	PROFIBUS DP
Physics	RS 485
Functionality	
• DP slave	Yes
DP slave	
• Transmission rate, min.	9.6 kbit/s
• Transmission rate, max.	12 Mbit/s
Services	
- SYNC/FREEZE	Yes
- Direct data exchange (slave-to-slave communication)	Yes
Interrupts/diagnostics/status information	
Diagnostics indication LED	
• Bus fault BF (red)	Yes
• Group error SF (red)	Yes
• Monitoring 24 V voltage supply ON (green)	Yes
• Load voltage monitoring 24 V DC (green)	Yes
Parameter	
DPV1 operation	possible
Hardware interrupt	Parameterizable
Swapping interrupt	Parameterizable
Startup if setpoint not equal to actual configuration	Parameterizable
Galvanic isolation	
between supply voltage and electronics	Yes
Isolation	
Isolation checked with	500 V DC
Degree and class of protection	
IP67	Yes
Ambient conditions	
Operating temperature	
• Min.	-25 °C
• max.	55 °C
Storage/transport temperature	
• Min.	-40 °C
• max.	70 °C
Dimensions	
Width x Height x Depth (mm)	90 x 130 x 59.3
Weight, approx.	375 g

Safety integrated automation

SIMATIC ET 200pro fail-safe distributed IO

SIMATIC IM 154-2 DP High Feature

Selection and ordering data

	Article No.
IM154-2 High Feature interface module For ET 200pro; for communication between ET 200pro and higher-level masters over PROFIBUS DP; support of PROFIsafe.	6ES7154-2AA01-0AB0
Accessories	
CM IM DP ECOFAST connection module For connecting PROFIBUS DP and the 24 V power supply to PROFIBUS interface modules, 2 ECOFAST Cu connections.	6ES7194-4AA00-0AA0
CM IM DP direct connection module For connecting PROFIBUS DP and the 24 V power supply directly to PROFIBUS interface modules, up to six M20 cable glands.	6ES7194-4AC00-0AA0
CM IM DP M12, 7/8" connection module For connecting PROFIBUS DP and the 24 V power supply to PROFIBUS interface modules, 2 x M12 and 2 x 7/8".	6ES7194-4AD00-0AA0
Accessories for CM IM DP ECOFAST	
PROFIBUS ECOFAST hybrid cable, preassembled With 2 ECOFAST connectors, trailing-type cable with 2 x CU 0.64 mm ² and 4 x Cu 1.5 mm ² , in various lengths:	
1.5 m	6XV1830-7BH15
3.0 m	6XV1830-7BH30
5.0 m	6XV1830-7BH50
10 m	6XV1830-7BN10
15 m	6XV1830-7BN15
20 m	6XV1830-7BN20
25 m	6XV1830-7BN25
30 m	6XV1830-7BN30
35 m	6XV1830-7BN35
40 m	6XV1830-7BN40
45 m	6XV1830-7BN45
50 m	6XV1830-7BN50
PROFIBUS ECOFAST hybrid cable GP, preassembled With 2 ECOFAST connectors, trailing-type cable with 2 x CU 0.64 mm ² and 4 x Cu 1.5 mm ² , in various lengths:	
1.5 m	6XV1860-3PH15
3.0 m	6XV1860-3PH30
5.0 m	6XV1860-3PH50
10 m	6XV1860-3PN10
15 m	6XV1860-3PN15
20 m	6XV1860-3PN20
25 m	6XV1860-3PN25
30 m	6XV1860-3PN30
35 m	6XV1860-3PN35

	Article No.
40 m	6XV1860-3PN40
45 m	6XV1860-3PN45
50 m	6XV1860-3PN50
PROFIBUS ECOFAST hybrid cable, non-assembled Trailing-type cable with 2 x CU 0.64 mm ² and 4 x Cu 1.5 mm ² , in various lengths:	
50 m	6XV1830-7AN50
100 m	6XV1830-7AT10
PROFIBUS ECOFAST hybrid cable GP, non-assembled Trailing-type cable with 2 x CU 0.64 mm ² and 4 x Cu 1.5 mm ² , in various lengths:	
50 m	6XV1860-4PN50
100 m	6XV1860-4PT10
PROFIBUS ECOFAST hybrid connector 180 ECOFAST Cu, 2 x Cu, 4 x 1.5 mm ² , HANBRID connector <ul style="list-style-type: none"> • With male insert, 5-pack • With female insert, 5-pack 	6GK1905-0CA00 6GK1905-0CB00
PROFIBUS ECOFAST hybrid connector angular ECOFAST Cu, 2 x Cu, 4 x 1.5 mm ² , HANBRID connector <ul style="list-style-type: none"> • With male insert, 5-pack • With female insert, 5-pack 	6GK1905-0CC00 6GK1905-0CD00
Accessories for CM IM DP direct	
PROFIBUS trailing cable Max. acceleration 4 m/s ² , at least 3 000 000 bending cycles, bending radius at least 60 mm, 2-core shielded, sold by the meter, minimum order quantity 20 m, maximum order quantity 1 000 m.	6XV1830-3EH10
PROFIBUS FC Food bus cable With PE sheath for use in the food and beverages industry, 2-core, shielded, sold by the meter, minimum order quantity 20 m, maximum order quantity 1 000 m.	6XV1830-0GH10
PROFIBUS FC Robust bus cable With PUR sheath for use in environments subject to harsh chemicals and extreme mechanical stress, 2-core, shielded, sold by the meter, minimum order quantity 20 m, maximum order quantity 1 000 m.	6XV1830-0JH10
Power line 5-core, 5 x 1.5 mm ² , trailing type, sold by the meter, minimum order quantity 20 m, maximum order quantity 1 000 m.	6XV1830-8AH10

Safety integrated automation

SIMATIC ET 200pro fail-safe distributed IO

SIMATIC IM 154-2 DP High Feature

	Article No.
Accessories for CM IM DP M12, 7/8"	a. Anfr.
PROFIBUS M12 connecting cable Preassembled with two M12 connectors, 5-pin, in various lengths:	
1.5 m	6XV1830-3DH15
2.0 m	6XV1830-3DH20
3.0 m	6XV1830-3DH30
5.0 m	6XV1830-3DH50
10 m	6XV1830-3DN10
15 m	6XV1830-3DN15
7/8" connecting cable to power supply 5-core, 5 x 1.5 mm ² , trailing type, preassembled with two 7/8" connectors, 5-pin, in various lengths:	
1.5 m	6XV1822-5BH15
2.0 m	6XV1822-5BH20
3.0 m	6XV1822-5BH30
5.0 m	6XV1822-5BH50
10 m	6XV1822-5BN10
15 m	6XV1822-5BN15
M12 cable connector For ET 200eco, with axial cable outlet. • With male insert, 5-pack • With female insert, 5-pack	6GK1905-0EA00 6GK1905-0EB00
PROFIBUS M12 bus termination connector With male insert.	6GK1905-0EC00
7/8" cable connector For ET 200eco, with axial cable outlet. • With male insert, 5-pack • With female insert, 5-pack	6GK1905-0FA00 6GK1905-0FB00
M12 sealing cap For protection of unused M12 connections with ET 200pro.	3RX9 802-0AA00
Sealing cap 7/8" For protection of unused 7/8" connections with ET 200pro; 10 units per pack.	6ES7194-3JA00-0AA0

	Article No.
General accessories	a. Anfr.
ET 200pro rack • Narrow, for interface, electronics and power modules - 500 mm - 1000 mm - 2000 mm, can be cut to length • Compact, for interface, electronics and power modules - 500 mm - 1000 mm - 2000 mm, can be cut to length • Wide, for interface, electronics, power modules and motor starters - 500 mm - 1000 mm - 2000 mm, can be cut to length • Wide, for I/O modules and motor starters - 500 mm - 1000 mm - 2000 mm	6ES7194-4GA00-0AA0 6ES7194-4GA60-0AA0 6ES7194-4GA20-0AA0 6ES7194-4GC70-0AA0 6ES7194-4GC60-0AA0 6ES7194-4GC20-0AA0 6ES7194-4GB00-0AA0 6ES7194-4GB60-0AA0 6ES7194-4GB20-0AA0 6ES7194-4GD00-0AA0 6ES7194-4GD10-0AA0 6ES7194-4GD20-0AA0
Spare fuse 12.5 A fast-blow, for interface and power modules, 10 units per pack.	6ES7194-4HB00-0AA0
PROFIBUS Fast Connect bus cable Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1 000 m, minimum order quantity 20 m.	6XV1830-0EH10
PROFIBUS Hybrid Standard Cable GP Standard PROFIBUS hybrid cable with 2 energy cables (1.5 mm ²) for supplying data and energy for ET 200pro.	6XV1860-2R
Technical product data For CAX applications, one-off license.	6ES7991-0CD01-0YX0
SIMATIC Manual Collection Electronic manuals on DVD, multi-language: S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication).	6ES7998-8XC01-8YE0
SIMATIC Manual Collection – Update service for 1 year Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates.	6ES7998-8XC01-8YE2

Safety integrated automation

SIMATIC ET 200pro fail-safe distributed IO

SIMATIC IM 154-4 PN High Feature

Overview



Interface module for processing the communication between ET 200pro and a higher-level controller over PROFINET IO.

Application

The IM 154-4 PN High Feature interface module handles the communication between ET 200pro and the higher-level PLC over PROFINET IO.

Design

The interface module contains a 2-port switch required for linear bus topologies and for communication. PROFI-safe applications are also possible in combination with this module.

Connection modules for the IM 154-4 PN interface module (to be ordered separately):

- CM IM PN M12, 7/8"
- CM IM PN 2XRJ45
- CM IM PN 2XSCRJ FO

Function

The IM 154-4 PN High Feature interface modules are configured using STEP 7 V5.4. The module can be configured using a hardware support package from STEP 7 V5.3 SP3. A GSD file allows it to be integrated into older versions of STEP 7.

Technical specifications

6ES7154-4AB10-0AB0	
General information	
Vendor identification (VendorID)	0x002A
Device identifier (DeviceID)	0x0305
Supply voltage	
Rated value	24 V DC
Permissible range	20.4 V ... 28.8 V DC
Short-circuit protection	Yes; Fuse in lower part is exchangeable, the fuse on the IM-LP is not
Load voltage 1L+	
• Rated value (DC)	24 V
• Reverse polarity protection	Yes; against destruction
Input current	
from supply voltage 1L+, max.	400 mA; Dependent on terminal module, typ. maximum value for FO connection method, full load on RWB and 20.4 V input voltage

6ES7154-4AB10-0AB0	
Power losses, typ.	6 W; Dependent on terminal module, typ. maximum value for CU connection method, full load on RWB, for FO the value is approx. 0.7 W higher
Memory	
Micro Memory Card	No; Internal memory
Address area	
• Inputs	256 byte
• Outputs	256 byte
Interfaces	
Supports protocol for PROFINET IO	
• Automatic detection of transmission speed	Yes
• Transmission rate, max.	100 Mbit/s
• Services	ARP, PING, SNMP
Protocols	
Supports protocol for PROFINET IO	Yes
Interrupts/diagnostics/status information	
Diagnostics indication LED	
• Bus fault BF (red)	Yes; Additional LEDs (MAINT, P1/2 LINK, P1/2 RX/TX) available
• Group error SF (red)	Yes
• Monitoring 24 V voltage supply ON (green)	Yes
• Load voltage monitoring DC 24 V (green)	Yes
Parameter	
Diagnostic alarm	1
Hardware interrupt	1
Swapping interrupt	1
identifier-related diagnostic data	1
Module status	1
Channel-related diagnostics	1
Startup if setpoint not equal to actual configuration	1
Hot swapping of modules	1
Galvanic isolation	
between backplane bus and electronics	No
between supply voltage and electronics	Yes
Isolation	
Isolation checked with	500 V DC
Degree and class of protection	
	IP 67
Ambient conditions	
Operating temperature	-25 °C ... 55 °C
Storage/transport temperature	-40 °C ... 70 °C
Dimensions	
Width x Height x Depth (mm)	135 x 130 x 59.3
Weight, approx.	490 g

Safety integrated automation

SIMATIC ET 200pro fail-safe distributed IO

SIMATIC IM 154-4 PN High Feature

Selection and ordering data

	Article No.		Article No.
IM 154-4 PN High Feature interface module For communication between ET 200pro and higher-level controllers over PROFINET IO; support of PROFIsafe.	6ES7154-4AB10-0AB0	Other special lengths with 90° or 180° cable outlet.	
Accessories		http://support.automation.siemens.com/WW/view/en/26999294	
CM IM PN connection module M12, 7/8" For connecting PROFINET PN and 24 V power supply to PROFINET interface modules, 2 x M12 and 2 x 7/8".	6ES7194-4AJ00-0AA0	Power line 5-core, 5 x 1.5 mm ² , trailing type, sold by the meter, minimum order quantity 20 m, maximum order quantity 1 000 m.	6XV1830-8AH10
CM IM PN connection module 2xRJ45 For connecting PROFINET PN and 24 V power supply to PROFINET interface modules, 2 x RJ45 and 2 x push-pull power connector.	6ES7194-4AF00-0AA0	7/8" cable connector For ET 200eco, with axial cable outlet. <ul style="list-style-type: none"> With male insert, 5-pack With female insert, 5-pack 	6GK1905-0FA00 6GK1905-0FB00
CM IM PN 2xSCRJ FO connection module For connecting PROFINET PN and 24 V power supply to PROFINET interface modules, 2 x SCRJ FO and 2 x push-pull power connector.	6ES7194-4AG00-0AA0	Industrial Ethernet FastConnect installation cables <ul style="list-style-type: none"> IE FC TP Standard Cable GP 2 x 2; Sold by the meter, max. delivery unit 1 000 m; Minimum order quantity 20 m. IE FC TP Trailing Cable 2 x 2; Sold by the meter, max. order quantity 1000 m; Minimum order quantity 20 m. IE FC TP Trailing Cable GP 2 x 2; sold by the meter, max. delivery unit 1000 m; minimum order quantity 20 m. IE TP Torsion Cable GP 2 x 2; sold by the meter, max. delivery unit 1000 m; minimum order quantity 20 m. IE FC TP Marine Cable 2 x 2; Sold by the meter, max. order quantity 1000 m; Minimum order quantity 20 m. 	6XV1840-2AH10 6XV1840-3AH10 6XV1870-2D 6XV1870-2F 6XV1840-4AH10
M12 sealing cap For protection of unused M12 connections with ET 200pro.	3RX9 802-0AA00	IE RJ45 Plug PRO RJ45 plug in IP65/67-rated design for on-site assembly, plastic housing, insulation/displacement connection system, for SCALANCE X-200IRT PRO and ET200pro: 1 pack = 1 unit.	6GK1901-1BB10-6AA0
IE M12 connecting cables Preassembled with two M12 connectors, up to 85 m, in various lengths: 0.3 m 0.5 m 1.0 m 1.5 m 2.0 m 3.0 m 5.0 m 10 m 15 m Other special lengths with 90° or 180° cable outlet.	6XV1870-8AE30 6XV1870-8AE50 6XV1870-8AH10 6XV1870-8AH15 6XV1870-8AH20 6XV1870-8AH30 6XV1870-8AH50 6XV1870-8AN10 6XV1870-8AN15	IE SC RJ POF Plug PRO SC RJ plug for POF fibers in IP65/67-rated design for on-site assembly, plastic housing, for SCALANCE X-200IRT PRO and ET200pro 1 pack = 1 unit	6GK1900-0MB00-6AA0
7/8" sealing caps 1 pack = 10 units	6ES7194-3JA00-0AA0	IE SC RJ PCF Plug PRO SC RJ plug connector for PCF fibers in IP65/67-rated design for on-site assembly, plastic housing, for SCALANCE X-200IRT PRO 1 pack = 1 unit.	6GK1900-0NB00-6AA0
7/8" connecting cable to power supply 5-core, 5 x 1.5 mm ² , trailing type, preassembled with two 7/8" connectors, 5-pin, up to 50 m, in various lengths: 1.5 m 2.0 m 3.0 m 5.0 m 10 m 15 m	6XV1822-5BH15 6XV1822-5BH20 6XV1822-5BH30 6XV1822-5BH50 6XV1822-5BN10 6XV1822-5BN15	Power Plug PRO 5-pole power plug for 2 x 24 V power supply in IP65/67-rated design, for on-site assembly, plastic housing, for SCALANCE X-200IRT and ET200 pro 1 pack = 1 unit.	6GK1907-0AB10-6AA0

Safety integrated automation

SIMATIC ET 200pro fail-safe distributed IO

SIMATIC IM 154-4 PN High Feature

	Article No.
IE panel feedthrough Control cabinet feedthrough for converting M12 D-coded connection system (IP65) to RJ45 connection system (IP20). • 1 pack = 5 units	6GK1901-0DM20-2AA5
Push-Pull cable connector For 1L+/ 2L+, unassembled	6GK1907-0AB10-6AA0
Cover caps for Push-Pull RJ45 female connectors 5 items per pack	6ES7194-4JD50-0AA0
General accessories	
ET 200pro rack • Narrow, for interface, electronics and power modules - 500 mm - 1000 mm - 2000 mm, can be cut to length • Compact, for interface, electronics and power modules - 500 mm - 1000 mm - 2000 mm, can be cut to length • Wide, for interface, electronics, power modules and motor starters - 500 mm - 1000 mm - 2000 mm, can be cut to length • Wide, for I/O modules and motor starters - 500 mm - 1000 mm - 2000 mm	6ES7194-4GA00-0AA0 6ES7194-4GA60-0AA0 6ES7194-4GA20-0AA0 6ES7194-4GC70-0AA0 6ES7194-4GC60-0AA0 6ES7194-4GC20-0AA0 6ES7194-4GB00-0AA0 6ES7194-4GB60-0AA0 6ES7194-4GB20-0AA0 6ES7194-4GD00-0AA0 6ES7194-4GD10-0AA0 6ES7194-4GD20-0AA0
Spare fuse 12.5 A fast-blow, for interface and power modules, 10 units per pack.	6ES7194-4HB00-0AA0
SIMATIC Manual Collection Electronic manuals on DVD, multi-language: S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication).	6ES7998-8XC01-8YE0
SIMATIC Manual Collection – Update service for 1 year Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates.	6ES7998-8XC01-8YE2

Safety integrated automation

SIMATIC ET 200pro fail-safe distributed IO

SIMATIC IM 154-6 PN IWLAN

Overview



Interface module for handling communication between ET 200pro and host PROFINET IO controllers over Industrial Wireless LAN (IWLAN) radio networks for 2.4 GHz or 5 GHz with data transfer rates up to 54 Mbit/s.

- Protection against illegal access, espionage, tapping and falsification through use of effective encryption mechanisms
- Fast exchange of devices through use of interchangeable medium MICRO MEMORY CARD

Application

The IM 154-6 PN HF IWLAN High interface module handles communication between ET 200pro and host PROFINET IO controllers over Industrial Wireless LAN (IWLAN) radio networks for 2.4 GHz or 5 GHz.

It permits the use of an ET 200pro for applications in which a cabled solution can only be implemented at high cost (wear, distance, inaccessible terrain).

Possible fields of application include:

- Automatic guided vehicle systems
- Escalators
- Warehouse logistics
- Goods transportation
- Electric overhead conveyors
- Building management
- Service applications

The IM 154-6 PN HF IWLAN interface module communicates via Industrial Wireless LAN Access Points with PROFINET IO controllers which respond in accordance with the IEC 61158 standard.

Design

The IM 154-6 PN HF interface module IWLAN consists of:

- an interface unit (IWLAN radio card; compatible with IEEE 802.11a/h/b/g and IEEE 802.11e/i) and
- a connection unit

The interface unit and the connection unit are supplied together with the terminating module.

By means of a screw connection (R-SMA), antennas can be connected directly or also remotely to the interface module.

Device names as well as the user and configuration data can be saved on a SIMATIC Micro Memory Card.

Function

The IM 154-6 PN HF IWLAN interface module communicates with host systems. It is an IWLAN station, and exchanges data via access points. It can move freely within the radio field.

In addition to a reliable radio link, the IM 154-6 PN HF IWLAN interface module has the following features:

- IEEE 802.11b/ g/ a for different frequency bands
- IEEE 802.11h for different frequency bands ¹⁾
- IEEE 802.11e for multimedia, wireless multimedia (WMM)
- IEEE 802.11i for security
- Maximum transmission rate (gross data transfer rate) 54 Mbit/s
- Transmission methods (physical layer)
 - Direct Sequence Spread Spectrum (DSSS)
 - Complementary Code Keying (CCK)
 - Orthogonal Frequency Division Multiplexing (OFDM)
- Frequency bands / channels
 - 2.4 – 2.4835 GHz / 13 or 11
 - 5.15 – 5.25 GHz / 4
 - 5.25 – 5.35 GHz / 4 ¹⁾
 - 5.47 – 5.725 GHz / 11 ¹⁾
 - 5.745 – 5.825 GHz / 5
- Supported Industrial Wireless LAN services
 - Optimized media access with Industrial Point Coordination Function (iPCF)
 - Interruption-free swapping of radio cell with Rapid Roaming (RR)
 - Fault suppression mechanisms with Dynamic Frequency Selection (DFS) ¹⁾ and Transmission Power Control (TPC)
- Use of two antennas for optimization of data transmission

Security

A high degree of data security is achieved using the WPA2/IEEE 802.11i mechanisms. Modern procedures are defined here which control the regular replacement of the complete 128-bit keys and also provide access control (authentication) for a participant. Data encryption is carried out in accordance with the Advanced Encryption Standard (AES).

¹⁾ Not valid for 6ES7154-6AB50-0AB0

Safety integrated automation

SIMATIC ET 200pro fail-safe distributed IO

SIMATIC IM 154-6 PN IWLAN

Technical specifications

IM 154-6 PN IWLAN interface module	6ES7154-6AB00-0AB0 6ES7154-6AB50-0AB0
Supply voltage for electronic components 1L+	
• Rated value	24 V DC
• Valid range, lower limit	20.4 V DC
• Valid range, upper limit	28.8 V DC
• Short-circuit protection	Yes; replaceable fuse
• Reverse polarity protection	Yes; against destruction
• Max. infeed current	5 A
Load voltage 2L+	
• Rated value (DC)	24 V DC
• Lower limit of permissible range	20.4 V DC
• Upper limit of permissible range	28.8 V DC
• Short-circuit protection	Yes, for potential group
• Reverse polarity protection	Yes; against destruction
• Max. infeed current	8 A
Current consumption from supply voltage 1L+, typ.	335 mA
Power loss, typ.	8.5 W
Memory type	Micro Memory Card, is required
Address range/address volume	
• Outputs	256 byte
• Inputs	256 byte
Reports	
• PROFINET IO	Yes
• Industrial Wireless LAN	Yes
PROFINET IO services	ARP, PING, SNMP
Industrial Wireless LAN	
• Transmission rate, max.	54 Mbit/s
• Standards for wireless communication	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11h (not valid for 6ES7154-6AB50-0AB0) IEEE 802.11e IEEE 802.11i
• Radio frequency for WLAN in 2.4 GHz frequency band	2,4 ... 2.4835 GHz
• Radio frequency for WLAN in 5 GHz frequency band	5,15 ... 5.825 GHz
• Transmission method	Direct Sequence Spread Spectrum (DSSS) Complementary Code Keying (CCK) Orthogonal Frequency Division Multiplexing (OFDM)
• Supported IWLAN services	Current approvals can be found in the Internet at
http://support.automation.siemens.com/WW/view/en/19812553	
• Connection for external antenna	Yes

IM 154-6 PN IWLAN interface module	6ES7154-6AB00-0AB0 6ES7154-6AB50-0AB0
Parameters	
• Diagnostic interrupt	Yes
• Maintenance alarm	Yes
• Hardware interrupt	Yes
• Swapping interrupt	Yes
• Identifier-related diagnostic data	Yes
• Module status	Yes
• Channel-specific diagnostics	Yes
• Start-up if preset configuration is not equal to actual configuration	Yes
• Module replacement during operation	Yes
Diagnostics indication (LED)	Yes
• Group fault (red)	Yes
• Bus fault (red)	Yes
• Maintenance information (yellow)	Yes
• Monitoring 24 V power supply ON (green)	Yes
• Load voltage monitoring 24 V DC (green)	Yes
• Connection to an Access Point R1 LINK (green)	Yes
• Data exchange R1 RX/TX (yellow)	Yes
• Connection to a PG/PC (green)	Yes
• Data exchange with a PG/PC (yellow)	Yes
Insulation tested at	500 V DC
Isolation	
• Between the backplane bus and supply voltage 1L+ and 2L+	Yes
• Between Ethernet and supply voltage 1L+ and 2L+	Yes
• Between the supply voltage and electronic components	Yes
Operating temperature	
• Minimum	-25 °C
• Maximum	55 °C
Storage/transport temperature	
• Minimum	-40 °C
• Maximum	70 °C
Degree of protection	IP65, IP66, IP67
General information	
• Manufacturer's code (VendorID)	0x002A
• Device ID	0x0305
Dimensions	
• Width	135 mm
• Height	130 mm
• Depth	60 mm
Weight, approx.	1085 g

Safety integrated automation

SIMATIC ET 200pro fail-safe distributed IO

SIMATIC IM 154-6 PN IWLAN

Selection and ordering data

	Article No.		Article No.
IM 154-6 PN HF IWLAN interface module For communication between ET 200pro and higher-level controllers over Industrial Wireless LAN (IWLAN) radio networks; support of PROFIsafe. With various national approvals; refer to the current list of approvals. With approval for USA.	6ES7154-6AB00-0AB0 6ES7154-6AB50-0AB0	Twisted Pair cables 4x2 with RJ45 connectors 0.5 m 1 m 2 m 6 m 10 m	6XV1870-3QE50 6XV1870-3QH10 6XV1870-3QH20 6XV1870-3QH60 6XV1870-3QN10
Antennas with omnidirectional characteristic Mounting directly on IM154-6 PN HF IWLAN <ul style="list-style-type: none"> • ANT IM 154-6 IWLAN; 2 units For wall or pipe mounting <ul style="list-style-type: none"> • ANT 792-6MN; rod antenna N-Connect female 2.4 GHz; 1 unit • ANT793-6MN; rod antenna N-Connect female 5 GHz; 1 unit For use with the RCoax antenna system <ul style="list-style-type: none"> • ANT 792-4DN; RCoax N-Connect female 2.4 GHz; 1 unit • ANT793-4MN; RCoax N-Connect female 5 GHz; 1 unit 	6ES7194-4MA00-0AA0 6GK5792-6MN00-0AA6 6GK5793-6MN00-0AA6 6GK5792-4DN00-0AA6 6GK5793-4MN00-0AA6	Crossed Twisted Pair cables 4x2 with RJ45 connectors 0.5 m 1 m 2 m 6 m 10 m	6XV1870-3RE50 6XV1870-3RH10 6XV1870-3RH20 6XV1870-3RH60 6XV1870-3RN10
Antenna cables IWLAN RCoax; N-Connect / R-SMA 1 m 2 m 5 m 10 m IWLAN terminating resistor 50 ohms for second R-SMA antenna socket, 3 units.	6XV1875-5CH10 6XV1875-5CH20 6XV1875-5CH50 6XV1875-5CN10 6GK5795-1TR10-0AA6	IE FC RJ45 Plug 180 180° cable outlet; for line components and CPs/CPU's with Industrial Ethernet interface. <ul style="list-style-type: none"> • 1 pack = 1 unit • 1 pack = 10 units 	6GK1901-1BB10-2AA0 6GK1901-1BB10-2AB0
Accessories 7/8" connecting cable to power supply 5-core, 5 x 1.5 mm ² , trailing type, preassembled with two 7/8" connectors, in various lengths: 1.5 m 2.0 m 3.0 m 5.0 m 10 m 15 m Other special lengths with 90° or 180° cable outlet.	6XV1822-5BH15 6XV1822-5BH20 6XV1822-5BH30 6XV1822-5BH50 6XV1822-5BN10 6XV1822-5BN15 See	IE FC RJ45 Plug 90 90° cable outlet; e.g. for ET 200S. <ul style="list-style-type: none"> • 1 pack = 1 unit • 1 pack = 10 units 	6GK1901-1BB20-2AA0 6GK1901-1BB20-2AB0
Power line 5-core, 5 x 1.5 mm ² , trailing type, sold by the meter, minimum order quantity 20 m, maximum order quantity 1 000 m.	6XV1830-8AH10	General accessories ET 200pro rack <ul style="list-style-type: none"> • Narrow, for interface, electronics and power modules <ul style="list-style-type: none"> - 500 mm - 1000 mm - 2000 mm, can be cut to length • Compact, for interface, electronics and power modules <ul style="list-style-type: none"> - 500 mm - 1000 mm - 2000 mm, can be cut to length • Wide, for interface, electronics, power modules and motor starters <ul style="list-style-type: none"> - 500 mm - 1000 mm - 2000 mm, can be cut to length • Wide, for I/O modules and motor starters <ul style="list-style-type: none"> - 500 mm - 1000 mm - 2000 mm 	6ES7194-4GA00-0AA0 6ES7194-4GA60-0AA0 6ES7194-4GA20-0AA0 6ES7194-4GC70-0AA0 6ES7194-4GC60-0AA0 6ES7194-4GC20-0AA0 6ES7194-4GB00-0AA0 6ES7194-4GB60-0AA0 6ES7194-4GB20-0AA0 6ES7194-4GD00-0AA0 6ES7194-4GD10-0AA0 6ES7194-4GD20-0AA0
7/8" cable connector For ET 200eco, with axial cable outlet; with socket insert, pack of 5.	6GK1905-0FB00	Spare fuse 12.5 A fast-blow, for interface and power modules, 10 units per pack.	6ES7194-4HB00-0AA0
		Labels 20 x 7 mm, pale turquoise, 340 units per pack.	3RT1900-1SB20

Safety integrated automation

SIMATIC ET 200pro fail-safe distributed IO

SIMATIC IM 154-6 PN IWLAN

	Article No.
SIMATIC Micro Memory Card	
• 64 KB	6ES7953-8LF20-0AA0
• 128 KB	6ES7953-8LG20-0AA0
• 512 KB	6ES7953-8LJ30-0AA0
SIMATIC Manual Collection	6ES7998-8XC01-8YE0
Electronic manuals on DVD, multi-language: S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication).	
SIMATIC Manual Collection – Update service for 1 year	6ES7998-8XC01-8YE2
Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates.	

More information

Radio approvals

Current approvals can be found on the Internet.

In Germany

Further information can be found on the Internet at:

www.siemens.com/funkzulassungen

Outside Germany:

Further information can be found on the Internet at:

www.siemens.com/wireless-approvals

Safety integrated automation

SIMATIC ET 200pro fail-safe distributed IO

SIMATIC IM 154-8 F PN/DP CPU

Overview



- Interface module for SIMATIC ET 200pro with integrated fail-safe CPU
- CPU with PLC functionality equivalent to CPU S7-315F PN/DP; with distributed intelligence for preprocessing
- For constructing a fail-safe automation system for plants with increased safety requirements
- Complies with safety requirements up to SIL 3 according to IEC 61508, IEC 62061, up to PLe according to ISO 13849-1:2006 and Cat. 4 according to EN 954-1
- For high-performance control solutions in ET 200pro
- Increase of the availability of systems and machines
- Integral Web server with the option of creating user-defined Web sites
- Isochronous mode on PROFIBUS or PROFINET
- PROFINET IO Controller for up to 128 IO Devices
- PROFINET interface with integrated 3-port switch
- With many communication options: PG/OP communication, PROFINET IO, PROFINET CBA, open IE communication (TCP, ISO-on-TCP and UDP), web server and S7-communication (with loadable FBs)
- Fast, simple and end-to-end programming of a system with modular programs via STEP 7
- Compact SIMATIC Micro Memory Card (MMC)

Note:

SIMATIC Micro Memory Card required for operation of CPU.

Application

The intelligent interface module IM 154-8 F PN/DP CPU features integrated PLC functionality. The functions included correspond to those of the S7-300 CPU 315F PN/DP.

The IM 154-8 F PN/DP CPU can be used simultaneously as an IO Controller and as an I-Device on PROFINET via the integral PROFINET interface.

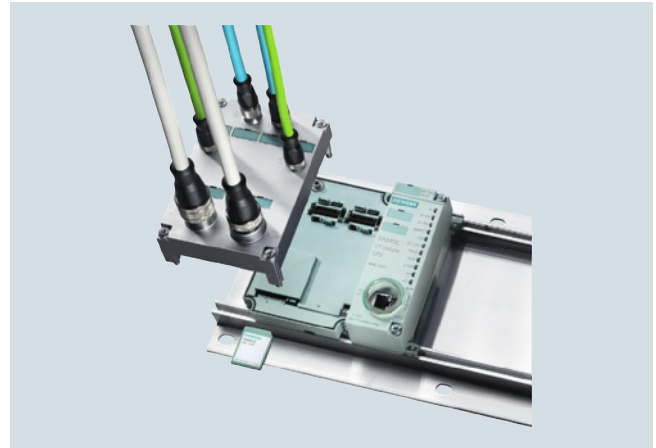
The ET 200pro can use this interface module to control autonomous technological functional units, e.g.:

- Conveyor systems, switches
- Lifting stations
- Positioning tasks

Further distributed I/Os can be connected via the additionally available PROFIBUS interface. In doing so, the IM 154-8 F PN/DP CPU can be used as master or slave on PROFIBUS.

In this way, applications in extensive manufacturing cells are possible with preprocessing; stand-alone operation is also possible. Cabinet-free installations are possible due to the high IP67 rating.

Design



Interface module and connection module

The IM 154-8 F PN/DP CPU intelligent interface module consists of two components:

- IM 154-8 F PN/DP CPU (6ES7154-8FB01-0AB0 or 6ES7154-8FX00-0AB0) and
- CM IM PN DP M12 7/8" connection module (6ES7194-4AN00-0AA0)

Both components are sold separately.

The IM 154-8 F PN/DP CPU interface module features the following:

- 3 PROFINET ports (2 x M12, 1 x RJ45)
- 2 MPI/PROFIBUS connections (input and output, M12)
- Integral CPU with the performance power of an S7-300-CPU 315F PN/DP
- RUN/STOP switch and RJ45 PROFINET port behind a sealed cover
- Micro Memory Card below the connection module

Function

Configurable and programmable properties

- I/O setup:
Type and scope
- Startup and cycle behavior:
Stipulation of maximum cycle time and loading as well as self-test functions
- Definition of the number of retentive bit memories, counters, timers and data blocks
- Clock memory:
Address setting
- Protection level:
Specifying the access rights to programs and data
- Definition of the handling and scope of diagnostic messages
- Cyclic interrupts:
Setting of periodicity
- Time-of-day interrupts:
Setting of date and time of start and periodicity

Safety integrated automation

SIMATIC ET 200pro fail-safe distributed IO

SIMATIC IM 154-8 F PN/DP CPU

Display and information functions

- Status and error functions;
LEDs indicate, for example, hardware, programming, time or I/O errors, as well as operating states such as RUN, STOP, restart, etc.
- Test functions;
the PG is used to indicate signal statuses during program execution, to modify process variables independently of the user program and to output the contents of stack memories
- Information functions;
you can use the programming device to obtain information about the storage capacity and operating mode of the CPU as well as the current utilization of the main and load memories, current cycle times and diagnostic buffer contents in plain text

Programming, parameterization

The ET 200pro with IM 154-8 F PN/DP CPU can be universally programmed, configured and diagnosed from any point in the network. STEP 7, V5.5 or higher, is used for this.

SIMATIC S7 Distributed Safety option package

The STEP 7 option package "SIMATIC S7 Distributed Safety" is required for programming the safety-related program components. The package contains all the necessary functions and blocks for creating the F program.

The F program with the safety functions is connected in F FBD or F LAD or using special function blocks from the F library. Use of F FBD or F LAD simplifies configuration and programming of the system and also acceptance testing thanks to the cross-system uniform presentation form. Programmers can concentrate fully on the safety-related application without having to use additional tools.

SIMATIC S7 Distributed Safety (Classic) and SIMATIC Safety Advanced V13 (TIA Portal V13) option packages

The STEP 7 option packages "SIMATIC S7 Distributed Safety" (Classic) or SIMATIC Safety Advanced V13 (TIA Portal V13) are required for programming the safety-related program sections. The packages contains all the functions and blocks required to create the F program.

The F program with the safety functions is created in F-FBD or F-LAD or using special function blocks from the F library. Use of F-FBD or F-LAD simplifies configuration and programming of the plant and, due to the cross-plant, uniform presentation, also acceptance testing. The programmer can therefore concentrate entirely on configuring the safety-related application, without the need to use any additional tools.

Technical specifications

	6ES7154-8FB01-0AB0	6ES7154-8FX00-0AB0
General information		
Engineering withYes		
• Programming package	STEP 7 V 5.5, Distributed Safety V 5.4 SP4 STEP 7 Professional V13 SP1 or higher: STEP 7 Safety Advanced V13	STEP 7 V5.5 mit HSP 222 + Distributed Safety V5.4 SP4 STEP 7 Professional V13 SP1 or higher: STEP 7 Safety Advanced V13
Supply voltage		
24 V DC	Yes	Yes
Power losses		
Power loss, typ.	8.5 W; Typical	8.5 W; Typical
Memory		
Main memory		
• integrated	512 kbyte	1 536 kbyte
Load memory		
• pluggable (MMC), max.	8 Mbyte	8 Mbyte
CPU processing times		
for bit operations, typ.	0.05 µs	0.025 µs
for word operations, typ.	0.09 µs	0.03 µs
for fixed point arithmetic, typ.	0.12 µs	0.04 µs
for floating point arithmetic, typ.	0.45 µs	0.16 µs
Counters, timers and their retentivity		
S7 counter		
• Number	256	256
IEC counter		
• present	Yes	Yes
S7 times		
• Number	256	256
IEC timer		
• present	Yes	Yes
Data areas and their retentivity		
Flags		
• Number, max.	2 048 byte	2 048 byte

Safety integrated automation

SIMATIC ET 200pro fail-safe distributed IO

SIMATIC IM 154-8 F PN/DP CPU

	6ES7154-8FB01-0AB0	6ES7154-8FX00-0AB0
Address area		
I/O address area		
• Inputs	2 048 byte	2 048 byte
• Outputs	2 048 byte	2 048 byte
Process image		
• Inputs, adjustable	2 048 byte	2 048 byte
• Outputs, adjustable	2 048 byte	2 048 byte
Time of day		
Clock		
• Hardware clock (real-time clock)	Yes	Yes
Operating hours counter		
• Number	1	1
1st interface		
Type of interface	Integrated RS 485 interface	Integrated RS 485 interface
Physics	RS 485/connection: 2 x M12 b-coded	RS 485/connection: 2 x M12 b-coded
Functionality		
• MPI	Yes	Yes
• DP master	Yes	Yes
• DP slave	Yes	Yes
• Point-to-point connection	No	No
DP master		
• Number of DP slaves, max.	124	124
2nd interface		
Type of interface	PROFINET	PROFINET
Physics	Ethernet (2 x M12 d-coded; 1 x RJ45)	Ethernet (2 x M12 d-coded; 1 x RJ45)
Number of ports	3	3
Functionality		
• MPI	No	No
• DP master	No	No
• DP slave	No	No
• PROFINET IO Controller	Yes; Also simultaneously with IO-Device functionality	Yes; Also simultaneously with IO-Device functionality
• PROFINET IO Device	Yes; Also simultaneously with IO Controller functionality	Yes; Also simultaneously with IO Controller functionality
• PROFINET CBA	Yes	Yes
PROFINET IO Controller		
• Max. number of connectable IO devices for RT	128	128
• Number of IO devices with IRT and the option "high flexibility"	128	128
• Number of IO Devices with IRT and the option "high performance", max.	64	64
Isochronous mode		
Isochronous operation (application synchronized up to terminal)	Yes; Via PROFIBUS DP or PROFINET interface	Yes; Via PROFIBUS DP or PROFINET interface
Communication functions		
PG/OP communication	Yes	Yes
Global data communication		
• supported	Yes	Yes
S7 basic communication		
• supported	Yes	Yes
S7 communication		
• supported	Yes	Yes

Safety integrated automation

SIMATIC ET 200pro fail-safe distributed IO

SIMATIC IM 154-8 F PN/DP CPU

	6ES7154-8FB01-0AB0	6ES7154-8FX00-0AB0
Open IE communication		
• TCP/IP	Yes; via integrated PROFINET interface and loadable FBs	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.	8	8
• ISO-on-TCP (RFC1006)	Yes	Yes
- Number of connections, max.	8	8
• UDP	Yes	Yes
- Number of connections, max.	8	8
Web server		
• supported	Yes	Yes
Configuration programming		
• Programming language		
- LAD	Yes	Yes
- FBD	Yes	Yes
- STL	Yes	Yes
- SCL	Yes	Yes
- CFC	Yes	Yes
- GRAPH	Yes	Yes
- HiGraph®	Yes	Yes
Know-how protection		
• User program protection/pass-word protection	Yes	Yes
• Block encryption	Yes; With S7 block Privacy	Yes; With S7 block Privacy
Dimensions		
Width	135 mm	135 mm
Height	130 mm	130 mm
Depth	65 mm; 60 mm without cover for RJ45 socket; 65 mm with cover for RJ45 socket	65 mm; 60 mm without cover for RJ45 socket; 65 mm with cover for RJ45 socket
Weight		
Weight, approx.	720 g	720 g

3

Selection and ordering data

	Article No.		Article No.
IM 154-8 F PN/DP CPU interface module, V3.2		STEP 7 Safety Advanced V13	
Fail-safe PROFINET IO Controller for operating distributed I/Os on PROFINET, with integrated PLC functionality.		Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, S7-1500F, WinAC RTX F, ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco	
• Main memory 512 Kbyte	6ES7154-8FB01-0AB0	Requirement: STEP 7 Professional V13 SP1	
• Main memory 1.5 Mbyte	6ES7154-8FX00-0AB0	• Floating license for 1 user	6ES7833-1FA13-0YA5
Distributed Safety V5.4 programming tool		• Floating license for 1 user, license key download without software and documentation ²⁾ ; email address required for delivery	6ES7833-1FA13-0YH5
Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco		STEP 7 Safety Advanced Upgrade	
Requirement: STEP 7 V5.3 SP3 and higher		Upgrade from STEP 7 Safety Advanced V11 to STEP 7 Safety Advanced V13.	6ES7833-1FA13-0YE5
• Floating license	6ES7833-1FC02-0YA5	Floating License for one User, Software and documentation on CD	
• Floating license for 1 user, license key download without software and documentation ²⁾ ; email address required for delivery.	6ES7833-1FC02-0YH5	Distributed Safety V5.4 SP5 to Safety Advanced V13 Combo.	6ES7833-1FA13-0YF5
Distributed Safety Upgrade		Combo License for parallel use Distributed Safety V5.4 and STEP 7 Safety Advanced V13.	
From V5.x to V5.4; Floating license for 1 user	6ES7833-1FC02-0YE5	Software and documentation on CD	

Safety integrated automation

SIMATIC ET 200pro fail-safe distributed IO

SIMATIC IM 154-8 F PN/DP CPU

	Article No.
Accessories	
MMC 64 KB ¹⁾ For program backup.	6ES7953-8LF20-0AA0
MMC 128 KB ¹⁾ For program backup.	6ES7953-8LG20-0AA0
MMC 512 KB ¹⁾ For program backup.	6ES7953-8LJ30-0AA0
MMC 2 MB ¹⁾ For program backup and/or firm-ware updates.	6ES7953-8LL31-0AA0
MMC 4 MB ¹⁾ For program backup.	6ES7953-8LM20-0AA0
MMC 8 MB ¹⁾ For program backup.	6ES7953-8LP20-0AA0
Connection module For CPU IM154-8 PN/DP, with 4 x M12 and 2 x 7/8", for connecting PROFINET and PROFIBUS DP.	6ES7194-4AN00-0AA0
SCALANCE X-200 Industrial Ethernet Switches With integral SNMP access, Web diagnostics, copper cable diagnostics and PROFINET diagnostics, for setting up linear, star and ring structures SCALANCE X208PRO, in degree of protection IP65, with eight 10/100 Mbit/s M12 ports, incl. eleven M12 dust caps.	6GK5208-0HA00-2AA6
Industrial Ethernet FC RJ45 Plug 90 RJ45 plug-in connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 90° cable outlet. <ul style="list-style-type: none">• 1 unit• 10 units	6GK1901-1BB20-2AA0 6GK1901-1BB20-2AB0
Industrial Ethernet FC RJ45 Plug 180 RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet <ul style="list-style-type: none">• 1 unit• 10 units• 50 units	6GK1901-1BB10-2AA0 6GK1901-1BB10-2AB0 6GK1901-1BB10-2AE0
Industrial Ethernet FastConnect installation cables <ul style="list-style-type: none">• FastConnect Standard Cable• FastConnect Trailing Cable• FastConnect Marine Cable	6XV1840-2AH10 6XV1840-3AH10 6XV1840-4AH10

	Article No.
Industrial Ethernet FastConnect installation cables <ul style="list-style-type: none">• IE FC TP Trailing Cable GP 2 x 2; sold by the meter, max. delivery unit 1000 m; minimum order quantity 20 m.• IE TP Torsion Cable GP 2 x 2; sold by the meter, max. delivery unit 1000 m; minimum order quantity 20 m.	6XV1870-2D 6XV1870-2F
Industrial Ethernet FastConnect Stripping Tool	6GK1901-1GA00
IE Connecting Cable M12-180/M12-180 <ul style="list-style-type: none">• Preamsembled IE FC TP Trailing Cable GP 2 x 2 (PROFINET Type C) with two 4-pin M12 plugs (4-pin, D-coded), degree of protection IP65/IP67, in various lengths:<ul style="list-style-type: none">- 0.3 m- 0.5 m- 1.0 m- 1.5 m- 2.0 m- 3.0 m- 5.0 m- 10 m- 15 m• PROFINET M12 connecting cable, trailing cable preassembled at both ends with angled M12 connectors (male contact insert), in various lengths:<ul style="list-style-type: none">- 3.0 m- 5.0 m- 10 m• PROFINET M12 connecting cable, trailing cable preassembled at one end with angled M12 connector (male contact insert at one end, other end open), in various lengths:<ul style="list-style-type: none">- 3.0 m- 5.0 m- 10 m	6XV1870-8AE30 6XV1870-8AE50 6XV1870-8AH10 6XV1870-8AH15 6XV1870-8AH20 6XV1870-8AH30 6XV1870-8AH50 6XV1870-8AN10 6XV1870-8AN15 3RK1902-2NB30 3RK1902-2NB50 3RK1902-2NC10 3RK1902-2HB30 3RK1902-2HB50 3RK1902-2HC10
IE FC M12 Plug PRO PROFINET M12 plug connector, D-coded with fast connection system, axial cable outlet. <ul style="list-style-type: none">• 1 unit• 8 units• PROFINET M12 plug connector, D-coded, angled	6GK1901-0DB20-6AA0 6GK1901-0DB20-6AA8 3RK1902-2DA00
IE panel feedthrough Cabinet feedthrough for converting from the M12 connection system (D-coded, IP65/IP67) to the RJ45 connection system (IP20), 1 pack = 5 units	6GK1901-0DM20-2AA5

¹⁾ An MMC is essential for operating the CPU.

²⁾ For up-to-date information and download availability, see:
www.siemens.com/tia-online-software-delivery

Safety integrated automation

SIMATIC ET 200pro fail-safe distributed IO

SIMATIC IM 154-8 F PN/DP CPU

Article No.	
7/8" connecting cable to power supply	
<ul style="list-style-type: none"> 5-core, 5 x 1.5 mm², trailing type, preassembled with two 7/8" connectors (axial cable outlet), 5-pin, up to 50 m, in various lengths: <ul style="list-style-type: none"> 1.5 m 6XV1822-5BH15 2.0 m 6XV1822-5BH20 3.0 m 6XV1822-5BH30 5.0 m 6XV1822-5BH50 10 m 6XV1822-5BN10 15 m 6XV1822-5BN15 Other special lengths with 90° or 180° cable outlet See 	
http://support.automation.siemens.com/www/view/en/26999294	
<ul style="list-style-type: none"> Power cable, can be trailed, 5 x 1.5 mm², preassembled at both ends with 7/8" angled connectors (female contact insert at one end, male contact insert at the other end), in various lengths: <ul style="list-style-type: none"> 3.0 m 3RK1902-3NB30 5.0 m 3RK1902-3NB50 10 m 3RK1902-3NC10 Power cable, can be trailed, 5 x 1.5 mm², preassembled at one end with 7/8" angled connector with female contact insert (female contact insert at one end, other end open), in various lengths: <ul style="list-style-type: none"> 3.0 m 3RK1902-3GB30 5.0 m 3RK1902-3GB50 10 m 3RK1902-3GC10 	
Power line	6XV1830-8AH10
5-core, 5 x 1.5 mm ² , trailing type, sold by the meter, minimum order quantity 20 m, maximum order quantity 1000 m.	
7/8" cable connector	
For ET 200eco, with axial cable outlet	
<ul style="list-style-type: none"> with male contact insert, 5-pack 6GK1905-0FA00 with female contact insert, 5-pack 6GK1905-0FB00 angled, with female contact insert, 1 unit 3RK1902-3DA00 angled, with male contact insert, 1 unit 3RK1902-3BA00 	
7/8" cover cap, 10 per pack	6ES7194-3JA00-0AA0
Twisted Pair cables 4x2 with RJ45 connectors	
0.5 m	6XV1870-3QE50
1 m	6XV1870-3QH10
2 m	6XV1870-3QH20
6 m	6XV1870-3QH60
10 m	6XV1870-3QN10

Article No.	
Crossed Twisted Pair cables 4x2 with RJ45 connectors	
0.5 m	6XV1870-3RE50
1 m	6XV1870-3RH10
2 m	6XV1870-3RH20
6 m	6XV1870-3RH60
10 m	6XV1870-3RN10
M12 sealing cap	3RX9802-0AA00
For protection of unused M12 connections with ET 200pro	
M12 sealing caps with female thread	6ES7194-4JD60-0AA0
5 units	
PROFIBUS M12 connecting cable	
Preassembled, with two 5-pole M12 connectors/sockets, up to 100 m, in various lengths: <ul style="list-style-type: none"> 1.5 m 6XV1830-3DH15 2.0 m 6XV1830-3DH20 3.0 m 6XV1830-3DH30 5.0 m 6XV1830-3DH50 10 m 6XV1830-3DN10 15 m 6XV1830-3DN15 	
Additional special lengths with 90° or 180° cable outlet. See http://support.automation.siemens.com/WWW/view/en/26999294	
M12 bus termination connector for PROFIBUS, female contact insert	6GK1905-0ED00
M12 bus termination connector for PROFIBUS, male contact insert	6GK1905-0EC00
M12 plug connector, axial outlet, with male contact insert	6GK1905-0EA00
PROFIBUS FC Standard Cable GP	6XV1830-0EH10
Standard type with special design for fast mounting, 2-core, shielded.	
Sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m.	
PROFIBUS FC Trailing Cable	6XV1830-3EH10
2-wire, shielded.	
PROFIBUS FC Food Cable	6XV1830-0GH10
2-wire, shielded.	
Sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m.	
PROFIBUS FC Robust Cable	6XV1830-0JH10
2-wire, shielded.	
Sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m.	
PROFIBUS M12 cable connector	
5-pole, B-coded, metal casing, 1 pack = 5 units.	
• Female contact insert	6GK1905-0EB00

1) An MMC is essential for operating the CPU

2) For up-to-date information and download availability, see: www.siemens.com/tia-online-software-delivery

Safety integrated automation

SIMATIC ET 200pro fail-safe distributed IO

Fail-safe digital expansion modules

Overview



Fail-safe digital inputs/outputs with degree of protection IP65/66/67 for application on the machine level without control cabinet

Fail-safe digital inputs

- For fail-safe reading of sensor information (1 or 2 channels)
- Provide integral discrepancy evaluation for 2-out-of-2 signals
- Internal sensor supplies (incl. test function) available

Fail-safe digital outputs

- Fail-safe 2-channel activation (sink/source output) by actuators
- Actuators can be driven by up to 2 A

All modules are certified up to SIL 3 (IEC 61508) and feature detailed diagnostics.

The modules support PROFIsafe, both in PROFIBUS, and in PROFINET configurations. They can be used with IM 151-7 F-CPU, CPU31xF-2 DP, CPU31xF-2 PN/DP and CPU416F-2.

Application

The fail-safe modules of ET200pro can be used to implement the safety-related application requirements as an integral part of the overall automation. The safety functions required for fail-safe operation are integrated in the modules. The modules can be used for safety circuits up to Cat. 4/ SIL 3.

Communication to fail-safe SIMATIC S7 CPUs is performed by means of PROFIsafe.

The modules can be operated in a distributed configuration down-circuit of the IM 154-2 High Feature and IM154-4 PROFINET High Feature interface modules.

A standard power module is required to supply the modules.

Technical specifications

	6ES7148-4FA00-0AB0	6ES7148-4FC00-0AB0	6ES7148-4FS00-0AB0
Supply voltage	20.4 V DC... 28.8 V DC	20.4 V DC... 28.8 V DC	20.4 V DC... 28.8 V DC
Digital inputs	16	8	2
Digital outputs	0	4	3
Output current • for signal "1" rated value		2 A	
Dimensions Width x Height x Depth (mm)	90 x 130 x 65	90 x 130 x 65	45 x 130 x 65

Selection and ordering data

	Article No.
Fail-safe digital input module 8/16 F-DI PROFIsafe 24 V DC, including bus module Connection module must be ordered separately	6ES7148-4FA00-0AB0
Fail-safe digital input/output module 4/8 F-DI, 4 F-DO 2 A 24 V DC, including bus module Connection module must be ordered separately	6ES7148-4FC00-0AB0
Fail-safe electronic module F-Switch PROFIsafe Three fail-safe PP-switching outputs for safe switching of the rear panel busbar (2L+, F0, F1); two fail-safe digital inputs, 45 mm; usable up to cat. 4 (EN 954)/SIL3 (IEC 61508)	6ES7148-4FS00-0AB0

	Article No.
Accessories	
Connection module For the fail-safe electronic module F-switch PROFIsafe	6ES7194-4DA00-0AA0
Connection module For the fail-safe electronic module 4/8 F-DI/4 F DO, 24 V DC/2 A	6ES7194-4DC00-0AA0
Connection module For the fail-safe electronic module 8/16 F-DI, 24 V DC/2 A	6ES7194-4DD00-0AA0
PROFIBUS DP interface module IM154-2 Including termination module	6ES7154-2AA01-0AB0
PROFINET interface module IM154-4 PN Including termination module	6ES7154-4AB10-0AB0
M12 sealing cap For protection of unused M12 connections with ET 200pro	3RX9802-0AA00

Safety integrated automation

SIMATIC ET 200M fail-safe distributed IO

ET 200M

Application



- Modular I/O system with IP20 degree of protection, particularly suitable for user-specific and complex automation tasks.
- Can be expanded with S7-300 automation system signal, communication and function modules
- Applicable Ex analog input or output modules with HART optimize the ET 200M for use in process engineering.
- Can be used in redundant systems (S7-400H, S7-400F/FH)
- Consists of a PROFIBUS DP or PROFINET interface module IM 153, up to 8 or 12 I/O modules of the S7-300 automation system (structure with bus connection or with active bus modules), and a power supply if applicable
- Modules can be replaced during operation (hot swapping) with the bus modules active
- Transmission rates up to 12 Mbit/s
- Ex approval to Cat. 3 for Zone 2 acc. to ATEX100 a
- **Failsafe digital in/outputs as well as analog inputs for safety-oriented signal processing in accordance with PROFIsafe**
- Support of modules with expanded user data, e.g. HART modules with HART minor variables

Design

The ET 200M modular I/O station comprises:

- One IM 153 interface
- Up to 12 I/O modules of the S7-300 automation system and
- If required, one power supply.

There are no slot rules for the I/O modules. Any combination is permissible.

The ET 200M is connected via an interface module IM 153 to PROFIBUS DP or PROFINET. A connection to PROFIBUS DP using fiber-optic technology is additionally possible by means of additional optical link modules (OLM) or the optical bus terminal (OBT).

Depending on the quantity structure of the interface module (IM), different numbers and types of I/O modules can be inserted.

The full address space of the ET 200M can only be used with a suitable master.

S7 master module	IM 153-2 (High Feature)
Function	<ul style="list-style-type: none"> • PROFIBUS DP standard slave with full S7 functionality for FM/CP • Redundancy through 2 x IM 153-2 • Time stamp function and time-of-day synchronization • Routing of parameter settings to intelligent field devices • Isochronous mode • Configuration changes in RUN in the non-redundant system • Identification functions • Firmware update via bus
Modules that can be used	SM/FM/CP
Function	PROFIBUS DP standard slave, DP V1 slave
Modules that can be used	All digital and analog S7-300 signal modules

Configuration using bus connectors

Easy assembly using SIMATIC S7-300 bus connectors makes ET 200M flexible and service-friendly:

- Module assembly; simply locate the modules on the mounting rail, pivot them and screw them down.
- Integral backplane bus; the backplane bus is integrated into the modules. The modules are connected through bus connectors that are plugged into the back of the housings.

Assembly using active bus modules

The active bus modules allow modules to be swapped during operation:

- Time-saving module replacement; operation is not interrupted on module replacement, it continues with the remaining modules. When the new module is inserted, it is automatically brought into operation again. When an S7-400 is used as a master, swapping of a distributed module is handled in the same manner as swapping of a central module. The relevant interrupt is generated in the CPU. For all other DP standard masters, a signal is sent to the master via DP diagnostics. With an S7-300 as master, hot swapping of modules is not supported.

Safety integrated automation

SIMATIC ET 200M fail-safe distributed IO

ET 200M

Various modules are available for assembling the ET 200M that are mounted on a special mounting rail.

- BM PS/IM bus module to hold the power supply and IM 153
- Bus module BM IM 153/IM 153 for receiving two IM 153-2 modules for redundant operation
- BM 2x40 bus module to hold 2 I/O modules of 40 mm in width
- BM 1x80 bus module to hold 1 I/O module of 80 mm in width

To achieve the specified thread length, an explosion-proof partition is available as spare part; it can be inserted between two bus modules.

- Easy assembly; the bus modules are pivoted in the mounting rail, arranged end-to-end and fixed using side connectors. The modules can then be inserted in the bus modules and screwed down so that they contact the bus module connector. Connectors of unused slots must be protected with backplane bus covers. A bus module cover must be plugged into the side of the last bus module.

Power supply

For ET 200M, single-phase power supplies are available with 2 A, 5 A and 10 A as special variants.

Function

Operating mode

The inputs and outputs of the modular ET 200M I/O station can be accessed from the user program in the PLC in the same manner as the inputs and outputs of the central controller.

Communication through the bus system is handled completely by the master interface module in the central controller and the IM 153 interface module.

Proper operation of the ET 200M is verified by way of diagnostic functions.

The ET 200M diagnoses:

- Module faults
- Short circuits (outputs)
- Bus errors, i.e. faulty data transfer
- 24 V DC load voltage supply
- Plugging and removal of I/O modules

The diagnostic data are analyzed as follows:

- Remotely through diagnostic LEDs on the ET 200M
- Centrally via the CPU in the programmable controller

Configuration and parameterization

	Configuration message frame	Parameter assignment frame
Length	15 byte + 5 byte per S7-300 I/O module	10 byte + 20 byte per parameterizable S7-300 I/O module

Calculating the frame length required for the configuration and parameter assignment frame

The DP master must provide the required quantity of configuration and parameterization data. A few masters have a restricted configuration and parameterization frame length. On the S5-95U/DP, for example, the maximum length of the configuration and parameterization frame is 32 byte. This means that in this example up to 3 modules, one of which may be parameterizable, can be plugged into the ET 200M.

When the station is connected to master modules which are not parameterized with COM PROFIBUS or STEP 7 (operation on third-party master modules), a fixed preassigned GSD file can be created with COM PROFIBUS from Version 3. This file is then loaded into the configuration tool of the third-party manufacturer and can be used for simple parameter assignment of the station.

This allows the use of the user-friendly plain-text parameterization feature of COM PROFIBUS; there is no need for hexadecimal code inputs in the third-party configuring tool.

To be able to use the entire address area of the IM 153, a suitable master is required.

Technical specifications

General technical data ET 200M

Cables and connections	Screw and spring-loaded connections in permanent wiring
Degree of protection	IP20
Ambient temperature on vertical wall (preferred mounting position)	<ul style="list-style-type: none"> • with horizontal assembly 0 to +60 °C • with other assembly 0 to +40 °C
Relative humidity	5 to 95% (RH stress level 2 according to IEC 1131-2)
Atmospheric pressure	795 to 1080 hPa
Mechanical stress	<ul style="list-style-type: none"> • Vibrations IEC 68, parts 2 – 6: 10 - 57 Hz (const.amplitude 0.075 mm) 57 - 150 Hz (constant acceleration 1 g) • Shock IEC 68, parts 2 – 27 half-sine, 15 g, 11 ms

More information

Brochures

Information material for downloading can be found in the Internet: www.siemens.com/simatic/printmaterial

Safety integrated automation

SIMATIC ET 200M fail-safe distributed IO

F-digital and F-analog modules

Overview

The fail-safe CPUs of SIMATIC S7 and the fail-safe signal modules of SIMATIC ET 200S, ET 200pro, ET 200eco and ET 200M have been specially developed for distributed safety-related applications in production engineering. Thanks to the discreetly modular structure of the fail-safe I/OS, safety technology is only applied where actually required. The new system replaces conventional electromechanical components, such as:

- Freely programmable, safe linking of sensors to actuators
- Selective safe shutdown of actuators
- Mixed configuration of fail-safe modules and standard modules in a station
- Single-bus concept; fail-safe signals and standard signals are transferred over a single bus medium (PROFIBUS DP, PROFINET)

Totally Integrated Automation (TIA)

Safety technology (Safety Integrated) is a component of Totally Integrated Automation which provides total integration of safety automation and standard automation (SIMATIC S7).

Where standard automation (classical PLC) and safety automation (electro-mechanics) are still separate today, these two worlds are growing together into a uniform, integrated overall system.

Siemens can therefore present itself as a complete supplier for automation technology in which safety engineering is part of the standard automation and system-wide integration exists.

Safety integrated automation

SIMATIC ET 200M fail-safe distributed IO

Interface module IM 153-2 High Feature

Overview



The ET 200M system with various interface modules is available for the decentralized use of S7-300 I/O modules. Depending on the application purpose, the best suited IM in terms of costs and functions can be selected:

IM 153-2 High Feature

For higher requirements in manufacturing technology, such as the use of **F-technology** or the highest performance in conjunction with clock synchronization, the IM 153-2 High Feature is available. This IM is also designed for use with the PCS 7 in the field of manufacturing applications. This IM can be redundantly used and supports typical functions as they are required in the control field. These include, for example, clock synchronization or time stamping with an accuracy of up to 1ms.

Application

The IM 153-2 HF interface modules are required to connect the modular I/O device ET 200M to the PROFIBUS DP fieldbus.

These heads can be used in many different applications.

Special functions and modules for PCS7

The IM 153-2 is provided with special functions, such as clock synchronization, time stamping or I&M functions. In addition, special modules are available that take into account the increased diagnosis requirements in process engineering. For example, digital input modules allow for the connection of NAMUR sensors, have wire-break detectors at "0" and "1" signals and functions such as flatter monitoring or pulse stretching. In order to obtain a reasonable channel price, 8-channel HART modules may be used.

High availability systems

High availability systems are used in all cases where no system outage is permitted or the system restart after an unscheduled outage is tied to very high costs. Typical applications include, for example, power generation, power distribution, tunnel systems, baggage conveyor systems at airports, oil platforms, oil refineries, the manufacture of special glass, the semiconductor industry, etc.

In conjunction with the high-availability S7-400H (redundant CPUs), the ET 200M can be connected one-way (normal availability) or switched (increased availability).

Furthermore, the IM 153-2 can also be used in applications with S5-155H, with S7-300 / S7-400 with software redundancy as well as with the normal redundancy standardized in the PNO.

Area subject to explosion hazard

Various digital and analog modules exist as intrinsically safe versions for the Ex area. This means the modules themselves are installed in Zone 2 cost effectively; however, they can reach the sensors and actuators to be connected up to Zone 1. They are used, for example, in the chemical and pharmaceutical industry, on oil rigs or also in classic manufacturing plants, such as the printing industry or in paint shops in the automobile industry. They allow channel-wise, isolated processing of signals from the Ex zone 1. For use in the non-Ex area, the isolation from channel to channel for these modules is 250 V AC. In addition, there are still HART-capable analog modules.

Fail-safe systems

Fail-safe controllers switch to a safe state when a fault occurs and thus protect operators, machines, and the environment, e.g. for presses, robots or passenger transportation. For the connection of fail-safe signals to S7-300F or S7-400F/FH, several signal modules are available that provide SIL 2 or SIL 3 depending on the type of connection.

For the application of safety-related I/O modules, the IM 153-2 HF interface module must be used.

Highly dynamic production processes

Distributed solutions for the control of high-speed machines for production and machining processes with high accuracy are becoming increasingly important, e.g. for drive controls. For this reason, the time from the acquisition of a signal by the distributed I/O through to the appropriate response of the actuator must be kept as short and as accurately reproducible as possible. Synchronous coupling of a SIMATIC automation solution to the equidistant PROFIBUS is called "isochronous mode" and is supported by various signal modules of the ET 200M.

Design

- The IM 153-2 interface module serves as the head module (IM; Interface Module) of the ET 200M. Up to 8 or 12 I/O modules from the module product range of the S7-300 automation system can be connected to the interface module.
- The interface module and the necessary I/O modules are assembled on a profile rail for the S7-300. During assembly, the I/O modules are connected to one another using bus connectors and using the IM 153 interface modules.
- For redundant operation, two IM 153-2 are mounted onto the BM IM/IM bus module. Special profile rails are available to accommodate the bus modules.
- When equipping the IM153 with S7-300 modules, slot rules do not have to be taken into account.

How they work

The IM 153-2 interface module allows the design of redundant PROFIBUS DP systems. On failure of the active branch, the passive IM 153-2 takes over the corresponding functions without interruption.

Parameterization

STEP 7

Configuration is carried out using HW Config by selecting the respective headend from the corresponding HW catalog. The configuration with modules is also carried out from the corresponding HW catalog.

Third-party tools

Interfacing to third-party masters and configuration using third-party tools is carried out using the GSD file.

Safety integrated automation

SIMATIC ET 200M fail-safe distributed IO

Interface module IM 153-2 High Feature

Technical specifications

IM 153-2 High Feature	6ES7153-2BA02-0XB0
IM 153-2 High Feature with expanded temperature range	6ES7153-2BA82-0XB0
General information	
Vendor identification (VendorID)	801Eh
Supply voltage	
24 V DC	Yes
permissible range, lower limit (DC)	20.4 V
permissible range, upper limit (DC)	28.8 V
permissible range (ripple included), lower limit (DC)	20.4 V
permissible range (ripple included), upper limit (DC)	28.8 V
External protection for supply cables (recommendation)	2.5 A
Mains buffering	
• Mains/voltage failure stored energy time	5 ms
Input current	
Current consumption, max.	650 mA
Rated value at 24 V DC	
Inrush current, typ.	3 A
I^2t	0.1 A ² ·s
Output voltage	
Rated value, 5 V DC	Yes
Output current	
for backplane bus (5 V DC), max.	1.5 A
Power losses	
Power loss, typ.	5.5 W
Address area	
Addressing volume	
• Inputs/outputs	244 byte/244 byte
Hardware configuration	
Number of modules per DP slave interface, max.	12
Time stamping	
Accuracy	1 ms; 1ms at up to 8 modules; 10ms at up to 12 modules
Number of message buffers	15
Messages per message buffer	20
Number of stampable digital inputs, max.	128; Max. 128 signals/station; max. 32 signals/slot
Time format	RFC 1119
Time resolution	0.466 ns
Time interval for transmitting the message buffer if a message is present	1 000 ms
Time stamp on signal change	rising / falling edge as signal entering or exiting

IM 153-2 High Feature	6ES7153-2BA02-0XB0
IM 153-2 High Feature with expanded temperature range	6ES7153-2BA82-0XB0
Interfaces	
Interface physics, RS 485	Yes
Interface physics, FOC	No
PROFIBUS DP	
• Node addresses	1 to 125 permitted
• Automatic detection of transmission speed	Yes
• PROFIBUS DP, output current, max.	70 mA
• Transmission rate, max.	12 Mbit/s
• Transmission procedure	RS 485
• SYNC capability	Yes
• FREECE capability	Yes
• Direct data exchange (slave-to-slave communication)	Yes; Sender
• PROFIBUS DP	9-pin sub D
1st interface	
DP slave	
• GSD file	SI04801.GSG
• Automatic baud rate search	Yes
Communication functions	
Bus protocol/transmission protocol	PROFIBUS DP to EN 50170
Isolation	
Isolation checked with	Isolation voltage 500 V
Degree and class of protection	
IP20	Yes
Ambient conditions	
Operating temperature	
• IM 153-2 High Feature	0 °C ... 60 °C
• IM 153-2 High Feature with expanded temperature range	-25 °C ... 60 °C
Air pressure	
• Operating altitude above sea level, max.	3 000 m
Dimensions	
Width x Height x Depth (mm)	40 x 125 x 117
Weight, approx.	360 g

Active bus modul eIM 153/IM 153	6ES7195-7HD10-0XA0
Accessories	
	for 2 IM 153-2 High Feature , needed to establish a redundant system
Dimensions	
Width x Height x Depth (mm)	97 x 92 x 30
Weight, approx.	133 g

Bus module for ET 200M	6ES7195-7HA00-0XA0	6ES7195-7HB00-0XA0	6ES7195-7HC00-0XA0
Dimensions			
Width	97 mm	97 mm	97 mm
Height	92 mm	92 mm	92 mm
Depth	30 mm	30 mm	30 mm
Weight, approx.	111 g	140 g	127 g

Safety integrated automation

SIMATIC ET 200M fail-safe distributed IO

Interface module IM 153-2 High Feature

Selection and ordering data

	Article No.		Article No.
IM 153-2 interface module Slave interface for connecting an ET 200M to PROFIBUS DP; also for use in redundant systems <ul style="list-style-type: none"> • High Feature • High Feature with extended temperature range 	6ES7153-2BA02-0XB0 6ES7153-2BA82-0XB0	Accessories PROFIBUS bus connector 90° outgoing cable, terminating resistor with disconnecting function, up to 12 Mbit/s, FastConnect Without PG interface <ul style="list-style-type: none"> • 1 unit • 100 units With PG interface <ul style="list-style-type: none"> • 1 unit • 100 units 	6ES7972-0BA52-0XA0 6ES7972-0BA52-0XB0 6ES7972-0BB52-0XA0 6ES7972-0BB52-0XB0
Active IM 153 /IM 153 bus module For two IM 153-2 High Feature modules for designing redundant systems	6ES7195-7HD10-0XA0	SIMATIC DP DIN rail for ET 200M Accommodates up to 5 bus modules; for hot-swapping function <ul style="list-style-type: none"> • Length: 483 mm (19") • Length: 530 mm • Length: 620 mm • Length: 2000 mm 	6ES7195-1GA00-0XA0 6ES7195-1GF30-0XA0 6ES7195-1GG30-0XA0 6ES7195-1GC00-0XA0
Bus module for ET 200M <ul style="list-style-type: none"> • To accommodate a power supply and an IM 153 module for the hot-swapping function during RUN, incl. bus module cover • To accommodate two 40-mm wide I/O modules for the hot-swapping function • To accommodate one 80-mm wide I/O module for the hot-swapping function 	6ES7195-7HA00-0XA0 6ES7195-7HB00-0XA0 6ES7195-7HC00-0XA0	SIMATIC S7-300 mounting rail <ul style="list-style-type: none"> • Length: 160 mm • Length: 480 mm (19") • Length: 530 mm • Length: 830 mm • Length: 2000 mm 	6ES7390-1AB60-0AA0 6ES7390-1AE80-0AA0 6ES7390-1AF30-0AA0 6ES7390-1AJ30-0AA0 6ES7390-1BC00-0AA0
ET 200M redundancy bundle Comprising two IM 153-2 High Feature modules and one IM 153/IM 153 bus module	6ES7153-2AR03-0XA0	S7 Manual Collection Electronic manuals on DVD, multi-language: S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication)	6ES7998-8XC01-8YE0
		S7 Manual Collection, update service for 1 year Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates	6ES7998-8XC01-8YE2

More information

Brochures

Information material for downloading can be found in the Internet: www.siemens.com/simatic/printmaterial

Safety integrated automation

SIMATIC ET 200M fail-safe distributed IO

SIPLUS interface modules
SIPLUS IM 153-2 High Feature

Overview



Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

SIPLUS module	SIPLUS IM 153-2	SIPLUS IM 153-2
Article No.	6AG1153-2BA02-2XY0	6AG1153-2BA02-7XB0
Article number based on	6ES7153-2BA02-0XB0	6ES7153-2BA02-0XB0
Ambient temperature range	-25 ... +60 °C	-40 ... +70 °C Start-up temperature -25 °C
Compliant with the standards for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	Yes	No
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	
SIPLUS bus module	for accommodating a PS and an IM 153	For accommodating two 40 mm wide I/O modules
Article No.	6AG1195-7HA00-2XA0	6AG1195-7HB00-7XA0
Article number based on	6ES7195-7HA00-0XA0	6ES7195-7HB00-0XA0
Ambient temperature range	-40 ... +70 °C	-40 ... +70 °C
Compliant with the standards for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	No	Yes
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	
SIPLUS bus module	for accommodating an 80 mm module	for accommodating two IM 153-2
Article No.	6AG1195-7HC00-2XA0	6AG1195-7HD10-2XA0
Article number based on	6ES7195-7HC00-0XA0	6ES7195-7HD10-0XA0
Ambient temperature range	-40 ... +70 °C	-40 ... +70 °C
Compliant with the standards for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	No	Yes
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	

Safety integrated automation

SIMATIC ET 200M fail-safe distributed IO

SIPLUS interface modules

SIPLUS IM 153-2 High Feature

Ambient conditions	SIPLUS IM 153-2 High Feature
Relative humidity	100%, condensation/frost permissible. No commissioning if condensation present.
Biologically active substances, compliance with EN 60721-3-3	Class 3B2 mold and fungal spores (excluding fauna). The supplied plug covers must remain in place over the unused interfaces during operation!
Chemically active substances, compliance with EN 60721-3-3	Class 3C4 incl. salt spray in accordance with EN60068-2-52 (degree of severity 3). The supplied plug covers must remain in place over the unused interfaces during operation!
Mechanically active substances, compliance with EN 60721-3-3	Class 3S4 incl. sand, dust. The supplied plug covers must remain in place over the unused interfaces during operation!
Air pressure (depending on the highest positive temperature range specified)	1 080 ... 795 hPa (-1 000 ... +2 000 m) see ambient temperature range 795 ... 658 hPa (+2 000 ... +3 500 m) derating 10 K 658 ... 540 hPa (+3 500 ... +5 000 m) derating 20 K

For technical documentation on SIPLUS, see:
www.siemens.com/siplus-extreme

Selection and ordering data

	Article No.
SIPLUS IM 153-2 interface module Slave interface for connecting an ET 200M to PROFIBUS DP; also for use in redundant systems <ul style="list-style-type: none"> • High Feature, -25 ... +60 °C • High Feature, -40 ... +70 °C 	6AG1153-2BA02-2XY0 6AG1153-2BA02-7XB0
Active SIPLUS IM 153/IM 153 bus module For two IM 153-2 High Feature modules for designing redundant systems	6AG1195-7HD10-2XA0
SIPLUS bus module for ET 200M <ul style="list-style-type: none"> • To accommodate a power supply and an IM 153 for the hot-swapping function during RUN, incl. bus module cover • To accommodate two 40 mm wide I/O modules for the hot-swapping function • To accommodate one 80 mm wide I/O module for the hot-swapping function 	6AG1195-7HA00-2XA0 6AG1195-7HB00-7XA0 6AG1195-7HC00-2XA0
Accessories	See SIMATIC ET 200M, IM 153-2, page 3/144

More information

For further technical documentation on SIPLUS, see:
www.siemens.com/siplus-techdoku

Safety integrated automation

SIMATIC ET 200M fail-safe distributed IO

SIPLUS interface modules
SIPLUS IM 153-4 PN High Feature

Overview



- To connect ET 200M to PROFINET IO (via copper line, RJ45) as an IO device
- This High Feature version supports, in contrast to the standard version, the operation of PROFIsafe F and HART modules
- Integrated 2-port switch
- 12 modules per station
- Usable I/O capacity: 192 bytes each
- Active bus backplane to hot-swap modules available as an option
- Baud rate 10 Mbit/s / 100 Mbit/s (autonegotiation / full duplex)
- I&M functions in accordance with PROFIBUS International guideline order no. 3.502, Version V1.1

Note:

Micro Memory Card with at least 64 KB required if not all the stations in the network support LLDP (Link Layer Discovery Protocol; proximity detection).

Application

The IM 153-4 PN interface module is used to connect the modular ET 200M I/O device via copper line to the PROFINET fieldbus. It handles communication between the modules and the higher-level PROFINET I/O controller autonomously.

The interface module complements the existing ET 200M PROFIBUS interface product range.

Design

- The IM 153-4 PN interface module is used as a header module of the ET 200M. Up to 12 I/O modules from the S7-300 range of programmable controllers can be connected to the interface module. No slot rules apply.
- The interface module and the required I/O modules are mounted on a S7-300 DIN rail. This connects I/O modules with bus connectors and with the IM 153 interface module.
- The IM 153-4 PN is 40 mm wide. The display elements are located at the front along with a slot for the SIMATIC Micro Memory Card (MMC).
- A SIMATIC MMC with at least 64 KB is required for operation.

Function

Mode of operation

The IM 153-4 PN interface module handles all communication between the modular ET 200M I/O device and the higher-level IO controller via PROFINET.

The inputs and outputs are assigned to the respective IO controller during configuration.

Parameterization

- STEP 7;
Configuration is carried out in HW Config; the respective header module is selected from the corresponding HW catalog. The modules are also configured using the corresponding hardware catalog. As of STEP 7 V5.4, SP2 (HSP138)
- External tools;
Connection to external masters and configuration with external tools is completed using the GSDML file.

Technical specifications

6ES7153-4BA00-0XB0	
General information	
Vendor identification (VendorID)	002AH
Device identifier (DeviceID)	0302H
Supply voltage	
24 V DC	Yes
Permissible range	20.4 V ... 28.8 V DC
permissible range (ripple included)	18.5 V ... 30.2 V DC
External protection for supply cables (recommendation)	In a construction with grounded reference potential, a fuse is necessary for redundant interface modules (Recommendation: 2.5 A)
Mains buffering	
• Mains/voltage failure stored energy time	5 ms
Input current	
Current consumption, max.	600 mA
Inrush current, typ.	4 A
I ² t	0.09 A ² ·s
Output voltage	
Rated value, 5 V DC	Yes
Output current	
for backplane bus (5 V DC), max.	1.5 A
Power losses	
Power loss, typ.	6 W; Typical
Address area	
Addressing volume	
• Inputs	672 byte; Extended HART user data
• Outputs	192 byte
Hardware configuration	
Number of modules per DP slave interface, max.	12
Communication functions	
Bus protocol/transmission protocol	PN IO

Safety integrated automation

SIMATIC ET 200M fail-safe distributed IO

SIPLUS interface modules

SIPLUS IM 153-4 PN High Feature

6ES7153-4BA00-0XB0	
Interrupts/diagnostics/status information	
Diagnostics indication LED	
• Connection to network LINK (green)	Yes
• Transmit/receive RX/TX (yellow)	Yes
Isolation	
Isolation checked with	Between Profinet and 24 V supply: 1500 V AC Between functional grounding and 24 V supply: 500 V DC
Degree and class of protection	
IP20	Yes
Ambient conditions	
Operating temperature	
• Min.	0 °C
• max.	60 °C
Air pressure	
• Operating altitude above sea level, max.	2 000 m
Dimensions	
Width	40 mm
Height	125 mm
Depth	118 mm
Weight, approx.	215 g

Selection and ordering data

	Article No.
IM 153-4 PN interface module	
I/O device to connect an ET 200M to PROFINET	
High Feature	6ES7153-4BA00-0XB0
Accessories	
Bus modules for ET 200M	
• To accommodate a power supply and an IM 153 module for the hot-swapping function during RUN, incl. bus module cover	6ES7195-7HA00-0XA0
• To accommodate two 40-mm wide I/O modules for the hot-swapping function	6ES7195-7HB00-0XA0
• To accommodate one 80-mm wide I/O module for the hot-swapping function	6ES7195-7HC00-0XA0
SIMATIC Micro Memory Card	
64 KB ¹⁾	6ES7953-8LF20-0AA0
SIMATIC DP DIN rail for ET 200M	
Accommodates up to 5 bus modules; for hot-swapping function	
• Length: 483 mm (19")	6ES7195-1GA00-0XA0
• Length: 530 mm	6ES7195-1GF30-0XA0
• Length: 620 mm	6ES7195-1GG30-0XA0
• Length: 2 000 mm	6ES7195-1GC00-0XA0

Article No.

SIMATIC S7-300 mounting rail

Length: 160 mm

Length: 480 mm (19")

Length: 530 mm

Length: 830 mm

Length: 2000 mm

6ES7390-1AB60-0AA0**6ES7390-1AE80-0AA0****6ES7390-1AF30-0AA0****6ES7390-1AJ30-0AA0****6ES7390-1BC00-0AA0**

S7 Manual Collection

Electronic manuals on DVD, multi-language:
S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication)

6ES7998-8XC01-8YE0

S7 Manual Collection update service for 1 year

Scope of delivery:
Current DVD "S7 Manual Collection" and the three subsequent updates

6ES7998-8XC01-8YE2

Industrial Ethernet FC RJ45 Plug 180

RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet

1 unit

10 units

50 units

6GK1901-1BB10-2AA0**6GK1901-1BB10-2AB0****6GK1901-1BB10-2AE0**

Industrial Ethernet FastConnect installation cables

• FastConnect standard cable

• FastConnect trailing cable

• FastConnect marine cable

6XV1840-2AH10**6XV1840-3AH10****6XV1840-4AH10**

Industrial Ethernet FastConnect

Stripping Tool

6GK1901-1GA00

¹⁾ To operate the IM153-4, an MMC is required with at least 64 KB memory. Cards with higher memory capacity may also be used.

More information

Brochures

Information material for downloading is available in the Internet:

www.siemens.com/simatic/printmaterial

Safety integrated automation

SIMATIC ET 200M fail-safe distributed IO

SM 326 F digital input modules - Safety Integrated

Overview



- This module provides digital inputs for the fail-safe SIMATIC S7 systems
- For connecting:
 - Switches and 2-wire proximity switches
 - Sensors according to NAMUR and mechanical contacts, also for signals from hazardous areas
- With integral safety functions for fail-safe operation
- Can be used in fail-safe operation
 - Centrally: with S7-31xF-2 DP
 - Distributed in ET 200M: with SIMATIC IM 151-7 F-CPU, S7-31xF-2 DP, S7-416F-2 and S7-400F/FH
- In standard operation can be used in the same way as S7-300 modules

SIPLUS versions

SIPLUS versions of this module are also available.
See [page 3/173](#).

Application

Fail-safe digital input modules are suitable for connecting

- Switches and 2-wire proximity switches (BEROs)
- Sensors according to NAMUR and mechanical contacts, also for signals from hazardous areas

The modules are implemented centrally with SIMATIC S7-31xF-2 DP and in the ET 200M distributed I/O station in combination with SIMATIC IM 151-7 F-CPU, S7-31xF-2 DP, S7-416F-2 and S7-400F/FH. They can also be used in non-safety-relevant standard mode and then respond like standard S7-300 modules.

Design

Failsafe digital input modules have the following mechanical features:

- Compact configuration:
 - The rugged plastic housing contains
 - Green input signal status LEDs
 - Green LED for indicating safety mode
 - Red group fault LED
 - Slot for front connector protected by the front cover
 - Labeling area on the front cover
- Easy installation:
 - Installed in the same way as the other ET 200M I/O modules
- User-friendly wiring via front connector

Note:

Cable guide 6ES7393-4AA10-0AA0 is required in order to operate 6ES7326-1RF00-0AB0 failsafe digital input modules in hazardous areas.

Function

Failsafe digital input modules convert the levels of the external digital signals from the process into the internal signal level of the failsafe SIMATIC S7 CPUs.

The safety functions required for failsafe operation are integrated in the modules.

Technical specifications

	6ES7326-1RF01-0AB0	6ES7326-1BK02-0AB0
Supply voltage		
Rated value (DC)	24 V	24 V
Input current		
from load voltage L+ (without load), max.	160 mA	450 mA
from backplane bus 5 V DC, max.	90 mA	100 mA
Encoder supply		
Number of outputs	8	4; Isolated
Output voltage	8.2 V DC	
Output current, rated value		400 mA
Power losses		
Power loss, typ.	4.5 W	10 W
Digital inputs		
Number of digital inputs	8; 8 (one-channel); 4 (two-channel)	24
Number of simultaneously controllable inputs		
• all mounting positions		
- up to 40 °C, max.	8; vertical setup	24
- up to 60 °C, max.	8; horizontal set up	24; (at 24 V) or 18 (at 28.8 V)

Safety integrated automation

SIMATIC ET 200M fail-safe distributed IO

SM 326 F digital input modules - Safety Integrated

	6ES7326-1RF01-0AB0	6ES7326-1BK02-0AB0
Input voltage		
• Rated value, DC	in accordance with DIN 19234 or NAMUR	24 V
• for signal "0"		-30 to +5 V
• for signal "1"		11 to 30 V
Input current		
• for signal "0", max. (permissible quiescent current)	0.35 mA to 1.2 mA	2 mA
• for signal "1", typ.	2.1 to 7 mA	10 mA
Input delay (for rated value of input voltage)		
• for standard inputs		3.4 ms
- at "0" to "1", max.		3.4 ms
- at "1" to "0", max.		
• for NAMUR inputs		
- at "0" to "1", max.	1.2 to 3 ms	
- at "1" to "0", max.	1.2 to 3 ms	
Cable length		
• Cable length, shielded, max.	200 m	200 m
• Cable length unshielded, max.	100 m	100 m
Encoder		
Connectable encoders		
• 2-wire sensor		Yes; if short-circuit test is deactivated
- Permissible quiescent current (2-wire sensor), max.		2 mA
Interrupts/diagnostics/status information		
Alarms		
• Diagnostic alarm	Yes	Yes
Diagnostic messages		
• Diagnostic information readable	Yes	Yes
Ex(i) characteristics		
Module for Ex(i) protection	Yes	
Max. values of input circuits (per channel)		
• Co (permissible external capacity), max.	3 µF	
• Io (short-circuit current), max.	13.9 mA	
• Lo (permissible external inductivity), max.	80 mH	
• Po (power of load), max.	33.1 mW	
• Uo (output no-load voltage), max.	10 V	
• Um (fault voltage), max.	60 V DC/30 V AC	
• Ta (permissible ambient temperature), max.	60 °C	60 °C
Galvanic isolation		
Galvanic isolation digital inputs		
• between the channels	Yes	Yes
• between the channels, in groups of		12
• between the channels and the backplane bus	Yes	Yes
Isolation		
Isolation checked with	500 V DC	500 V DC / 350 V AC
Standards, approvals, certificates		
Highest safety class achievable in safety mode		
• acc. to DIN VDE 0801	AK 4 (one channel), AK 5 und 6 (two channel)	AK 6
• acc. to EN 954	4	Cat. 4
• acc. to IEC 61508	SIL 2 (single-channel), SIL 3 (two-channel)	SIL 3
Use in hazardous areas		
• Test number KEMA	99 ATEX 2671 X	
Connection method		
required front connector	40-pin	40-pin

Safety integrated automation

SIMATIC ET 200M fail-safe distributed IO

SM 326 F digital input modules - Safety Integrated

	6ES7326-1RF01-0AB0	6ES7326-1BK02-0AB0
Dimensions		
Width	80 mm	80 mm
Height	125 mm	125 mm
Depth	120 mm	120 mm
Weights		
Weight, approx.	482 g	442 g

Selection and ordering data

	Article No.		Article No.
F digital input module SM 326		STEP 7 Safety Advanced Upgrade	
24 inputs, 24 V DC	6ES7326-1BK02-0AB0	Upgrade from STEP 7 Safety Advanced V11 to STEP 7 Safety Advanced V13.	6ES7833-1FA13-0YE5
8 inputs, 24 V DC, NAMUR	6ES7326-1RF00-0AB0	Floating License for one User, Software and Docu on CD	
S7 Distributed Safety V5.4 programming tool		Distributed Safety V5.4 SP5 to Safety Advanced V13 Combo.	6ES7833-1FA13-0YF5
Task: Configuration software for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco		Combo License for parallel use Distributed Safety V5.4 and STEP 7 Safety Advanced V13.	
Requirement: STEP 7 V5.3 SP3 and higher		Software and documentation on CD	
• Floating License	6ES7833-1FC02-0YA5	DIN rail for active bus modules	
• Floating license for 1 user, license key download without software or documentation ¹⁾ ; email address required for delivery	6ES7833-1FC02-0YH5	for max. 5 active bus modules for hot swapping function	
S7 Distributed Safety upgrade		• 483 mm (19") long	6ES7195-1GA00-0XA0
From V5.x to V5.4; Floating license for 1 user	6ES7833-1FC02-0YE5	• 530 mm long	6ES7195-1GF30-0XA0
STEP 7 Safety Advanced V13		• 620 mm long	6ES7195-1GG30-0XA0
Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, S7-1500F, WinAC RTX F, ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco		• 2000 mm long	6ES7195-1GC00-0XA0
Requirement: STEP 7 Professional V13 SP1		Active bus module	6ES7195-7HC00-0XA0
• Floating license for 1 user	6ES7833-1FA13-0YA5	BM 1 x 80 for 1 module with 80 mm width	
• Floating license for 1 user, license key download without software or documentation ¹⁾ ; email address required for delivery	6ES7833-1FA13-0YH5	SITOP power supply module	6ES7307-1EA01-0AA0
		for ET 200M; 120/230 V AC, 24 V DC, 5 A; Type PS 307-1E	
		Front connectors	
		40-pin, with screw contacts	
		• 1 unit	6ES7392-1AM00-0AA0
		• 100 units	6ES7392-1AM00-1AB0
		40-pin, with spring-loaded contacts	
		• 1 unit	6ES7392-1BM01-0AA0
		• 100 units	6ES7392-1BM01-1AB0

Safety integrated automation

SIMATIC ET 200M fail-safe distributed IO

SM 326 F digital input modules - Safety Integrated

	Article No.
Front door, higher version, for F-modules For F-modules; for connecting 1.3 mm ² /16 AWG wires; wiring diagram and labels in yellow	6ES7328-7AA10-0AA0
Labeling strips For fail-safe modules (spare part); 10 units	6ES7392-2XX20-0AA0
Label cover For fail-safe modules (spare part); 10 units	6ES7392-2XY20-0AA0
LK 393 cable guide For F modules; L+ and M connections; 5 units	6ES7393-4AA10-0AA0
S7-300 manual Design, CPU data, module data, instruction list German English	6ES7398-8FA10-8AA0 6ES7398-8FA10-8BA0
SIMATIC Manual Collection Electronic manuals on DVD, multi-lingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	6ES7998-8XC01-8YE0
SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	6ES7998-8XC01-8YE2

¹⁾ For up-to-date information and download availability, see:
www.siemens.com/tia-online-software-delivery

Safety integrated automation

SIMATIC ET 200M fail-safe distributed IO

**SIPLUS SM 326 F digital input modules -
Safety Integrated**

Overview



- Digital inputs for the fail-safe SIPLUS S7 systems
- For connecting:
 - Switches and 2-wire proximity switches
 - Sensors according to NAMUR and mechanical contacts, also for signals from hazardous areas
- With integral safety functions for fail-safe operation
- Can be used in fail-safe operation
 - Centrally: With S7-31xF-2 DP
 - Distributed in ET 200M: With SIMATIC IM 151-7 F-CPU, S7-31xF-2 DP, S7-416F-2 and S7-400F/FH
- In standard operation can be used in the same way as S7-300 modules

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

SIPLUS F digital input SM 326

SIPLUS module	6AG1326-1BK02-2AB0	6AG1326-1BK02-2AY0	6AG1326-1RF00-4AB0
based-on	6ES7326-1BK02-0AB0	6ES7326-1BK02-0AB0	6ES7326-1RF00-0AB0
Ambient temperature range	- 25 ... + 60 °C	- 25 ... + 60 °C	0 ... + 60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components		
Technical data	The technical data of the standard product applies except for the ambient conditions.		
Compliant with the standards for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	No	Yes	No

Ambient conditions

Relative humidity 100 %, condensation and frost are permitted. No commissioning when condensation is present.

Technical documentation on SIPLUS is available here:

www.siemens.com/siplus-extreme

Selection and ordering data

	Article No.
SIPLUS SM 326 F-digital input (extended temperature range and exposure)	
24 inputs, 24 V DC	6AG1326-1BK02-2AB0
24 inputs, 24 V DC (EN 50155 compliant)	6AG1326-1BK02-2AY0
8 inputs, 24 V DC, NAMUR	6AG1326-1RF00-4AB0
Accessories	See SIMATIC SM 326 F-digital input, page 3/151

Safety integrated automation

SIMATIC ET 200M fail-safe distributed IO

SM 326 F digital output modules - Safety Integrated

Overview



- Digital outputs for the fail-safe SIMATIC S7 systems
- Two versions (1 x current sourcing, 1 x current sinking)
- For connecting solenoid valves, DC contactors and indicator lights
- With integral safety functions for fail-safe operation
- Can be used in fail-safe operation
 - Centrally: with S7-31xF DP, S7-31xF PN/DP
 - Distributed in ET 200M: with SIMATIC IM 151-7 F-CPU, S7-31xF-2 DP, S7-41xF-2 and S7-400F/FH

Application

Fail-safe digital output modules are used centrally with SIMATIC S7-31xF-2 DP, and in the ET 200M distributed I/O device together with SIMATIC IM 151-7 F-CPU, S7-31xF-2 DP, S7-416F-2 and S7-400F/FH.

The modules are, for example, suitable for connecting solenoid valves, DC contactors and indicator lights.

In the case of the SM 326 F-DO 10 x DC 24V/2A PP (6ES7326-2BF10-0AB0), the function "Keep last valid value" can be used optionally in safety mode too. Together with the diagnostics capability of the module, this can be used for cost-optimized implementation of applications in, for example, the area of fire and gas alarm systems (in accordance with EN 54-2/-4 or NFPA72).

Design

Fail-safe digital output modules have the following mechanical features:

- Compact design:
 - 2 connections per output for single-channel or redundant actuator control
 - Green LEDs for indicating signal states at the outputs
 - Green LED for indicating safety operation
 - Red LED for group error display
 - Connection options for the front connector, protected behind the front door
 - Labeling field on the front door
- Simple installation:
 - Installation is the same as for the other I/O modules of the ET 200M
- User-friendly wiring via the front connector
- Module width:
 - SM 326 F-DO 10 x DC 24V/2A PP (6ES7326-2BF10-0AB0) single-width (40mm)
 - SM 326 F-DO 8 x DC 24V/2A PM (6ES7326-2BF41-0AB0) double-width (80 mm)

Function

Failsafe digital output modules convert the internal signal level of the failsafe SIMATIC S7 CPUs into the external signal levels required for the process. The safety functions required for failsafe operation are integrated in the modules.

Technical specifications

F-Digital output SM 326	6ES7326-2BF10-0AB0	6ES7326-2BF41-0AB0
Supply voltage		
Load voltage L+		
• Rated value (DC)	24 V; 1L+, 2L+, 3L+	24 V; 1L+, 2L+, 3L+
Input current		
from load voltage 1L+, max.	100 mA; from supply voltage	75 mA; from supply voltage
from load voltage 2L+ (without load), max.	100 mA	100 mA
from load voltage 3L+ (without load), max.	100 mA	100 mA
from backplane bus 5 V DC, max.	100 mA	100 mA
Power losses		
Power loss, typ.	6 W	12 W
Digital outputs		
Number of digital outputs	10	8
Product function	Yes	
Limitation of inductive shutdown voltage to		L+ (-33 V)

Safety integrated automation

SIMATIC ET 200M fail-safe distributed IO

SM 326 F digital output modules - Safety Integrated

F-Digital output SM 326	6ES7326-2BF10-0AB0	6ES7326-2BF41-0AB0
Switching capacity of the outputs		
• Lamp load, max.	5 W	5 W
Output voltage		
• for signal "1" without series diode, min.		L+ (-1.0 V)
Output current		
• for signal "1" rated value	2 A	2 A
• for signal "1" permissible range for 0 to 40 °C, min.	7 mA	7 mA
• for signal "1" permissible range for 0 to 40 °C, max.	2.4 A	2 A; 2 A for horizontal installation, 1 A for vertical installation
• for signal "1" permissible range for 40 to 60 °C, min.	7 mA	7 mA
• for signal "1" permissible range for 40 to 60 °C, max.	2.4 A	1 A; for horizontal installation
• for signal "0" residual current, max.	0.5 mA	0.5 mA
Switching frequency		
• with resistive load, max.	25 Hz	30 Hz
• with inductive load, max.	25 Hz	2 Hz
• on lamp load, max.	10 Hz	10 Hz
Aggregate current of outputs (per group)		
• horizontal installation		
- up to 40 °C, max.	10 A	7.5 A
- up to 60 °C, max.	6 A	5 A
• vertical installation		
- up to 40 °C, max.	5 A	5 A
Cable length		
• Cable length, shielded, max.	1 000 m	200 m; 200 m for SIL3, AK 6, Cat 4
• Cable length unshielded, max.	600 m	200 m
Interrupts/diagnostics/status information		
Alarms		
• Diagnostic alarm	Yes	Yes; Parameterizable
Diagnostic messages		
• Diagnostic information readable	Yes	Yes
Galvanic isolation		
Galvanic isolation digital outputs		
• between the channels	Yes	Yes
• between the channels, in groups of	5	4
• between the channels and the backplane bus	Yes	Yes
• between the channels and the power supply of the electronics	Yes	Yes
Isolation		
Isolation checked with	370 V for 1 min	500 V DC / 350 V AC
Standards, approvals, certificates		
Highest safety class achievable in safety mode		
• acc. to DIN VDE 0801	AK 5 and 6	
• acc. to EN 954	Cat. 4	Cat. 4
• acc. to IEC 61508	SIL 3	SIL 3
Connection method		
required front connector	40-pin	40-pin
Dimensions		
Width	40 mm	80 mm
Height	125 mm	125 mm
Depth	120 mm	120 mm
Weight, approx.	330 g	465 g

Safety integrated automation

SIMATIC ET 200M fail-safe distributed IO

SM 326 F digital output modules - Safety Integrated

Selection and ordering data

	Article No.
F digital output module SM 326	
10 outputs, 24 V DC, 2 A PP; width 40 mm	6ES7326-2BF10-0AB0
8 outputs, 24 V DC, 2 A PM; width 80 mm	6ES7326-2BF41-0AB0
S7 Distributed Safety V5.4 programming tool	
Task: Configuration software for config- uring fail-safe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco Requirement: STEP 7 V5.3 SP3 and higher	
• Floating License	6ES7833-1FC02-0YA5
• Floating license for 1 user, li- cense key download without software or documentation ¹⁾ ; email address required for deliv- ery	6ES7833-1FC02-0YH5
S7 Distributed Safety upgrade	
From V5.x to V5.4; Floating license for 1 user	6ES7833-1FC02-0YE5
STEP 7 Safety Advanced V13	
Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, S7-1500F, WinAC RTX F, ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco Requirement: STEP 7 Professional V13 SP1	
• Floating license for 1 user	6ES7833-1FA13-0YA5
• Floating license for 1 user, li- cense key download without software or documentation ¹⁾ ; email address required for delivery	6ES7833-1FA13-0YH5
STEP 7 Safety Advanced Upgrade	
Upgrade from STEP 7 Safety Advanced V11 to STEP 7 Safety Advanced V13.	6ES7833-1FA13-0YE5
Floating License for one User, Software and Docu on CD	
Distributed Safety V5.4 SP5 and STEP 7 Safety Advanced V13 for parallel usage; incl. Software on CD; Combo License for 1 User, License Key download without software and documentation ¹⁾ ; Email address required for deliv- ery.	6ES7833-1FA12-0YK5
DIN rail for active bus modules	
for max. 5 active bus modules, for function "Insertion and removal"	
• 483 mm (19") long	6ES7195-1GA00-0XA0
• 530 mm long	6ES7195-1GF30-0XA0
• 620 mm long	6ES7195-1GG30-0XA0
• 2000 mm long	6ES7195-1GC00-0XA0

Article No.

Active bus modules	
BM 2 x 40 for accepting 2 IO modules each 40 mm wide	6ES7195-7HB00-0XA0
BM 1 x 80 for accepting 1 IO module 80 mm wide	6ES7195-7HC00-0XA0
SITOP power supply module	6ES7307-1EA01-0AA0
for ET 200M; 120/230 V AC, 24 V DC, 5 A; Type PS 307-1E	
Front connectors	
• 40-pin, with screw contacts	
- 1 unit	6ES7392-1AM00-0AA0
- 100 units	6ES7392-1AM00-1AB0
• 40-pin, with spring-loaded con- tacts	
- 1 unit	6ES7392-1BM01-0AA0
- 100 units	6ES7392-1BM01-1AB0
Front door, higher version, for F-modules	6ES7328-7AA10-0AA0
For F-modules; for connecting 1.3 mm ² /16 AWG wires; wiring diagram and labels in yellow	
Labeling strips	6ES7392-2XX20-0AA0
For fail-safe modules (spare part), 10 units	
Label cover	6ES7392-2XY20-0AA0
For fail-safe modules (spare part), 10 units	
LK 393 cable guide	6ES7393-4AA10-0AA0
For F modules; L+ and M connections, 5 units	
S7-300 manual	
Design, CPU data, module data, instruction list	
• German	6ES7398-8FA10-8AA0
• English	6ES7398-8FA10-8BA0
SIMATIC Manual Collection	6ES7998-8XC01-8YE0
Electronic manuals on DVD, multi- lingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sen- sors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	
SIMATIC Manual Collection update service for 1 year	6ES7998-8XC01-8YE2
Current "Manual Collection" DVD and the three subsequent updates	

¹⁾ For up-to-date information and download availability,
see: www.siemens.com/tia-online-software-delivery

Safety integrated automation

SIMATIC ET 200M fail-safe distributed IO

SIPLUS SM 326 F digital output modules - Safety Integrated

Overview



- Digital outputs for the fail-safe SIMATIC S7 systems
- For connection of solenoid valves, DC contactors and indicator lights
- With integral safety functions for fail-safe operation
- Can be used in fail-safe mode
 - Centrally: With S7-31xF-2 DP
 - Distributed in ET 200M: With SIMATIC IM 151-7 F-CPU, S7-31xF-2 DP, S7-416F-2 and S7-400F/FH

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

SIPLUS F digital output SM 326

SIPLUS module	6AG1326-2BF10-2AB0	6AG1326-2BF10-2AY0	6AG1326-2BF41-2AB0	6AG1326-2BF41-2AY0
based-on	6ES7326-2BF10-0AB0	6ES7326-2BF10-0AB0	6ES7326-2BF41-0AB0	6ES7326-2BF41-0AB0
Ambient temperature range	-25 ... +60 °C, condensation permitted			
Conformal coating	Coating of the printed circuit boards and the electronic components			
Technical data	The technical data of the standard product applies except for the ambient conditions.			
Compliant with the standards for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	No	Yes	No	Yes

Ambient conditions

Relative humidity 100 %, condensation and frost are permitted. No commissioning when condensation is present.

Technical documentation on SIPLUS is available here:

www.siemens.com/siplus-extreme

Selection and ordering data

	Article No.		Article No.
SIPLUS SM 326 F digital output module		Accessories	
(extended temperature range and exposure)		Active bus modules	
10 outputs, 24 V DC	6AG1326-2BF10-2AB0	(extended temperature range and exposure)	
10 outputs, 24 V DC (according to EN 50155)	6AG1326-2BF10-2AY0	BM 2 x 40 for accepting 2 IO modules each 40 mm wide	6AG1195-7HB00-7XA0
8 outputs, 24 V DC, 2 A	6AG1326-2BF41-2AB0	BM 1 x 80 for accepting 1 IO module 80 mm wide	6AG1195-7HC00-2XA0
8 outputs, 24 V DC, 2 A (according to EN 50155)	6AG1326-2BF41-2AY0	Further accessories	See SIMATIC SM 326 F digital output module, see page 3/156

Safety integrated automation

SIMATIC ET 200M fail-safe distributed IO

SM 336 F analog input modules - Safety Integrated

Overview



- Analog inputs for the fail-safe SIMATIC S7 systems
- Applicable in the ET 200M distributed I/O device with IM 153-2 HF as well as centrally with SIMATIC S7-31xF-2 DP
- Properties of the SM 336; F-AI 6 x 0/4 - 20 mA HART:
 - 6 analog inputs with galvanic isolation between channels and backplane bus
 - Input ranges: 0 to 20 mA, 4 to 20 mA
 - Short-circuit proof power supply from 2 or 4-wire transducer via the module
 - External encoder supply possible
 - Applicable in safety mode
 - HART communication
 - Firmware update using HW Config
 - Identification data

Application

The modules are used centrally with SIMATIC S7-31xF-2 DP and in the ET 200M distributed I/O device together with SIMATIC IM 151-7 F-CPU, S7-31xF-2 DP, S7-416F-2 and S7-400F/FH.

0 to 20 mA and 4 to 20 mA current transmitters (also HART) can be connected as encoders.

Design

- 6 inputs for current measurement.
- Compact design:
 - Group fault display (SF)
 - Safety mode display (SAFE)
 - Display for channel-specific faults (Fn)
 - Display for HART status (Hn)
 - Plug options for the 20-pin front connector, protected behind the front door.
 - Labeling field on the front door.
- Easy assembly
Assembled like the other ET 200M I/O modules.
- User-friendly wiring with 20-pin front connector.

Function

The analog input module converts analog signals from the process to digital signals for internal processing by the fail-safe SIMATIC S7 CPUs.

The safety functions required for fail-safe operation are integrated in the module.

The following functions are available:

- Resolution 15 bits + sign.
- Measuring ranges:
 - 0 to 20 mA or
 - 4 to 20 mA or
 - 4 to 20 mA (HART)
- Interrupt capability;
the module sends diagnostic interrupts to the CPU of the controller.
- Diagnostics;
the module sends extensive diagnostic information to the CPU.

Safety integrated automation

SIMATIC ET 200M fail-safe distributed IO

SM 336 F analog input modules - Safety Integrated

Technical specifications

6ES7336-4GE00-0AB0	
Designation	SM 336 F-AI 6x0/4 to 20 mA HART
Supply voltage	
Load voltage L+	
• Rated value (DC)	24 V
• Reverse polarity protection	Yes
Input current	
from backplane bus 5 V DC, max.	90 mA
from supply voltage L+, max.	150 mA; typical value
Power losses	
Power loss, typ.	4.5 W
Analog inputs	
Number of analog inputs	6
permissible input current for current input (destruction limit), max.	40 mA
Input ranges (rated values), currents	
• 0 to 20 mA	Yes
• 4 to 20 mA	Yes
Cable length	
• Cable length, shielded, max.	1 000 m
Analog value creation	
Integrations and conversion time/resolution per channel	
• Resolution with overrange (bit including sign), max.	16 bit; 15 bits + sign
• Integration time, ms	20 at 50 Hz 16.7 at 60 Hz
• Interference voltage suppression for interference frequency f1 in Hz	$f=n \times (f1 \pm 0.5\%)$
Encoder	
Connection of signal encoders	
• for current measurement as 2-wire transducer	Yes
• for current measurement as 4-wire transducer	Yes

6ES7336-4GE00-0AB0	
Errors/accuracies	
Operational limit in overall temperature range	
• Current, relative to input area	+/- 0,2 %; 40 µA
Basic error limit (operational limit at 25 °C)	
• Current, relative to input area	+/- 0,1 %
Interrupts/diagnostics/status information	
Alarms	
• Diagnostic alarm	Yes
Diagnostic messages	
• Diagnostic information readable	Yes
Galvanic isolation	
Galvanic isolation analog inputs	
• between the channels	Yes
• between the channels and the backplane bus	Yes
• between the channels and the power supply of the electronics	Yes
Isolation	
Isolation checked with	370 V for 1 min
Standards, approvals, certificates	
Highest safety class achievable in safety mode	
• acc. to DIN V 19250	old
• acc. to EN 954	4
• acc. to IEC 61508	SIL 3
Connection method	
required front connector	20-pin
Dimensions	
Width	40 mm
Height	125 mm
Depth	120 mm
Weight, approx.	350 g

Safety integrated automation

SIMATIC ET 200M fail-safe distributed IO

SM 336 F analog input modules - Safety Integrated

Selection and ordering data

	Article No.		Article No.
F analog input module SM 336 6 inputs, 15 bit, 0/4 - 20 mA HART	6ES7336-4GE00-0AB0	Active bus module BM 2x40 Bus module for accepting 2 IO modules each 40 mm wide	6ES7195-7HB00-0XA0
S7 Distributed Safety V5.4 programming tool Task: Configuration software for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco Requirement: STEP 7 V5.3 SP3 and higher • Floating License • Floating license for 1 user, license key download without software or documentation ¹⁾ ; email address required for delivery	6ES7833-1FC02-0YA5 6ES7833-1FC02-0YH5	SITOP power supply module for ET 200M; 120/230 V AC, 24 V DC, 5 A; Type PS 307-1E	6ES7307-1EA01-0AA0
S7 Distributed Safety upgrade From V5.x to V5.4; Floating license for 1 user	6ES7833-1FC02-0YE5	Front connectors • 20-pin, with screw contacts - 1 unit - 100 units • 20-pin, with spring-loaded contacts - 1 unit - 100 units	6ES7392-1AJ00-0AA0 6ES7392-1AJ00-1AB0 6ES7392-1BJ00-0AA0 6ES7392-1BJ00-1AB0
STEP 7 Safety Advanced V13 Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, S7-1500F, WinAC RTX F, ETS7-1500F, 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco Requirement: STEP 7 Professional V13 SP1 • Floating license for 1 user • Floating license for 1 user, license key download without software or documentation ¹⁾ ; email address required for delivery	6ES7833-1FA13-0YA5 6ES7833-1FA13-0YH5	Front door, higher version, for F-modules For F-modules; for connecting 1.3 mm ² /16 AWG wires; wiring diagram and labels in yellow	6ES7328-7AA10-0AA0
STEP 7 Safety Advanced Upgrade Upgrade from STEP 7 Safety Advanced V11 to STEP 7 Safety Advanced V13. Floating License for one User, Software and Docu on CD Distributed Safety V5.4 SP5 and STEP 7 Safety Advanced V13 for parallel usage; incl. Software on CD; Combo License for 1 User, License Key download without software and documentation ¹⁾ ; Email address required for delivery.	6ES7833-1FA13-0YE5 6ES7833-1FA12-0YK5	Labeling strips For fail-safe modules (spare part), 10 units	6ES7392-2XX20-0AA0
DIN rail for active bus modules for max. 5 active bus modules for hot swapping function • 483 mm long • 530 mm long • 620 mm long • 2000 mm long	6ES7195-1GA00-0XA0 6ES7195-1GF30-0XA0 6ES7195-1GG30-0XA0 6ES7195-1GC00-0XA0	Label cover For fail-safe modules (spare part), 10 units	6ES7392-2XY20-0AA0
		LK 393 cable guide For F modules; L+ and M connections, 5 units	6ES7393-4AA10-0AA0
		S7-300 manual Design, CPU data, module data, instruction list • German • English	6ES7398-8FA10-8AA0 6ES7398-8FA10-8BA0
		SIMATIC Manual Collection Electronic manuals on DVD, multi-lingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	6ES7998-8XC01-8YE0
		SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	6ES7998-8XC01-8YE2

¹⁾ For up-to-date information and download availability, see:
www.siemens.com/tia-online-software-delivery

Safety integrated automation

SIMATIC ET 200M fail-safe distributed IO

SIPLUS SM 336 F analog input modules - Safety Integrated

Overview



- Analog inputs for fail-safe SIPLUS S7 systems
- Applicable in the ET 200M distributed I/O device with M 153-2 HF as well as centrally with SIPLUS S7-31xF-2 DP
- Properties of the SM 336; F-AI 6 x 0/4 ... 20 mA HART:
 - 6 analog inputs with galvanic isolation between channels and backplane bus
 - Input ranges: 0 mA to 20 mA, 4 mA to 20 mA
 - Short-circuit proof power supply of 2 or 4-wire transmitter via the module
 - External encoder supply possible
 - Applicable in safety mode
 - HART communication
 - Firmware update using HW Config
 - Identification data

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

SIPLUS F analog input SM 336

SIPLUS module	6AG1336-4GE00-4AB0
based-on	6ES7336-4GE00-0AB0
Ambient temperature range	0 ... + 60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions.

Ambient conditions

Relative humidity	100 %, condensation and frost are permitted. No commissioning when condensation is present.
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Technical documentation on SIPLUS is available here:
www.siemens.com/siplus-extreme

Selection and ordering data

	Article No.
SIPLUS SM 336 F analog input module	
(suitable for exposure)	
6 inputs, 15 bit, 0/4 - 20 mA HART	6AG1336-4GE00-4AB0
Accessories	See SIMATIC SM 336 F analog input module, page 3/160

Safety integrated automation

SIMATIC ET 200M fail-safe distributed IO

Isolation module

Overview



- Supports mixed operation of fail-safe signal modules in safety mode and S7-300 standard modules in an ET 200M when Cat. 4 or SIL 3 has to be achieved.
- The isolation module is not required if the safety class or safety category to be achieved is less than SIL 3 or Cat. 4.

When Cat. 4/SIL 3 is required, the isolation module must be implemented in the following situations:

Application	Isolation module must be used
Central use after CPU 31xF-2 DP or CPU 31xF-2 PN/DP <ul style="list-style-type: none"> • Only fail-safe modules in the tier • Standard and fail-safe modules in the tier 	Yes, behind the CPU Yes, after the last standard module and before the first fail-safe module
Central use after CPU 31xF-2 DP or CPU 31xF-2 PN/DP in an expansion rack <ul style="list-style-type: none"> • Only fail-safe modules in the tier • Standard and fail-safe modules in the tier 	Yes, after the IM 36x Yes, after the last standard module and before the first fail-safe module
Distributed behind the IM 153-2 with copper connection <ul style="list-style-type: none"> • Only fail-safe modules in the station • Standard and fail-safe modules in the station 	Yes, after the IM 153-2 Yes, after the last standard module and before the first fail-safe module
Distributed behind the IM 153-2 with fiber-optic connection <ul style="list-style-type: none"> • Only fail-safe modules in the station • Standard and fail-safe modules in the station 	No Yes, after the last standard module and before the first fail-safe module

SIPLUS version

A SIPLUS version of this module is also available.

SIPLUS isolation module	
SIPLUS module	6AG1195-7KF00-2XA0
based-on	6ES7195-7KF00-0XA0
Operating temperature	-25 ... +60 °C
Technical data	The technical data of the standard product applies except for the ambient conditions.

Technical specifications

	6ES7195-7KF00-0XA0
Weight, approx.	10 g

Selection and ordering data

	Article No.
Isolation module for simultaneous operation of fail-safe and standard modules in an ET 200M	6ES7195-7KF00-0XA0
SIPLUS Isolation module for simultaneous operation of fail-safe and standard modules in an ET 200M For extended temperature range and exposure	6AG1195-7KF00-2XA0
Isolation bus module for accommodating the isolating module in an ET 200M	6ES7195-7HG00-0XA0

Safety integrated automation

ET 200iSP fail-safe distributed IO

SIMATIC ET 200iSP

Overview SIMATIC ET 200iSP



- Failsafe distributed I/O system to IP30 degree of protection for use in hazardous gaseous and dusty areas, i.e. in Zones 1 and 2 as well as 21 and 22
- Sensors and actuators can also be situated directly in Zone 0 or 20.
- Individual configuration and flexible expansion with the modular design for optimization to the respective automation task
- Independent wiring enables prewiring without the electronics connected
- Optimized for integration into process control systems (e.g. SIMATIC PCS 7)
- Parameters can be assigned using SIMATIC PDM
- Optimal integration of HART field devices (HART transparency)
- Failsafe digital inputs and outputs as well as analog inputs for the safety-related signal processing according to PROFIsafe
- Connection to PROFIBUS DP via isolating transformers
- Module replacement (hot swapping) and configuration expansion (Configuration in Run) possible during operation
- Extensive diagnostics possibilities
- Condensation-proof modules in temperature range -20°C to +70°C
- EMC in accordance with NE 21 (on Namur recommendation)
- Full redundancy of PROFIBUS and power supply

Application

The ET 200iSP distributed I/O system is designed in degree of protection IP30.

It is used wherever explosion protection for gases and dust is required in accordance with device group I and II.

The ET 200iSP system is designed in accordance with ATEX Directive 94/9/EC required for the European market when introducing new devices into areas subject to explosion hazard.

The design of the system also enables use under increased mechanical load such as are found on oil platforms.

The system consists of terminal modules to which the relevant function units such as the power supply, interface module and electronics modules are connected.

Thanks to this selective design, the system can be adapted optimally to plant-specific requirements in areas subject to explosion hazard. This enables, for example, fast replacement of individual functional units under power. In the event of a fault, only small plant sections are affected since only a few channels are processed in one module.

Use of an ET 200iSP station enables significant savings compared to a conventional design. There is no need for isolating stages or sub-distribution boards and cabling costs are reduced since the station functions locally like a terminal block. Startup and troubleshooting are simplified thanks to the extensive diagnostics facilities.

As well as analog input modules and analog output module with and without HART functionality, the existing range of input/output modules also encompasses digital input/output modules whose functionality can be parameterized.

The system is optimally adapted to use with SIMATIC S7 and SIMATIC PCS 7 – use on other process control systems and SIMATIC S5 is possible by means of integration using a GSD file.

Safety integrated automation

ET 200iSP fail-safe distributed IO

SIMATIC ET 200iSP

Design

One distributed I/O station (= remote I/O) ET 200iSP comprising:

- One terminal module for the power supply unit, as well as the relevant power supply module in degree of protection EX d (explosion-proof enclosure)
- One terminal module for the PROFIBUS interface module, as well as the relevant IM 152 interface module.
In the case of a single PROFIBUS interface module, there is another slot on the terminal module for an electronics module. If the PROFIBUS interface module is used redundantly, a terminal module is available that can accommodate two IM 152.
- Up to 32 terminal modules for electronics modules, as well as digital and analog electronics modules for plugging into them. One terminal module can accommodate 2 electronics modules.
- One termination module included in the scope of supply of the terminal modules for IM 152.

The station is assembled on an S7-300 mounting rail in accordance with the above list, starting with the terminal module of the power supply unit, then the terminal module for the PROFIBUS interface module, followed by the desired terminal modules for the electronics modules.

When the terminal modules are connected, it is possible to wire them and check the wiring even before any electronics modules are connected.

The relevant electronics modules are plugged into the terminal modules.

The electronics modules used are mechanically key coded on first use.

The terminal modules and electronics modules are installed without tools.

The maximum configuration is limited by the 32 electronics modules, corresponding to a station length of 107 cm.

The maximum possible number of modules can be limited by the current consumption of the actual modules used. Up to 16 modules can be used without restriction. With a higher degree of expansion, the configuring rule must be observed.

In the areas subject to explosion hazard, PROFIBUS must be managed with intrinsic safety by means of a suitable fieldbus isolating transformer (RS 485IS coupler).

The 24-V connection to the power supply terminal is carried out using EX e terminals. This connection must not be disconnected under Ex conditions. The incoming power supply must be installed in the safe area.

For use in areas subject to explosion hazard, installation in a suitable EX enclosure is required (varies according to zone, e.g. an EX enclosure IP54 for Zone 1).

Accessories:

The following accessories can be supplied for the ET 200iSP:

- Pre-perforated DIN A4 labeling sheets in different colors for electronics modules, machine printable
- Slot number plate for identifying the terminal modules

Function

Operating mode

Through PROFIBUS DP (up to 1.5 Mbit/s), a central PLC can access the electronic modules of the ET 200iSP station just like a central I/O module. Communication is handled by the master interface in the central PLC and the interface module of the ET 200iSP (= IM 152-1). The diagnostics integrated in the system reduce startup and debugging times.

The physical bus setup for devices in hazardous areas requires special protective measures. The method of the intrinsically safe PROFIBUS has been selected for ET 200iSP. This demands segmentation and power limiting on the bus (PROFIBUS RS 485-IS).

A commercially available "Fieldbus isolating transformer" (RS 485IS coupler) is used for this purpose. It can be installed in areas up to Zone 2. This converts the PROFIBUS DP to an intrinsically safe PROFIBUS RS 485-IS, which allows modules to be plugged and pulled – even under potentially explosive conditions.

Configuration

An ET 200iSP station can be connected to higher level PLCs as a DP V0 or DP V1 slave.

In an S7/ PCS 7 environment, configuration and parameterization of an ET 200iSP station is executed using SIMATIC STEP 7 hardware manager. This defines the station design (which module where).

This software is opened by double-clicking one of the implemented modules/stations.

Software requirements

- SIMATIC STEP 7, Version 5.3 + SP1 incl. Hardware Support Package (HSP)
- SIMATIC PCS 7, Version V6.1
- For configuring HART field devices, the current version of the PDM configuring software is required.
- TIA PORTAL SIMATIC STEP 7 PROFESSIONAL V13

Configuring in non-Siemens systems and older PCS 7/ STEP 7 versions

In all other applications, the configuration of the station must be relayed to the PROFIBUS DP network through the GSD file.

In this case, parameterization is carried out through PDM, whereby a comparison of the configuration between PDM and GSD file is not possible. It is not possible to commission an ET 200iSP without the PDM configuration software.

The parameters of this module can then be defined in the PDM dialog fields, such as alarm limits for analog modules, sensor selection for digital modules, settings for the release of analog values and the output of HART commands for analog HART modules.

Technical specifications

General	ET 200iSP	
Degree of protection	IP30	
Ambient temperature	-20 °C ... +70 °C	
Medial load	In accordance with ISA-S71.04 severity level G1 ;G2 ;G3 (with the exception of NH3, this only achieves level G2)	
EMC	Electromagnetic compatibility in accordance with NE21	
Vibration-proof	0.5 g continuously, 1 g periodically	
Approvals, standards		
• ATEX	II 2 G (1) GD I M2	Ex de [ia/ib] IIC T4 Ex de [ia/ib] I
• IECEX	Zone 1	Ex de [ia/ib] IIC T4
• INMETRO	Zone 1	BR-Ex de [ia/ib] IIC T4
• cFMus	Class I,II,II	NI Division 2, Groups A, B, C, D, E, F, G T4 AIS Division 1, Groups A, B, C, D, E, F, G
	Class I	Zone 1, AEx de [ia/ib] IIC T4
• cULus	Class I,II,II	Division 2, Groups A, B, C, D, E, F, G T4 providing int. safe circuits for Division 1, Groups A, B, C, D, E, F, G
	Class I	Zone 1, AEx de [ia/ib] IIC T4
• PROFIBUS	EN 50170, Volume 2	
• IEC	IEC 61131, Part 2	
• CE	In accordance with 94/9/EG (ATEX 100a), 89/336/EEC and 73/23/EEC	
• Shipbuilding approval	Classification companies • ABS (American Bureau of Shipping) • BV (Bureau Veritas) • DNV (Det Norske Veritas) • GL (Germanischer Lloyd) • LRS (Lloyds Register of Shipping) • Class NK (Nippon Kaiji Kyokai)	

More information

Brochures

Information material for downloading can be found in the Internet: www.siemens.com/simatic/printmaterial

Safety integrated automation

ET 200iSP fail-safe distributed IO

IM 152-1 interface module

Overview



- The IM 152 interface module is plugged onto the corresponding terminal module TM-IM/EM (to be ordered separately). For redundant operation, two IM 152 are used. They are plugged onto the TM-IM/IM.
- The interface module IM 152 has the following properties:
 - Connects the ET 200iSP to PROFIBUS DP
 - Prepares data for the fitted electronic modules
 - The PROFIBUS address of ET 200iSP can be adjusted by switch
 - Slot for MMC
 - Firmware updating over PROFIBUS DP or MMC
- Shutting down the 24 V DC supply voltage at the terminal module TM-PS also shuts down the interface module IM 152.
- The maximum address size is 244 byte inputs and 244 byte outputs.

Technical specifications

6ES7152-1AA00-0AB0	
General information	
Vendor identification (VendorID)	8110H
Supply voltage	
Mains buffering	
• Mains buffering, min.	f
Input current	
from supply voltage 1L+, max.	30 mA
Power losses	
Power loss, typ.	0.5 W
Time stamping	
Description	for each digital input, digital input module, total ET 200iS
Accuracy	20 ms
Number of stampable digital inputs, max.	64; for accuracy class 20 ms
Time format	RFC 1119 Internet (ISP)
Time resolution	1 ms
Time interval for transmitting the message buffer if a message is present	1 000 ms
Time stamp on signal change	rising / falling edge as signal entering or exiting
Interfaces	
Interface physics, RS 485	Yes; (intrinsically safe)
PROFIBUS DP	
• Transmission rate, max.	1.5 Mbit/s; 9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 Kbit/s
• SYNC capability	Yes
• FREECE capability	Yes
• Direct data exchange (slave-to-slave communication)	Yes; Slave to slave as publisher
Protocols	
PROFIBUS DP	Yes
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	No

6ES7152-1AA00-0AB0	
Interrupts/diagnostics/status information	
Alarms	
• Alarms	Yes
• Acyclic function, interrupts	Yes
• Acyclic function, parameters	Yes
Diagnostic messages	
• Diagnostic functions	Yes
Diagnostics indication LED	
• Bus fault BF (red)	Yes
• Group error SF (red)	Yes
• Monitoring 24 V voltage supply ON (green)	Yes
Galvanic isolation	
between supply voltage and electronics	Yes
Standards, approvals, certificates	
CE mark	Yes
Use in hazardous areas	
• Type of protection acc. to EN 50020 (CENELEC)	II2 G Ex ib IIC T4 and I M2 Ex ib I
• Type of protection acc. to KEMA	04 ATEX 1243
Dimensions	
Width	30 mm
Height	129 mm
Depth	136.5 mm
Weight	
Weight, approx.	245 g

Safety integrated automation

ET 200iSP fail-safe distributed IO

IM 152-1 interface module

	6ES7193-7AA00-0AA0	6ES7193-7AA10-0AA0	6ES7193-7AB00-0AA0
Standards, approvals, certificates			
CE mark	No	No	No
Use in hazardous areas			
• Type of protection acc. to EN 50020 (CENELEC)	No	No	No
• Test number KEMA	04 ATEX 2242	04 ATEX 2242	04 ATEX 2242
Dimensions			
Width	60 mm	60 mm	60 mm
Height	190 mm	190 mm	190 mm
Depth	52 mm	52 mm	52 mm
Weight, approx.	235 g	235 g	195 g

Selection and ordering data

	Article No.		Article No.
IM152 interface module • ET 200iSP-IM152-1	6ES7152-1AA00-0AB0	Labeling sheet DIN A4, perforated, each consisting of 10 sheets of 30 strips each for electronic modules, and 20 strips each for IM 152 • petrol • red • yellow • light beige	6ES7193-7BH00-0AA0 6ES7193-7BD00-0AA0 6ES7193-7BB00-0AA0 6ES7193-7BA00-0AA0
Terminal module for IM152 incl. termination module • TM-IM/EM60S (blue screw-type terminals) • TM-IM/EM60C (blue spring-loaded terminals) • TM-IM/IM (black screw-type terminals)	6ES7193-7AA00-0AA0 6ES7193-7AA10-0AA0 6ES7193-7AB00-0AA0	Labels, inscribed Ordering unit 1 set with 200 pieces each for slot numbering • 10 x slots 1 to 2 • 5 x slots 1 to 40 • 1 x slot 1 to 64 2 x slots 1 to 68	8WA8 861-0AB 8WA8 861-0AC 8WA8 861-0DA
Accessories		Labels, blank Ordering unit 1 set with 200 pieces each for slot numbering	8WA8 848-2AY
ET 200iSP manual • German • English	6ES7152-1AA00-8AA0 6ES7152-1AA00-8BA0	S7-300 mounting rails Standard rail 585 mm Standard rail 885 mm	6ES7390-1AF85-0AA0 6ES7390-1AJ85-0AA0
Connector PROFIBUS connector with active terminating resistor, for RS 485-IS circuit; 1.5 Mbit/s	6ES7972-0DA60-0XA0	Stainless steel enclosure	See catalog ST 70
RS 485-IS coupler Isolating transformer for coupling of PROFIBUS DP and PROFIBUS RS 485-IS	6ES7972-0AC80-0XA0		

Safety integrated automation

ET 200iSP fail-safe distributed IO

Power supply units

Overview



The power supply (PS) is plugged into the associated terminal module TM-PS-A or TM-PS-B (with redundancy; to be ordered separately).

The power supply unit fulfills the following functions:

- It provides reliable isolated power supply for the ET 200iSP with the necessary operating voltages for
 - logic (through the backplane bus)
 - PROFIBUS DP interface of IM 152-1
 - powerbus (for supplying the electronic modules)
- Takes over the safety limit of the output voltage
- Has an explosion-proof metal enclosure (explosion protection EEx d)
- Can be redundantly configured

Application

The power supply unit provides all required voltages and currents for the operation of the ET 200iSP station and feeds these into the backplane bus (to the terminal modules).

The input voltage of 24 V DC or 120/230 V AC is connected by means of EEx e terminals to the power supply terminal. This connection must not be undone under hazardous conditions.

The feeding power supply unit is to be installed in the safe area.

Design

A power supply unit comprises the terminal module and the power supply (PS) that is plugged into it.

The operating status of the PS is indicated on the PROFIBUS interface. There are two LEDs here, for each power supply there is a separate LED.

The PS module is brought into its operating position by means of a sliding system with mechanical locking and unlocking that is operated manually.

The power supply PS is permitted to be removed from its operating position and replaced under Ex conditions.

Technical specifications

	6ES7138-7EA01-0AA0	6ES7138-7EC00-0AA0
Supply voltage		
Load voltage L+		
• Rated value (DC)	24 V	
• Reverse polarity protection	Yes	
Load voltage L1		
• Rated value (AC)		230 V; 120/230 V AC
• permissible range, lower limit (AC)		85 V
• permissible range, upper limit (AC)		264 V
• permissible frequency range, lower limit		47 Hz
• permissible frequency range, upper limit		63 Hz
Input current		
from supply voltage L+, max.	4 A	
from supply voltage L1, max.		1.04 A; at rated voltage 230 VAC: 0.45A at rated voltage 120 VAC: 0.75A
Power losses		
Power loss, typ.	20 W	5 W; 5 W + 1.2 x total power loss of the electronics modules
Power loss, max.	20 W	21.3 W
Interrupts/diagnostics/status information		
Status indicator	Yes	Yes
Alarms		
Alarms	No	No
Diagnostic messages		
• Diagnostic information readable	Yes; via IM 152	Yes; via IM 152

Safety integrated automation

ET 200iSP fail-safe distributed IO

Power supply units

	6ES7138-7EA01-0AA0	6ES7138-7EC00-0AA0
Diagnostics indication LED		
• Group error SF (red)	No	No
Ex(i) characteristics		
Max. values of input circuits (per channel)		
• Um (fault voltage), max.	250 V; DC	264 V; AC/DC
Galvanic isolation		
primary/secondary	Yes	Yes
between supply voltage and electronics	Yes	No
Standards, approvals, certificates		
CE mark	Yes	Yes
Use in hazardous areas		
• Type of protection acc. to EN 50020 (CENELEC)	Ex de [ib] IIC T4	Ex de [ib] IIC T4
• Type of protection acc. to KEMA	04 ATEX 2263	09 ATEX 0156
Dimensions		
Width	60 mm	60 mm
Height	190 mm	190 mm
Depth	136.5 mm	136.5 mm
Weight, approx.	2 700 g	2 700 g

	6ES7193-7DA10-0AA0	6ES7193-7DB10-0AA0	6ES7193-7DA20-0AA0	6ES7193-7DB20-0AA0
Standards, approvals, certificates				
CE mark			Yes	Yes
Use in hazardous areas				
• Type of protection acc. to EN 50020 (CENELEC)			II 2 G (1) GD and I M2 Ex e [ia/ib] IIC T4; Ex e [ia/ib] I	II 2 G (1) GD and I M2 Ex e [ia/ib] IIC T4; Ex e [ia/ib] I
• Test number KEMA			04 ATEX 2242	04 ATEX 2242
Dimensions				
Width	60 mm	60 mm	60 mm	60 mm
Height	190 mm	190 mm	190 mm	190 mm
Depth	52 mm	52 mm	52 mm	52 mm
Weight, approx.			230 g	230 g

Selection and ordering data

	Article No.
ET 200iSP Power supply module Input voltage: 24 V DC	6ES7138-7EA01-0AA0
Terminal module TM-PS-A Standard	6ES7193-7DA10-0AA0
Terminal module TM-PS-B for redundant operation	6ES7193-7DB10-0AA0
Power supply module Input voltage: 120/230 V AC	6ES7138-7EC00-0AA0
Terminal module TM-PS-A UC Standard	6ES7193-7DA20-0AA0
Terminal module TM-PS-B UC for redundant operation	6ES7193-7DB20-0AA0

More information

Brochures

Information material for downloading can be found in the Internet: www.siemens.com/simatic/printmaterial

Safety integrated automation

ET 200iSP fail-safe distributed IO

Fail-safe electronic modules

Overview



The fail-safe CPUs of SIMATIC S7 and the fail-safe signal modules of SIMATIC ET 200iSP have been specially designed for distributed safety-related applications in the process and manufacturing industry. Thanks to the discreetly modular structure of the fail-safe I/Os, safety technology only has to be applied where actually required. The new system replaces conventional electromechanical components, e.g.:

- Freely programmable, safe linking of sensors to actuators
- Selective safe shutdown of actuators
- Mixed configuration of fail-safe modules and standard modules in a station
- 1-bus concept; fail-safe signals and standard signals are transferred over a single bus medium

Totally Integrated Automation (TIA)

Safety technology (Safety Integrated) is a component of Totally Integrated Automation, which provides total integration of safety automation and standard automation (SIMATIC S7).

Where standard automation (classical PLCs) and safety automation (electro-mechanics) are still separate today, these two worlds are growing together into a uniform, integrated overall system.

Siemens can therefore present itself as a complete supplier of automation technology, in which safety engineering is part of the standard automation and system-wide integration exists.

More information

Brochures

Information material available for download on the Internet:

www.siemens.com/simatic/printmaterial

Safety integrated automation

ET 200iSP fail-safe distributed IO

F Digital input module

Overview



- Digital inputs for fail-safe SIMATIC S7 systems
- Can be used in the distributed ET 200iSP I/O device with IM 152-1

The digital electronic module 8 F-DI Ex NAMUR has the following features:

- Suitable for the connection of encoders from the hazardous area
- 8 inputs 1-channel (SIL2/Category 3/PLe) or 4 inputs 2-channel (SIL3/Category 4/PLe)
- Isolated from the power bus/backplane bus
- Suitable for the following sensors:
 - According to IEC 60947-5-6 or NAMUR (with diagnostic evaluation)
 - Wired mechanical contacts (with diagnostic evaluation)
 - Unwired mechanical contacts (with deactivated diagnostics)
- Programmable diagnostic interrupt
- Diagnostic buffer integrated in module
- Firmware update
- Identification data I&M
- Channel-selective passivation
- Supports time stamping
- Can only be used in safety mode

Application

The module is used decentrally in the ET 200iSP I/O device together with SIMATIC IM151-7 F-CPU, S7-31xF-2 DP, S7-416F-2, and S7-400F/FH.

Encoders according to NAMUR and wired mechanical contacts, also for signals from the hazardous area, can be connected.

Design

The fail-safe digital input module has the following features:

- 8 short-circuit-proof encoder supplies (8 V DC) for 1 channel each, electrically isolated from the power bus/backplane bus
- Group error display (SF LED; red)
- Safety mode display (SAFE LED; green)
- Status/channel fault display per channel (green/red LED)
- Simple installation; the installation is the same as for the other I/O modules of the ET 200iSP
- User-friendly, permanent wiring.

Function

Fail-safe digital input modules convert the levels of the external digital signals from the process to the internal signal level of the fail-safe SIMATIC S7 CPUs.

The safety functions required for fail-safe operation are integrated in the modules.

Technical specifications

6ES7138-7FN00-0AB0	
FH technology	
Module for failsafe applications	Yes
Input current	
from supply voltage L+, max.	150 mA; (int. power bus)
Encoder supply	
Number of outputs	8
Output voltage	8 V DC
Power losses	
Power loss, typ.	1.4 W
Address area	
Occupied address area	
• Inputs	6 byte
• Outputs	4 byte
Digital inputs	
Number of digital inputs	8
Number of NAMUR inputs	8
Input current for signal "1", typ.	9.5 mA
Input delay (for rated value of input voltage)	
• for standard inputs	
- at "0" to "1", min.	0.7 ms
- at "0" to "1", max.	16 ms; Parameterizable
- at "1" to "0", min.	0.7 ms
- at "1" to "0", max.	16 ms; Parameterizable
Cable length	
• Cable length, shielded, max.	500 m
• Cable length unshielded, max.	200 m
Encoder	
Number of connectable encoders, max.	8
Connectable encoders	
• NAMUR encoder	Yes
NAMUR encoder	
• Input current, for signal "0", max.	1.2 mA
• Input current, for signal "1", min.	2.1 mA

Safety integrated automation

ET 200iSP fail-safe distributed IO

F Digital input module

6ES7138-7FN00-0AB0	
Interrupts/diagnostics/status information	
Status indicator	Yes
Alarms	
• Diagnostic alarm	Yes; Parameterizable
• Hardware interrupt	No
Diagnostic messages	
• Diagnostic functions	Yes
• Diagnostic information readable	Yes
• Wire break	Yes; NAMUR encoders or single contact with 10 kOhm parallel resistor
• Short circuit	Yes; R load < 150 ohms with NAMUR sensor/sensor and NAMUR changeover contact/sensor to DIN 19234
Diagnostics indication LED	
• Group error SF (red)	Yes
Parameter	
Diagnosis: wire break	channel by channel
Diagnosis: short circuit	channel by channel
Galvanic isolation	
between the channels and backplane bus	Yes
Galvanic isolation digital inputs	
• between the channels	No
• between the channels and the backplane bus	Yes
Permissible potential difference	
between different circuits	60 V DC/30 V AC
Isolation	
Isolation checked with	350 V AC/1 min between the shield and backplane bus connection 350 V AC/1 min between the shield and I/O 2830 V AC/1 min between backplane bus connection and I/O
Standards, approvals, certificates	
CE mark	Yes
Highest safety class achievable in safety mode	
• acc. to IEC 61508	SIL 3
• Performance Level in accordance with EN ISO 13849-1:2008	PL e
Use in hazardous areas	
• Type of protection acc. to EN 50020 (CENELEC)	II 2 G (1) GD Ex ib[ia Ga][ia IIIC Da] IIC T4 GB and I M2 Ex ib[ia Ma] I Mb
• Type of protection acc. to KEMA	10 ATEX 0056
Dimensions	
Width	30 mm
Height	129 mm
Depth	136.5 mm
Weight, approx.	288 g

Selection and ordering data

Article No.	
F digital input modules	
8 F-DI Ex NAMUR	6ES7138-7FN00-0AB0
Terminal modules	
TM-EM/EM60S	6ES7193-7CA00-0AA0
Terminal module E60S (screw-type terminal)	
TM-EM/EM60C	6ES7193-7CA10-0AA0
Terminal module E60C (spring-loaded terminal)	
Accessories	
ET 200iSP Manual	
• German	6ES7152-1AA00-8AA0
• English	6ES7152-1AA00-8BA0
Cable connector	
PROFIBUS cable connector with active terminating resistor	6ES7972-0DA60-0XA0
For RS 485-IS electric circuit; 1.5 Mbit/s	
RS 485-IS coupler	6ES7972-0AC80-0XA0
Isolating transformer for connection of PROFIBUS DP and PROFIBUS RS 485-IS	
Labeling sheet	
DIN A4, perforated, each consisting of 10 sheets of 30 strips each, can be used for electronic modules, and 20 strips each, can be used for IM 151	
• petrol	6ES7193-7BH00-0AA0
• red	6ES7193-7BD00-0AA0
• yellow	6ES7193-7BB00-0AA0
• light beige	6ES7193-7BA00-0AA0
Labels, inscribed	
Ordering unit: 1 set with 200 items each for slot numbering	
• 10 x slots 1 to 2	8WA8861-0AB
• 5 x slots 1 to 40	8WA8861-0AC
Labels, not inscribed	8WA8848-2AY
Ordering unit: 1 set with 200 items each for slot numbering	
Distributed Safety V5.4 programming tool	
Task: Software for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, ET 200S Requirement: STEP 7 V5.3 SP3 and higher	
Floating License	6ES7833-1FC02-0YA5

Safety integrated automation

ET 200iSP fail-safe distributed IO

F Digital input module

	Article No.
S7 F Systems RT License For processing safety-related user programs, for one AS 412F/FH, AS 414F/FH or AS 417F/FH	6ES7833-1CC00-6YX0
S7 F Systems V6.1 Programming and configuring environment for creating and operating safety-related STEP 7 programs for an S7 400H-based target system, Floating License for 1 user, executable under Windows XP Prof SP2/SP3, Windows Server 2003 SP2 2 languages (German, English) Type of delivery: Certificate of License as well as software and electronic documentation on CD	6ES7833-1CC02-0YA5
SIMATIC Safety Matrix Tool V6.2 Creation, configuration, compilation, loading and online monitoring of the Safety Matrix in a SIMATIC PCS 7 environment Including SIMATIC Safety Matrix Viewer for SIMATIC PCS 7, for operation and monitoring of the Safety Matrix in a SIMATIC PCS 7 environment with several operator control levels 1 language (English), executes with Windows XP Professional, Type of delivery: Certificate of License and authorization diskette for Safety Matrix Tool and Safety Matrix Viewer; software and electronic documentation on CD <ul style="list-style-type: none"> Floating License for 1 installation Floating License upgrade from V5.x/V6.x to V6.2 	6ES7833-1SM02-0YA5 6ES7833-1SM02-0YE5
SIMATIC Safety Matrix Editor V6.2 Creation and checking of the Safety Matrix logic on an external computer without a SIMATIC PCS 7 or STEP 7 environment 1 language (English), executes with Windows 2000 Professional or Windows XP Professional, single license for 1 installation Type of delivery: Certificate of License and authorization diskette; software and electronic documentation on CD	6ES7833-1SM42-0YA5

	Article No.
SIMATIC Safety Matrix Viewer V6.2 for SIMATIC PCS 7 Operation and monitoring of the Safety Matrix in the SIMATIC PCS 7 environment with several operator control levels 2 languages (English/German), runs under Windows 2000 Professional, Windows XP Professional, Windows 2003 Server Type of delivery: Certificate of License and authorization diskette; software and electronic documentation on CD Floating License for 1 installation Floating License upgrade from V6.x to V6.2	6ES7833-1SM62-0YA5 6ES7833-1SM62-0YE5
STEP 7 Safety Advanced V13 Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, S7-1500F, WinAC RTX F, ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco Requirement: STEP 7 Professional V13 SP1 <ul style="list-style-type: none"> Floating license for 1 user Floating license for 1 user, license key download without software or documentation¹⁾; email address required for delivery 	6ES7833-1FA13-0YA5 6ES7833-1FA13-0YH5
STEP 7 Safety Advanced Upgrade Upgrade from STEP 7 Safety Advanced V11 to STEP 7 Safety Advanced V13. Floating License for one User, Software and Docu on CD Distributed Safety V5.4 SP5 to Safety Advanced V13 Combo. Combo License for parallel use Distributed Safety V5.4 and STEP 7 Safety Advanced V13. Software and documentation on CD	6ES7833-1FA13-0YE5 6ES7833-1FA13-0YF5

¹⁾ For up-to-date information and download availability, see:
www.siemens.com/tia-online-software-delivery

Safety integrated automation

ET 200iSP fail-safe distributed IO

F Digital output module

Overview



- Digital outputs for fail-safe SIMATIC S7 systems
 - Can be used in the distributed ET 200iSP I/O device with IM 152-1
- The digital electronic module 4 F-DO Ex 17.4 V/40 mA has the following properties:
- Suitable for the connection of actuators from the hazardous area
 - 4 outputs, PP-switching (SIL3/Category 4/PLe)
 - Isolated from the power bus/backplane bus
 - Max. output current 40 mA
 - Rated load voltage 17.4 V DC
 - Short-circuit, overload and wire-break monitoring
 - Suitable for Ex i solenoid valves, DC current relays and actuators
 - To increase the power rating, two digital outputs can be connected in parallel for one actuator
 - Programmable diagnostics
 - Programmable diagnostic interrupt
 - Diagnostic buffer integrated in module
 - Firmware update
 - Identification data I&M
 - Channel-selective passivation
 - Can only be used in safety mode

Application

The module is used decentrally in the ET 200iSP I/O device together with SIMATIC IM151-7 F-CPU, S7-31xF-2 DP, S7-416F-2, and S7-400F/FH.

The modules are, for example, suitable for connecting solenoid valves, DC contactors and indicator lights.

Design

The fail-safe digital output module has the following features:

- Group error display (SF LED; red)
- Safety mode display (SAFE LED; green)
- Status/channel fault display per output (green/red LED)
- Simple installation; the installation is the same as for the other I/O modules of the ET 200iSP.
- User-friendly, permanent wiring.

Function

Fail-safe digital output modules convert the internal signal level of the fail-safe SIMATIC S7-CPU to the external signal level required by the process. The safety functions required for fail-safe operation are integrated in the modules.

Technical specifications

6ES7138-7FD00-0AB0	
Input current	
from load voltage L+ (without load), max.	510 mA; (int. power bus)
Power losses	
Power loss, typ.	5.3 W; max.
Digital outputs	
Number of digital outputs	4
Product function	
• Response threshold, typ.	Depending on the "short-circuit level" parameter
Controlling a digital input	No
No-load voltage U _{ao} (DC)	17.4 V
Internal resistor R _i	167 Ω
Load resistance range	
• lower limit	270 Ω
• upper limit	18 kΩ
Trend key points E	
• Voltage U _e (DC)	10 V
• Current I _e	40 mA
Output voltage	
• for signal "1", min.	max. 17.4 V
Output current	
• for signal "0" residual current, max.	10 μA
Parallel switching of 2 outputs	
• for increased power	Yes
• for redundant control of a load	No
Switching frequency	
• with resistive load, max.	30 Hz
• with inductive load, max.	2 Hz
Cable length	
• Cable length, shielded, max.	500 m
• Cable length unshielded, max.	500 m
Interrupts/diagnostics/status information	
• Status indicator	Yes
Substitute values connectable	Yes
Alarms	
• Diagnostic alarm	Yes; Parameterizable
Diagnostic messages	
• Diagnostic information readable	Yes
• Wire break	Yes
• Short circuit	Yes
Diagnostics indication LED	
• Group error SF (red)	Yes
• Status indicator digital output (green)	Yes

Safety integrated automation

ET 200iSP fail-safe distributed IO

F Digital output module

6ES7138-7FD00-0AB0	
Parameter	
Diagnosis: wire break	Yes
Diagnosis: short circuit	Yes
Galvanic isolation	
Galvanic isolation digital outputs	
• between the channels	No
• between the channels and the backplane bus	Yes
• between the channels and the load voltage L+	Yes
Permissible potential difference	
between different circuits	60 V DC/30 V AC
Isolation	
Isolation checked with	370 V for 1 min
Standards, approvals, certificates	
CE mark	Yes
Highest safety class achievable in safety mode	
• acc. to IEC 61508	SIL 3
• Performance Level in accordance with EN ISO 13849-1:2008	PL _e
Use in hazardous areas	
• Type of protection acc. to EN 50020 (CENELEC)	II 2 G (1) GD Ex ib[ia Ga][ia IIIC Da] IIC T4 GB and I M2 Ex ib[ia Ma] I Mb
• Type of protection acc. to KEMA	10 ATEX 0057
Dimensions	
Width	30 mm
Height	129 mm
Depth	136.5 mm
Weight, approx.	285 g

Selection and ordering data

	Article No.
Digital output module	
4 F-DO Ex 17.4 V/40 mA	6ES7138-7FD00-0AB0
Terminal modules	
TM-EM/EM60S	6ES7193-7CA00-0AA0
Terminal module E60S (screw-type terminal)	
TM-EM/EM60C	6ES7193-7CA10-0AA0
Terminal module E60C (spring-loaded terminal)	
Accessories	
ET 200iSP Manual	
• German	6ES7152-1AA00-8AA0
• English	6ES7152-1AA00-8BA0
Cable connector	
PROFIBUS cable connector with active terminating resistor	6ES7972-0DA60-0XA0
For RS 485-IS electric circuit; 1.5 Mbit/s	
RS 485-IS coupler	6ES7972-0AC80-0XA0
Isolating transformer for connection of PROFIBUS DP and PROFIBUS RS 485-IS	
Labeling sheet	
DIN A4, perforated, each consisting of 10 sheets of 30 strips each, can be used for electronic modules, and 20 strips each, can be used for IM 151	
• petrol	6ES7193-7BH00-0AA0
• red	6ES7193-7BD00-0AA0
• yellow	6ES7193-7BB00-0AA0
• light beige	6ES7193-7BA00-0AA0
Labels, inscribed	
Ordering unit: 1 set with 200 items each for slot numbering	
• 10 x slots 1 to 2	8WA8861-0AB
• 5 x slots 1 to 40	8WA8861-0AC
Labels, not inscribed	8WA8848-2AY
Ordering unit: 1 set with 200 items each for slot numbering	
Distributed Safety V5.4 programming tool	
Task: Software for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, ET 200S Requirement: STEP 7 V5.3 SP3 and higher	
Floating License	6ES7833-1FC02-0YA5
S7 F Systems RT License	6ES7833-1CC00-6YX0
For processing safety-related user programs, for one AS 412F/FH, AS 414F/FH or AS 417F/FH	

Safety integrated automation

ET 200iSP fail-safe distributed IO

F Digital output module

	Article No.		Article No.
S7 F Systems V6.1 Programming and configuring environment for creating and operating safety-related STEP 7 programs for an S7 400H-based target system, Floating License for 1 user, executable under Windows XP Prof SP2/SP3, Windows Server 2003 SP2 2 languages (German, English) Type of delivery: Certificate of License as well as software and electronic documentation on CD	6ES7833-1CC02-0YA5	SIMATIC Safety Matrix Viewer V6.2 for SIMATIC PCS 7 Operation and monitoring of the Safety Matrix in the SIMATIC PCS 7 environment with several operator control levels 2 languages (English/German), runs under Windows 2000 Professional, Windows XP Professional, Windows 2003 Server Type of delivery: Certificate of License and authorization diskette; software and electronic documentation on CD	
SIMATIC Safety Matrix Tool V6.2 Creation, configuration, compilation, loading and online monitoring of the Safety Matrix in a SIMATIC PCS 7 environment Including SIMATIC Safety Matrix Viewer for SIMATIC PCS 7, for operation and monitoring of the Safety Matrix in a SIMATIC PCS 7 environment with several operator control levels 1 language (English), executes with Windows XP Professional, Type of delivery: Certificate of License and authorization diskette for Safety Matrix Tool and Safety Matrix Viewer; software and electronic documentation on CD		<ul style="list-style-type: none"> Floating License for 1 installation 	6ES7833-1SM62-0YA5
<ul style="list-style-type: none"> Floating License upgrade from V5.x/V6.x to V6.2 	6ES7833-1SM02-0YE5	<ul style="list-style-type: none"> Floating License upgrade from V6.x to V6.2 	6ES7833-1SM62-0YE5
SIMATIC Safety Matrix Editor V6.2 Creation and checking of the Safety Matrix logic on an external computer without a SIMATIC PCS 7 or STEP 7 environment 1 language (English), executes with Windows 2000 Professional or Windows XP Professional, single license for 1 installation Type of delivery: Certificate of License and authorization diskette; software and electronic documentation on CD	6ES7833-1SM42-0YA5	STEP 7 Safety Advanced V13 Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, S7-1500F, WinAC RTX F, ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco Requirement: STEP 7 Professional V13 SP1	
		<ul style="list-style-type: none"> Floating license for 1 user Floating license for 1 user, license key download without software or documentation¹⁾; email address required for delivery 	6ES7833-1FA13-0YA5 6ES7833-1FA13-0YH5
		STEP 7 Safety Advanced Upgrade Upgrade from STEP 7 Safety Advanced V11 to STEP 7 Safety Advanced V13. Floating License for one User, Software and Docu on CD Distributed Safety V5.4 SP5 to Safety Advanced V13 Combo. Combo License for parallel use Distributed Safety V5.4 and STEP 7 Safety Advanced V13. Software and documentation on CD	6ES7833-1FA13-0YE5 6ES7833-1FA13-0YF5

¹⁾ For up-to-date information and download availability, see:
www.siemens.com/tia-online-software-delivery

Safety integrated automation

ET 200iSP fail-safe distributed IO

F Analog input module

Overview



- Analog inputs for fail-safe SIMATIC S7 systems
- Can be used in the distributed ET 200iSP I/O device with IM 152-1

The analog electronic module 4 F-AI Ex HART has the following properties:

- Suitable for the connection of encoders from the hazardous area
- 4 analog inputs 1-channel (SIL2/Cat.3/PLe) or 4 inputs 2-channel (SIL3/Category 4/PLe, with two 4 F-AI Ex HART modules)
- Electrical isolation between channels and the backplane bus
- Input ranges:
 - 0 to 20 mA
 - 4 to 20 mA
- Suitable for the following sensors:
 - 2-wire transducers
 - HART field devices
- Programmable diagnostics
- Programmable diagnostic interrupt
- Diagnostic buffer integrated in module
- HART communication (HART protocol versions 5, 6, 7)
- Firmware update
- Identification data I&M
- Can only be used in safety mode

Application

The module is used decentrally in the ET 200iSP I/O device together with SIMATIC IM 151-7 F-CPU, S7-31xF-2 DP, S7-416F-2, and S7-400F/FH.

Current sensors 0 ... 20 mA and 4 ... 20 mA (also HART) can be connected as encoders.

Design

- 4 short-circuit-proof encoder supplies (min. 12 V DC/ max. 26 V DC) for 1 channel each, electrically isolated from the backplane bus
- Group error display (SF LED; red)
- Safety mode display (SAFE LED; green)
- Channel fault display per channel (red LED)
- Display for HART status per channel (green LED)
(If HART communication is activated for a channel and HART communication is running, the green HART status display lights up.)
- Simple installation;
the installation is the same as for the other I/O modules of the ET 200iSP
- User-friendly, permanent wiring.

Function

The analog input module converts analog signals from the process to digital signals for internal processing within the fail-safe SIMATIC S7 CPUs.

The safety functions required for fail-safe operation are integrated in the module.

The following functions are available:

- Resolution 15 bits + sign.
- Different measuring ranges:
 - 0 to 20 mA or
 - 4 to 20 mA or
 - 4 to 20 mA (HART)
- Interrupt capability;
the module sends diagnostic interrupts to the CPU of the controller.
- Diagnostics;
the module sends extensive diagnostic information to the CPU.

Safety integrated automation

ET 200iSP fail-safe distributed IO

F Analog input module

Technical specifications

6ES7138-7FA00-0AB0	
Input current	
from supply voltage L+, max.	490 mA; (int. power bus)
Output voltage	
Power supply to the transmitters	
• short-circuit proof	Yes
• Supply current, max.	25 mA; Plus 4 mA per channel
Power losses	
Power loss, typ.	5.4 W; max.
Address area	
Address space per module	
• Address space per module, max.	16 byte; 12 bytes in the I area / 4 bytes in the O area
Analog inputs	4
Cycle time (all channels) max.	See data in manual
Input ranges	
• Voltage	No
• Current	Yes
• Thermocouple	No
• Resistance thermometer	No
• Resistance	No
Input ranges (rated values), currents	
• 4 to 20 mA	Yes; and 0 to 20 mA
Cable length, shielded, max.	500 m
Analog value creation	
Measurement principle	integrating (Sigma-Delta)
Integrations and conversion time/ resolution per channel	
• Resolution with overrange (bit including sign), max.	16 bit
• Integration time, parameterizable	Yes
• Interference voltage suppression for interference frequency f1 in Hz	50 / 60 Hz
Smoothing of measured values	
• Parameterizable	Yes; in 4 stages
• Step: None	Yes; 1 x cycle time
• Step: low	Yes; 4 x cycle time
• Step: Medium	Yes; 32 x cycle time
• Step: High	Yes; 64 x cycle time
Encoder	
Connection of signal encoders	
• for current measurement as 2-wire transducer	Yes
• Burden of 2-wire transmitter, max.	750 Ω
Errors/accuracies	
Linearity error (relative to input area)	+/- 0.015 %
Temperature error (relative to input area)	+/- 0.005 %/K
Crosstalk between the inputs, min.	-50 dB
Repeat accuracy in settled status at 25 °C (relative to input area)	+/- 0.015 %

6ES7138-7FA00-0AB0	
Operational limit in overall temperature range	
• Current, relative to input area	+/- 0.35 %
Basic error limit (operational limit at 25 °C)	
• Current, relative to input area	+/- 0.1 %
Interference voltage suppression for $f = n \times (f1 \pm 1 \%)$, f1 = interference frequency	
• Series mode interference (peak value of interference < rated value of input range), min.	40 dB
• Common mode interference, min.	50 dB
Interrupts/diagnostics/status information	
Alarms	
• Diagnostic alarm	Yes; Parameterizable
Diagnostic messages	
• Diagnostic information readable	Yes
• Wire break	Yes
• Short circuit	Yes
Diagnostics indication LED	
• Group error SF (red)	Yes
Galvanic isolation	
Galvanic isolation analog inputs	
• between the channels	No
• between the channels and the backplane bus	Yes
• between the channels and the load voltage L+	Yes; Power bus
Permissible potential difference	
between the inputs (UCM)	60 V DC/30 V AC
Standards, approvals, certificates	
CE mark	Yes
Highest safety class achievable in safety mode	
• acc. to IEC 61508	SIL 3
• Performance Level in accordance with EN ISO 13849-1:2008	PL _e
Use in hazardous areas	
• Type of protection acc. to EN 50020 (CENELEC)	II 2 G (1) GD Ex ib[ia Ga][ia IIIC Da] IIC T4 GB and I M2 Ex ib[ia Ma] I Mb
• Type of protection acc. to KEMA	10 ATEX 0058
Dimensions	
Width	30 mm
Height	129 mm
Depth	136.5 mm
Weight, approx.	299 g

Safety integrated automation

ET 200iSP fail-safe distributed IO

F Analog input module

Selection and ordering data

	Article No.
F analog input module 4 F-AI Ex HART	6ES7138-7FA00-0AB0
Terminal modules	
TM-EM/EM60S Terminal module E60S (screw-type terminal)	6ES7193-7CA00-0AA0
TM-EM/EM60C Terminal module E60C (spring-loaded terminal)	6ES7193-7CA10-0AA0
Accessories	
ET 200iSP Manual • German • English	6ES7152-1AA00-8AA0 6ES7152-1AA00-8BA0
Cable connector PROFIBUS cable connector with active terminating resistor For RS 485-IS electric circuit; 1.5 Mbit/s	6ES7972-0DA60-0XA0
RS 485-IS coupler Isolating transformer for connection of PROFIBUS DP and PROFIBUS RS 485-IS	6ES7972-0AC80-0XA0
Labeling sheet DIN A4, perforated, each consist- ing of 10 sheets of 30 strips each, can be used for electronic mod- ules, and 20 strips each, can be used for IM 151 • petrol • red • yellow • light beige	6ES7193-7BH00-0AA0 6ES7193-7BD00-0AA0 6ES7193-7BB00-0AA0 6ES7193-7BA00-0AA0
Labels, inscribed Ordering unit: 1 set with 200 items each for slot numbering • 10 x slots 1 to 2 • 5 x slots 1 to 40	8WA8861-0AB 8WA8861-0AC
Labels, not inscribed Ordering unit: 1 set with 200 items each for slot numbering	8WA8848-2AY
Distributed Safety V5.4 programming tool Task: Software for configuring fail- safe user programs for SIMATIC S7-300F, S7-400F, ET 200S Requirement: STEP 7 V5.3 SP3 and higher Floating License	6ES7833-1FC02-0YA5
S7 F Systems RT License For processing safety-related user programs, for one AS 412F/FH, AS 414F/FH or AS 417F/FH	6ES7833-1CC00-6YX0
S7 F Systems V6.1 Programming and configuring envi- ronment for creating and operating safety-related STEP 7 programs for an S7 400H-based target system, Floating License for 1 user, execut- able under Windows XP Prof SP2/SP3, Windows Server 2003 SP2 2 languages (German, English) Type of delivery: Certificate of License as well as software and electronic documen- tation on CD	6ES7833-1CC02-0YA5

	Article No.
SIMATIC Safety Matrix Tool V6.2 Creation, configuration, compila- tion, loading and online monitoring of the Safety Matrix in a SIMATIC PCS 7 environment Including SIMATIC Safety Matrix Viewer for SIMATIC PCS 7, for operation and monitoring of the Safety Matrix in a SIMATIC PCS 7 environment with several operator control levels 1 language (English), executes with Windows XP Professional, Type of delivery: Certificate of License and authorization diskette for Safety Matrix Tool and Safety Matrix Viewer; software and elec- tronic documentation on CD • Floating License for 1 installation • Floating License upgrade from V5.x/V6.x to V6.2	6ES7833-1SM02-0YA5 6ES7833-1SM02-0YE5
SIMATIC Safety Matrix Editor V6.2 Creation and checking of the Safety Matrix logic on an external computer without a SIMATIC PCS 7 or STEP 7 environment 1 language (English), executes with Windows 2000 Professional or Windows XP Professional, single license for 1 installation Type of delivery: Certificate of License and authorization diskette; software and electronic documen- tation on CD	6ES7833-1SM42-0YA5
SIMATIC Safety Matrix Viewer V6.2 for SIMATIC PCS 7 Operation and monitoring of the Safety Matrix in the SIMATIC PCS 7 environment with several operator control levels 2 languages (English/German), runs under Windows 2000 Profes- sional, Windows XP Professional, Windows 2003 Server Type of delivery: Certificate of License and authorization diskette; software and electronic documen- tation on CD • Floating License for 1 installation • Floating License upgrade from V6.x to V6.2	6ES7833-1SM62-0YA5 6ES7833-1SM62-0YE5
STEP 7 Safety Advanced V13 Task: Engineering tool for configuring fail- safe user programs for SIMATIC S7-300F, S7-400F, S7-1500F, WinAC RTX F, ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco Requirement: STEP 7 Professional V13 SP1 • Floating license for 1 user • Floating license for 1 user, license key download without software and documentation ²⁾ ; email address required for delivery	6ES7833-1FA13-0YA5 6ES7833-1FA13-0YH5
STEP 7 Safety Advanced Upgrade Upgrade from STEP 7 Safety Advanced V11 to STEP 7 Safety Advanced V13. Floating License for one User, Software and documen- tation on CD Distributed Safety V5.4 SP5 to Safety Advanced V13 Combo. Combo License for parallel use Distributed Safety V5.4 and STEP 7 Safety Advanced V13. Software and docu- mentation on CD	6ES7833-1FA13-0YE5 6ES7833-1FA13-0YF5

Safety integrated automation

ET 200eco fail-safe distributed IO

SIMATIC ET 200eco

Overview



- Compact, cost-effective I/O devices for processing digital signals
- Design without control cabinet with degree of protection IP65/67 with flexible and fast connections
- Comprises a basic module and various connection blocks for application-specific implementation options:
 - ECOFAST: 2 x RS 485 hybrid fieldbus connection with identification plug for setting the PROFIBUS address
 - M12: 2 x M12 and 2 x 7/8" with 2 rotary coding switches for assigning the PROFIBUS address
- Connection block contains T-functionality for bus and power supply so that during commissioning and service, the modules can be disconnected from and reconnected to the PROFIBUS without interruption
- Module variance: 8DI, 16DI, 8DI/8DO (1.3 A), 8DI/8DO (2.0 A), 8DO (2.0 A), 16DO (0.5 A)
- Transmission rates up to 12 Mbit/s
- Failsafe DI modules 4/8 F-DI with safety-related signal processing according to PROFIsafe

Application

ET 200eco is a distributed I/O device to the degree of protection IP65/67. ET 200eco stands for easy handling and installation.

ET 200eco offers the user the option of low-cost processing of digital signals (also failsafe) on PROFIBUS DP.

Its high degree of protection and its ruggedness make it particularly suitable for implementation in the machine environment.

The flexible connection blocks can be used to connect to PROFIBUS DP through M12 or through a standardized hybrid fieldbus interface (ECOFAST).

The compact ET 200eco block I/O offers a compatible extension for applications to a high degree of protection alongside the modular I/O product range ET 200X.

Design

ET 200eco comprises a basic module and terminal block.

For implementing and integrating PROFIBUS applications, a compact perfectly interacting module spectrum is available for digital I/Os:

Number of channels	Type of connection
8 DI	8 single channels via 8x M12 screwed glands for 8 digital input signals
16 DI	16 channels via 8x M12 screwed glands with dual assignment for 16 digital input signals
8 DO	8 single channels via 8x M12 screwed glands for 8 digital output signals (2A)
16 DO	16 channels via 8x M12 screwed glands with dual assignment for 16 digital output signals (0.5 A)
8 DI / 8 DO (1.3 A)	16 channels via 8x M12 screwed glands with dual assignment for 8 digital inputs and 8 digital output signals (1.3 A)
8 DI / 8 DO (2.0 A)	16 channels via 8x M12 screwed glands with dual assignment for 8 digital inputs and 8 digital output signals (2.0 A)
4/8F-DI	Up to 4 channels (Cat. 4, SIL 3) or up to 8 channels (Cat. 3, SIL 2)

Via the variable and flexible terminal blocks, PROFIBUS DP can be connected as required via 2x M12, 2x 7/8" or 2x hybrid fieldbus interfaces (ECOFAST).

The T functions for PROFIBUS DP and the power supply are integrated in the terminal block which means that installations can be operated without interruption and without the need for additional components during the commissioning and maintenance of bus lines.

The pin assignment for the actuators and sensors are adapted to the degree of protection IP65/67 standardization trend.

Depending on the type of terminal block, the PROFIBUS address is set either visually or using plug-in jumpers.

In ECOFAST interfaces, the well-proven identification connector is implemented; in M12, 7/8" interfaces, two rotary coding switches visible from the outside are used to set the PROFIBUS address.

Safety integrated automation

ET 200eco fail-safe distributed IO

SIMATIC ET 200eco

Function

Operating mode

Communication takes place exclusively via PROFIBUS DP.

There are diagnostics functions to monitor the functionality of the ET 200eco:

- BF (bus fault)
- SF (system fault)
- Power supply, encoder and load

The diagnostics data are indicated by LEDs on the module and can be evaluated via software on the programming device or PC or by the PLC

A short-circuit in the encoder supply or a missing load voltage is diagnosed module by module.

The connection block can be removed from the basic module and screwed on again with the equipment live, so PROFIBUS and the power supply remain permanently active in the application.

Configuration

A GSD file is available for parameterizing when connecting modules to master modules that are not parameterized with STEP 7. This can be loaded into the configuration tool of the master and provides all the information in plain text for parameterizing the ET 200eco.

For the 4/8F-DI, the F configuration tool that runs under STEP 7 is required for parameterization. This is a component part of S7 Distributed Safety and S7 F systems.

Technical specifications

ET 200eco basic modules	6ES7141-3BF00-0XA0	6ES7141-3BH00-0XA0	6ES7148-3FA00-0XB0
Vendor identification (VendorID)	80DBh	80DAh	
FH technology			
Module for failsafe applications			Yes
Supply voltage			
Load voltage 1L+			
• Rated value (DC)	24 V	24 V	24 V
• Reverse polarity protection	Yes	Yes	No
Input current			
from supply voltage 1L+, max.	70 mA	70 mA	100 mA
Encoder supply			
Number of outputs	8	8	2
Output voltage	24 V DC	24 V DC	min. L+ (-1.5 V)
Output current, rated value	1 A; Aggregate current up to 55 °C	1 A; Aggregate current up to 55 °C	300 mA
Output current			
• Short-circuit protection	Yes; Electronic	Yes; Electronic	Yes
Power losses, typ.	2.4 W	3.6 W	3 W
Digital inputs	8	16	8; 8 single channel, 4 two-channel
Input characteristic curve in accordance with IEC 61131, type 1	Yes	Yes	Yes
Number of simultaneously controllable inputs	8; All mounting positions up to 55 °C	16; All mounting positions up to 55 °C	8; 8 single channel, 4 two-channel
Input voltage			
• Rated value, DC	24 V	24 V	24 V
• for signal "0"	-3 to +5 V	-3 to +5 V	-30 to +5 V
• for signal "1"	13 to 30 V	13 to 30 V	15 to 30 V
Input current			
• for signal "1", typ.	7 mA	7 mA	3.7 mA
Input delay (for rated value of input voltage)			
• for standard inputs			
- at "0" to "1", max.	3 ms	3 ms	
- at "1" to "0", max.	3 ms	3 ms	
Cable length			
• Cable length unshielded, max.	30 m	30 m	30 m

Safety integrated automation

ET 200eco fail-safe distributed IO

SIMATIC ET 200eco

ET 200eco basic modules	6ES7141-3BF00-0XA0	6ES7141-3BH00-0XA0	6ES7148-3FA00-0XB0
Encoder			
Connectable encoders			
• 2-wire sensor - Permissible quiescent current (2-wire sensor), max.	Yes 1.5 mA	Yes 1.5 mA	No
Interfaces			
PROFIBUS DP			
• Transmission rate, max.	12 Mbit/s; 9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 Kbit/s; 1.5 / 3 / 6 / 12 Mbit/s	12 Mbit/s; 9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 Kbit/s; 1.5 / 3 / 6 / 12 Mbit/s	12 Mbit/s
Protocols			
PROFIBUS DP	Yes	Yes	Yes
Interrupts/diagnostics/status information			
Status indicator	Yes	Yes	
Alarms			
• Alarms	No	No	
Diagnostic messages			
• Diagnostics	Yes; Diagnostic information read-able	Yes; Diagnostic information read-able	
Diagnostics indication LED			
• Group error SF (red)	Yes	Yes	Yes
• Status indicator digital input (green)	Yes	Yes	Yes
• Channel error indicator F (red)	No	No	No
Galvanic isolation			
between PROFIBUS DP and all other circuit components	Yes	Yes	Yes
Galvanic isolation digital inputs			
• between the channels	No	No	No
Permissible potential difference			
between different circuits	75 V DC / 60 V AC	75 V DC / 60 V AC	75 V DC / 60 V AC
Isolation			
Isolation checked with	500 V DC	500 V DC	500 V AC for 1 min.
Standards, approvals, certificates			
Highest safety class achievable in safety mode acc. to IEC 61508			SIL 2 (single-channel), SIL 3 (two-channel)
Dimensions			
Width x Height x Depth (mm)	60 x 210 x 28	60 x 210 x 28	60 x 210 x 28
Weight, approx.	210 g	210 g	220 g

ET 200eco basic modules	6ES7142-3BF00-0XA0	6ES7142-3BH00-0XA0
Vendor identification (VendorID)	80DDh	80FBh
Supply voltage		
Load voltage 1L+		
• Rated value (DC)	24 V	24 V
• Reverse polarity protection	Yes	Yes
Load voltage 2L+		
• Rated value (DC)	24 V	24 V
• Reverse polarity protection	Yes	Yes
Input current		
from load voltage 2L+ (without load), max.	60 mA	80 mA
from supply voltage 1L+, max.	70 mA	70 mA
Power losses		
Power loss, typ.	4 W	4 W

Safety integrated automation

ET 200eco fail-safe distributed IO

SIMATIC ET 200eco

ET 200eco basic modules	6ES7142-3BF00-0XA0	6ES7142-3BH00-0XA0
Digital outputs		
• Number of digital outputs	8	16
Product function	Yes	Yes
• Response threshold, typ.	4 A per channel	1.4 A (per channel)
Limitation of inductive shutdown voltage to	2L+ (-44 V)	2L+ (-47 V)
Controlling a digital input	Yes	Yes
Switching capacity of the outputs		
• Lamp load, max.	10 W	5 W
Load resistance range		
• lower limit	12 Ω	12 Ω
• upper limit	4 kΩ	4 kΩ
Output voltage		
• for signal "1", min.	2L+ (-0.8 V)	2L+ (-0.8 V)
Output current		
• for signal "1" rated value	2 A	0.5 A
• for signal "1" permissible range for 0 to 55 °C, min.	5 mA	5 mA
• for signal "1" permissible range for 0 to 55 °C, max.	2.4 A	1 A
• for signal "0" residual current, max.	0.5 mA	0.1 mA
Parallel switching of 2 outputs		
• for increased power	No	No
• for redundant control of a load	Yes	Yes
Switching frequency		
• with resistive load, max.	100 Hz	100 Hz
• with inductive load, max.	0.5 Hz; to IEC 947-5-1, DC13	0.5 Hz; to IEC 947-5-1, DC13
• on lamp load, max.	1 Hz	1 Hz
Aggregate current of outputs (per group) - all mounting positions, up to 55 °C, max.	4 A; 4 A each for sockets X1, X3, X5, X7 and 4 A each for sockets X2, X4, X6, X8; note the current carrying capacity of the cable	4 A; Please note the current carrying capacity of the cable!
Cable length		
• Cable length unshielded, max.	30 m	30 m
Interfaces		
PROFIBUS DP		
• Transmission rate, max.	12 Mbit/s; 9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 Kbit/s; 1.5 / 3 / 6 / 12 Mbit/s	12 Mbit/s; 9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 Kbit/s; 1.5 / 3 / 6 / 12 Mbit/s
Protocols		
PROFIBUS DP	Yes	Yes
Interrupts/diagnostics/status information		
Status indicator	Yes	Yes
Alarms		
• Alarms	No	No
Diagnostic messages		
• Diagnostics	Yes; Diagnostic information readable	Yes; Diagnostic information readable
Diagnostics indication LED		
• Group error SF (red)	Yes	Yes
• Status indicator digital output (green)	Yes	Yes
• Channel error indicator F (red)	No	No
Galvanic isolation		
between PROFIBUS DP and all other circuit components	Yes	Yes
Galvanic isolation digital outputs between the channels	No	No

Safety integrated automation

ET 200eco fail-safe distributed IO

SIMATIC ET 200eco

ET 200eco basic modules	6ES7142-3BF00-0XA0	6ES7142-3BH00-0XA0
Permissible potential difference		
between different circuits	75 V DC / 60 V AC	75 V DC / 60 V AC
Isolation checked with	500 V DC	500 V DC
Dimensions		
Width x Height x Depth (mm)	60 x 210 x 28	60 x 210 x 28
Weight, approx.	210 g	210 g
ET 200eco basic modules	6ES7143-3BH00-0XA0	6ES7143-3BH10-0XA0
Vendor identification (VendorID)	80DCh	80FCh
Supply voltage		
Load voltage 1L+		
• Rated value (DC)	24 V	24 V
• Reverse polarity protection	No	Yes
Load voltage 2L+		
• Rated value (DC)	24 V	24 V
• Reverse polarity protection	No	Yes
Input current		
from load voltage 2L+ (without load), max.	60 mA	60 mA
from supply voltage 1L+, max.	70 mA	70 mA
Encoder supply		
Number of outputs	8	8
Output voltage	24 V DC	
Output current, rated value	0.75 A; up to 55 °C max. 0.75 A (summation current)	1 A; Up to 55 °C max. 1 A (summation current)
Output current		
• Short-circuit protection	Yes; Electronic	Yes; Electronic
Power losses		
Power loss, typ.	5 W	5 W
Digital inputs		
Number of digital inputs	8	8
Input characteristic curve in accordance with IEC 61131, type 1	Yes	Yes
Number of simultaneously controllable inputs	8; All mounting positions up to 55 °C	8; All mounting positions up to 55 °C
Input voltage		
• Rated value, DC	24 V	24 V
• for signal "0"	-3 to +5 V	-3 to +5 V
• for signal "1"	13 to 30 V	13 to 30 V
Input current for signal "1", typ.	7 mA	7 mA
Input delay (for rated value of input voltage)		
• for standard inputs		
- at "0" to "1", max.	3 ms	3 ms
- at "1" to "0", max.	3 ms	3 ms
Digital outputs		
Number of digital outputs	8	8
Product function	Yes	Yes
• Response threshold, typ.	4 A per channel	4 A per channel
Limitation of inductive shutdown voltage to	2L+ (-44 V)	2L+ (-44 V)
Controlling a digital input	Yes	Yes
Switching capacity of the outputs		
• Lamp load, max.	10 W	10 W
Load resistance range		
• lower limit	12 Ω	12 Ω
• upper limit	4 kΩ	4 kΩ

Safety integrated automation

ET 200eco fail-safe distributed IO

SIMATIC ET 200eco

ET 200eco basic modules	6ES7143-3BH00-0XA0	6ES7143-3BH10-0XA0
Output voltage		
• for signal "1", min.	2L+ (-0.8 V)	2L+ (-1.2 V)
Output current		
• for signal "1" rated value	2 A	1.3 A
• for signal "1" permissible range for 0 to 55 °C, min.	5 mA	5 mA
• for signal "1" permissible range for 0 to 55 °C, max.	2.4 A	1.8 A
• for signal "0" residual current, max.	0.5 mA	0.5 mA
Parallel switching of 2 outputs		
• for increased power	No	No
• for redundant control of a load	Yes	Yes
Switching frequency		
• with resistive load, max.	100 Hz	100 Hz
• with inductive load, max.	0.5 Hz; to IEC 947-5-1, DC13	0.5 Hz; to IEC 947-5-1, DC13
• on lamp load, max.	1 Hz	1 Hz
Aggregate current of outputs (per group)		
• all mounting positions - up to 55 °C, max.	4 A; 4 A each for sockets X1, X3, X5, X7 and 4 A each for sockets X2, X4, X6, X8; note the current carrying capacity of the cable	5.2 A; Please note the current carrying capacity of the cable!
Cable length		
• Cable length unshielded, max.	30 m	30 m
Encoder		
Connectable encoders		
• 2-wire sensor	Yes	Yes
- Permissible quiescent current (2-wire sensor), max.	1.5 mA	1.5 mA
Interfaces		
PROFIBUS DP		
• Transmission rate, max.	12 Mbit/s; 9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 Kbit/s; 1.5 / 3 / 6 / 12 Mbit/s	12 Mbit/s; 9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 Kbit/s; 1.5 / 3 / 6 / 12 Mbit/s
Protocols		
PROFIBUS DP	Yes	Yes
Interrupts/diagnostics/status information		
Status indicator	Yes	Yes
Alarms		
• Alarms	No	No
Diagnostic messages		
• Diagnostics	Yes; Diagnostic information readable	Yes; Diagnostic information readable
Diagnostics indication LED		
• Group error SF (red)	Yes	Yes
• Status indicator digital output (green)	Yes	Yes
• Status indicator digital input (green)	Yes	Yes
• Channel error indicator F (red)	No	No
Galvanic isolation		
between PROFIBUS DP and all other circuit components	Yes	Yes
Galvanic isolation digital inputs		
• between the channels	No	No
Galvanic isolation digital outputs		
• between the channels	No	No
Permissible potential difference		
between different circuits	75 V DC / 60 V AC	75 V DC / 60 V AC

Safety integrated automation

ET 200eco fail-safe distributed IO

SIMATIC ET 200eco

ET 200eco basic modules	6ES7143-3BH00-0XA0	6ES7143-3BH10-0XA0
Isolation		
Isolation checked with	500 V DC	500 V DC
Dimensions		
Width	60 mm	60 mm
Height	210 mm	210 mm
Depth	28 mm	28 mm
Weight, approx.	210 g	210 g
ET 200eco connection blocks	6ES7194-3AA00-0AA0	6ES7194-3AA00-0BA0
Power losses, typ.	2 W; The power loss depends on the current that you loop through via the connection block.	2 W; The power loss depends on the current that you loop through via the connection block.
Dimensions		
Width x Height x Depth (mm)	79 x 60 x 30	79 x 60 x 29
Weight, approx.	313 g	392 g

Selection and ordering data

	Article No.		Article No.
ET 200eco basic modules BM 141		Accessory for ECOFAST connection block	
<ul style="list-style-type: none"> 8 DI DC 24 V 8 x M12, individual assignment, IP65/67 connection block 6ES7194-3AA00-0.A0 to be ordered separately 16 DI DC 24 V 8 x M12, double assignment, IP65/67 connection block 6ES7194-3AA00-0.A0 to be ordered separately 	6ES7141-3BF00-0XA0 6ES7141-3BH00-0XA0	PROFIBUS ECOFAST hybrid plug	
		<ul style="list-style-type: none"> Female contact insert, straight Female contact insert, angled Male contact insert, straight Male contact insert, angled 	6GK1905-0CB00 6GK1905-0CD00 6GK1905-0CA00 6GK1905-0CC00
ET 200eco basic module BM 142		PROFIBUS ECOFAST terminating plug	
<ul style="list-style-type: none"> 8 DO DC 24 V/1.2 A 8 x M12, individual assignment, IP65/67 connection block 6ES7194-3AA00-0.A0 to be ordered separately 16 DO DC 24 V/0.5 A 8 x M12, double assignment, IP65/67; connection block 6ES7194-3AA00-0.A0 to be ordered separately 	6ES7142-3BF00-0XA0 6ES7142-3BH00-0XA0	ECOFAST terminating resistor for PROFIBUS DP	
		<ul style="list-style-type: none"> 1 pack = 1 unit 1 pack = 5 units 	6GK1905-0DA10 6GK1905-0DA00
ET 200eco basic modules BM 143		PROFIBUS ECOFAST	See ECOFAST bus cables
<ul style="list-style-type: none"> 8 DI/8 DO, 2 A 8 x M12, IP65/67 connection block 6ES7194-3AA00-0.A0 to be ordered separately 8 DI/8 DO, 1.3 A 8 x M12, double assignment, IP65/67 connection block 6ES7194-3AA00-0.A0 to be ordered separately 	6ES7143-3BH00-0XA0 6ES7143-3BH10-0XA0	Hybrid cable – Cu	
ET 200eco basic modules BM 148		M12 connection block, 7/8" accessories	
<ul style="list-style-type: none"> 4/8 F-DI, 8 x M12, connection block 6ES7194-3AA00-0.A0 to be ordered separately 	6ES7148-3FA00-0XB0	PROFIBUS M12 cable connector	
ECOFAST connection block	6ES7194-3AA00-0AA0	1 pack = 5 units <ul style="list-style-type: none"> Male contact insert Female contact insert 	6GK1905-0EA00 6GK1905-0EB00
for ET 200eco, 2 x ECOFAST connection RS485 identification connector for PROFIBUS DP, address setting		PROFIBUS M12 connecting cable	
M12 connection block, 7/8"	6ES7194-3AA00-0BA0	for PROFIBUS DP, 1 pack = 5 units	
for ET 200eco, 2 x M12 and 2 x 7/8" 2 rotary coding switch for PROFIBUS DP, address setting		<ul style="list-style-type: none"> Male contact insert 	6GK1905-0EC00
		PROFIBUS M12 connecting cable	
		Preassembled 2-wire (inverse coded) with M12 connectors (straight) in various lengths:	
		<ul style="list-style-type: none"> 0.3 m 0.5 m 1.0 m 1.5 m 2.0 m 3.0 m 5.0 m 	6XV1830-3DE30 6XV1830-3DE50 6XV1830-3DH10 6XV1830-3DH15 6XV1830-3DH20 6XV1830-3DH30 6XV1830-3DH50

Safety integrated automation

ET 200eco fail-safe distributed IO

SIMATIC ET 200eco

	Article No.
<ul style="list-style-type: none"> 10.0 m 15.0 m Other special lengths with 90° or 180° cable outlet, see 	6XV1830-3DN10 6XV1830-3DN15
http://support.automation.siemens.com/WW/view/en/26999294	
7/8" connector 1 pack = 5 units <ul style="list-style-type: none"> Male contact insert, straight Male contact insert, angled Female contact insert, straight Female contact insert, angled 	6GK1905-0FA00 3RK1902-3BA00 6GK1905-0FB00 3RK1902-3DA00
7/8" sealing caps 1 pack = 10 units	6ES7194-3JA00-0AA0
SIMATIC NET energy cable 5-wire energy cable, stranded 5 x 1.5 mm ² , trailing-type <ul style="list-style-type: none"> Sold by the meter, minimum order quantity = 20 m 	6XV1830-8AH10
7/8" connecting cable to power supply Preassembled 5-wire cable with 7/8" connectors (straight) in various lengths: <ul style="list-style-type: none"> 0.3 m 0.5 m 1.0 m 1.5 m 2.0 m 3.0 m 5.0 m 10.0 m 15.0 m Preassembled 5-wire cable with 7/8" connectors (straight) in various lengths: <ul style="list-style-type: none"> 3.0 m 5.0 m 10.0 m <ul style="list-style-type: none"> Other special lengths with 90° or 180° cable outlet, see 	6XV1822-5BE30 6XV1822-5BE50 6XV1822-5BH10 6XV1822-5BH15 6XV1822-5BH20 6XV1822-5BH30 6XV1822-5BH50 6XV1822-5BN10 6XV1822-5BN15 3RK1902-3NB30 3RK1902-3NB50 3RK1902-3NC10
http://support.automation.siemens.com/WW/view/en/26999294	

	Article No.
Other accessories	
Identification connector For setting the PROFIBUS station address	6ES7194-1KB00-0XA0
Y circular connector M12 For double connection of sensors via a single cable, 5-pole; cannot be used for F DI 4/8	6ES7194-1KA01-0XA0
Y cable M12 For double connection of sensors via a single cable, 5-pole; cannot be used for F DI 4/8	6ES7194-6KA00-0XA0
M12 coupler plug for connecting actuators or sensors, 5-pole	3RK1902-4BA00-5AA0
M12 covering caps for sealing of unused I/O sockets	3RX9802-0AA00
Labels	3RT1900-1SB20
Manual "Distributed IO ET 200eco" except F-DI <ul style="list-style-type: none"> on paper, German on paper, English on paper, French 	6ES7198-8GA00-8AA0 6ES7198-8GA00-8BA0 6ES7198-8GA00-8CA0
"Distributed Safety" V5.4 F programming tool Floating License for 1 user, with documentation, 3 languages (German, English, French), on CD, runs on STEP 7 V5.3 SP3 or higher	6ES7833-1FC02-0YA5
"Distributed Safety" F programming tool Upgrade from V5.x to V5.4	6ES7833-1FC02-0YE5
S7 Manual Collection Electronic manuals on DVD, multi-language: S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication)	6ES7998-8XC01-8YE0
S7 Manual Collection update service for 1 year Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates	6ES7998-8XC01-8YE2

More information

Brochures

Information material for downloading can be found in the Internet: www.siemens.com/simatic/printmaterial

Introduction

Overview

AS-Interface: ASIsafe

ASIsafe enables the integration of safety-related components in an AS-Interface network, for example:

- EMERGENCY-STOP pushbuttons
- Protective door switches
- Safety light arrays

The simple wiring of AS-Interface, which is a major advantage, is maintained.

Modular Safety System (MSS)

Supplementing the service-proven concept of the safety monitors, the new 3RK3 Modular Safety System offers for example the following functions for ASIsafe:

- Up to 50 enabling circuits including muting function
- Expandable fail-safe and non-fail-safe inputs/outputs
- Control of up to 12 ASIsafe outputs or 12 fail-safe independent switch-off groups
- Memory module for parameters, e.g. for device replacement
- Optional PROFIBUS interface for diagnostics and parameterization
- Intuitive graphic parameterization and diagnostics software MSS ES
- AS-i Power24V capability

Your advantage: Easy to configure safety functions up to Category 4, PL e, SIL 3

AS-Interface safety monitors

- For monitoring safe stations and for linking AS-Interface inputs and outputs
- Ensures safe disconnection
- Available with one or two release circuits with two-channel configuration
- All versions with removable screw terminals or spring-type terminals
- All safety monitors in revised Version 3 with additional options
- Filtering out of brief single-channel interruptions in the sensor circuit with the expanded safety monitor Version 3
- Expanded safety monitor with integrated safe slave for controlling a distributed safe AS-i output or for safe coupling a safe signal from one AS-i network to another AS-i network
- Configuration software ASIMON V3 with graphic function diagram presentation

Your advantage: Easy to configure safety functions up to Category 4, PL e, SIL 3

AS-Interface safety modules

- Complete portfolio of ASIsafe modules
- For connection of safety switches with contacts (e.g. position switches) as well as solid-state safety sensors (ESPE)
- Degree of protection IP65/IP67 or IP20
- Very compact dimensions, from 20 mm width
- Up to four safe inputs per module
- Up to one safe output per module
- Standard outputs are available on the module in addition
- Up to Category 4, PL e, SIL 3

Your advantage: Easy integration of safe signals, be it in the control cabinet or in the field

SIRIUS 3SF1, 3SF3 mechanical safety switches for AS-Interface

- Plastic with degree of protection IP65 and metal with degree of protection IP66/IP67
- ASIsafe electronics integrated in the enclosure, with low power consumption < 60 mA
- Available with separate actuator or interlocking

Your advantage: Conventional wiring of safety functions no longer required.

SIRIUS 3SF2 cable-operated switches for AS-Interface

- Degree of protection IP65
- Direct connection of cable-operated switches for detection of signals
- Metal enclosures

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3RK3
Modular Safety System



K45F



S45F SlimLine module,
safe AS-i output



Position switch



Cable-operated switch



EMERGENCY-STOP for mounting on front plate

SIRIUS EMERGENCY-STOP mushroom pushbuttons for AS-Interface

- Degree of protection IP65/IP67
 - EMERGENCY-STOP directly on AS-Interface using integrated modules
 - Metal or plastic version
- Your advantage: Easy direct connection of service-proven control elements to ASIsafe

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AS-Interface: ASIsafe (continued)

F-adapter

AS-Interface F adapters for EMERGENCY-STOP devices

- Connection of an EMERGENCY-STOP device according to ISO 13850 to AS-Interface
 - Is snap-mounted from behind onto the EMERGENCY-STOP device (actuator)
 - Can be used up to Category 4, PL e, SIL 3
- Your advantage: Easy direct connection of service-proven control elements to ASIsafe

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AS-Interface: Master

CM 1243-2 for SIMATIC S7-1200



CP 343-2, CP 343-2P for SIMATIC S7-300



CM AS-i Master ST for SIMATIC ET 200SP

The AS-Interface master connects SIMATIC control systems to AS-Interface. It automatically organizes the data traffic on the AS-Interface cable and sees not only to processing the signals but also to performing the parameter setting, monitoring and diagnostics functions.

Masters for SIMATIC S7

AS-Interface master connections:

- CM 1243-2 for SIMATIC S7-1200
- CP 343-2P, CP 343-2 for SIMATIC S7-300 and ET 200M

Characteristics:

- Connection of up to 62 AS-Interface slaves
- Connection of up to 496 inputs and 496 outputs per master or AS-Interface network
- Integrated analog value transmission
- Simple configuration by adopting the actual configuration on the AS-Interface network
- Easy operation in the input/output address area of the SIMATIC S7 comparable to standard I/O modules
- Monitoring of the control supply voltage on the AS-Interface shaped cable

Your advantage: Easy connection to SIMATIC controllers

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Masters for SIMATIC ET 200

CM AS-i Master ST for SIMATIC ET 200SP

- Connection of up to 62 AS-Interface slaves per master
- Connection of up to 496 inputs and 496 outputs per AS-Interface network
- Integrated analog value transmission (input/output via data record communication)
- Simple configuration by adopting the actual configuration on the AS-Interface network
- Easy operation in the input/output address area of the SIMATIC (or other controller) comparable to standard I/O modules
- Monitoring of the control supply voltage on the AS-Interface shaped cable
- Integrated ground-fault monitoring

Your advantage: Easy connection of AS-i networks to distributed I/Os

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Introduction

AS-Interface: Routers



DP/AS-i LINK Advanced



DP/AS-Interface Link 20E



IE/AS-i LINK PN IO

As an alternative to the CPs, it is also possible to use a link as AS-Interface master
– at any position beneath the PROFIBUS DP or PROFINET IO.

Routers

- Degree of protection IP20
 - PROFIBUS slave or PROFINET IO device and AS-Interface master (single or double master in case of DP/AS-i LINK Advanced and IE/AS-i LINK PN IO)
 - Connection of up to 62 AS-Interface slaves per AS-Interface network
 - Connection of up to 496 digital inputs and 496 outputs per AS-i network, with doubling of the project data volume for double master versions
 - Integrated ground-fault monitoring (in case of DP/AS-i LINK Advanced and IE/AS-i LINK PN IO)
 - User-friendly local diagnostics and local startup by means of a full graphic display and control keys or through a web interface with a standard browser (in case of DP/AS-i LINK Advanced and IE/AS-i LINK PN IO)
 - Integrated analog value transmission
 - Configuring and uploading of AS-Interface configuration in STEP 7 possible
 - User-friendly selection of AS-Interface slaves
 - Safety-related transition from ASIsafe to PROFIsafe also available as DP/AS-i F-Link
- Your advantage: Optimum transition to PROFIBUS or PROFINET, integrated in STEP 7

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AS-Interface: Slaves



K20 Digital-Modul



K45 Digital-Modul



Pushbutton



8WD4 Signaling column

Slaves contain the AS-Interface electronics and connection options for sensors and actuators in the field and in the control cabinet. A total of up to 62 slaves can be connected to one bus. The slaves then exchange their data in cyclic mode with a control module (master).

I/O modules for use in the field, high degree of protection

Digital I/O modules IP67 – K60, K60R, K45 and K20

- Degree of protection IP65/IP67 or IP68/IP69K
- Modules available with up to degree of protection IP68/IP69K
- ATEX-certified modules available for Ex Zone 22
- Connection sockets in M8/M12
- Up to eight inputs and four outputs
- A/B technology available
- Contacting protected against polarity reversal
- Standard rail mounting and wall mounting possible
- Mounting of the module on the base plate using just one screw
- Diagnostics LEDs

Your advantage: Reduction of mounting and startup times by up to 40 %

Commanding and signaling devices

SIRIUS 3SF5 pushbuttons and indicator lights

- Modular construction according to individual requirements
- Up to 6 signaling points
- Metal and plastic version
- Any change of equipment possible even after installation
- Indicator lights with integrated LED

Your advantage: Complete 3SB3 operating system with simple AS-Interface connection for your plant

8WD4 signaling columns







- Up to three signaling elements can be connected using an adapter element
- With LEDs or incandescent lamps

Your advantage: Signaling columns for monitoring production sequences and for visual or acoustic warnings in emergency situations, with easy AS-Interface connection




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		Article-No.	Page
AS-Interface: Power supply units and data decoupling modules			
 IP20, 3 A  IP20, 8 A  PSN130S DC 30 V, 8 A  S22.5 data decoupling module  DCM 1271 data decoupling module	<p>AS-Interface power supply units generate a controlled direct voltage of 30 V DC with high stability and low residual ripple in conjunction with data decoupling. They are an integral component of the AS-Interface network and enable the simultaneous transmission of data and energy on one cable.</p> <p>In conjunction with data decoupling modules, AS-Interface can also be operated with standard power supply units.</p> <p>AS-Interface power supply units</p> <ul style="list-style-type: none"> • With wide performance spectrum from 2.6 to 8 A • Degree of protection IP20 • Separation of data and energy by means of the integrated data decoupling • UL/CSA approval means the power supplies can be used worldwide. 2.6 A version with output power restricted to max. 100 W (for use in NEC Class 2 circuits) • Certified for global use • Integrated ground-fault and overload detection save the need for additional components and make applications reliable • Diagnostics memory, remote signaling and remote RESET allow fast detection of faults in the system • The ultra-wide input range enables single- and two-phase applications (8 A version) <p>Your advantage: Optimum performance for each application</p> <p>30 V power supply units</p> <p>Standard 30 V power supply units without data decoupling</p> <ul style="list-style-type: none"> • Power spectrum 3 A, 4 A and 8 A • Overload and short-circuit proof in every performance class • Diagnostics: With output voltage > 26.5 V DC LED and signaling contact for output voltage 30V O.K. • Primary-side connection to 120 V AC / 230 V AC (1-phase) with automatic range selection <p>Your advantage: Economical alternatives in conjunction with data decoupling modules while making full use of the maximum AS-Interface cable length</p> <p>S22.5 data decoupling modules</p> <ul style="list-style-type: none"> • Degree of protection IP20, narrow design 22.5 mm • Supply of several AS-i networks with a single power supply unit • Single and double data decoupling • Operation with 24 V DC or 30 V DC <p>Your advantage: Cost-effective installation of AS-i networks in conjunction with standard power supply units</p> <p>DCM 1271 data decoupling module for SIMATIC S7-1200</p> <ul style="list-style-type: none"> • Simple data decoupling in IP 20 design • Supply of several AS-i networks with a single power supply unit • Operation with 24 V DC or 30 V DC <p>Your advantage: Cost-effective installation of AS-i networks in conjunction with standard power supply units in the design of a SIMATIC S7-1200 module</p>	3RX9	3/252
		3RX9	3/253
 Shaped cable	<p>AS-Interface shaped cable for connection of network stations.</p> <p>AS-Interface shaped cables</p> <ul style="list-style-type: none"> • No polarity reversal thanks to trapezoidal shape • Cables made of optimized material for different operating conditions • Special version according to UL Class 2 available <p>Your advantage: Fast replacement and connection to AS-Interface by piercing method</p>	3RX9	3/259

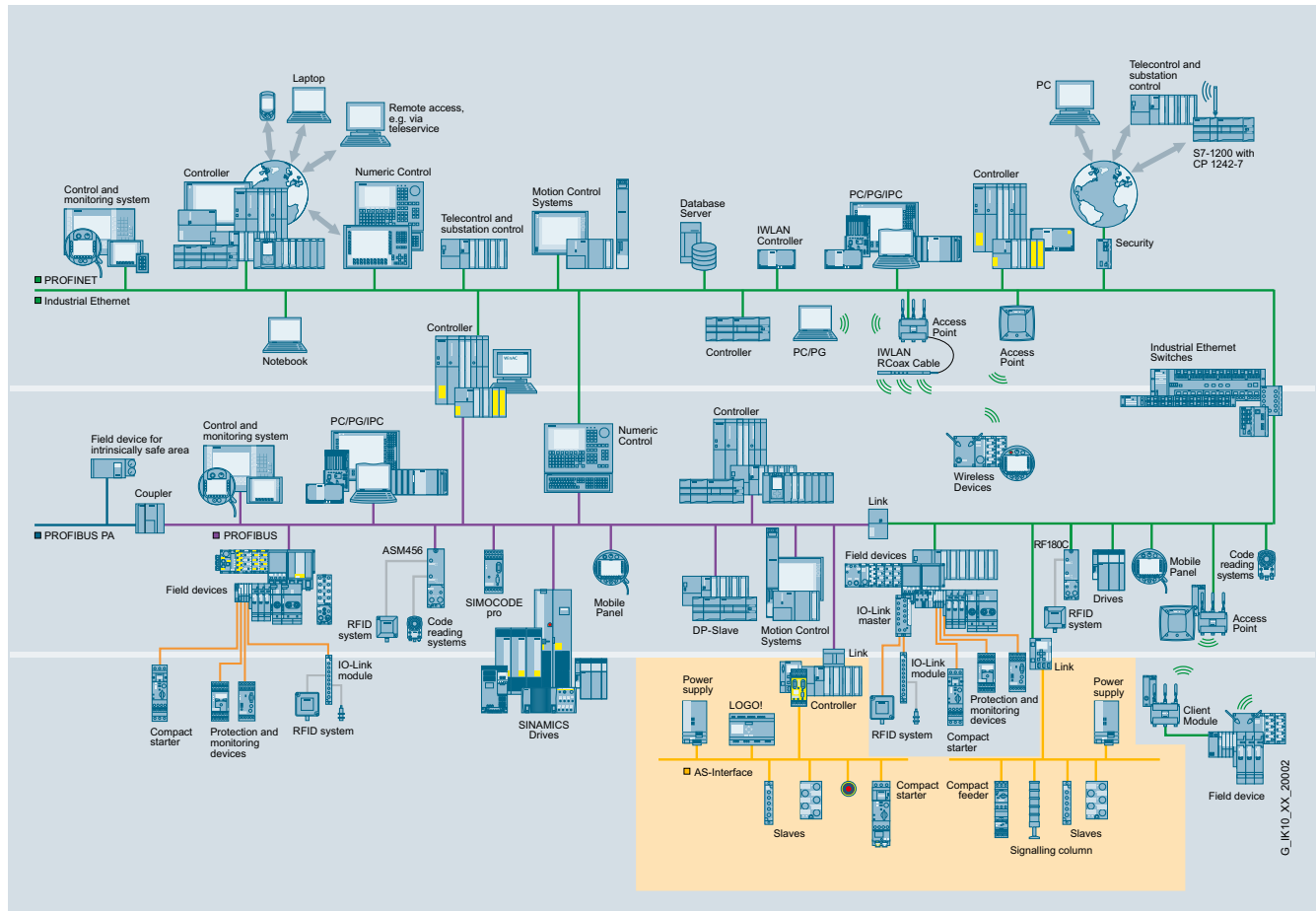
Introduction

		Article-No.	Page
AS-Interface: System components and accessories			
 Addressing unit for AS-Interface V 3.0  Cable terminating piece	<p>Accessories comprise tools for mounting, installation and operating as well as individual components.</p> <p>Addressing units</p> <ul style="list-style-type: none"> • Reading out and adjusting the slave address 0 to 31 or 1A to 31A, 1B to 31B, with automatic addressing aid and prevention of double addresses • Reading out the slave profile (IO, ID, ID2) and reading out and setting the ID1 code • Input/output test when commissioning the slaves, on all digital and analog slaves according to AS-Interface Specification V 3.0, including safe input slaves and complex CTT2 slaves • Display of the operational current in case of direct connection of an AS-i slave (measuring range from 0 to 150 mA) • Storage of complete network configurations (profiles of all slaves) to simplify the addressing <p>Your advantage: Easiest way to address and test the slaves</p>	3RK1	3/260
	<p>Miscellaneous accessories</p> <p>AS-Interface system manual, individual components such as sealing caps, cable adapters, distributors, M12 plugs and cables, etc.</p>	3RK2, 3RG7, 3RG9, 3RK1, 3RX9, 6ES7	3/262
AS-Interface: Software			
 AS-i block library for PCS 7	<p>AS-Interface block library for SIMATIC PCS 7</p> <ul style="list-style-type: none"> • Engineering software and runtime software • Easy connection of AS-Interface to PCS 7 • Engineering work reduced to positioning and connecting the function blocks in the CFC • With no additional configuring steps required for connection to the PCS 7 Maintenance Station, diagnostics for the AS-i system is optimally guaranteed <p>Your advantage: Easy connection of AS-Interface to PCS 7, little engineering and configuration</p>	3ZS1	see catalog IC 10, chapter 14

Overview

AS-Interface is an open, international standard according to EN 50295 and IEC 62026-2 for process and field communication. Leading manufacturers of actuators and sensors all over the world support the AS-Interface. Interested companies are provided with the electrical and mechanical specifications by the AS-Interface Association.

AS-Interface is a single master system. For automation systems from Siemens, there are communications processors (CPs), communications modules (CMs) and routers (links) that control the process or field communication as masters, and actuators and sensors that are activated as AS-Interface slaves.



3

Benefits

A key feature of AS-Interface technology is the use of a shared two-conductor cable for data transmission and the distribution of auxiliary power to the sensors/actuators. A power supply unit which meets the requirements of the AS-Interface transmission method and has an external data decoupling module if required is used for the distribution of auxiliary power. The AS-Interface cable used for the wiring is mechanically coded and hence protected against polarity reversal and can be easily contacted by the insulation piercing method.

Elaborately wired control cables in the control cabinet and marshalling racks can be replaced by AS-Interface.

The AS-Interface cable can be connected to any points thanks to a specially developed cable and connection by the insulation piercing method.

With this concept you become extremely flexible and achieve high savings.

Application

I/O data exchange

The AS-i master transmits automatically the inputs and outputs between the control system and the digital and analog AS-Interface slaves.

Slave diagnostics information is forwarded to the control system when required.

AS-Interface masters according to the AS-Interface Specification V2.1 or V3.0 support integrated analog value processing. This means that data exchange with analog AS-Interface slaves is just as easy as with digital slaves.

Command interface

In addition to I/O data exchange with binary and analog AS-Interface slaves the AS-Interface masters provide a number of other functions through the command interface.

Hence it is possible, for example, for slave addresses to be issued, parameter values transferred or configuration information read out from user programs.

You can find more information on the Internet, [see http://support.automation.siemens.com/WW/view/en/51678777](http://support.automation.siemens.com/WW/view/en/51678777)

AS-Interface

Introduction

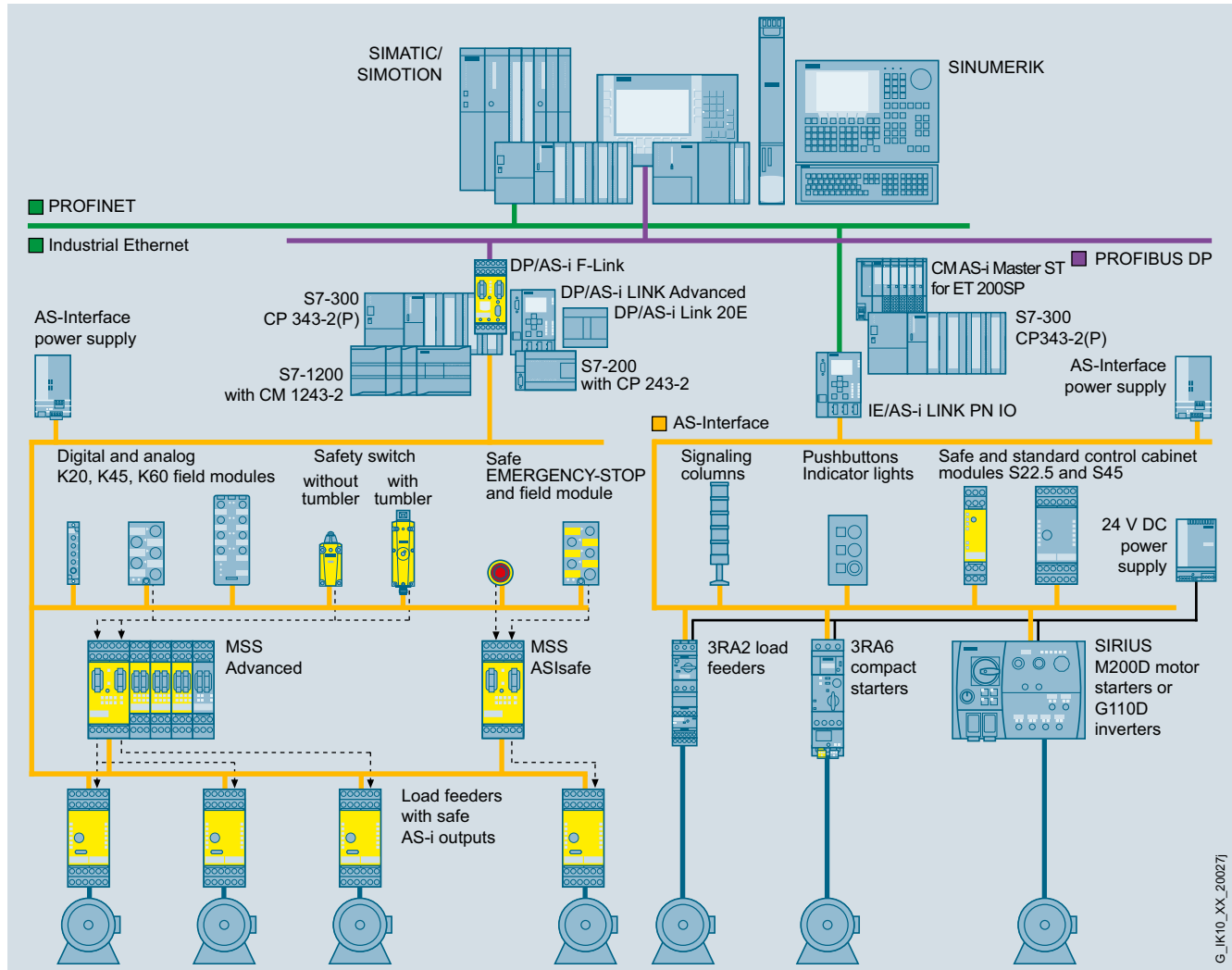
System components

Overview

To implement communication, a system installation has the following main components:

- Master interface modules for central control units such as SIMATIC S7, ET 200/ET 200SP distributed peripherals, or routers from PROFIBUS/PROFINET to AS-Interface
- Power supply units, if required in combination with a data decoupling module for the power supply to the slaves
- AS-Interface shaped cables

- Network components such as repeaters and extension plugs (cannot be used for AS-i Power24V)
- Modules for connection of standard sensors/actuators
- Actuators and sensors with integrated AS-i slave
- Safety modules for transmitting safety-related data through AS-Interface
- Addressing units for setting the slave addresses during commissioning



Example of a configuration with the system components

Features

Standard	EN 50295 / IEC 62026-2
Topology	Line, star or tree structure (same as electrical wiring)
Transmission medium	Unshielded two-wire cable (2 x 1.5 mm ²) for data and auxiliary power
Connection methods	Contacting of the AS-Interface cable by insulation piercing method
Maximum cable length	<ul style="list-style-type: none"> • 100 m without repeater • 200 m with extension plug • 300 m with two repeaters in series connection • 600 m with extension plugs and two repeaters connected in parallel Larger cable lengths are also possible when additional repeaters are connected in parallel

Maximum cycle time	<ul style="list-style-type: none"> • 5 ms in full expansion with standard addresses • 10 ms in full expansion with A/B addresses, profile-specific for Spec 3.0 slaves
Number of stations per AS-Interface line	<ul style="list-style-type: none"> • 31 slaves acc. to AS-Interface Spec. V2.0 • 62 slaves (A/B technology) acc. to AS-Interface Spec. V2.1 and V3.0 • Integrated analog value transmission
Number of binary sensors and actuators	<ul style="list-style-type: none"> • Max. 124 DI/124 DO according to Spec. V2.0 • Max. 248 DI/186 DO according to Spec. V2.1 • Max. 496 DI/496 DO according to Spec. V3.0
Access control	<ul style="list-style-type: none"> • Cyclic polling master/slave procedure • Cyclic data acceptance from host (PLC, PC)
Error safeguard	Identification and repetition of faulty message frames

G_IK10_XX_200271

Overview

Scope of the AS-Interface specification

AS-Interface specification	Maximum number of slaves		ASIsafe	Number of digital inputs	Number of digital outputs
	Digital	Analog		DI	DO
Version 2.0	31	31	31	$31 \times 4 = 124$	$31 \times 4 = 124$
Version 2.1	62	31	31	$62 \times 4 = 248$	$62 \times 3 = 186$
Version 3.0	62	62	31	$62 \times 8 = 496$	$62 \times 8 = 496$

Basic data of AS-Interface Specification V2.0

- AS-Interface Specification V2.0 describes a fieldbus system with an AS-i master and up to 31 AS-i slaves.
- Each AS-i slave has up to 4 digital inputs and 4 digital outputs.
- With full expansion, the complete transmission of all input/output data requires max. 5 ms cycle time.

Expansions of AS-Interface Specification V2.1

AS-Interface Specification V2.1 enables the number of network stations to be doubled from 31 to 62 as follows:

- The standard slaves continue to occupy one AS-i address (1...31).
- Slaves with extended addressing divide an address into an A address (1A...31A) and a B address (1B...31B). Up to 62 A/B slaves can be connected accordingly to one AS-Interface network.
- Mixed operation of standard slaves and A/B slaves is possible without difficulty. The AS-i master identifies automatically which type of slave is connected. No special adjustments are required of the user.

Another function of the AS-Interface Specification V2.1 is the integrated analog value transmission function. Access to both analog values and digital values is possible without the need for any special function blocks.

Expansions of AS-Interface Specification V3.0

- AS-Interface Specification V3.0 enables the connection of nearly 1000 digital inputs/outputs (profile S-7.A.A: 8DI/8DO as A/B slave).
- New profiles have also enabled the option of expanded addressing for analog slaves.
- Acceleration of analog value transmission through "Fast Analog Profile".
- Variable use of analog modules: Optional parameterization of resolution (12/14 bit) and 1- and 2-channel capability.
- Asynchronous serial protocol 100 baud or 50 baud, bidirectional.

AS-Interface master for A/B slaves

To be able to operate A/B slaves on an AS-Interface network you must use master modules that meet the minimum requirements of Specification V2.1.

AS-Interface specification	Available masters
Version 3.0	CP 343-2, 343-2P (S7-300/ET 200M), DP/AS-i Link Advanced, DP/AS-i F-Link, DP/AS-Interface Link 20E, IE/AS-i Link PN IO, CM 1243-2 (S7-1200), CM AS-i Master ST for ET 200SP, F-CM AS-i Safety ST for ET 200SP

The AS-Interface specification relevant for the respective slave is noted in the "Selection and ordering data".

For the exact slave profile see [AS-Interface system manual](#).

Communication cycle

AS-Interface specification	Maximum cycle time (digital signals)
Version 2.0	5 ms
Version 2.1	5 ms with 31 slaves 10 ms with 62 slaves
Version 3.0	5 ms with 31 slaves 10 ms with 62 slaves, supplementary, up to 20 ms with A/B slaves using 4DI/4DO, up to 40 ms with A/B slaves using 8DI/8DO

Each address is queried in max. 5 ms cycle time. If two A/B slaves are operated on one basic address (e.g. 12A and 12B), a maximum 10 ms will be required for updating the data of both slaves.

All slave types can be mixed and used on a single AS-Interface network.

More information, e.g. whether an AS-Interface slave is a standard slave or an A/B slave, can be seen in the section "Selection and ordering data" or the "AS-Interface system manual".

More information

Systemhandbuch AS-Interface

AS-Interface system manual

More information is available in the AS-Interface system manual.

The AS-Interface system manual can be downloaded free of charge, see

<http://support.automation.siemens.com/WW/view/en/26250840>

AS-Interface

ASIsafe

Introduction

Overview

Safety is included

ASIsafe enables the integration of safety-related components, such as EMERGENCY-STOP pushbuttons, protective door switches or safety light arrays, in an AS-Interface network. These are fully compatible with the familiar AS-Interface components (masters, slaves, power supplies, repeaters, etc.) in accordance with IEC 62026-2 and are operated in conjunction with them on the yellow AS-Interface cable.

Tested safety

The transmission method for safety-related signals is released for applications up to PL e according to EN ISO 13849-1 and up to SIL 3 according to IEC 62061/IEC 61508.

Higher-level control

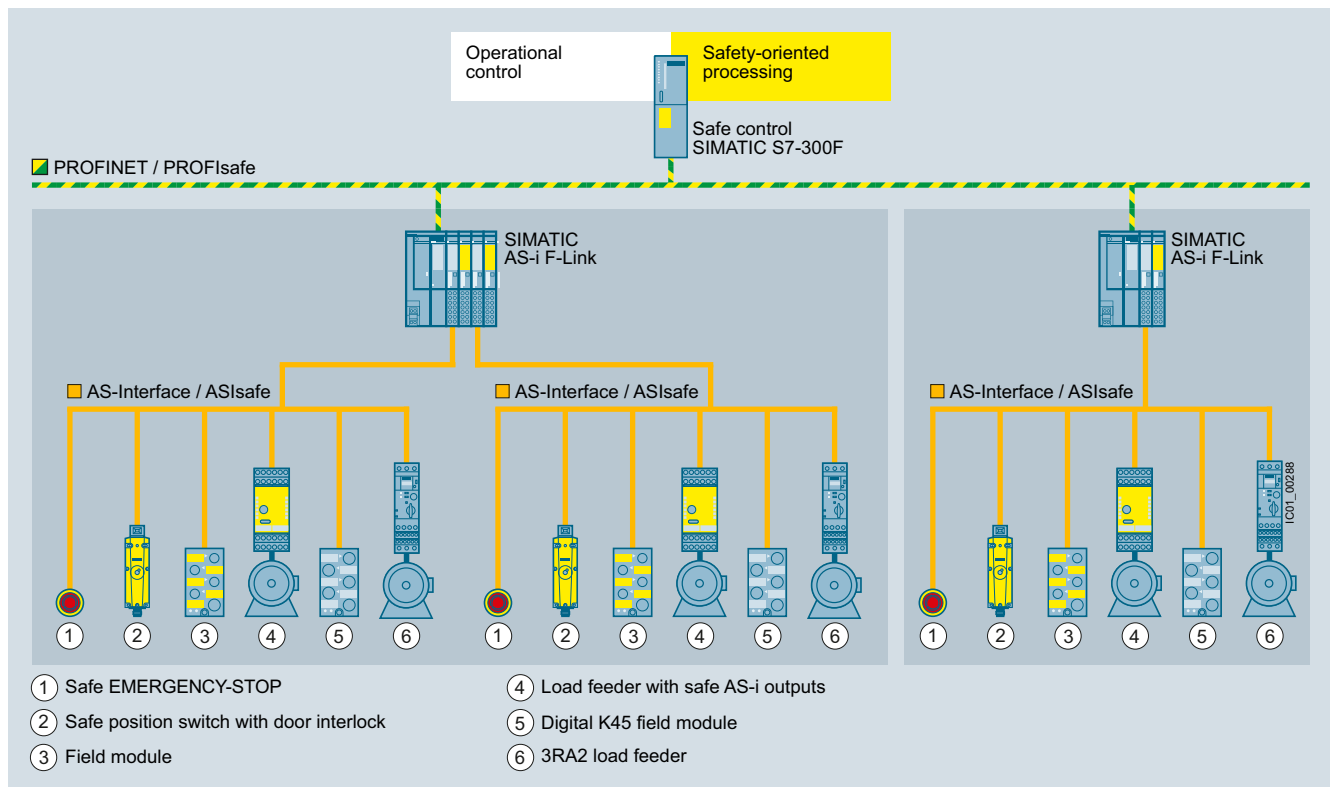
Operational control of the nodes on the AS-Interface bus is performed by the standard program of the higher-level SIMATIC (F)-CPU or by a SINUMERIK controller as usual.

AS-i safety solution with F-CPU

Configuring safety functions

In order to implement safe functions, the information from the safe and standard nodes must be combined logically and further parameters set. The configuration of the safety functions depends on which safety solution is being used:

- AS-i safety solution with F-CPU: In conjunction with the SIMATIC AS-i F-Link as a safe AS-i master, all safety functions and combinations are configured via STEP 7 and processed in the controller (F-CPU) by the failsafe program.
- AS-i safety solution with local evaluation by MSS: In conjunction with the Modular Safety System all safety functions and combinations are configured using the MSS ES software and processed in the MSS central unit.



AS-Interface structure with SIMATIC AS-i F-Link

The SIMATIC AS-i F-Link allows AS-Interface to be used with fail-safe SIMATIC or SINUMERIK controllers.

The assignment of tasks is as follows:

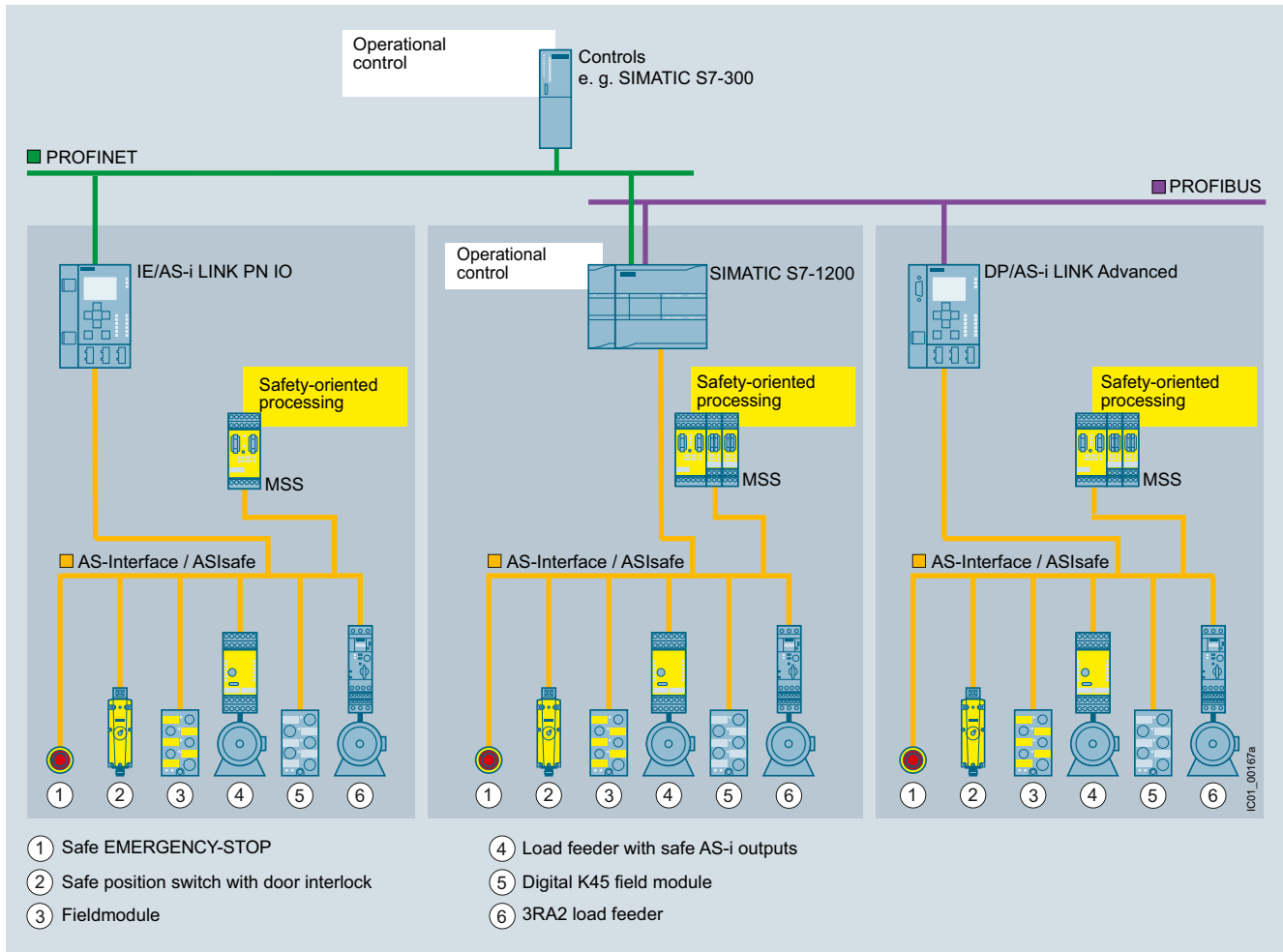
- Detecting the safety-related signals through safe input slaves on the AS-Interface bus. Further signals can be detected through other F-DI modules of the SIMATIC.
- Evaluating and processing the signals through the existing failsafe SIMATIC or SINUMERIK controller
- Responding through safe output modules on the AS-Interface bus or through other F-DQ modules of the SIMATIC

The SIMATIC AS-i F-Link is implemented as a modular structure of ET 200SP components.

Simple combination of the CM AS-i Master ST and F-CM AS-i Safety ST modules in one ET 200SP station with PROFINET interfacing results in a powerful PN/AS-i F-Link, which can be expanded with further I/O modules of the ET 200SP in a modular fashion.

Expansion variants for almost every application are possible in this way. Besides the single AS-i master, double, triple or generally multiple masters can be realized with or even without fail-safe functionality.

AS-i safety solution with local evaluation by MSS



AS-Interface structure with 3RK3 Modular Safety System (MSS)

The local AS-i safety solution uses the 3RK3 Modular Safety System (MSS) for safety-related processing. In this case, one standard controller (i.e. no F-CPU) and one standard AS-i Master are sufficient.

The assignment of tasks is as follows:

- Detecting the safety-related signals through safe input slaves on the AS-Interface bus. Further signals can be detected via F-DI inputs of the central unit or the expansion modules of the MSS.

- Evaluating and processing the signals via the central unit of the MSS
- Responding through safe output modules on the AS-Interface bus or through other F-DQ outputs of the central unit or the expansion modules of the MSS

Benefits

- Simple system structure thanks to standardized AS-Interface technique
- Safety-related and standard data on the same bus
- Existing systems can be expanded quickly and easily
- Optimum integration in TIA (Safety Diagnostics) and Safety Integrated
- Inclusion of the safety signals in the plant diagnostics, also on existing HMI panels
- Approved to PL e according to EN ISO 13849-1 or SIL 3 according to IEC 61508
- ASIsafe is certified by TÜV (Germany), NRTL (USA) and INRS (France)

Application

In the AS-Interface system, integrated safety technology is used wherever EMERGENCY-STOP pushbuttons, protective door in-

terlocks, safety switches, light arrays and two-hand operator controls are installed.

More information

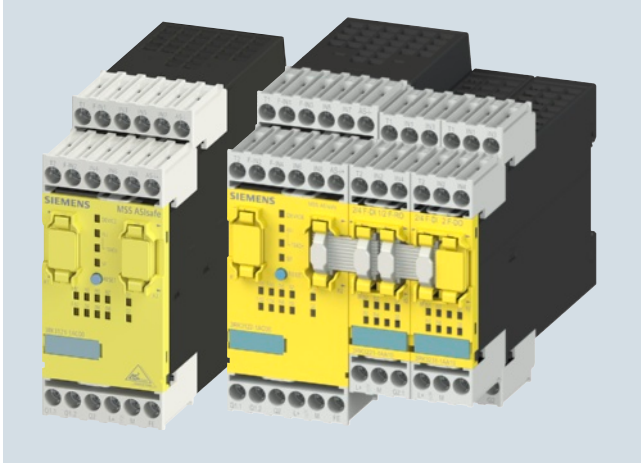
For more information and circuit examples for safety systems, see
<http://support.automation.siemens.com/WW/view/en/20208582>.

AS-Interface

ASIsafe

SIRIUS 3RK3 modular safety system

SOverview



MSS ASIsafe basic (left) and
MSS ASIsafe extended with two expansion modules (right)

The Modular Safety System (MSS) is the centerpiece of ASIsafe Solution local. It allows safety-related response to signals from the ASIsafe nodes connected in the AS-i network, such as safe input modules, EMERGENCY-STOP pushbuttons or position switches.

The MSS thus supports safety-related applications up to Category 4 according to ISO 13849-1 or SIL3 according to IEC 62061.

Safe disconnection takes place via the local safe outputs of the MSS or via the distributed safe AS-Interface outputs in the AS-Interface network.

The safety functions are configured within the MSS using the MSS ES software. The configuration can be transmitted directly in the MSS via the system interface with the aid of a PC cable or memory module. If the DP interface module is used, transmission via PROFIBUS DP is also possible.

The MSS supports a large number of different safety functions. These can be tailored to individual needs in the form of ready-made function blocks.

The safety functions supported include the following:

- EMERGENCY-STOP
- Safety shutdown mat
- Protective door monitoring
- Protective door tumbler mechanism
- Approval switches
- Two-hand operator controls
- ESPE monitoring
- Muting
- Mode selector switches

Application

All the MSS that can be used for the AS-Interface bus support the same safety functions. Differences exist in the number of inputs/outputs and expansion modules that can be connected, and hence in the number of independent enabling circuits.

Several MSS can be used on the same AS-Interface bus.

AS-Interface is available in the following versions:

MSS ASIsafe basic

- A total of up to 10 independent (2-channel) enabling circuits
 - 2 of these enabling circuits via safe outputs integrated into the central unit
 - And another 8 enabling circuits via ASIsafe, e.g. with local, safe AS-i outputs

MSS ASIsafe extended

- A total of up to 20 independent (2-channel) enabling circuits
 - 2 of these enabling circuits via safe outputs integrated into the central unit
 - In addition, up to 8 enabling circuits via a maximum of 2 expansion modules
 - And another 10 enabling circuits via ASIsafe, e.g. with local, safe AS-i outputs

MSS Advanced

- A total of up to 50 independent (2-channel) enabling circuits
 - 2 of these enabling circuits via safe outputs integrated into the central unit
 - In addition, up to 36 enabling circuits via a maximum of 9 expansion modules
 - And another 12 enabling circuits via ASIsafe, e.g. with local, safe AS-i outputs

Expandability

All versions above can be expanded by adding a DP interface module and a diagnostics module. In addition, various safety and non-safety expansion modules can be selected for the MSS, and these can be used in any combination.

Comparison of the three MSS versions

MSS 3RK3	ASIsafe basic	ASIsafe extended	Advanced
Number of independent (2-channel) enabling circuits	2 ... 10	2 ... 20	2 ... 50
Inputs	1/2 F-DI and 6 DI	2/4 F-DI and 4 DI (expandable)	4/8 F-DI (expandable)
Outputs	1 F-DO and 1 F-RO	1 F-DO and 1 F-RO (expandable)	
Number of expansion modules	--	Up to 2	Up to 9
Connection to ASIsafe			
Number of safe AS-i outputs	Up to 8	Up to 10	Up to 12
Number of safe AS-i inputs	Up to 31		

-- Not available

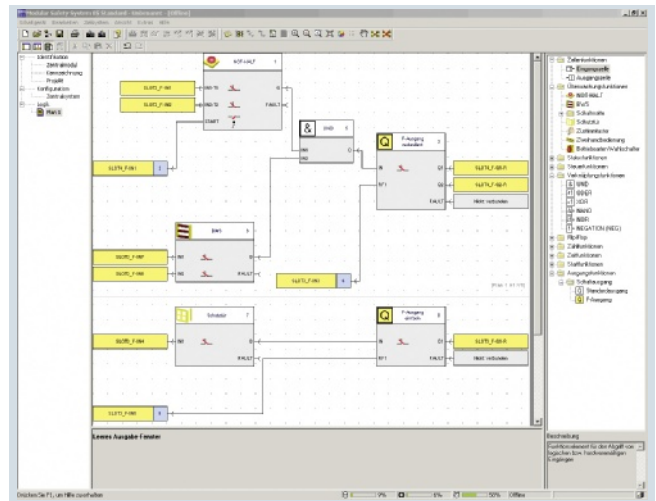
SIRIUS 3RK3 modular safety system

Software for startup, testing and diagnostics: Modular Safety System ES (MSS ES)

MSS ES is the engineering software for the configuration, startup and diagnostics of the 3RK3 Modular Safety System.

All function elements can be positioned using drag & drop. All functions – whether safety or logic functions – are available as blocks and can also be easily combined with one another.

MSS ES makes it possible to test the safety application by forcing. Outputs can be individually set in order to test in advance the reaction of the downstream safety function. In addition, the parameterization can be downloaded to the MSS via PROFIBUS. The integrated macro function allows you to compile a library of your own function elements for reuse in other projects. In addition, the parameterization software is suitable for use as a reliable diagnostics tool: the status of each element as well as the configuration as a whole can be viewed online.



MSS ES user interface showing the ISO-Plan display

Note:



Screw terminals



Spring-type terminals





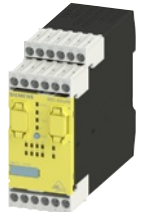

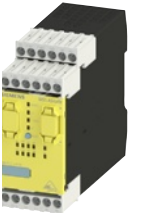

Combicon-terminal (steckbarer Screw terminals)



Fast Connect

Die Anschlüsse sind in den Auswahl- und Bestelldaten durch orange Hintergründe gekennzeichnet.


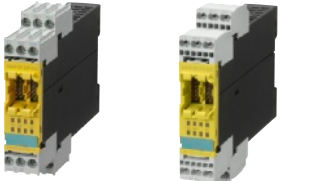
Selection and ordering data

Version		DT	Screw terminals 	DT	Spring-type terminals 
			Article No.		Article No.
Central units					
 3RK3121-1AC00		3RK3 ASIsafe basic Central units for connecting to AS-Interface with safety-related inputs and outputs <ul style="list-style-type: none"> • 1/2 safe inputs • 6 standard inputs • 1 two-channel relay output • 1 two-channel electronic output • Memory module 3RK3931-0AA00 is included in the scope of supply • No expansion modules can be connected 		 3RK3121-2AC00	
 3RK3122-1AC00		3RK3 ASIsafe extended Central units for connecting to AS-Interface with safety-related inputs and outputs <ul style="list-style-type: none"> • 2/4 safe inputs • 4 standard inputs • 1 two-channel relay output • 1 two-channel electronic output • Memory module 3RK3931-0AA00 is included in the scope of supply • Max. 2 expansion modules can be connected 		 3RK3122-2AC00	
		A	3RK3121-1AC00	A	3RK3121-2AC00
		A	3RK3122-1AC00	A	3RK3122-2AC00


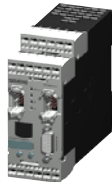

AS-Interface

ASIsafe

SIRIUS 3RK3 modular safety system

Version		DT	Screw terminals 	DT	Spring-type terminals 
			Article No.		Article No.
 3RK3131-1AC10 3RK3131-2AC10		A	3RK3131-1AC10	A	3RK3131-2AC10
3RK3 Advanced Central units for connecting to AS-Interface with safety-related inputs and outputs <ul style="list-style-type: none"> • 4/8 safe inputs • 1 two-channel relay output • 1 two-channel electronic output • Memory module 3RK3931-0AA00 is included in the scope of supply • Max. 9 expansion modules can be connected 					
Expansion modules					
 3RK3211-1AA10 3RK3211-2AA10		A	3RK3211-1AA10	A	3RK3211-2AA10
4/8 F-DI Safety-related input modules <ul style="list-style-type: none"> • 8 inputs 					
 3RK3221-1AA10 3RK3221-2AA10		A	3RK3221-1AA10	A	3RK3221-2AA10
2/4 F-DI 1/2 F-RO Safety-related input/output modules <ul style="list-style-type: none"> • 4 inputs • 2 single-channel relay outputs 					
 3RK3231-1AA10 3RK3231-2AA10		A	3RK3231-1AA10	A	3RK3231-2AA10
2/4 F-DI 2F-DO Safety-related input/output modules <ul style="list-style-type: none"> • 4 inputs • 2 two-channel electronic outputs 					
 3RK3251-1AA10 3RK3251-2AA10		A	3RK3251-1AA10	A	3RK3251-2AA10
4/8 F-RO Safety-related output modules <ul style="list-style-type: none"> • 8 single-channel relay outputs 					
 3RK3242-1AA10 3RK3242-2AA10		A	3RK3242-1AA10	A	3RK3242-2AA10
4 F-DO Safety-related output modules <ul style="list-style-type: none"> • 4 two-channel electronic outputs 					

SIRIUS 3RK3 modular safety system





Version		DT	Screw terminals	DT	Spring-type terminals	
			Article No.		Article No.	
Interface modules						
		DP-Interface PROFIBUS DP interface, 12 Mbit/s, RS 485, cyclic and acyclic data exchange	A	3RK3511-1BA10	A	3RK3511-2BA10
3RK3511-1BA10		3RK3511-2BA10				
Operating and monitoring modules						
	Diagnostics module For direct display of errors, e.g. of crossover	A	3RK3611-3AA00	--		
3RK3611-3AA00						

More information

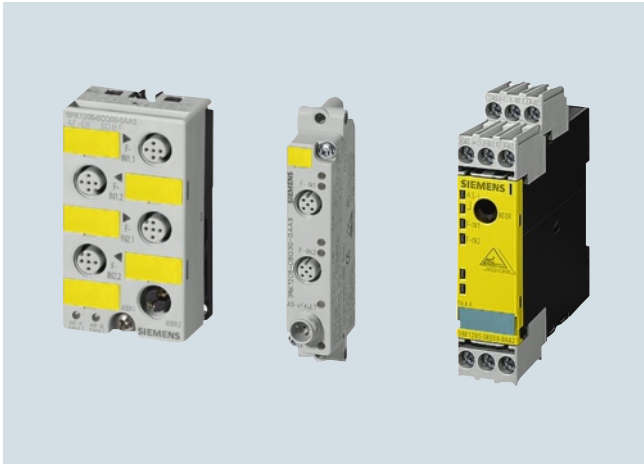
Manuals for the Modular Safety System (MSS) [see](http://support.automation.siemens.com/WW/view/en/26493228)
<http://support.automation.siemens.com/WW/view/en/26493228>

AS-Interface safety monitors

Selection and ordering data

	Version	DT	Article-No.
 3RK1105-1BE04-0CA0	Basic safety monitors Version 3 With screw terminals, removable terminals, width 45 mm		Screw terminals 
	• One enabling circuit (monitor type 1)	A	3RK1105-1AE04-0CA0
	• Two enabling circuits (monitor type 2)	A	3RK1105-1BE04-0CA0
	Expanded safety monitors Version 3 With screw terminals, removable terminals, width 45 mm		
	• One enabling circuit (monitor type 3)	A	3RK1105-1AE04-2CA0
	• Two enabling circuits (monitor type 4)	A	3RK1105-1BE04-2CA0
	Expanded safety monitors with integrated safe slave Version 3 With screw terminals, removable terminals, width 45 mm		
	• Two enabling circuits including control of a safe AS-i output/safe coupling (monitor type 6)	A	3RK1105-1BE04-4CA0
	Basic safety monitors Version 3 With spring-type terminals, removable terminals, width 45 mm		Spring-type terminals 
	• One enabling circuit (monitor type 1)	A	3RK1105-1AG04-0CA0
	• Two enabling circuits (monitor type 2)	A	3RK1105-1BG04-0CA0
 3RK1901-5AA00	Accessories		
	ASIsafe CD Included in the scope of supply: <ul style="list-style-type: none"> ASIMON V3 configuration software on CD ROM, for PC with the 32-bit operating systems Windows XP, Windows Vista Business/Ultimate, Windows 7 		▶ 3RK1802-2FB06-0GA1
	Cable sets Included in the scope of supply: <ul style="list-style-type: none"> PC configuration cable for communication between PC (serial interface) and safety monitor, length approx. 1.50 m Transfer cable between two safety monitors, length approx. 0.25 m 		▶ 3RK1901-5AA00
	Sealable covers For securing against unauthorized configuration of the safety monitor		B 3RP1902
	Push-in lugs For screw fixing		B 3RP1903

Übersicht



AS-Interface safety modules: K45F (left), K20F (center) and S22.5F (right)



S45F SlimLine module, safe AS-i output

Safety modules for AS-Interface (ASIsafe modules) are available for field use in degree of protection IP67 (K20F and K45F compact modules) and for the control cabinet (S22.5F SlimLine modules) in degree of protection IP20.

A very compact module with an optimum price/performance ratio is thus available for every application.

All modules for the connection of (mechanical) switches and safety sensors with contacts feature crossover monitoring of the connected sensor line. On versions for the connection of solid-state switches and safety sensors (e.g. light arrays) the crossover monitoring must be performed by the sensor.

The following modules are available for selection:

K20F compact safety modules for use in the field

Being only 20 mm wide, the K20F module is particularly well suited for applications where modules need to be arranged in the most confined space. The K20F modules are connected to the AS-Interface with a round cable with M12 cable box instead of with the AS-Interface flat cable. This enables extremely compact installation. The flexibility of the round cable means that it can also be used on moving machine parts without any problems. The K20 modules are also ideal for such applications as their non-encapsulated design makes them particularly light in weight.

K45F compact safety modules for use in the field

The platform of the K45F modules covers the following variations:

- Connection of ("mechanical") switches/safety sensors with contacts:
 - K45F 2F-DI: Two safety-related inputs in operation up to Category 2 according to EN ISO 13849-1. If Category 4 is required, a two-channel input is available on the module.
 - K45F 2F-DI/2DO: There are also two standard outputs in addition to the safe inputs. Supplied from the yellow AS-i cable
 - K45F 2F-DI/2DO U_{aux} : same as K45F 2F-DI/2DO, but supplied from the black 24 V DC cable
 - K45F 4F-DI: Four safety-related inputs in operation up to Category 2, two for Category 4. Extremely compact double slave (uses two full AS-i addresses).
- Connection of solid-state switches / safety sensors (non-contact protective devices, ESPE):
 - K45F LS (light sensor): Safe input module for the connection of electronic safety sensors with testing semiconductor outputs (OSSD)
 In particular non-contact protective devices such as active, optoelectronic light arrays and light curtains for Type 2 and Type 4 according to IEC 61496. Transmitters as well as receivers are supplied with power from the yellow AS-i cable. Matching sensor cables and optionally a separate transmitter supply module are available as accessories.

S22.5F SlimLine safety modules for use in control cabinets and local control cabinets

The S22.5F SlimLine safety module has two safety inputs. The safe connection of signals to ASIsafe networks in the cabinet is also possible therefore. For operation up to Category 2, both inputs can be separately assigned; if Category 4 is required, a two-channel input is available on the module.

In addition there are two S22.5F module versions which have two standard outputs in addition to the two safety inputs; power is supplied either from only the yellow AS-Interface cable or as auxiliary voltage from the black 24 V DC cable.

S45F SlimLine safety modules with safe outputs for the safe distributed disconnection of actuators

With the safe SlimLine-Module S45F, the shutdown signal, for example from the Modular Safety System, can be used through the ASIsafe for distributed safety-related disconnection.

To this end, the module has a dual-channel relay output with which an enabling circuit up to safety category 4 and Performance Level e according to EN ISO 13849-1 and SIL 3 according to EN 62061 / IEC 61508 can be deactivated safely.

As an additional possibility the module offers normal switching of the output using an AS-i standard output bit.

The module has three digital inputs and two digital outputs for the additional connection of sensors and actuators. These can be used, inter alia, for the necessary monitoring of downstream contactors of the feedback circuit.

AS-Interface safety modules

Selection and ordering data

Version		DT	Article No.
K20F compact safety modules			
I/O type	U_{aux} 24 V		
2 F-DI	--	A	3RK1205-0BQ30-0AA3
K45F compact safety modules			
Modules supplied without mounting plate			
I/O type	U_{aux} 24 V		
2 F-DI	--	▶	3RK1205-0BQ00-0AA3
4 F-DI	--	A	3RK1205-0CQ00-0AA3
2 F-DI/2 DO	--	B	3RK1405-0BQ20-0AA3
2 F-DI/2 DO	✓	B	3RK1405-1BQ20-0AA3
2 F-DI LS type 2 ¹⁾	--	B	3RK1205-0BQ21-0AA3
2 F-DI LS type 4 ²⁾	--	B	3RK1205-0BQ24-0AA3
S22.5F SlimLine safety modules			
Connection	I/O type	U_{aux} 24 V	
Screw	2 F-DI	--	A
	2 F-DI/2 DO	--	A
	2 F-DI/2 DO	✓	A
Spring-type	2 F-DI	--	A
	2 F-DI/2 DO	--	B
	2 F-DI/2 DO	✓	B
S45F SlimLine safety modules			
Connection	I/O type	U_{aux} 24 V	
Screw	1F-RO/3DI/2DO	✓	A
	1F-RO/3DI/2DO	✓	A

✓ Available or possible
 -- Not available or not possible

- ¹⁾ Connection of previous Siemens light curtain FS 400 3RG7843 (type 2) through socket 1/3
²⁾ Connection of previous Siemens light curtain FS 400 3RG7846 (type 4) through socket 1/3, other makes through socket 2/3

Accessories

Version		DT	Article No.
K45 mounting plates			
For mounting K45F			
• For wall mounting		▶	3RK1901-2EA00
• For standard rail mounting		▶	3RK1901-2DA00
24 V supply modules for K45F LS (light sensor)			
• Optional, for transmitter power supply for large protective field widths		B	3RK1901-1NP00
• Max. current carrying capacity 200mA			
• Modules supplied without mounting plate			
Input bridges for K45F			
• Black version		A	3RK1901-1AA00
• Red version		D	3RK1901-1AA01
AS-Interface M12 sealing caps			
For free M12 sockets		▶	3RK1901-1KA00
AS-Interface M12 sealing caps, tamper-proof			
For free M12 sockets		A	3RK1901-1KA01

Overview



CM 1243-2 communication module for S7-1200

The CM 1243-2 communication module is the AS-Interface master for the SIMATIC S7-1200 and has the following features:

- Connection of up to 62 AS-Interface slaves
- Integrated analog value transmission
- Supports all AS-Interface master functions according to the AS-Interface Specification V3.0
- Indication of the operating state on the front of the device displayed via LED
- Display of operating mode, AS-Interface voltage faults, configuration faults and peripheral faults via LED behind the front panel
- Compact enclosure in the design of the SIMATIC S7-1200
- Suitable for AS-i power 24V: In combination with the optional DCM 1271 data decoupling module, a standard 24 V power supply unit can be used.
- Configuration and diagnostics via the TIA portal

Design

The CM 1243-2 communication module is positioned to the left of the S7-1200 CPU and linked to the S7-1200 via lateral contacts.

It has:

- Terminals for two AS-i cables (internally jumpered) via two screw terminals each respectively
- One terminal for connection to the functional ground
- LEDs for indication of the operating state and fault statuses of the connected slaves

The screw terminals (included in scope of supply) can be removed to facilitate installation.

Function

The CM 1243-2 supports all specified functions of the AS-Interface Specification V3.0.

The values of the digital AS-i slaves can be activated via the process image of the S7-1200. During configuration of the slaves in the TIA Portal, the values of the analog AS-i slaves can also be accessed directly in the process image.

It is also possible to exchange all data of the AS-i master and the connected AS-i slaves with the S7-1200 via the data record interface.

Changeover of the operating mode, automatic application of the slave configuration and the re-addressing of a connected AS-i slave can be implemented via the control panel of the CM 1243-2 in the TIA Portal.

The optional DCM 1271 data decoupling module has an integrated detection unit for detecting ground faults on the AS-Interface cable. The integrated overload protection also disconnects the AS-Interface cable if the drive power required exceeds 4 A.

Notes on safety

The use of this product requires suitable protective measures (e.g. network segmentation for IT security among others) in order to ensure safe plant operation, see www.siemens.com/industrialsecurity.

Configuration

To configure CM 1243-2, you require STEP 7 V11+ SP2 or STEP 7 V13 or higher.

For STEP 7 V11+ SP2 or higher, you require the additional Hardware Support Package for CM 1243-2, which is available via the Service & Support portal, see under <http://support.automation.siemens.com/WW/view/en/54164095>

The software enables user-friendly configuration and diagnostics of the AS-Interface master and any connected slaves.

Alternatively, you can also apply the AS-Interface ACTUAL configuration at the "touch of a button" via the control panel integrated in the TIA Portal/STEP 7.

AS-Interface

Masters

Masters for SIMATIC S7 CM 1243-2

Benefits


- More flexibility and versatility in the use of SIMATIC S7-1200 as the result of a significant increase in the number of digital and analog inputs/outputs available
- Very easy configuration and diagnostics of the AS-Interface via the TIA Portal (STEP 7 V11+ SP2 or higher)
- No need for the AS-i power supply unit with AS-i Power24V: The AS-Interface cable is supplied through an existing 24 V DC PELV power supply unit. For decoupling, the AS-i DCM 1271 data decoupling module is required, [see catalog IC 10, chapter 2](#)
- LEDs for indication of fault statuses for fast diagnostics
- Monitoring of AS-Interface voltage facilitates diagnostics

Application

The CM 1243-2 is the AS-Interface master connection for the 12xx CPUs of the SIMATIC S7-1200. Connection to the AS-Interface greatly increases the number of inputs and outputs available for S7-1200 (max. 496 DI/496 DO on the AS-Interface per CM).


The integrated analog value processing also makes the analog values available at the AS-Interface for the S7-1200 (per CM up to 31 standard analog slaves, each with up to 4 channels, or up to 62 A/B analog slaves, each with up to 2 channels).

Selection and ordering data

Version	DT	Article No.
 <p>CM 1243-2 communication modules</p> <ul style="list-style-type: none"> • AS-Interface masters for SIMATIC S7-1200 • Corresponds to AS-Interface Specification V3.0; • Dimensions (W × H × D / mm): 30 × 100 × 75 	A	3RK7243-2AA30-0XB0

3RK7243-2AA30-0XB0

Accessories

Version	DT	Article No.
<p>5-pole screw terminals for AS-i master CM 1243-2 and AS-i DCM 1271 data decoupling module</p> <ul style="list-style-type: none"> • With screw terminals 		3RK1901-3MA00

More information

The manuals are available free of charge on the Internet, [see http://support.automation.siemens.com/WW/view/en/50414115/133300](http://support.automation.siemens.com/WW/view/en/50414115/133300)

Overview



CP 343-2P / CP 343-2

The CP 343-2P is the AS-Interface master for the SIMATIC S7-300 programmable controller and the ET 200M distributed I/O station offering convenient parameterization options.

The CP 343-2 is the basic version of the module.

The CP 343-2P / CP 343-2 performs the following features:

- Connection of up to 62 AS-Interface slaves
- Integrated analog value transmission
- Supports all AS-Interface master functions according to the AS-Interface Specification V3.0
- Status displays of operating states and indication of the readiness for operation of connected slaves by means of LEDs in the front panel
- Fault indications (including AS-Interface voltage errors, configuration errors) by means of LEDs on the front plate.
- Compact enclosure in the design of the SIMATIC S7-300
- Suitable for AS-i Power24V (from product version 2/ firmware version 3.1) for Standard AS-i with 30 V voltage.
- Additionally for CP 343-2P: Supports detailed configuration of the AS-Interface network with STEP 7 V5.2 and higher

Design

The CP 343-2P / CP 343-2 is connected like an I/O module to the S7-300. It has:

- Two terminal connections for direct connection of the AS-Interface cable
- LEDs in the front panel for indicating the operating state and the readiness for operation of all connected and activated slaves
- Pushbuttons for switching over the master operating state and for adopting the existing ACTUAL configuration of the AS-i slave as the TARGET configuration

Function

The CP 343-2P / CP 343-2 supports all specified functions of the extended AS-Interface Specification V3.0.

The CP 343-2P / CP 343-2 occupies 16 bytes each in the I/O address area of the SIMATIC S7-300. The digital I/O data of the standard slaves and A slaves is saved in this area. The digital I/O data of the B slaves and the analog I/O data can be accessed with the S7 system functions for read/write data record.

If required, master calls can be performed with the command interface, e.g. read/write parameters, read/write configuration.

For more information see

<http://support.automation.siemens.com/WW/view/en/51678777>.

Security information

The use of this product requires suitable protective measures (e.g. network segmentation for IT security) to ensure secure plant operation, see <http://www.siemens.com/industrialsecurity>.

Configuration

All connected AS-Interface slaves are configured at the press of a button. No further configuration of the CP is required.

Additionally for CP 343-2P

The CP 343-2P also supports the configuration of the AS-Interface network with STEP 7 V5.2 and higher. Specifying the AS-i configuration in the HW config facilitates the setting of slave parameters and system documentation. Uploading the ACTUAL configuration of an already configured AS-Interface network is also supported. The saved configuration cannot be overwritten at the press of a button and is therefore tamper-proof.

Benefits

- Shorter start-up times through simple configuration at the press of a button
- Design of flexible machine-related structures using the ET 200M distributed I/O system
- Provides diagnostics of the AS-Interface networks
- Well suited also for complex applications thanks to connection options for 62 slaves and integral analog value processing
- Reduction of standstill and servicing times in the event of a fault thanks to the LED indicators:
 - status of the AS-Interface network
 - slaves connected and their readiness for operation
 - monitoring of the AS-Interface mains voltage
- Lower costs for stock keeping and spare parts inventory because the CP can be used for the SIMATIC S7-300 and also for the ET 200M
- With CP 343-2P additionally: Improved plant documentation and support for service assignments thanks to a description of the AS-Interface configuration in the STEP 7 project
- No need for the AS-i power supply unit with AS-i Power24V: The AS-Interface cable is supplied through an existing 24 V DC PELV power supply unit. An AS-i data decoupling module (e.g. 3RK1901-1DE12-1AA0) is needed for decoupling, see "Power supply units and data decoupling modules".
- Operation with AS-Interface power supply unit (e.g. 3RX9501-0BA00, see "Power supply units and data decoupling modules") is also possible without restrictions.

AS-Interface

Masters

Masters for SIMATIC S7 CP 343-2P, CP 343-2

Application



The CP 343-2P/CP 343-2 is the AS-Interface master connection for the SIMATIC S7-300 und ET 200M.

By connecting an AS-Interface, a max. of 248 DI/248 DO can be accessed per CP when using 62 A/B slaves with 4DI/4DO respectively.

The integrated analog processing function can be used to easily transfer analog signals (up to 62A/B analog slaves with a max. of 2 channels each or up to 31 standard analog slaves, each with a max. of 4 channels per CP).

The CP 343-2P is an enhancement to the CP 343-2 and has exactly the same functions. An existing STEP 7 user program for a CP 343-2 can be used for a CP 343-2P without limitations. The two assemblies are merely configured differently in STEP 7 HW Config, whereby the CP 343-2P offers additional possibilities. We recommend the CP 343-2P for these reasons.

Selection and ordering data

Version	DT	Article No.
 CP 343-2P communications processors For connection of SIMATIC S7-300 and ET 200M to AS-Interface; configuration of the AS-i network using the SET key or STEP 7 (V5.2 and higher); without front connector; corresponds to AS-Interface Specification V3.0; dimensions (W x H x D / mm): 40 x 125 x 120	▶	6GK7343-2AH11-0XA0
 CP 343-2 communications processors Basic version for connection of SIMATIC S7-300 and ET 200M to AS-Interface Configuration of the AS-i network using the SET key; without front connector; corresponds to AS-Interface Specification V3.0; dimensions (W x H x D / mm): 40 x 125 x 120	▶	6GK7343-2AH01-0XA0

Accessories

Version	DT	Article No.
Front connector, 20-pole <ul style="list-style-type: none"> With screw terminals 	A	6ES7392-1AJ00-0AA0
<ul style="list-style-type: none"> With spring-type terminals 	A	6ES7392-1BJ00-0AA0

More information

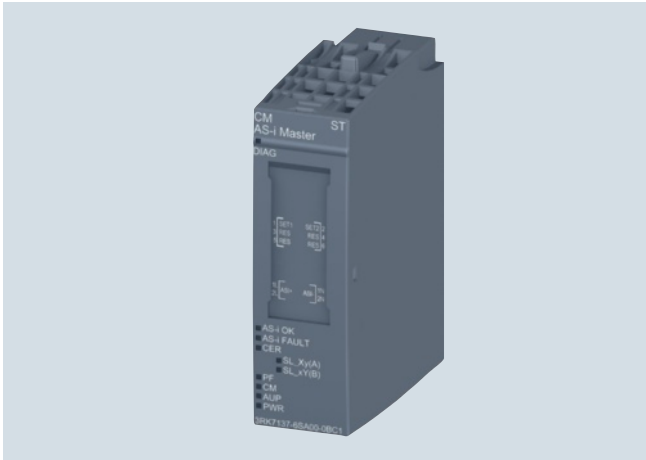
AS-i function block library for PCS 7 for easy connection of AS-Interface to PCS 7, see

- "Industrial Controls" → "Parameter Assignment, Configuration and Visualization for SIRIUS" → "AS-Interface function block library for SIMATIC PCS 7".
- Industry Mall: "Automation"
 - "Industrial controls"
 - "Parameterization, Configuration and Visualization with SIRIUS"
 - "AS-Interface Block Library for SIMATIC PCS 7"

Manuals

For manuals, see
<http://support.automation.siemens.com/WW/view/en/14310380/133300>.

Übersicht



CM AS-i Master ST für SIMATIC ET 200 SP

The CM AS-i Master ST communication module is designed for use in the SIMATIC ET 200SP distributed I/O system and has the following features:

- Connection of up to 62 AS-Interface slaves
- Supports all AS-Interface master functions according to the AS-Interface Specification V3.0
- User-friendly configuration with graphic display of the AS-i line in TIA Portal V13.0 or in other systems by using GSD
- Supply via AS-Interface cable
- Suitable for AS-i Power24V and for AS-Interface with 30 V voltage
- Integrated ground-fault monitoring for the AS-Interface cable
- Through connection to AS-Interface and in combination with ET 200SP, the number of digital inputs and outputs available for the control system is greatly increased (max. 496 DI / 496 DO on the AS-Interface per CM).
- Integrated analog value processing (all analog profiles)

Basic unit: ET 200SP distributed I/O system

The SIMATIC ET 200SP distributed I/O system is a scalable and highly flexible I/O system for connecting the process signals to a central control system via PROFINET.

Up to eight CM AS-i Master STs can be plugged into a SIMATIC ET 200SP with IM 155-6 PN ST standard interface module.

For more information see "ET 200SP System Manual" at

<http://support.automation.siemens.com/WW/view/en/58649293>

Design

The CM AS-i Master ST has an ET 200SP module enclosure with a width of 20 mm. A BaseUnit is required for use in the ET 200SP. The CM AS-i Master ST can be plugged onto type C0 BaseUnits (BU) with automatic coding.

The CM AS-i Master ST has LED indicators for diagnostics, operation, AS-i voltage and AS-i slave status.

The CM AS-i Master ST offers informative front-side module inscription for

- Plain-text marking of the module type and function class
- 2D matrix code (article number and serial number)
- Circuit diagram
- Color coding of the CM module type: Blue
- Hardware and firmware version
- Complete article number

Function

The CM AS-i Master ST supports all specified functions of the AS-Interface Specification V3.0.

The input/output values of the digital AS-i slaves can be activated via the cyclic process image. The values of the analog AS-i slaves can be reached via data record transfer.

If required, master calls can be performed with the command interface, e.g. read/write parameters, read/write configuration.

Changeover of the operating mode, automatic application of the slave configuration and the re-addressing of a connected AS-i slave can be implemented via the control panel of the CM AS-i Master ST in the TIA Portal.

Notes on safety

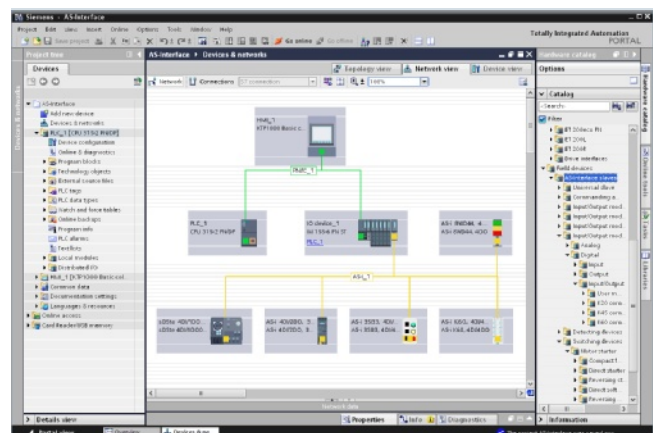
The use of this product requires suitable protective measures (e.g. network segmentation for IT security among others) in order to ensure safe plant operation, see www.siemens.com/industrialsecurity.

Configuration

Configuration of the CM AS-i Master ST requires TIA Portal V13 or the updated version of STEP 7 V5.5 SP4 or the GSD file.

The TIA Portal enables user-friendly configuration and diagnostics of the AS-i master and any connected slaves.

Alternatively, you can also apply the AS-Interface ACTUAL configuration as the DESIRED configuration at the "touch of a button" via the control panel integrated in the TIA Portal or an optional expansion button. Configuration with the GSD file is possible only with the button.



Configuration of an AS-Interface network with CM AS-i Master ST via TIA Portal

AS-Interface

Masters

Masters for SIMATIC ET 200 CM AS-i Master für ET 200SP

Benefits

The CM AS-i Master ST for ET 200SP enables modular, easy and high-performance expansion of AS-Interface networks via engineering in the TIA Portal.

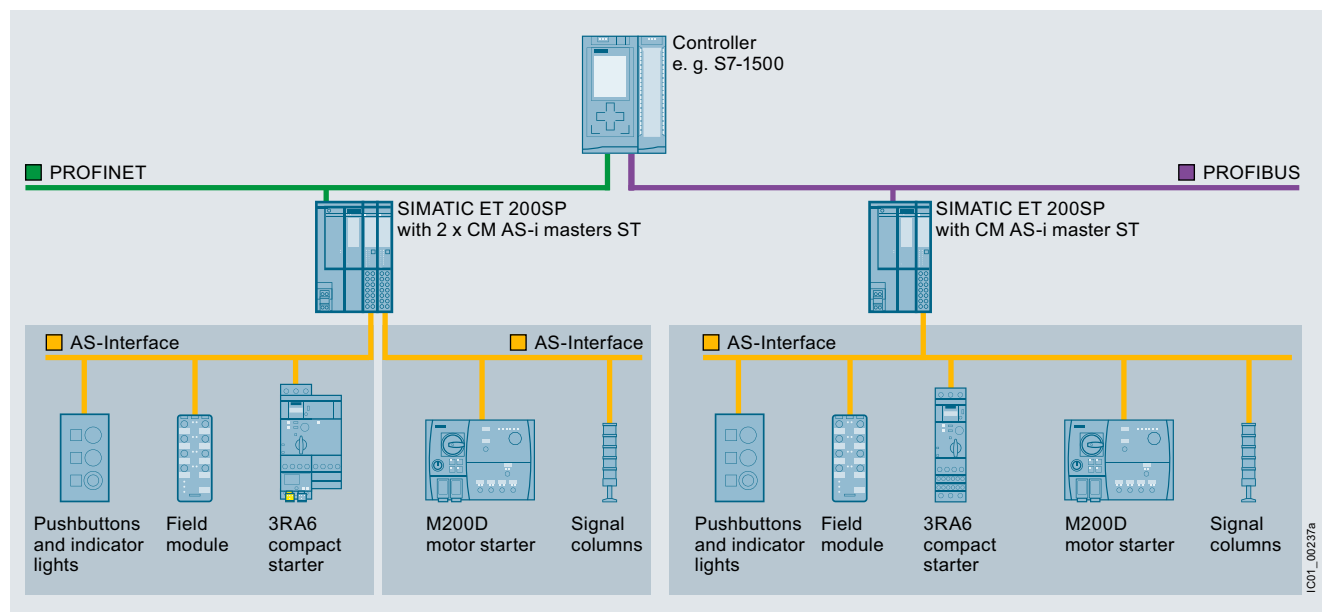
Up to eight CM AS-i masters can be plugged into one ET 200SP station with IM 155-6PN ST. The maximum configuration depends on the interface module used.

Multiple masters as well as single masters can thus be implemented in the ET 200SP depending on the number of modules.

Together with the interface module, a scalable PROFINET/AS-i Link or PROFIBUS/AS-i Link can be assembled.

Application

Configuration examples of AS-Interface networks with CM AS-i Master ST for SIMATIC ET 200SP



Configuration of AS-Interface networks under a SIMATIC ET 200SP

1001_00237a

Selection and ordering data

	Version	DT	Article No.
 3RK7137-6SA00-0BC1	CM AS-i Master ST communication modules <ul style="list-style-type: none"> AS-Interface master for SIMATIC ET 200SP, can be plugged onto BaseUnit type C0 Corresponds to AS-Interface Specification V3.0 Dimensions (W × H × D / mm): 20 x 73 x 58 	A	3RK7137-6SA00-0BC1
 3RK7136-6SC00-0BC1	F-CM AS-i Safety ST communication module NEW <ul style="list-style-type: none"> Fail-safe module for SIMATIC ET 200SP, can be plugged onto BaseUnit type C1 (alternatively type C0) Operation requires an AS-i master, e.g. CM AS-i Master ST Can be used up to SIL 3 (IEC 62061/IEC 61508), PL e (EN ISO 13849-1) Approved for use with the PROFINET interface modules IM 155-6 PN Standard and IM 155-6 PN High Feature, under CPU S7-300F or CPU S7-416F. More approvals on request. Coding element type F (included in scope of supply) Dimensions (W × H × D / mm): 20 x 73 x 58 	A	3RK7136-6SC00-0BC1
 6ES7155-6AA00-0BN0	PROFINET IM 155-6PN ST interface modules Including server module (bus adapter must be ordered separately)	A	6ES7155-6AU00-0BN0
	Including server module and bus adapter 2 x RJ45	A	6ES7155-6AA00-0BN0
 6ES7193-6AR00-0AA0	Variable bus adapters for PROFINET For connection of the Ethernet cable to the PROFINET IM interface module	A	6ES7193-6AR00-0AA0
	<ul style="list-style-type: none"> Connection 2 x RJ45 		
 6ES7193-6AF00-0AA0	<ul style="list-style-type: none"> Connection 2 x FC (FastConnect) 	A	6ES7193-6AF00-0AA0


AS-Interface

Masters

Masters for SIMATIC ET 200
CM AS-i Master für ET 200SP

Accessories



Version	DT	Spring-type terminals 
BaseUnits		Artikel-Nr.
<ul style="list-style-type: none"> • BU20-P6+A2+4D BaseUnit for CM AS-i Master ST to ET 200SP • Type C0 • For connection of AS-Interface cable to the CM AS-i master 		6ES7193-6BP20-0DC0

More information

Manuals

CM AS-i Master ST manual [see](http://support.automation.siemens.com/WW/view/en/61757442/133300)
<http://support.automation.siemens.com/WW/view/en/61757442/133300>

BaseUnits manual [see](http://support.automation.siemens.com/WW/view/en/59753521)
<http://support.automation.siemens.com/WW/view/en/59753521>

ET 200SP system manual [see](http://support.automation.siemens.com/WW/view/en/58649293)
<http://support.automation.siemens.com/WW/view/en/58649293>

The "AS-Interface" system manuals [see](http://support.automation.siemens.com/WW/view/en/26250840)
<http://support.automation.siemens.com/WW/view/en/26250840>

Industry Mall

More information
see Industry Mall at "Automation Technology"
→ "Industrial Communication" → "AS-Interface" → "Masters"
→ "Masters for SIMATIC ET 200"

Overview



DP/AS-i LINK Advanced

PN	DP-M	DP-S	ASi-M		
		●	●		

The DP/AS-i LINK Advanced is a compact router between PROFIBUS (DP Slave) and AS-Interface, with the following features:

- Single and double AS-Interface master (according to AS-Interface Specification V3.0) for connection of 62 AS-Interface slaves or 124 AS-Interface slaves (with a double master)
- Integrated analog value transmission (all analog profiles)
- Integrated ground-fault monitoring for the AS-Interface cable
- User-friendly local diagnostics and startup by means of a full graphic display and control keys or through a web interface with a standard browser on the PC screen
- Optimum TIA integration using STEP 7
- Integration in non-Siemens engineering tools using the PROFIBUS GSD file
- Vertical integration (standard web interface) through Industrial Ethernet
- Supply voltage from the AS-Interface shaped cable or alternatively with 24 V DC (optional)
- Suitable for AS-i Power24V (from product version 4 / firmware version 2.2) and for Standard AS-i with 30 V voltage
- Module exchange without entering the connection parameters (e.g. PROFIBUS address) using C-PLUG (optional)

Design

- Compact plastic enclosure in degree of protection IP20 for standard rail mounting
- COMBICON plug-in screw terminals
- Compact design:
 - Pixel graphics display in the front panel for detailed display of the operating state and readiness for operation of all connected AS-Interface slaves
 - 6 pushbuttons for starting up and testing the AS-Interface line directly on the DP/AS-i LINK Advanced
 - LED display of the operating state of PROFIBUS DP and AS-Interface
 - Integrated Ethernet port (RJ45 socket) for user-friendly startup, diagnostics and testing of DP/AS-i LINK Advanced through a web interface using a standard browser
- Small mounting depth thanks to recessed plug mounting
- Operation without fans and batteries

Functionality

Communications

The DP/AS-i LINK Advanced enables a PROFIBUS DP master to cyclically access the I/O data of all the slaves of a lower-level AS-Interface segment. Also supported are the expanded slave types with higher I/O data volume according to AS-i Specification V3.0.

The DP/AS-i LINK Advanced occupies the following address area:

- As a single master: 32 bytes of input data and 32 bytes of output data in which the I/O data of the connected AS-Interface slaves (standard and A/B slaves) of an AS-i line are stored.
- As double master, double the number of bytes
- Optional additional I/O bytes for data from analog slaves

The size of the input/output image can be compressed so that only the actually required I/O address area is occupied in the system of the DP master. The integrated evaluation of analog signals is just as easy as access to digital values because the analog process data also lie directly in the I/O address area of the CPU.

PROFIBUS DP-V1 Masters also provide the option of triggering AS-Interface Master calls over the acyclic PROFIBUS services (e.g. write parameters, amend addresses, read diagnostic values). Using an operating display in AS-i Link it is possible to fully commission the lower-level AS-Interface line.

DP/AS-i LINK Advanced is equipped with an additional Ethernet port which enables use of the integrated web server. The web server can be called up with any standard web browser (e.g. Internet Explorer) without additional software. It allows all diagnostics information to be shown on the PC and the bus configuration and, if applicable, any adjustments, to be displayed. Firmware updates are also possible using this port. The optional C-PLUG supports module exchange without entering the connection parameters (PROFIBUS address etc.), keeping downtimes to a minimum in the event of a fault.

Diagnostics

The following diagnostics is possible using LEDs, the display and control keys, web interface or STEP 7:

- Operating state of the DP/AS-i LINK Advanced
- Status of the link as a PROFIBUS DP slave
- Diagnostics of the AS-Interface network
- Message frame statistics
- Standard diagnostics pages in the web interface for fast diagnostics access through Ethernet using a standard browser
- For the use of the web interfaces no network settings are necessary on the PC (Zeroconf procedure).
- The reporting of diagnostic events is optionally possible via E-Mail or SNMP Trap. The integrated diagnostic buffer saves the events including time stamp.

Notes on safety

The use of this product requires suitable protective measures (e.g. network segmentation for IT security among others) in order to ensure safe plant operation, see www.siemens.com/industrialsecurity.

Configuration

The DP/AS-i LINK Advanced can be configured as follows:

- With STEP 7 as of V5.4: With STEP 7 the AS-Interface configuration can be uploaded in STEP 7. Furthermore, AS-Interface slaves can also be conveniently configured in HW-Config (slave selection dialog).
- By adopting the ACTUAL configuration of the AS-Interface on the display
- Alternatively DP/AS-i LINK Advanced can be integrated into the engineering tool over the PROFIBUS GSD file (e.g. STEP 7 versions below V5.4 or engineering tools from third-party software houses).

AS-Interface Routers

DP/AS-i LINK Advanced

Benefits

- Short startup times through simple configuration at the press of a button and testing of the AS-Interface line using the display or web interface
- Reduction of standstill and servicing times in the event of a slave failure thanks to user-friendly diagnostics using the display or web interface and through simple module exchange with the help of the C-PLUG exchange medium
- Reduced amount of engineering work thanks to user-friendly configuration of Siemens slaves using the slave catalog in HW-Config (STEP 7)
- Costs saved by the double AS-Interface master when large volumes of project data are involved
- Standard mode with AS-Interface power supply (see [power supply units page 3/252](#)) possible without restrictions, whereby no further operational voltage is required.

Application

The DP/AS-i LINK Advanced is a PROFIBUS DP-V1 slave (according to IEC 61158/IEC 61784) and an AS-Interface master (based on AS-Interface Specification V3.0 according to IEC 62026-2). It enables transparent data access to AS-Interface from PROFIBUS DP.

Exchanging data with the PROFIBUS DP master

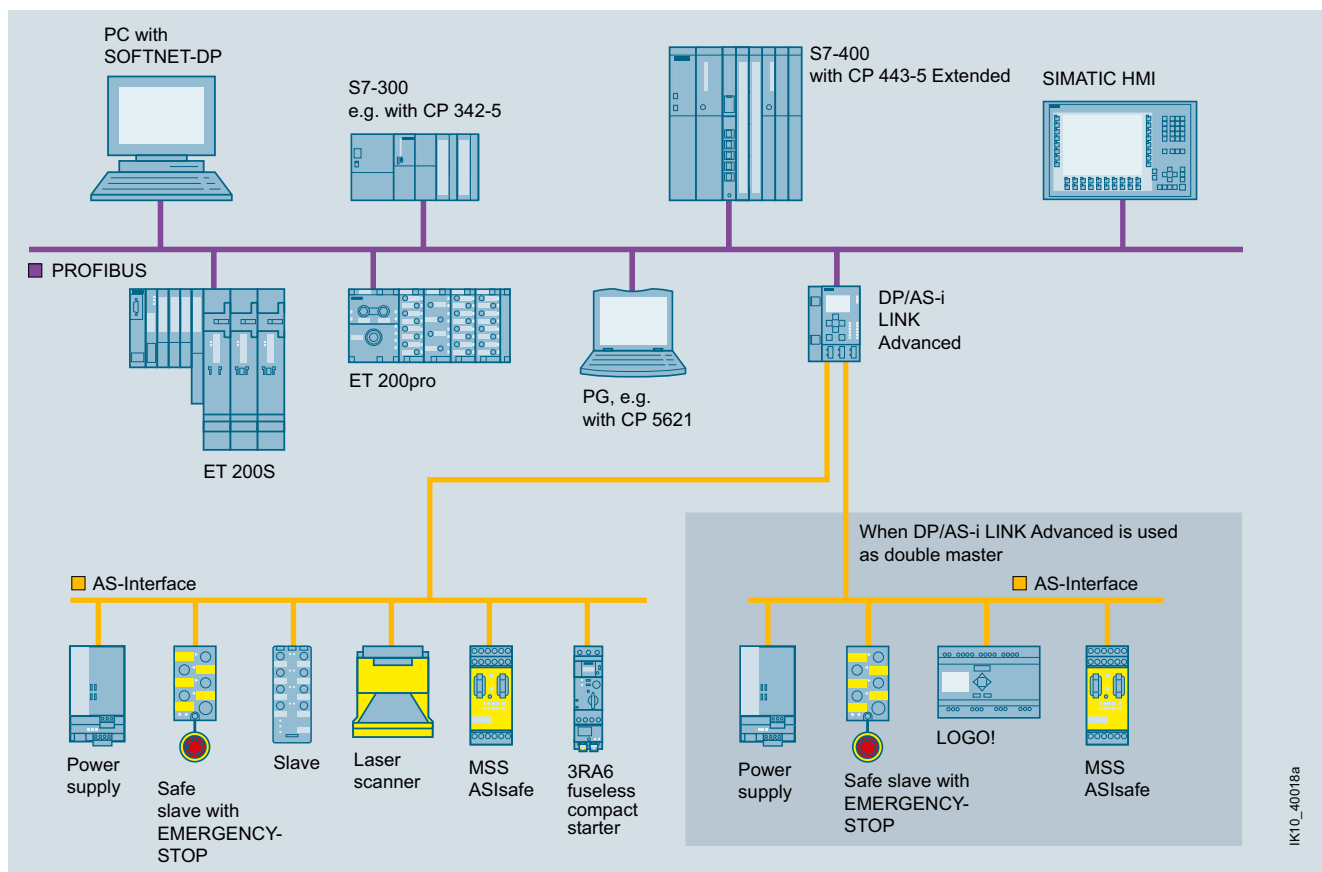
PROFIBUS DP masters (DP-V0) can exchange I/O data with AS-Interface in cyclic mode. PROFIBUS DP masters with acyclic services (DP-V1) are able in addition to initiate AS-Interface master calls (e.g. reading/writing the AS-i configuration during normal operation). As such, the DP/AS-i LINK Advanced is particularly well suited for a distributed construction and for connection of a lower-level AS-Interface network.

Single masters

For applications with typical volumes of project data, it is sufficient to use the DP/AS-i LINK Advanced in its version as an AS-Interface single master. The single master can operate up to 248 DI/248 DO, using 62 A/B slaves with 4 DI/4 DO each.



Double masters

For applications with large volumes of project data, the DP/AS-i LINK Advanced is used in its version as an AS-Interface double master. In this case, twice the volume of project data can be used on two AS-Interface lines running independently of each other. The double master can operate up to 496 DI/496 DO, using 2 AS-i networks each with 62 A/B slaves with 4DI/4DO each.



Integration of AS-Interface on PROFIBUS through DP/AS-i LINK Advanced as single/double master

Selection and ordering data

Version	DT	Article No.
DP/AS-i LINK Advanced		
 <p>Router between PROFIBUS DP and AS-Interface; Degree of protection IP20; including COMBICON plug-in screw terminals for connection of an AS-Interface cable (two AS-Interface cables for double masters) and the optional 24 V supply; corresponds to AS-Interface Specification 3.0; dimensions (W x H x D / mm): 90 x 132 x 88.5</p> <ul style="list-style-type: none"> Single master with display Double master with display <p>DP/AS-i LINK Advanced</p>		Combicon connection 
		6GK1415-2BA10 6GK1415-2BA20
Accessories		
C-PLUG	A	6GK1900-0AB00
Exchange medium for the simple exchange of devices in the event of a fault; for accommodating configuration and application data; can be used in SIMATIC NET products with a C-PLUG slot		
PROFIBUS FastConnect Standard Cable GP	A	6XV1830-0EH10
FastConnect standard type with special design for fast installation, 2-core, shielded		
PROFIBUS FastConnect RS485 bus connectors with angled cable feeder (35°)		
With insulation displacement connection, the max. transmission rate is 12 Mbit/s Activatable terminating resistor is integrated		
• Without PG connection socket	A	6ES7972-0BA60-0XA0
• With PG connection socket	A	6ES7972-0BB60-0XA0
PROFIBUS FastConnect Stripping Tool	A	6GK1905-6AA00
Preset stripping tool for speedy stripping of PROFIBUS FastConnect bus cables		
IE FC RJ45 Plug 90		
RJ45 plug-in connector for Industrial Ethernet, with robust metal enclosure and integrated insulation displacement contacts for connection of Industrial Ethernet FC installation cables; with 90° cable feeder		
• 1 pack = 1 unit	A	6GK1901-1BB20-2AA0
• 1 pack = 10 units	A	6GK1901-1BB20-2AB0
• 1 pack = 50 units	A	6GK1901-1BB20-2AE0

More information

The manuals are available on the Internet at
<http://support.automation.siemens.com/WW/view/en/28602701/133300>

AS-i block library for PCS 7 for easy connection of AS-Interface to PCS 7 [see](#)

- Catalog IC 10, chapter 14
 → "Parameterization, Configuration and Visualization with SIRIUS" → "AS-Interface Block Library for SIMATIC PCS 7"
- Industry Mall: "Automation"
 → "Industrial controls"
 → "Parameterization, Configuration and Visualization with SIRIUS" → "AS-Interface Block Library for SIMATIC PCS 7"

AS-Interface

Routers

DP/AS-Interface Link 20E

Overview



DP/AS-Interface Link 20E

PN	DP-M	DP-S	ASi-M		
		●	●		

DP/AS-Interface Link 20E connects PROFIBUS DP to AS-Interface and has the following features:

- PROFIBUS DP slave and AS-Interface master
- Up to 62 AS-Interface slaves, each with 4 digital inputs and 4 digital outputs as well as analog slaves can be connected
- Integrated analog value transmission (all analog profiles)
- Supports all AS-Interface master functions according to the AS-Interface Specification V3.0
- Supply from AS-Interface cable; hence no additional power supply required
- Suitable for AS-i Power24V (from product version 2 / firmware version 3.1) and for Standard AS-i with 30 V voltage
- Supports the uploading of the AS-Interface configuration in STEP 7 V5.2 and higher

Design

- Compact plastic enclosure in degree of protection IP20 for standard rail mounting
- LEDs in the front panel for indicating the operating state and functional readiness of all connected slaves
- Setting of PROFIBUS DP address is possible by pressing a button
- LED indication of the PROFIBUS DP slave address, DP bus faults and diagnostics
- Two pushbuttons for switching over the operating state and for adopting the existing ACTUAL configuration as the DESIRED configuration

Functionality

Communications

The DP/AS-Interface Link 20E enables a DP master to access all the slaves of an AS-Interface network.

The DP/AS-Interface Link 20E occupies a standard 32 bytes of input data and 32 bytes of output data in which the digital I/O data of the connected AS-Interface slaves (standard and A/B slaves) of an AS-i line are stored.

The size of the input/output image can be compressed so that only the actually required I/O address area is occupied in the system of the DP master.

The analog I/O data can be accessed with the S7 system functions for read/write data records.

Configuration

The DP/AS-Interface Link 20E is configured as follows:

- With STEP 7 as of Version V5.1 SP2:
With STEP 7 configuring the AS-Interface configuration can be uploaded in STEP 7 V5.2 and higher. Furthermore, AS-Interface slaves from Siemens can also be conveniently configured in HW Config (slave selection dialog).
- By adopting the ACTUAL configuration of the AS-Interface by using the SET pushbutton on the front panel
- Alternatively, DP/AS-Interface Link 20E can be integrated by means of the PROFIBUS GSD file in the engineering tool (e.g. for STEP 7 V5.1 and lower or for non-Siemens engineering tools).

Benefits

- Reduction of installation costs because the power is supplied entirely via the AS-Interface cable, which means that no additional power supply is required
- Short startup times thanks to easy configuration at the touch of a button
- The LED indicators help reduce downtime and service times if a slave fails
- Easy and fast startup through reading out the AS-Interface configuration

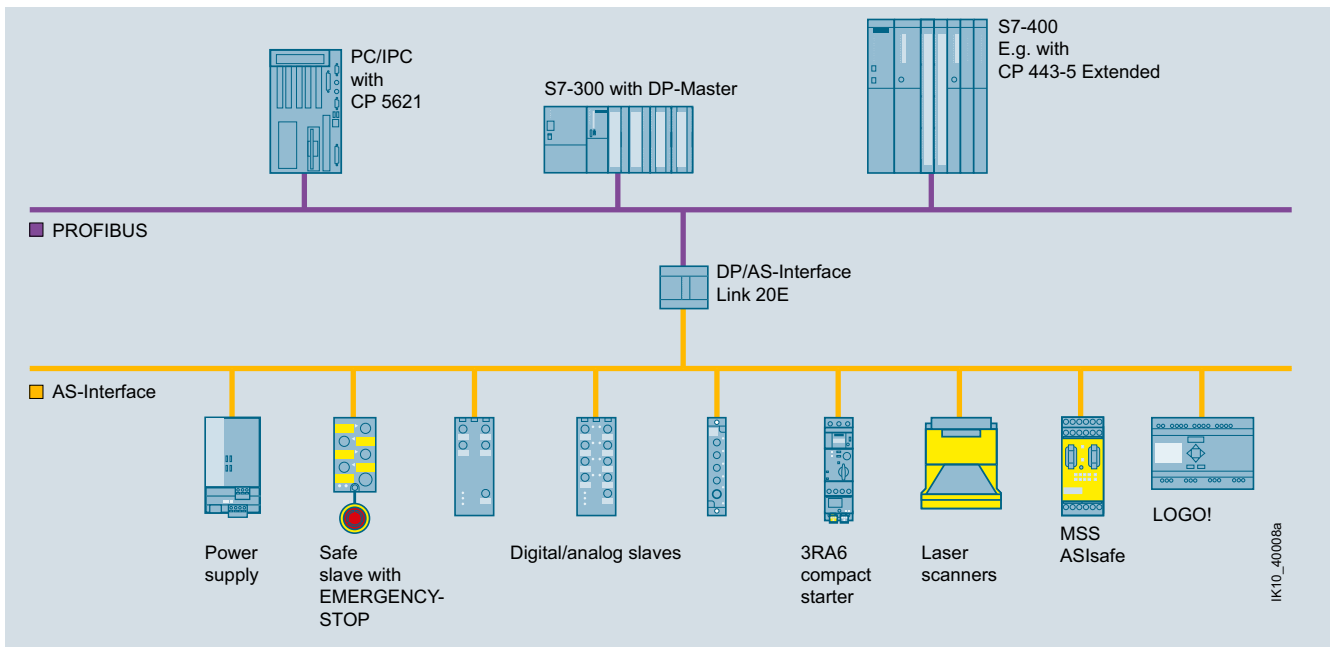
Application

The DP/AS-Interface Link 20E is a PROFIBUS DP slave (according to IEC 61158 / IEC 61784) and an AS-Interface master (according to IEC 62026-2). It enables the AS-Interface to be operated on PROFIBUS DP.

DP/AS-Interface Link 20E can operate up to 248 DI/248 DO when using 62 A/B slaves with 4DI/4DO each.



PROFIBUS DP Masters (DP-V0) can exchange digital I/O data cyclically with the AS-Interface.

PROFIBUS DP masters with acyclic services (DP-V1) are also able to exchange analog I/O data and initiate AS-Interface master calls (e.g. reading/writing the AS-i configuration during normal operation).



Transition from PROFIBUS DP to AS-Interface using DP/AS-Interface Link 20E

Selection and ordering data

Version	DT	Article No.
DP/AS-Interface Link 20E		
 Router between PROFIBUS DP and AS-Interface in degree of protection IP20; including screw terminals for connection of the AS-Interface cable; corresponds to AS-Interface Specification V3.0; dimensions (W x H x D / mm): 90 x 80 x 60 (dimensions without fixing lugs)		Screw terminals  6GK1415-2AA10
Accessories		
PROFIBUS FC Standard Cable GP FastConnect standard type with special design for fast installation, 2-core, shielded	A	6XV1830-0EH10
PROFIBUS FastConnect With insulation displacement connection, the max. transmission rate is 12 Mbit/s. Activatable terminating resistor is integrated. <ul style="list-style-type: none"> RS485 bus connector with 90° cable feeder <ul style="list-style-type: none"> Without PG connection socket With PG connection socket RS485 bus connector with angled cable feeder (35°) <ul style="list-style-type: none"> Without PG connection socket With PG connection socket 	A A A A	6ES7972-0BA52-0XA0 6ES7972-0BB52-0XA0 6ES7972-0BA60-0XA0 6ES7972-0BB60-0XA0
PROFIBUS FastConnect Stripping Tool Preset stripping tool for speedy stripping of PROFIBUS FastConnect bus cables	A	6GK1905-6AA00

More information

The manuals are available on the Internet at
<http://support.automation.siemens.com/WW/view/en/28602858/133300>

AS-Interface

Routers

DP/AS-i F-Link

Overview



DP/AS-i F-Link

PN	DP-M	DP-S	ASi-M		
		●	●		

The DP/AS-i F-Link is a compact, safety-related router between PROFIBUS (DP Slave) and AS-Interface, with the following features:

- Monitoring the inputs of safety-related digital AS-i slaves (ASIsafe slaves) and forwarding of data through PROFIsafe. No additional safety-related components required for the AS-Interface (e.g. MSS ASIsafe Modular Safety System)
- Can be used up to PL e according to EN ISO 13849-1 and to SIL 3 according to IEC 62061/IEC 61508.
- Connection of up to 62 AS-Interface slaves
- Supports all AS-Interface master functions according to the AS-Interface Specification V3.0
- Typically easy transmission of non-safety-related input/output data of all AS-i slaves
- Integrated analog value transmission (all analog profiles)
- Direct integration in PROFIBUS networks.
Optional integration in PROFINET environments through PROFINET/PROFIBUS gateway (IE/PB Link PN IO) or through SIMATIC S7-315/317/319 F PN/DP or S7-416F-3 PN/DP
- Connection to ET 200S with IM-F-CPU using DP master module is possible
- Optimum TIA integration in STEP 7 using Object Manager, integration in non-Siemens engineering tools using PROFIBUS GSD file
- Local diagnostics using LEDs and display with control keys

Design

- Rugged, slim plastic enclosure, degree of protection IP20, for standard mounting rail or wall mounting (with adapter)
- Compact design:
 - LEDs in the front panel for indicating the operating state and functional readiness of all connected slaves
 - 2 buttons on the front for startup and call-up of diagnostics information
 - 4 LEDs for display of the operating state of the device, of PROFIBUS DP and the AS-Interface network
 - Front PROFIBUS DP connection with sub D connector
 - Removable terminal blocks for connection of AS-i +/- and control supply voltage (over 24 V DC PELV power supply unit)
 - Narrow width (45 mm)
- Operation without fans and batteries
- Fast device replacement in the event of a fault

Functionality

Communication principle

The PROFIBUS DP master or the safe control communicates with the AS-Interface slaves over the DP/AS-i F-Link. The AS-Interface process data are mapped in different data areas for non-safety-related input and output data and safety-related input data.

Diagnostics

Extensive diagnostics is possible using the four LEDs, display and control keys or SIMATIC S7. Further details can be found in the manual.

Configuration

The DP/AS-i F-Link is configured as follows:

- With STEP 7 as of Version V5.4 SP1: In particular, Siemens AS-Interface slaves can be conveniently configured via the slave selection dialog.
- Uploading the actual configuration of an already configured AS-Interface network in a STEP 7 project is possible.
- Alternatively, DP/AS-i F-Link can be integrated by means of the PROFIBUS GSD file in the engineering tool.
As a startup aid, it is also possible to adopt the ACTUAL configuration in the appliance storage device directly on the appliance to activate the AS-interface slaves.

Programming

In contrast to the MSS ASIsafe Modular Safety System, the DP/AS-i F-Link is a pure gateway, which does not run through its own safety logic. Programming of the safety function is implemented at the level of the higher-level fail-safe PLC, e.g.:

- With Distributed Safety, Version V5.4 SP1 or higher for SIMATIC S7-300F/416F
- With the SAFETY INTEGRATED "SI-Basic" or "SI-COMFORT NCU" Software for SINUMERIK 840D pl/sl

The safety and standard range can access the digital and analog I/O data of the connected AS-Interface slaves directly through the I/O address area of the CPU.

Benefits

- Gaps in (bus-based) safety technology closed: safety-related signals (EMERGENCY-STOP, door interlock, light curtains etc.) collected with AS-i and transferred to higher-level F-PLC. This enables:
 - Quick installation, easy commissioning: Use of AS-i virtues in the field now fully consistent for Safety Integrated
 - Cost-effective solution as ASIsafe is ideally suited for the collection of "fewer but more distributed fail-safe bits"
- Price advantage: As a fully fledged AS-i master according to Specification V3.0, more inputs and outputs can be used, e.g.:
 - Up to 248 DI/248 DO when using 62 A/B slaves with 4DI/4DO each
 - Up to 62 digital or analog slaves
- Investment protection:
 - Connection to PROFIBUS networks, such as DP/AS-i LINK Advanced or DP/AS-Interface Link 20E
 - Downward compatibility to AS-Interface specification V2
 - Open for modern automation concepts with AS-i
- Teaching the code sequences of ASIsafe slaves is possible at the press of a button
- Reduced amount of engineering work thanks to user-friendly configuration of all AS-i slaves from Siemens using the slave selection dialog in HW-Config (STEP 7), including setting the F-parameter of the ASIsafe slaves modeled on PROFIsafe slaves
- Cost-savings thanks to programming of the safety logic with the familiar, powerful commands of the distributed safety packages from the fail-safe SIMATIC PLC in F-FBD or F-LAD, incl. TUV-certified function blocks for typical safety applications
- Use in machine tools under SINUMERIK 840 D (pI/sl) possible
- Reduction of standstill and servicing times in the event of a slave failure thanks to user-friendly diagnostics using the display and through simple module exchange (only a few settings by control keys are required, without use of the configuring tool)

Application

Links between PROFIsafe and ASIsafe

The DP/AS-i F-Link is a PROFIBUS DP-V1 slave (according to IEC 61158 and IEC 61784) and an AS-Interface master (based on AS-Interface Specification V3.0 according to IEC 62026-2). It enables transparent data access to AS-Interface from PROFIBUS DP. The DP/AS-i F-Link is also an AS-i master with which safety-related input data can be passed from ASIsafe slaves via the PROFIsafe protocol to a fail-safe CPU with PROFIBUS DP master. No additional safety cabling or monitoring is required (in particular no MSS ASIsafe Modular Safety System).

The transmission of binary values or analog values is possible depending on the slave type. All slaves according to AS-Interface Specification V2.0, V2.1 or V3.0 can be used as AS-i slaves.

PROFIBUS DP masters according to DP-V0 or DP-V1 can exchange I/O data with lower-level AS-i slaves in cyclic mode. PROFIBUS DP masters with acyclic services according to DP-V1 are able in addition to initiate AS-i command calls (e.g. reading/writing the AS-i configuration during normal operation). In addition to digital I/O data, analog data can also be saved with high performance in the cyclic I/O of a fail-safe S7-300/ S7-416 F-CPU.

In configuring mode the DP/AS-i F-Link reads in the configuration data of the peripherals on the AS-Interface. Slave addresses can be set using the display and the control keys, and the code sequences of safe AS-i slaves can be taught.

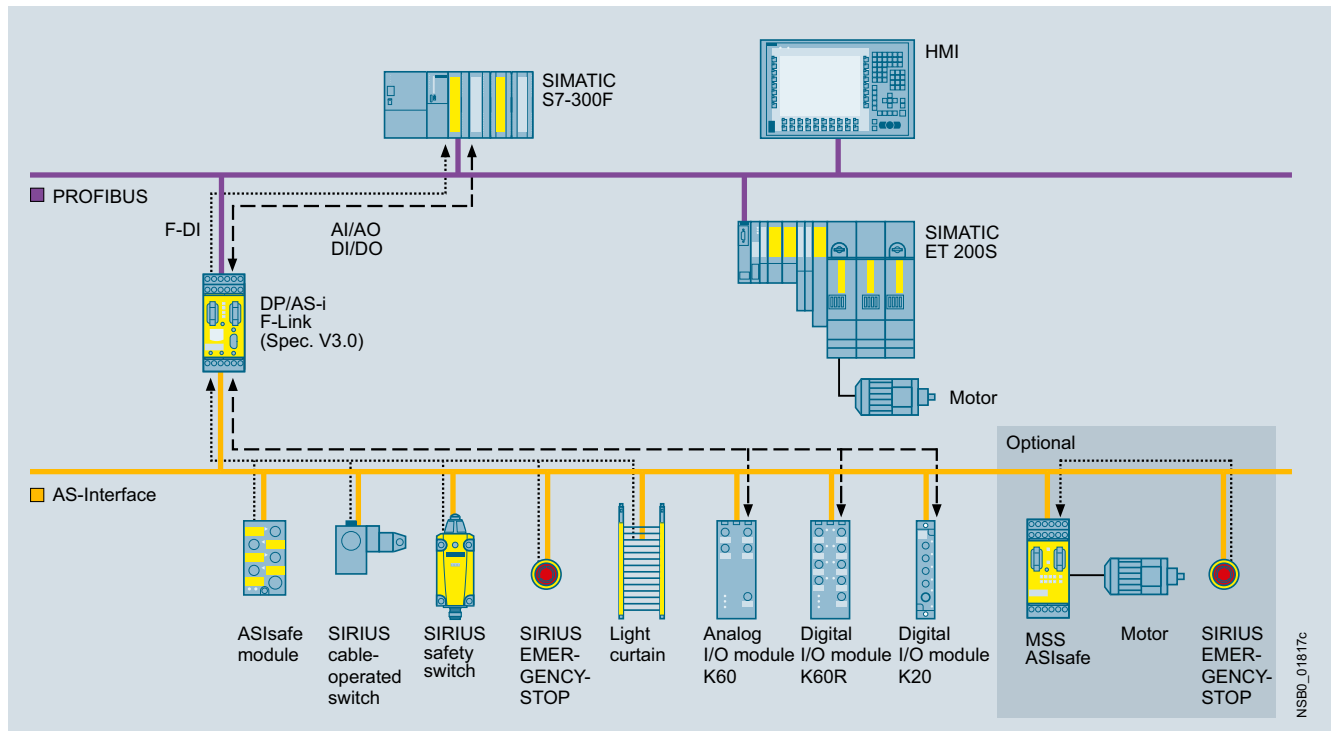
During operation, four display LEDs and the display provide detailed diagnostics information, which directly localizes the fault if required. Using the PLC user program it is possible to read out diagnostics data records and make them available to a higher-level operating and monitoring system (e.g. WinCC flexible or TRANSLINE HMI).

AS-Interface Routers

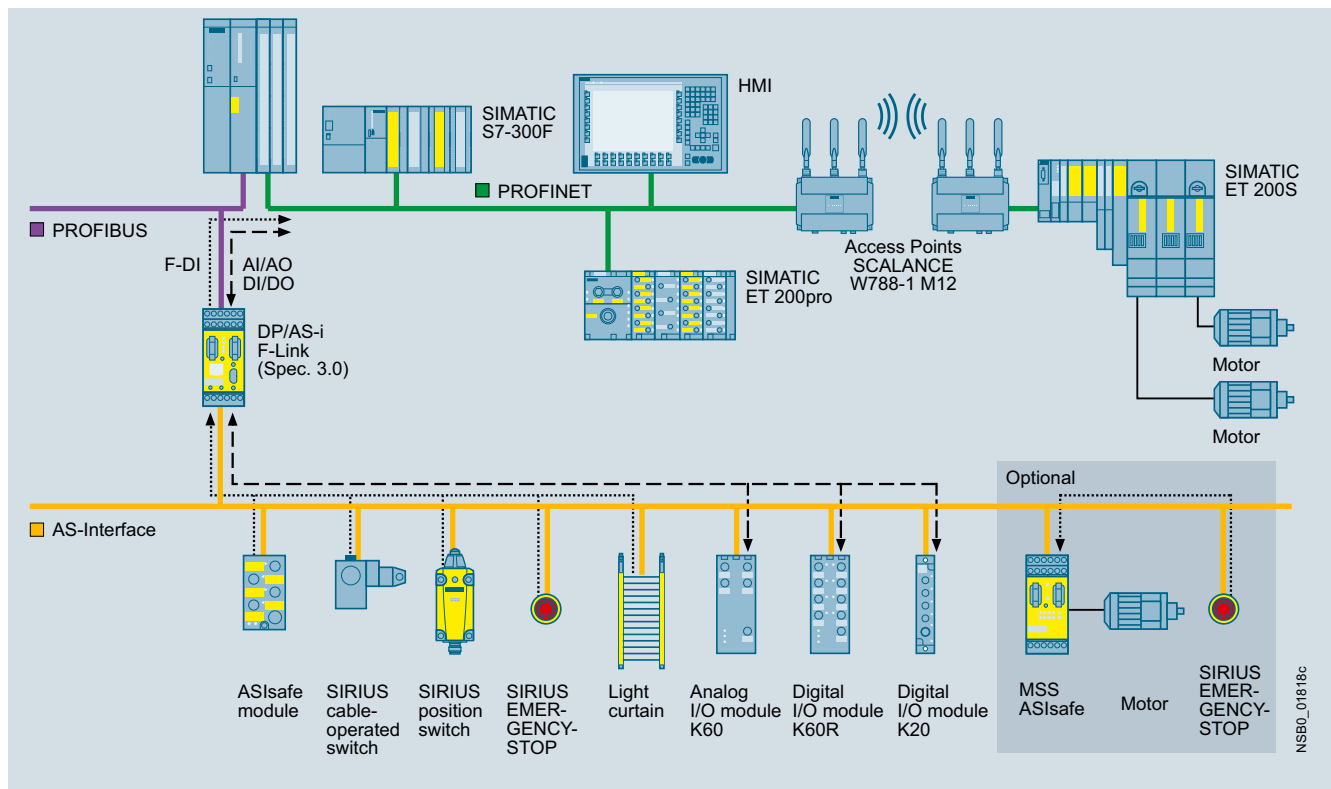
DP/AS-i F-Link

Network connectivity

The DP/AS-i F-Link can be used in PROFIBUS and PROFINET networks as follows:



Integration in PROFIBUS networks under SIMATIC F PLC



Integration in PROFINET networks under SIMATIC F PLC (alternatively through IE/PB Link)




NSB0_01817c

NSB0_01818c

Further network connectivity options

- Integration in PROFINET networks under SIMATIC F PLC through IE/PB Link
- Integration in SINUMERIK Power Line and Solution Line
- Integration under non-Siemens fail-safe control systems using PROFIBUS GSD file, [see](http://support.automation.siemens.com/WW/view/en/113250)
<http://support.automation.siemens.com/WW/view/en/113250>

Selection and ordering data

Version	DT	Article No.
 DP/AS-i F-Link	DP/AS-i F-Link Router between PROFIBUS DP and AS-Interface for safety-related data transmission from ASIsafe to PROFIBUS DP – PROFIsafe in degree of protection IP20; corresponds to AS-Interface Specification V3.0; not approved for AS-i Power24V; dimensions (W x H x D / mm): 45 x 104 x 120	
	• With screw terminals 	A 3RK3141-1CD10
	• With spring-type terminals 	A 3RK3141-2CD10

More information

For more accessories for the PROFIBUS connection [see page 3/237](#).

For the DP/AS-i F-Link manual [see](http://support.automation.siemens.com/WW/view/en/24196041)
<http://support.automation.siemens.com/WW/view/en/24196041>

Circuit examples for safety systems with DP/AS-i F-Link [see](http://support.automation.siemens.com/WW/view/en/24509484)
<http://support.automation.siemens.com/WW/view/en/24509484>

The F-Link Object Manager must be installed for configuration with STEP 7 / HW-Config [see](http://support.automation.siemens.com/WW/view/en/24724923)
<http://support.automation.siemens.com/WW/view/en/24724923>

AS-Interface

Routers

IE/AS-i LINK PN IO

Overview



IE/AS-i LINK PN IO

PN	DP-M	DP-S	ASi-M		
●			●		

The IE/AS-i LINK PN IO is a compact router between PROFINET/Industrial Ethernet (PROFINET IO Device) and AS-Interface, with the following features:

- Single and double AS-Interface master (according to AS-Interface Specification V3.0) for connection of 62 AS-Interface slaves or 124 AS-Interface slaves (with a double master)
- Integrated analog value transmission (all analog profiles)
- Integrated ground-fault monitoring for the AS-Interface cable
- User-friendly local diagnostics and startup by means of a full graphic display and control keys or through a web interface with a standard browser on the PC screen
- Optimum TIA integration using STEP 7
- Integration in non-Siemens engineering tools using the PROFINET GSD file
- Vertical integration (standard web interface) through Industrial Ethernet
- Supply via AS-Interface cable or with 24 V DC
- Suitable for AS-i Power24V (from product version 4/firmware version 2.2) and for AS-Interface with 30 V voltage
- Module exchange without entering the connection parameters (IP address etc.) using C-PLUG (optional)
- Costs saved by the double AS-Interface master when large volumes of project data are involved

Design

- Compact plastic enclosure in degree of protection IP20 for standard rail mounting
- COMBICON plug-in screw terminals
- Compact design:
 - Pixel graphics display in the front panel for detailed display of the operating state and readiness for operation of all connected AS-Interface slaves
 - Six pushbuttons for starting up and testing the AS-Interface line directly on the IE/AS-i LINK PN IO
 - LED display of the operating state of PROFINET IO and AS-Interface
 - Integrated 2-port switch (RJ45 socket) for connection to Industrial Ethernet
- Small mounting depth thanks to recessed plug mounting
- Operation without fans and batteries

Functionality

Communications

The IE/AS-i LINK PN IO enables a PROFINET IO controller to cyclically access the I/O data of all the slaves of a lower-level AS-Interface segment. Also supported are the expanded slave types with higher I/O data volume according to AS-i Specification V3.0.

The IE/AS-i LINK PN IO occupies the following address area:

- As a single master with full expansion: 62 bytes of input data and 62 bytes of output data in which the I/O data of the connected AS-Interface slaves (standard and A/B slaves) of an AS-i line are stored.
- As double master, double the number of bytes
- Optional additional I/O bytes for data from analog slaves

The size of the input/output image can be compressed so that only the actually required I/O address area is occupied in the system of the IO controller.

The integrated evaluation of analog signals is just as easy as access to digital values because the analog process data also lie directly in the I/O address area of the CPU.

PROFINET IO controllers are able in addition to initiate AS-Interface master calls (e.g. to write parameters, change addresses, read diagnostic values) through the acyclic PROFINET services. Using an operating display in AS-Interface Link it is possible to fully commission the lower-level AS-i line.

The IE/AS-i LINK PN IO is equipped with two Ethernet ports which are connected by an internal switch. With the Ethernet it is possible in addition to use the integrated web server. The web server can be called up with any standard web browser (e.g. Internet Explorer) without additional software. It enables the PC to present all diagnostics information and to display the set bus configuration and parameters as well as their adaptation where applicable. Firmware updates are also possible using this port. The optional C-PLUG supports module exchange without entering the connection parameters (e.g. IP address), keeping downtimes to a minimum in the event of a fault.

Diagnostics

The following diagnostics is possible using the display and control keys, web interface or STEP 7:

- Operating state of the IE/AS-i LINK PN IO
- Status of the link as a PROFINET IO device
- Diagnostics of the AS-Interface network
- Message frame statistics
- Standard diagnostics pages in the web interface for fast diagnostics access through Ethernet using a standard browser
- The reporting of diagnostic events is optionally possible via E-Mail or SNMP Trap. The integrated diagnostic buffer saves the events including time stamp.

Notes on safety

The use of this product requires suitable protective measures (e.g. network segmentation for IT security among others) in order to ensure safe plant operation, see www.siemens.com/industrialsecurity.

Configuration

The IE/AS-i LINK PN IO is configured as follows:

- STEP 7 V5.4 or higher is required for configuring the full functional scope of the IE/AS-i LINK PN IO. With STEP 7 configuring the AS-Interface configuration can be uploaded in STEP 7 V5.4 SP2 and higher. Furthermore, AS-Interface slaves from Siemens can also be conveniently configured in HW Config (slave selection dialog).
- Alternatively, IE/AS-i LINK PN IO can be integrated by means of the PROFINET GSD file in the engineering tool (e.g. for STEP 7 V5.4 SP2 and lower, TIA portal, or for non-Siemens engineering tools).

Application

- Short startup times through simple configuration at the press of a button and testing of the AS-Interface line using the display or web interface
- Reduction of standstill and servicing times in the event of a slave failure thanks to user-friendly diagnostics using the display or web interface
- Costs saved by the double AS-Interface master when large volumes of project data are involved
- Standard mode with AS-Interface power supply (see power supply units 3/252) possible without restrictions, whereby no further operational voltage is required

The DP/AS-i LINK PN IO is a PROFINET IO device (according to IEC 61158/IEC 61784) and an AS-Interface master (based on AS-Interface Specification V3.0 according to IEC 62026-2). It enables transparent data access to AS-Interface from Industrial Ethernet.

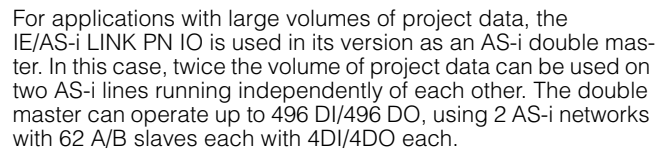
Exchanging data with PROFINET IO controllers

PROFINET IO controllers can exchange I/O data with AS-Interface in cyclic mode and can perform AS-i master calls in addition with acyclic services (e.g. reading/writing the AS-i configuration during normal operation). IE/AS-i LINK PN IO is, therefore, suitable for distributed configurations and for integrating a lower-level AS-Interface network.

Single masters

For applications with typical volumes of project data, it is sufficient to use the IE/AS-i LINK PN IO in its version as an AS-i single master. The single master can operate up to 248 DI/248 DO, using 62 A/B slaves with 4DI/4DO each.

Double masters



The diagram illustrates a PROFINET system architecture. At the top, a PC with SOFTNET PN IO is connected to an S7-400 PLC with CP 443-1 Advanced. The S7-400 PLC is also connected to an S7-300 PLC (e.g., with CP 343-1) and a SIMATIC HMI. A SCALANCE X208 switch is connected to the S7-400 PLC and an ET 200S I/O module. The ET 200S is connected to an ET 200pro I/O module. The ET 200pro is connected to an IE/AS-i LINK PN IO module. The IE/AS-i LINK PN IO module is connected to the S7-400 PLC and the SIMATIC HMI. The IE/AS-i LINK PN IO module is also connected to an AS-Interface network. The AS-Interface network is connected to various field devices: Power supply, Safe slave with EMERGENCY-STOP, Slave, Laser scanner, MSS ASIsafe, and 3RA6 fuseless compact starter. A separate AS-Interface network is shown for the S7-300 PLC, connected to a Power supply, Safe slave with EMERGENCY-STOP, LOGO!, and MSS ASIsafe. The diagram includes a legend for PROFINET (green line) and Industrial Ethernet (blue line).

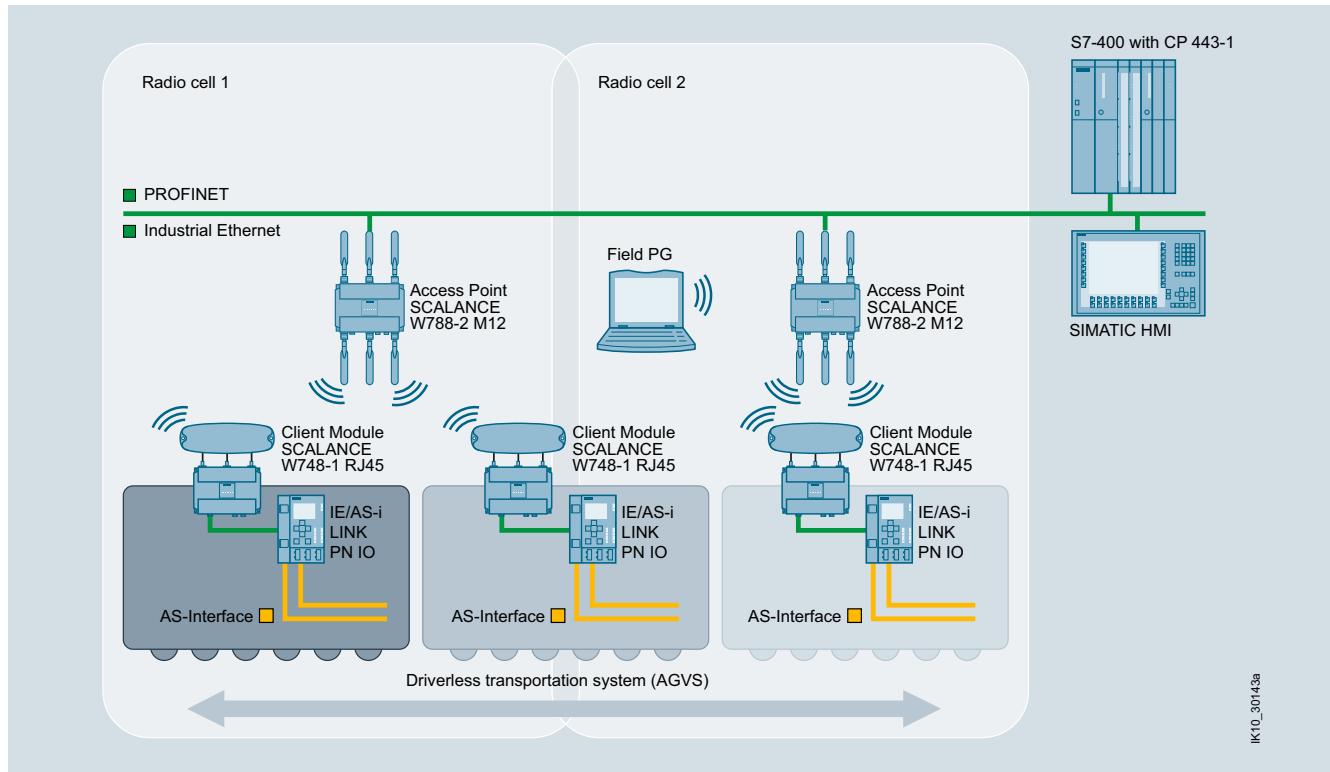
AS-Interface Routers

IE/AS-i LINK PN IO

Wireless communication


Using an upstream IWLAN client module, e.g. SCALANCE W746-1PRO, an AS-Interface line can be integrated in the PROFINET world by wireless means.

Sample uses are applications which up to now have been performed with fault-prone tow chain or collector wire technology. Maintenance costs are thus reduced.



Wireless communication between Industrial Ethernet and AS-Interface components

Selection and ordering data

Version	DT	Article No.
IE/AS-i LINK PN IO  Router between PROFINET/Industrial Ethernet and AS-Interface in degree of protection IP20; including COMBICON plug-in screw terminals for connection of an AS-Interface cable, (two AS-Interface cables for double masters) and the optional 24 V supply; corresponds to AS-Interface Specification 3.0; dimensions (W x H x D / mm): 90 x 132 x 88.5		
Accessories		Combicon connection
C-PLUG Exchange medium for the simple exchange of devices in the event of a fault; for accommodating configuration and application data; can be used in SIMATIC NET products with a C-PLUG slot		6GK1411-2AB10 6GK1411-2AB20
IE FC RJ45 Plug 90 RJ45 plug-in connector for Industrial Ethernet, with robust metal enclosure and integrated insulation displacement contacts for connection of Industrial Ethernet FC installation cables; with 90° cable feeder		6GK1900-0AB00
• 1 pack = 1 unit • 1 pack = 10 units • 1 pack = 50 units		6GK1901-1BB20-2AA0 6GK1901-1BB20-2AB0 6GK1901-1BB20-2AE0

More information

Manuals see <http://support.automation.siemens.com/WW/view/en/29992487/13330>

I/O modules for use in the field, high degree of protection: Digital I/O modules, IP67 - Introduction

Overview



K60



K45



K20

Three coordinated series of AS-Interface compact modules with digital and analog compact modules and a high degree of protection are available for use in the field:

- Series K60 (digital and analog)
- Series K45 (digital)
- Series K20 (digital)

All compact modules are characterized by particularly simple handling. The K60 and K45 modules are mounted with a mounting plate. The mounting plate is used to mount the AS-Interface flat cables and enables mounting on a wall or standard mounting rail.

The particularly narrow K20 modules are directly mounted without a mounting plate and connected to the AS-Interface using a round cable.

Connection types

For flexible connection of different sensors and actuators, the following PIN assignments are available on the I/O modules with M12 sockets:

Standard assignment

With the standard assignment, one sensor/actuator is connected per M12 socket. In this case the signal for the outputs is acquired at PIN4 while the signal for the inputs is acquired at PIN4 and PIN2. As the result, sensors can be connected directly to PIN2 and PIN4.

Y assignment

With the Y assignment, two sensors or two actuators can be connected to one M12 socket. In this case, both PIN4 and PIN2 are provided for one sensor signal and one actuator signal on each M12 socket.

Y-II assignment

The Y-II assignment offers the following options:

- Individual connection of a sensor/actuator to one M12 socket
- Connection of two sensors/actuators to one M12 socket as follows:
 - The signal of the first sensor/actuator is connected to PIN4 of the first socket.
 - The signal of the second sensor/actuator is connected to PIN2 of the first socket and to PIN4 of the second socket. In this case, the second socket is not required and is closed with a sealing cap.

Overview of digital compact modules

The following table provides an overview of the important features of the digital compact modules.

Version	K60	K45	K20
8 inputs/2 outputs	✓	--	--
8 inputs	✓	✓	--
4 inputs/4 outputs	✓	✓	✓
4 inputs/3 outputs	✓	--	--
4 inputs/2 outputs	✓	--	--
4 inputs	✓	✓	✓
2 inputs/2 outputs	--	✓	✓
4 outputs	✓	✓	✓
3 outputs	--	✓	--
AS-Interface connection	Flat cable / round cable	Flat cable	Round cable
I/O connection method	M12	M12/M8	M12/M8
Pin assignment	Standard/Y-II/Y	Standard/Y	Standard/Y
Degree of protection	IP65/IP67/IP68/IP69K	IP65/IP67	IP65/IP67
ATEX 3D (Zone 22)	✓	--	--
Extended address mode	✓	✓	✓

✓ Available

-- Not available

AS-Interface

Slaves

I/O modules for use in the field, high degree of protection: Digital I/O modules, IP67 - K60

Overview

The K60 digital AS-Interface compact modules are characterized by optimized handling characteristics and user-friendliness. They permit the mounting times and startup times of AS-Interface to be reduced by up to 40 %.

Mounting and connection of the AS-Interface shaped cables

Assembly of the K60 modules is performed with a mounting plate which accommodates the AS-Interface shaped cables. Two different mounting plates are offered for

- Wall mounting
- Standard rail mounting

The mounting plate and the compact module are joined together by means of a screw, with simultaneous contacting of the AS-Interface cable by the service-proven insulation piercing method.

Addressing and connection of the sensors/actuators

Addressing of the K60 modules is performed using an addressing socket integrated in the compact module. The addresses can also be assigned after installed.

K60 modules with a maximum of four digital inputs and outputs

These compact modules contain the M12 standard connections for inputs and outputs. Using M12 standard connectors, a maximum of four sensors and four actuators can be connected to the compact module.

K60 compact modules with a maximum of eight digital inputs

These modules have eight digital inputs for connection through M12 plugs.

The module requires two AS-Interface addresses for processing all eight inputs. The addressing can thus be performed through a double addressing socket integrated in the module.

K60 compact modules with four digital inputs and outputs according to AS-Interface Specification 3.0

The extended address mode (A/B addresses) AS-Interface Specification 3.0 enables the connection of up to 62 slaves on one AS-Interface network. With the extended address mode, four outputs are now possible even with A/B slaves (instead of only three outputs possible up to now with Specification 2.1). Hence with full expansion of an AS-Interface network, there are now 248 inputs as well as 248 outputs available on one AS-i network.

Please note, however,

- that these modules can be used only with a master according to AS-i Specification 3.0
- that the cycle times for the outputs may be up to 20 ms.

K60 data couplers

An AS-Interface data coupler has been added to the K60 compact module range. Integrated in this module are two AS-i slaves which are connected to two different AS-i networks. Each of the two integrated slaves has four virtual inputs and four virtual outputs. The bidirectional data transmission of four data bits between two AS-i networks is thus possible in a simple and cost-effective manner. The data coupler needs its own address in each AS-i network.

Each AS-i network works with a different cycle time depending on the number of stations. Hence two AS-i networks are not necessarily synchronous. For this reason the AS-i data coupler can be used to transmit only standard data and no safety data.

K60 compact modules for use in hazardous areas (ATEX)

Two versions of the K60 modules are available for operation in Zone 22 hazardous areas according to Classification II 3D (dusty atmosphere, non-conductive dust). The version with four inputs and four outputs has the designation (Ex) II 3D Ex tD A22 IP65X T75°C and the version with four inputs has the designation (Ex) II 3D Ex tD A22 IP65X T60°C.

Special conditions have to be observed for the safe operation of these devices. In particular the module must be protected by suitable protective measures from mechanical damage.

More information

For other conditions for safe operation see <http://support.automation.siemens.com/WW/view/en/18290447>

I/O modules for use in the field, high degree of protection: Digital I/O modules, IP67 - K60

Selection and ordering data



3RK1400-1DQ00-0AA3

Version					DT	Article No.
Digital I/O modules, IP67 - K60 <ul style="list-style-type: none"> • PNP transistor • Width 60 mm • Connection method: M12 • Modules supplied without mounting plate 						
Type	Current carrying capacity of outputs	Slave type	Pin assignment	Sensor power supply off		
8 inputs/ 2 outputs ¹⁾	2 A	A/B	Special	AS-i	A	3RK2400-1HQ00-0AA3
8 inputs ¹⁾	--	Standard	Y-II	AS-i	▶	3RK1200-0DQ00-0AA3
	--	A/B	Y-II	AS-i	▶	3RK2200-0DQ00-0AA3
	--	A/B	Y-II	U _{aux}	A	3RK2200-1DQ00-1AA3
4 inputs/ 4 outputs	2 A	Standard	Y-II	AS-i	▶	3RK1400-1DQ00-0AA3
	2 A	Standard	Standard	AS-i	▶	3RK1400-1CQ00-0AA3
	1 A	Standard	Y-II	AS-i	A	3RK1400-1DQ01-0AA3
	1 A	Standard	Standard	AS-i	▶	3RK1400-1DQ03-0AA3
	2 A	A/B (Spec. 3.0)	Y-II	AS-i	A	3RK2400-1DQ00-0AA3
	2 A	A/B (Spec. 3.0)	Y-II	U _{aux}	A	3RK2400-1DQ00-1AA3
4 inputs/ 3 outputs	2 A	A/B	Y-II	AS-i	▶	3RK2400-1FQ03-0AA3
4 inputs/ 2 outputs	2 A	Standard	Y-II	AS-i	▶	3RK1400-1MQ00-0AA3
4 inputs	--	Standard	Y-II	AS-i	▶	3RK1200-0CQ00-0AA3
	--	A/B	Y-II	AS-i	A	3RK2200-0CQ00-0AA3
2x2 inputs/ 2x2 outputs	1 A	Standard	Y	AS-i	B	3RK1400-1DQ02-0AA3
4 outputs	2 A	Standard	Y-II	--	▶	3RK1100-1CQ00-0AA3
	2 A	A/B (Spec. 3.0)	Y-II	--	A	3RK2100-1CQ00-0AA3
Digital I/O modules IP67 – K60, version ATEX (Ex) II 3D Ex tD A22 IP65X T75°C/60°C <ul style="list-style-type: none"> • PNP transistor • Width 60 mm • Current carrying capacity of the inputs: 200 mA • Connection method: M12 • Modules supplied without mounting plate 						
Type	Current carrying capacity of outputs	Slave type	Pin assignment			
4 inputs/ 4 outputs	2 A	Standard	Y-II		C	3RK1400-1DQ05-0AA3
4 inputs	--	Standard	Y-II		B	3RK1200-0CQ05-0AA3
Digital I/O modules IP67 - K60 data couplers <ul style="list-style-type: none"> • Modules supplied without mounting plate 						
Type	Current carrying capacity of outputs	Slave type	Pin assignment			
Data coupler 4 inputs/ 4 outputs (virtual)	--	Standard	--		C	3RK1408-8SQ00-0AA3

Accessories



3RK1901-0CA00



K60 mounting plates
Suitable for all K60 compact modules

- Wall mounting
- Standard rail mounting

AS-Interface M12 sealing caps
For free M12 sockets

- ▶ 3RK1901-0CA00
- ▶ 3RK1901-0CB01

- ▶ 3RK1901-1KA00

1) Module occupies two AS-Interface addresses

AS-Interface

Slaves

I/O modules for use in the field, high degree of protection: Digital I/O modules, IP67 - K45

Overview



K45 compact modules

The K45 series of compact modules supplements the large K60 compact modules which have a proven track record in industry. They are the logical consequence for rounding off the bottom end of the existing product range.

The acclaimed advantages of the existing K60 compact modules are fully emulated by the K45 modules. The K45 modules, however, have a considerably smaller footprint and mounting depth.

Yet in spite of these small dimensions all the modules have large labels and an integrated addressing socket.

Two mounting plates are offered for the K45 compact modules:

- The mounting plate for wall mounting has a hole pattern that is identical to that of the K60 compact modules. This means that K60 compact modules can be mounted together with K45 modules in an aligned arrangement. The shaped cables can be inserted in the recesses of the mounting plates where they cause no hindrance.
- The mounting plate for standard rail mounting

Connection of the AS-Interface shaped cables

The mounting plate and the compact module are joined together by means of a screw, with simultaneous contacting of the AS-Interface cable by the service-proven insulation piercing method.

Now, mounting the AS-Interface shaped cables is in fact easier than ever. The yellow and black AS-Interface shaped cable can be inserted into the mounting plates from the left or right regardless of the position of the coding lug. The correct polarity of the applied voltages is thus guaranteed.

Addressing and connection of the sensors/actuators

Addressing of the K45 compact modules is performed using an addressing socket integrated in the module. The addresses can be assigned even when mounted.

K45 modules with a maximum of four digital inputs and outputs

These compact modules contain up to four M12 standard connections for inputs and outputs. Using M12 standard connectors or M8 standard connectors, a maximum of four sensors and four actuators can be connected to the compact module. Depending upon the module, the sockets can have a double assignment.

Pin assignment: Y i.e. via a socket, two sensors or one sensor/one actuator is connected.

K45 modules with a maximum of eight digital inputs

These modules have eight digital inputs for connection through M12 plugs. The sockets have a double assignment
Pin assignment: Y i.e. via a socket, two sensors or one sensor/one actuator is connected.

The module requires two AS-Interface addresses for processing all eight inputs. The addresses can be assigned through a double addressing socket integrated in the module.

K45 modules with four digital inputs and outputs according to AS-i Specification 3.0

The extended address mode (A/B addresses) according to AS-Interface Specification 3.0 enables the connection of up to 62 slaves on one AS-i network. With this extended address mode, four outputs are now possible even with A/B slaves (instead of only three outputs possible up to now with Specification 2.1). Hence with full expansion of an AS-Interface network, there are now 248 inputs as well as 248 outputs available on one AS-Interface network.

Please note, however,





- that these modules can be used only with a master according to AS-i Specification 3.0
- that the cycle times for the outputs may be up to 20 ms.

Depending upon the module, the sockets can have a double assignment.

Pin assignment: Y i.e. via a socket, two sensors or one sensor/one actuator is connected.

I/O modules for use in the field, high degree of protection: Digital I/O modules, IP67 - K45

Selection and ordering data

Version						DT	Article No.
 <p>Digital I/O modules, IP67 - K45</p> <ul style="list-style-type: none"> • PNP transistor • Width 45 mm • Current carrying capacity of the inputs: 200 mA • Modules supplied without mounting plate 							
Type	Current carrying capacity of outputs	Slave type	Pin assignment	U_{aux} 24 V	Connection methods		
8 inputs ¹⁾	--	A/B	Y	--	M12	A	3RK2200-0DQ20-0AA3
4 inputs	--	Standard	Standard	--	M12	▶	3RK1200-0CQ20-0AA3
		Standard	Standard	--	M8 screw	A	3RK1200-0CT20-0AA3
		Standard	Standard	--	M8 screw	C	3RK1200-0CU20-0AA3
		A/B	Standard	--	M12	▶	3RK2200-0CQ20-0AA3
		A/B	Standard	--	M8 screw	B	3RK2200-0CT20-0AA3
		A/B	Standard	--	M8 screw	C	3RK2200-0CU20-0AA3
2 x 2 inputs	--	A/B	Y	--	M12	A	3RK2200-0CQ22-0AA3
2 inputs/ 2 outputs	2 A ²⁾	Standard	Standard	✓	M12	▶	3RK1400-1BQ20-0AA3
2 x (1 input/ 1 output)	0.2 A	Standard	Y	--	M12	A	3RK1400-0GQ20-0AA3
4 x (1 input/ 1 output)	0.2 A	A/B (Spec. 3.0)	Y	--	M12	B	3RK2400-0GQ20-0AA3
4 x (1 input/ 1 output)	0.5 A	A/B (Spec. 3.0)	Y	✓	M12	B	3RK2400-1GQ20-1AA3
4 outputs	1 A	A/B (Spec. 3.0)	Standard	✓	M12	A	3RK2100-1CQ20-0AA3
3 outputs	1 A	A/B	Standard	✓	M12	▶	3RK2100-1EQ20-0AA3
4 outputs	1 A	Standard	Standard	✓	M12	▶	3RK1100-1CQ20-0AA3
2 outputs/ 2 inputs	2 A	A/B	Standard	✓	M12	A	3RK2400-1BQ20-0AA3
Accessories							
 <p>K45 mounting plates</p> <ul style="list-style-type: none"> • For wall mounting ▶ 3RK1901-2EA00 • For standard rail mounting ▶ 3RK1901-2DA00 							
 <p>AS-Interface sealing caps</p> <ul style="list-style-type: none"> • For free M12 sockets ▶ 3RK1901-1KA00 • For free M8 sockets A 3RK1901-1PN00 							
 <p>3RK1901-1PN00</p> <p>✓ Available -- Not available</p>							

¹⁾ Module occupies two AS-Interface addresses

²⁾ The typical current carrying capacity per output increases with version "E12" from 1.5 to 2 A (available since approx. 07/2003).

AS-Interface

Slaves

I/O modules for use in the field, high degree of protection: Digital I/O modules, IP67 - K20

Overview



Digital I/O modules IP67 - K20

The K20 compact module series rounds off the AS-Interface compact modules with a particularly slim design and a width of a mere 20 mm. Thanks to its extremely compact dimensions, these modules are particularly suited for handling machine applications in the field of production engineering where modules need to be arranged in the smallest of spaces.

Robotics is yet another application area. Instead of the AS-Interface flat cable, the K20 modules are connected to AS-Interface over a round cable with M12 cable box.

The AS-Interface bus cable and the 24 V DC auxiliary power supply are routed in this case in a shared round cable. This enables extremely compact installation.

The flexibility of the round cable means that it can also be used on moving machine parts without any problems. The K20 modules are also ideal for such applications as their non-encapsulated design makes them particularly light in weight.

In applications with tow chains, many users rely on placing the AS-Interface bus cable in a round cable. In this case, the K20 modules support direct connection to the round cable. No flat to round cable adapter is required.

The K20 compact module range includes standard AS-Interface modules, as well as an ASIsafe version for the connection of safety-related sensors, such as EMERGENCY-STOP pushbuttons or protective door monitoring. All standard AS-Interface K20 modules support, as far as technically possible, the expanded address mode (A/B addresses) according to AS-Interface specification 2.1, which enables connection of 62 stations to an AS-Interface network. The K20 module with four inputs and four outputs works in expanded address mode according to AS-Interface specification 3.0 which, for the first time, supports four outputs with an A/B slave, thus enabling 248 inputs and 248 outputs in a fully expanded AS-Interface network.

For particularly space-saving dimensions, the sensors and actuators are connected over M8 plug-in connectors. Alternatively, M12 connectors with Y assignment can be used.

Selection and ordering data



3RK2200-0CT30-0AA3

Version					DT	Article No.
Digital I/O modules, IP67 – K20						
Width 20 mm						
Type	Current carrying capacity of outputs	Slave type	Pin assignment	Connection methods		
4 inputs	--	A/B	Standard	M8	A	3RK2200-0CT30-0AA3
	--	A/B	Y	M12	A	3RK2200-0CQ30-0AA3
2 inputs/ 2 outputs	1	A/B	Standard	M8	A	3RK2400-1BT30-0AA3
	1	A/B	Y	M12	A	3RK2400-1BQ30-0AA3
4 outputs	1	A/B (Spec. 3.0)	Standard	M8	A	3RK2100-1CT30-0AA3
4 inputs/ 4 outputs	1	Standard	Standard	M8	C	3RK1400-1CT30-0AA3
	1	A/B (Spec. 3.0)	Standard	M8	A	3RK2400-1CT30-0AA3
2 safe inputs	--	Standard	Y-II	M12	A	3RK1205-0BQ30-0AA3

I/O modules for use in the field, high degree of protection: Digital I/O modules, IP67 - K20

Version	DT	Article No.
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Accessories



3RK1901-1KA00



3RK1901-1PN00

AS-Interface sealing caps

- For free M12 sockets
- For free M8 sockets

▶ **3RK1901-1KA00**
A **3RK1901-1PN00**



3RK1901-1NN10

AS-Interface compact distributors, for AS-Interface flat cable

Current carrying capacity up to 8 A

A **3RK1901-1NN10**



3RX9801-0AA00

AS-Interface M12 feeders

- Degree of protection IP67
- Current carrying capacity up to 2 A

For flat cable	For	Cable length	Cable end in feeder	
AS-i	M12 socket	--	Available	▶ 3RX9801-0AA00



3RK1901-1NR10

AS-Interface M12 feeders

- Degree of protection IP67/IP68/IP69K
- Current carrying capacity up to 4 A

For flat cable	For	Cable length	Cable end in feeder	
AS-i	M12 socket	--	Not available	A 3RK1901-1NR10
AS-i	M12 cable box	1 m	Not available	A 3RK1901-1NR11
AS-i	M12 cable box	2 m	Not available	A 3RK1901-1NR12
AS-i/U _{aux}	M12 socket	--	Not available	A 3RK1901-1NR20
AS-i/U _{aux}	M12 cable box	1 m	Not available	A 3RK1901-1NR21
AS-i/U _{aux}	M12 cable box	2 m	Not available	A 3RK1901-1NR22



3RK1901-1NR11



3RK1901-1NR04

AS-Interface M12 feeders, 4-fold

Current carrying capacity up to 4 A

For flat cable	For	Cable length	Cable end in feeder	
AS-i/U _{aux}	4-fold M12 socket, delivery includes coupling module	--	Not available	A 3RK1901-1NR04



3RK1901-1TR00

M12 T distributors

- IP68
- 1 x M12 plug
- 2 x M12 box

C **3RK1901-1TR00**



6ES7194-1KA01-0XA0

M12 Y-shaped coupler plugs

For connection of two sensors to one M12 socket with Y assignment

A **6ES7194-1KA01-0XA0**



3RK1902-4PB15-3AA0

M12 connecting cables

- 3-pole
- For addressing AS-i slaves with M12 bus connection
- Cable length 1.5 m

C **3RK1902-4PB15-3AA0**

AS-Interface

Power Supply Units and Data Decoupling Modules

AS-Interface power supply units

Overview



AS-Interface power supply unit for 3 A

AS-Interface power supply units feed 30 V DC into the AS-Interface cable and supply the AS-Interface components. They include power-optimized data decoupling for the separation of communication signals and control supply voltage. As the result, AS-Interface is able to convey both data and power along a single line. The power supply units are resistant to overloads and short circuits.

Dimensions

AS-Interface power supply units have compact dimensions in widths of 50 / 70 / 120 mm. No distances from other devices need to be observed when mounting the power supply units.

Features

- Higher rating: The power supply units deliver currents of 2.6 to 8 A.
- Integrated data decoupling: As the result, AS-Interface is able to convey both data and power along a single line.
- Integrated ground-fault detection: The power supply units perform the reliable detection and signaling of ground faults according to IEC 60204-1. The AS-Interface voltage can be disconnected automatically in the event of a ground fault.
- Integrated overload detection: An output overload is detected and reported over a diagnostics LED.
- Diagnostics memory: Any ground faults or overloads on the output side are stored in a diagnostics memory until the device is RESET.
- Remote RESET and remote signaling: Using relay contacts, a ground fault can be signaled and evaluated by a central controller and/or indicator light.
- Diagnostics LEDs: Three different LEDs indicate the status of the AS-Interface power supply locally at the power supply unit.
- Ultra-wide input range / two-phase connection: The ultra-wide input range of 120 to 500 V of the 8 A version means that the supply units can be used in virtually any network worldwide. In addition, this version dispenses with the need for an N conductor as the device can be connected directly between 2 phases of a network.
- Operation with 24 V DC: The 3 A power supply unit is also available as a version with a 24 V DC input. This power supply unit is suitable for use in battery-powered systems or in systems with UPS (uninterruptible power supply).
- Removable terminal blocks with spring-type connections: For easy exchanging of devices, each power supply unit has three removable terminal blocks: for the input side, for the output side and for Signal/RESET connections.

Benefits

- Complete solution for supplying AS-Interface networks while making full use of the maximum possible cable length per AS-i segment, [see chapter 2, IC 10 · 2014](#).
- Only AS-i masters and AS-i slaves need to be connected to the AS-Interface cable in order to operate AS-Interface
- Compact, space-saving dimensions
- Reliable power supply even for large numbers of AS-Interface modules with a high power requirement
- Integrated ground-fault and overload detection saves the need for additional components and enhances safety
- Fast fault detection and reduced downtimes thanks to diagnostics memory, remote signaling and remote RESET
- Reduced downtimes as the result of removable terminal blocks which enable the fast exchanging of devices
- Ultra-wide input range of the 8 A version permits single-phase and two-phase operation and saves the need for an N conductor
- Can be used world-wide, thanks to, for example, UL/CSA approval (UL 508)
- With the 2.6 A version the output power is restricted to max. 100 W for use in NEC Class 2 circuits

Selection and ordering data

Version		DT	Article No.
	AS-Interface power supply units, IP20 <ul style="list-style-type: none"> • AS-i single output 30 V DC • With integrated ground-fault detection • With the 2.6 A version, the output power is restricted to max. 100 W (for use in NEC Class 2 circuits) • Dimensions: Width: 50 mm (3 A/2.6 A); 70 mm (5 A), 120 mm (8 A); Height: 125 mm; Depth: 125 mm 		
	Output current	Input voltage	Spring-type terminals
	2.6 A/max. 100 W	120/230 V AC (selectable)	▶ 3RX9501-2BA00
	3 A	120/230 V AC (selectable)	▶ 3RX9501-0BA00
	3 A	24 V DC	▶ 3RX9501-1BA00
	5 A	120/230 V AC (selectable)	▶ 3RX9502-0BA00
	8 A	120/230 ... 500 V AC (selectable)	▶ 3RX9503-0BA00

AS-Interface

Power Supply Units and Data Decoupling Modules

30 V power supply units

Overview



PSN130S 30 V power supply units for 3 A, 4 A and 8 A

The PSN130S 30 V power supply units feed 30 V DC into the AS-Interface cable and supply the AS-Interface components, but do not include data decoupling. Data decoupling modules are needed in addition therefore to separate communication signals and control supply voltage, [see page 3/255 and 3/257](#).

The power supply units are resistant to overload and short circuits.

Dimensions

The 30 V power supply units have compact dimensions in widths of 50 and 70 mm. No distances from other devices need to be observed when mounting the power supply units.

Features

- Primary clocked power supply units for connection to a single-phase AC network
- Power for currents of 3, 4 and 8 A
- The output voltage is floating, and resistant to short-circuits and no-load operation. In the event of an overload, the output voltage will be reduced or switched off. After a short-circuit or overload the devices will start up again automatically.
- In the event of a device fault, the output voltage will be limited to max. 37 V.
- Modular installation devices in degree of protection IP20 and safety class I.
- Diagnostics: With an output voltage > 26.5 V DC, the green LED (30V O.K.) is lit and the signaling contact 13-14 is closed.

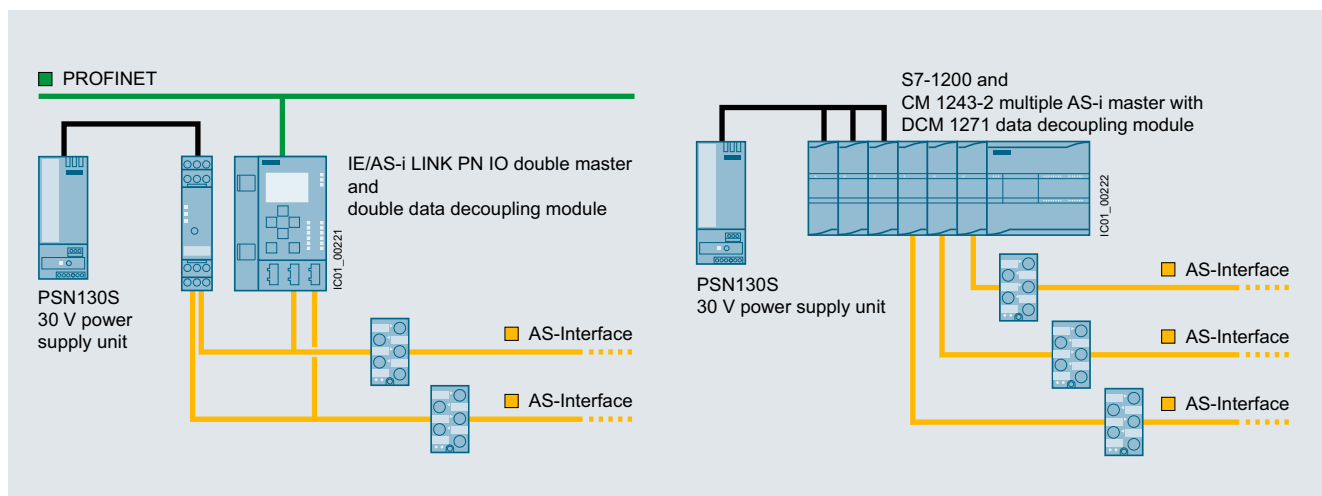
3

Benefits

- Low-cost alternative solution for supplying AS-Interface networks while making full use of the maximum possible cable length per AS-i segment
- Cost advantage particularly for multiple networks
- Compact, space-saving dimensions
- Reliable power supply even for large numbers of AS-Interface modules with a high power requirement
- Can be used world-wide thanks to, for example, UL/CSA approval (UL 508)

Application

Configuration examples of AS-Interface networks with a 30 V power supply unit



Configuration of AS-Interface multiple networks, each with one PSN130S 30 V power supply unit (examples with schematic representation):
 Left: Double network based on the S22.5 double data decoupling module and IE/AS-i LINK PN IO double master
 Right: Triple network based on the SIMATIC S7-1200 with DCM 1271 data decoupling modules and CM 1243-2 communication processors

AS-Interface

Power Supply Units and Data Decoupling Modules

30 V power supply units

Technical specifications

Version		3 A	4 A	8 A
Input data				
• Input voltage, rated value U_e	V AC	120 / 230 V, single-phase, automatic selection		
• Input voltage range	V AC	85 ... 132 / 174 ... 264		
• Mains frequency	Hz	50 / 60		
• Power consumption at full load, typ.	W	103	139	270
Output data				
• Output voltage, rated value U_a	V DC	30		
• Residual ripple	mV _{ss}	< 150		
• Output current, rated value at -20 °C ... +60 °C	A	3	4	8
• Max. output current at +60 °C ... +70 °C	A	3	3	4
Degree of efficiency in rated conditions				
• Degree of efficiency	%	87	88	90
• Power loss, typ.	W	12	17	25
Protection and monitoring				
• Output overvoltage protection	V	< 37		
• Current limit, typ.	A	4	5.5	11
Safety				
• Electrical separation primary / secondary		Output voltage PELV / SELV according to EN 60950 and EN 50178		
• Safety class		I		
• Degree of protection		IP20		

Version	3 A		4 A	8 A
Approvals				
• UL	UL 508 / CSA 22.2			
• Pollution degree	EN 60950			
• Overvoltage category and electrical separation	EN 50178 and IEC 61558			
EMC				
• Emitted interference (class B)	EN 61000-6-3			
• Line harmonics limit	EN 61000-3-2			
• Interference immunity	EN 61000-6-2			
Operating data				
Ambient temperature				
• Operation	°C	-20 ... +70		
• Transport / storage	°C	-40 ... +85		
Pollution degree	2			
Humidity class	Climate class according to DIN 50010, relative air humidity max. 100 %, without condensation			
Dimensions and weight				
• Width	mm	50	50	70
• Height x depth	mm	125 x 126.5		
• Weight	kg	0.4	0.4	0.7

Selection and ordering data

Version	DT	Article No.
<p>PSN130S 30 V DC power supply units (without AS-i data decoupling)</p> <ul style="list-style-type: none"> • Output voltage 30 V DC • Dimensions: Width: 50 mm (3 A / 4 A); 70 mm (8 A), Height: 125 mm; Depth: 126.5 mm 		
Output current	Input voltage	Screw terminals
3 A	120 / 230 V AC (automatic selection)	3RX9511-0AA00
4 A	120 / 230 V AC (automatic selection)	3RX9512-0AA00
8 A	120 / 230 V AC (automatic selection)	3RX9513-0AA00

More information

Operating instructions and more technical information see
<http://support.automation.siemens.com/WW/view/en/64364000>

AS-Interface

Power Supply Units and Data Decoupling Modules

S22.5 data decoupling modules

Overview



AS-Interface S22.5 double data decoupling modules
Left: screw terminal version, right: spring-type terminal version

With the aid of the S22.5 data decoupling module, the AS-Interface network can also be supplied with 24 V DC or 30 V DC from a standard power supply unit and the transmission of data and power can be realized along one cable.

The combination of data decoupling modules and standard power supply units is therefore a cost-efficient alternative to the service-proven AS-Interface power supply units.

The quality of the data signals and the reliable operation of the AS-i network are not negatively affected as the result.

Features of the S22.5 data decoupling module

- Degree of protection IP20
- Narrow design: 22.5 mm wide
- Version with screw or spring-type terminals
- Versions for single and double data decoupling
- Supply of several AS-i networks with a single power supply unit
- Operation with 24 V DC or 30 V DC, grounded or non-grounded
- Adjustable current limiting up to 2 x 4 A
- Integrated ground-fault detection with fault storage
- Diagnostics LEDs and signaling contacts
- RESET by button or remote RESET

Ground-fault detection

The integrated ground-fault detection works with a grounded and non-grounded supply: The connection of negative pole and ground (upstream from the data decoupling module) customary with 24 V DC power supplies is permitted. A ground fault to the negative or positive pole on the AS-Interface network (downstream from the data decoupling module) is detected and stored as a fault and will be signaled using LEDs and a relay contact.

Benefits

- Compatible expansion of the AS-Interface system
- An existing standard power supply unit with 24 V DC or 30 V DC can be used for supplying AS-i networks
- The AS-Interface system can also be used in tightly budgeted applications because no AS-Interface power supply unit needs to be purchased
- Applications benefit in addition from the advantages of a modern bus system:
 - High level of standardization
 - Additional diagnostics and maintenance information
 - Faster commissioning
- Easy and cost-efficient design of single and multiple networks is possible

Application

The AS-Interface data decoupling module is designed for AS-Interface networks with 30 V supply or 24 V supply (AS-iPower24V).

Operation of an AS-i network with the data decoupling module and a 30 V standard power supply unit is technically equivalent to the use of an AS-Interface power supply unit and offers the service-proven features of AS-Interface for all applications.

AS-Interface Power24V uses a 24 V power supply unit in conjunction with a data decoupling module and is particularly suitable for

- Compact machines using AS-Interface input/output modules
- Applications in the control cabinet for AS-Interface connection of SIRIUS Innovations contactors and compact starters (3RT2 contactors through 3RA27 function modules or 3RA6 compact starters through 3RA69 AS-i add-on modules).

When using the double data decoupling module or other data decoupling units, several AS-Interface networks can be operated with a single power supply unit. This results in an additional cost advantage.

Note:

The power supply units must comply with the PELV (Protective Extra Low Voltage) or SELV (Safety Extra Low Voltage) standards, have a residual ripple of < 250 mV_{pp}, and in the event of a fault, must limit the output voltage to a maximum of 40 V. We recommend SITOP power supply units, see [catalog IC 10 chapter 15 "Products for Specific Requirements" → "Stabilized Power Supplies"](#) or PSN130S 30 V power supplies, see [page 3/253](#).

Note on AS-i Power24V:

The length of an AS-i Power24V network is restricted to 50 m in order to limit the voltage drop along the cable.

AS-i masters, AS-i slaves and the sensors and actuators supplied through the AS-i cable must be designed for the reduced voltage. Sensors and actuators for the standard voltage range of 10 to 30 V can be supplied with sufficient voltage.

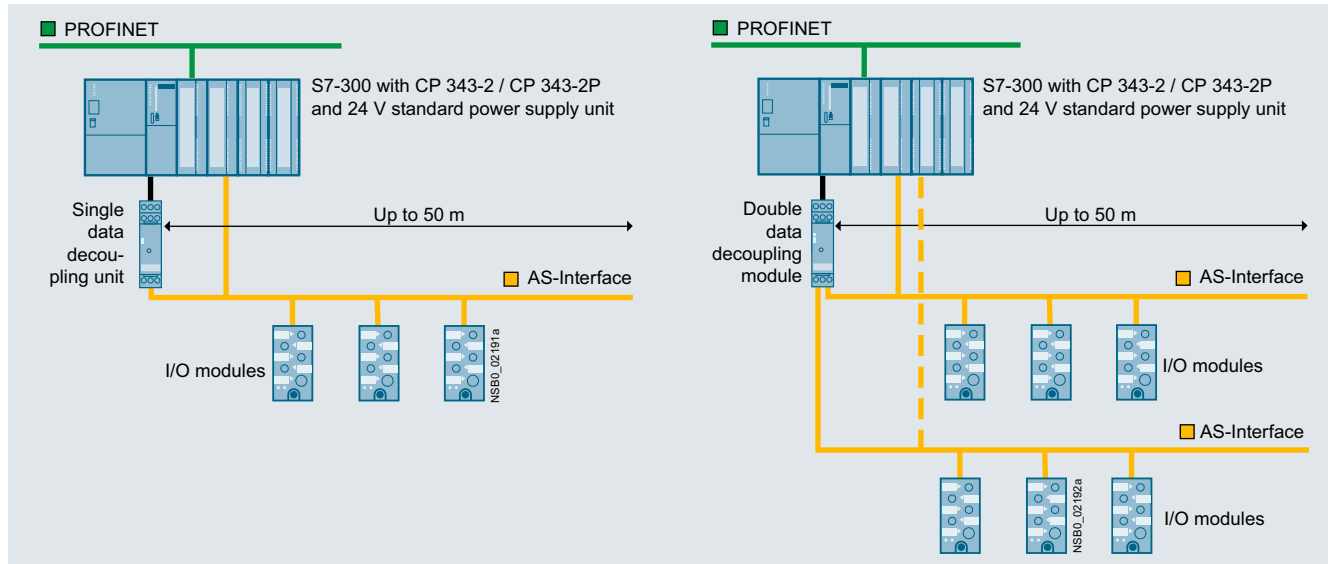
For more information on AS-i Power24V, see ["AS-Interface System Manual"](#) <http://support.automation.siemens.com/WW/view/en/47052644>

AS-Interface

Power Supply Units and Data Decoupling Modules



S22.5 data decoupling modules

Construction of an AS-i Power24V network with an AS-Interface S22.5 data decoupling module

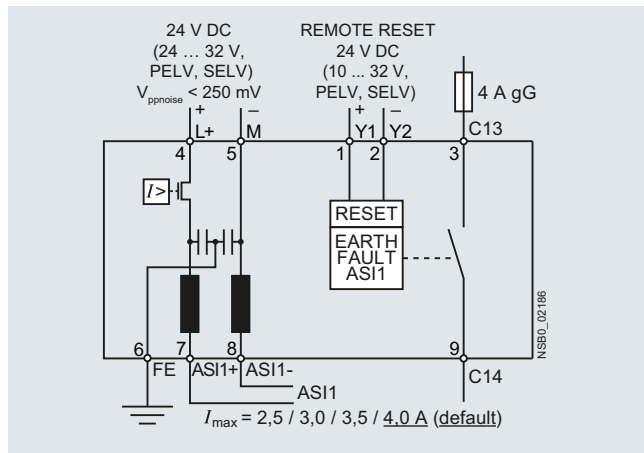


Construction of an AS-i Power24V network with an AS-Interface S22.5 data decoupling module: Left: single network, Right: multiple network

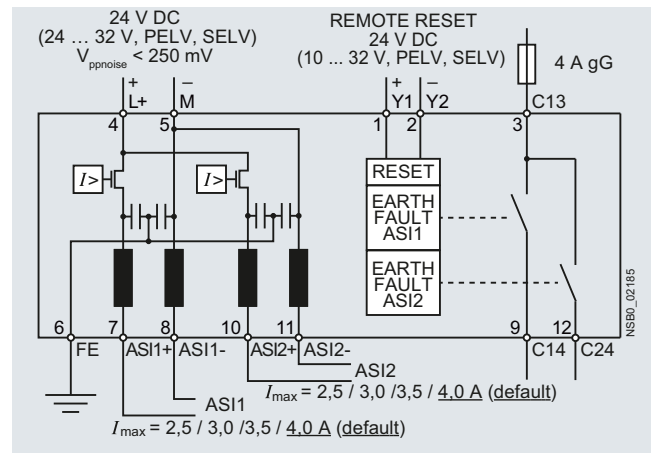
Selection and ordering data

Version	DT	Article No.
 <p>S22.5 data decoupling modules With screw terminals, removable terminals, width 22.5 mm, height 101 mm, depth 115 mm</p> <ul style="list-style-type: none"> Single data decoupling module, 1 x 4 A Double data decoupling module, 2 x 4 A <p>3RK1901-1DE12-1AA0</p>	Schraubanschluss	
	<ul style="list-style-type: none"> 3RK1901-1DE12-1AA0 3RK1901-1DE22-1AA0 	
 <p>S22.5 data decoupling modules With spring-type terminals, removable terminals, width 22.5 mm, height 105 mm, depth 115 mm</p> <ul style="list-style-type: none"> Single data decoupling module, 1 x 4 A Double data decoupling module, 2 x 4 A <p>3RK1901-1DG12-1AA0</p>	Federzuganschluss	
	<ul style="list-style-type: none"> 3RK1901-1DG12-1AA0 3RK1901-1DG22-1AA0 	

Circuit diagrams



Single data decoupling module



Double data decoupling module

AS-Interface

Power Supply Units and Data Decoupling Modules

Data decoupling modules for S7-1200 DCM 1271 data decoupling module

Overview



DCM 1271 data decoupling module for SIMATIC S7-1200

With the aid of the DCM 1271 data decoupling module, the AS-Interface network can also be supplied with 24 V DC or 30 V DC from a standard power supply unit and the transmission of data and power can be realized along one cable. The DCM 1271 data decoupling module has the same enclosure design as the S7-1200 module and is therefore ideal for combining with the CM 1243-2 AS-i master.

Features of the DCM 1271 data decoupling module

- Design: S7-1200, 30 mm wide, degree of protection IP 20
- Detachable terminals (scope of supply)
- Single data decoupling
- Supply of several AS-i networks with a single power supply unit
- Operation with 24 V DC or 30 V DC, grounded or non-grounded
- Current limiting at 4 A
- Integrated ground-fault detection
- Diagnostics LEDs for ground faults and overloads
- Signaling contacts for ground-fault detection

Ground-fault detection

The integrated ground-fault detection works with a grounded and non-grounded supply: The connection of negative pole and ground (upstream from the data decoupling module) customary with 24 V DC power supplies is permitted. A ground fault to the negative or positive pole on the AS-Interface network (behind the data decoupling module) is identified and signaled via LED and a transistor output.

Benefits

- An existing standard power supply unit with 24 V DC or 30 V DC can be used for supplying AS-i networks
- The AS-Interface system can also be used in tightly budgeted applications because no AS-Interface power supply unit needs to be purchased
- Applications benefit in addition from the advantages of a modern bus system:
 - High level of standardization
 - Additional diagnostics and maintenance information
 - Faster commissioning

Application

The AS-Interface data decoupling module is designed for AS-Interface networks with 30 V supply or 24 V supply (AS-Interface Power24V).

Operation of an AS-i network with the data decoupling module and a 30 V standard power supply unit is technically equivalent to the use of an AS-Interface power supply unit and offers the service-proven features of AS-Interface for all applications.

AS-Interface Power24V uses a 24 V power supply unit in conjunction with a data decoupling module and is particularly suitable for

- Compact machines using AS-Interface input/output modules
- Applications in the control cabinet for AS-Interface connection of SIRIUS Innovations contactors and compact starters (3RT2 contactors through 3RA27 function modules or 3RA6 compact starters through 3RA69 AS-i add-on modules).

Note:

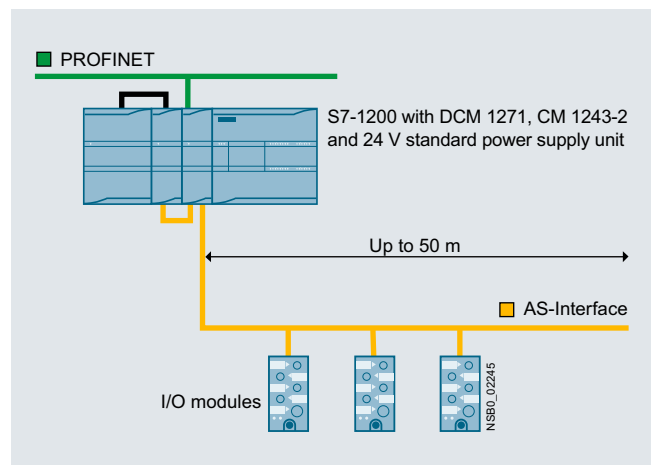
The power supply units must comply with the PELV (Protective Extra Low Voltage) or SELV (Safety Extra Low Voltage) standards, have a residual ripple of $< 250 \text{ mV}_{\text{pp}}$, and in the event of a fault, must limit the output voltage to a maximum of 40 V. We recommend SITOP power supply units, [see catalog IC 10, chapter 15 "Products for Specific Requirements" → "Stabilized Power Supplies"](#) or PSN130S 30 V power supplies, [see page 3/253](#).

Note on AS-i Power24V:

The length of an AS-i Power24V network is restricted to 50 m in order to limit the voltage drop along the cable.

AS-i masters, AS-i slaves and the sensors and actuators supplied through the AS-i cable must be designed for the reduced voltage. Sensors and actuators for the standard voltage range of 10 to 30 V can be supplied with sufficient voltage.

Construction of an AS-i Power24V network with AS-Interface DCM 1271 data decoupling module



AS-Interface

Power Supply Units and Data Decoupling Modules

Data decoupling modules for S7-1200 DCM 1271 data decoupling module

Selection and ordering data



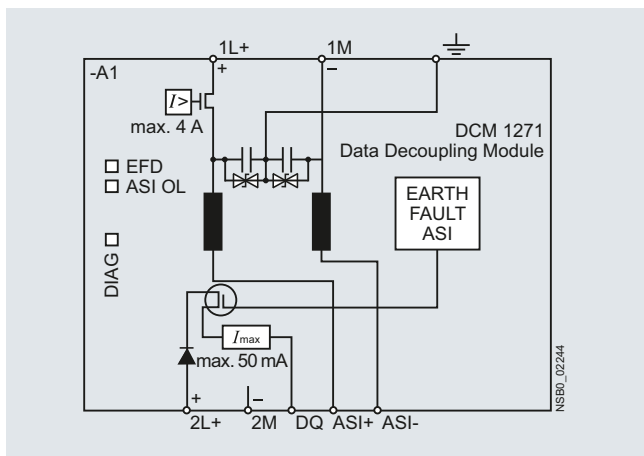
3RK7271-1AA30-0AA0

Version	DT	Article No.
DCM 1271 data decoupling modules		
<ul style="list-style-type: none"> With screw terminals, removable terminals (included in the scope of supply) Dimensions (W × H × D / mm): 30 × 100 × 75 	A	3RK7271-1AA30-0AA0

Accessories

Version	DT	Article No.
5-pole screw terminals for AS-i master CM 1243-2 and AS-i DCM 1271 data decoupling module		
<ul style="list-style-type: none"> With screw terminals 		3RK1901-3MA00
3-pole screw terminal for AS-i DCM 1271 data decoupling module for connecting the power supply unit		
<ul style="list-style-type: none"> With screw terminals 		3RK1901-3MB00

Circuit diagrams



DCM 1271 single data decoupling module

More information

The manuals are available free of charge on the Internet, [see](http://support.automation.siemens.com/WW/view/en/50414115/133300)
<http://support.automation.siemens.com/WW/view/en/50414115/133300>

For more information on AS-i Power24V,
[see "AS-Interface System Manual",](http://support.automation.siemens.com/WW/view/en/47052644)
<http://support.automation.siemens.com/WW/view/en/47052644>

Overview



AS-Interface shaped cable

The actuator-sensor interface – the networking system used for the lowest field area – is characterized by very easy mounting and installation. A new connection method was developed specially for AS-Interface.

The stations are connected using the AS-Interface cable. This two-wire AS-Interface shaped cable has a trapezoidal shape, thus ruling out polarity reversal.

Connection is effected by the insulation piercing method. In other words, male contacts pierce the shaped AS-Interface cable and make reliable contact with the two wires. Cutting to length and stripping are superfluous. Consequently, AS-Interface stations (e.g. I/O modules, intelligent devices) can be connected in the shortest possible time and exchanging devices is quick.

To enable use in the most varied ambient conditions (e.g. in an oily environment), the AS-Interface cable is available in different materials (rubber, TPE, PUR).

For special applications it is also possible to use an unshielded standard round cable H05VV-F 2 x 1.5 mm² according to AS-i Specification. With AS-Interface, data and energy for the sensors (e.g. BERO proximity switches) and actuators (e.g. indicator lights) are transmitted over the yellow AS-Interface cable.

The black AS-Interface cable must be used for actuators with a 24 V DC supply (e.g. solenoid valves) and a high power requirement.

Suitable for operation in tow chains

The use of the AS-Interface shaped cables with TPE and PUR outer sheath was checked in a tow chain test with the following conditions:

Chain length	m	6
Travel	m	10
Bending radius	mm	75
Travel speed	m/s	4
Acceleration	m/s ²	4
Number of cycles		10 million
Duration of test		approx. 3 years (11 000 cycles per day)

After termination of the 10 million cycles, only slight wear was visible due to the lugs of the tow chain. No damage to the cores and core insulation could be detected.

Note:

When using a tow chain, the cables must be installed in such a way that they are not subject to tensile forces. On no account may the cables be twisted, but they must be routed flat through the tow chain.

Selection and ordering data



3RX9 0...0AA00

Version			DT	Article No.
AS-Interface shaped cables				
Material	Color	Quantity		
Rubber	Yellow (AS-Interface)	100-m roll	▶	3RX9010-0AA00
	Yellow (AS-Interface)	1-km drum	B	3RX9012-0AA00
	Black (24 V DC)	100-m roll	▶	3RX9020-0AA00
	Black (24 V DC)	1-km drum	B	3RX9022-0AA00
TPE	Yellow (AS-Interface)	100-m roll	▶	3RX9013-0AA00
	Yellow (AS-Interface)	1-km drum	B	3RX9014-0AA00
	Black (24 V DC)	100-m roll	▶	3RX9023-0AA00
	Black (24 V DC)	1-km drum	B	3RX9024-0AA00
TPE special version according to UL Class 2	Yellow (AS-Interface)	100-m roll	B	3RX9017-0AA00
	Black (24 V DC)	100-m roll	B	3RX9027-0AA00
PUR	Yellow (AS-Interface)	100-m roll	▶	3RX9015-0AA00
	Yellow (AS-Interface)	1-km drum	B	3RX9016-0AA00
	Black (24 V DC)	100-m roll	▶	3RX9025-0AA00
	Black (24 V DC)	1-km drum	B	3RX9026-0AA00

Addressing units

Overview



The innovated addressing unit for AS-Interface of the AS-i Specification V3.0

The addressing unit is used to assign an address during commissioning to each AS-Interface slave. The device detects a connected slave module or a complete AS-i network and displays the found module in the LCD display. Via the Up/Down keys each address can be individually set. By turning the rotary switch, further commissioning functions are selected intuitively. The innovative device has been adapted to the current AS-i Specification V3.0 and can now also handle the I/O data of the latest slaves.

Functionality

- Reading out and adjusting the slave address 0 to 31 or 1A to 31A, 1B to 31B, with automatic addressing aid and prevention of double addresses
- Reading out the slave profile (IO, ID, ID2)
- Reading out and adjusting the ID1 code
- Input/output test when commissioning the slaves:
Read input signals and write outputs with all digital and analog slaves according to AS-Interface Specification V3.0, including safe input slaves and complex CTT2 slaves
- Measuring the voltage on the AS-Interface cable (measuring range from 2 to 35 V)
- Display of the operational current in case of direct connection of an AS-i slave (measuring range from 0 to 150 mA)
- Storage of complete network configurations (profiles of all slaves) to simplify the addressing
- Adjusting the slave parameters for commissioning
- Reading out the identification and diagnostics of CTT2 slaves
- Reading out the code table of safe input slaves (ASIsafe)

Note:

For operation of the addressing unit on an AS-Interface cable with connected power supply unit, the following applies:
The AS-Interface addressing unit is suitable for standard AS-i networks and AS-i Power24V networks (operational voltage on the AS-Interface cable min. 19 V).







Benefits

- Increased power supply to the slaves to 150 mA
- Better utilization of the battery capacity thanks to improved circuitry
- Support for the current AS-i Specification V3.0
- Expanded display for simultaneously displaying input and output states
- Clearly recognizable display of status of digital inputs/outputs in binary format (0 / 1), optionally also available as hexadecimal values
- Intuitive display of analog data either as decimal, hexadecimal or as a percentage (e.g. 100 % corresponds to input/output value 20 mA)
- I/O data of complex slaves (CTT2 profile) can be displayed
- Decoded display of the input data of safe input slaves, including code table
- Simplification of the operating steps when setting the slave address with automatic read back of the set address
- Addressing cable, ready for operation even without screwing in tight into the M12 socket, thus faster availability of the addressing unit
- Proven compact housing with smooth keys and rotary switch
- Connection of standard AS-i networks possible with 30 V as well as Power24V networks
- Complex slaves with high operating current can be addressed without external supply
- Longer operating time per battery pack
- Can be used with all types of digital and analog slaves
- Comprehensive and fast input/output test of plants, even for A/B modules with 4 DI / 4 DO and current analog modules with an A/B address
- Faster and more reliable commissioning of the AS-Interface modules
- One-hand operation possible, with unique selection of the functions
- Universal applicability for all AS-i networks

Technical specifications

3RK1904-2AB02 AS-Interface addressing unit		
Parameters		
Measuring range		
• Voltage	V	2 ... 35
• Current (for slaves)	A	0 ... 0.150
Measuring accuracy in % of the measured value		
• Voltage	%	± 3.5 + 2 digits
• Current (for slaves)	%	± 5 + 2 digits
Input resistance for voltage measurement	kΩ	300
Power supply		
Standard power supply		4 batteries 1.5 V type AA, IEC LR6 (NEDA15) or corresponding batteries (preferably NiMH)
Recommendation for current-intensive application		4 high-grade alkaline manganese batteries 1.5 V type AA
Automatic disconnection for a longer battery life		Approx. 5 minutes (or approx. 1 minute when data exchange is active) after last operation
Ambient conditions		
Ambient temperature	°C	0 ... +50
Storage temperature	°C	-20 ... +75 without batteries
Relative air humidity, max.	%	75, condensation not permitted
Altitude above sea level, max.	m	2000
Location		Only indoors
Mechanical design		
Degree of protection		IP40
Dimensions, W x H x D	mm	84 x 195 x 35
Connection		M12 socket: Pin 1: ASI+; Pin 3: ASI-; Pin 2, 4, 5: Not used
Weight with batteries	kg	0.450

Selection and ordering data

Version	DT	Article No.
 3RK1 904-2AB02	AS-Interface addressing unit V 3.0 • For AS-Interface modules and sensors and actuators with integrated AS-Interface according to AS-i Specification V3.0 • For setting the AS-i address of standard slaves, and slaves with extended addressing mode (A/B slaves) • With input/output test function and many other commissioning functions • Battery operation with 4 batteries type AA (IEC LR6, NEDA 15) • Scope of supply: - Addressing unit with 4 batteries - Addressing cable, with M12 plug to addressing plug (hollow plug), length 1.5m	▶ 3RK1904-2AB02
Accessories		
 3RK1902-4PB15-3AA0	Addressing cable, with M12 plug to M12 socket²⁾ • For addressing slaves with M12 connection, e.g. K20 or K60R modules or light curtains • Length 1.5 m, 3-pole, 3 x 0.34 mm ²	C 3RK1902-4PB15-3AA0
 3RX9801-0AA00	AS-Interface M12 feeders • Transition of AS-Interface cable to a standard round cable • Insulation piercing method for connection of AS-Interface cable • M12 socket for connection of standard round cable • Current carrying capacity up to 2 A	▶ 3RX9801-0AA00
 3RK1901-1NR10	AS-Interface M12 feeders • Transition of AS-Interface cable without U_{aux} , with M12 socket • Insulation piercing method for connection of AS-Interface cable • M12 socket for connection of standard round cable	A 3RK1901-1NR10
 3RK1902-4HB50-5AA0	M12 cable plug³⁾ • Extruded M12 plug (angled cable feeder 90°), other cable end open • Length: 5 m, 5-pole, color: Black	C 3RK1902-4HB50-5AA0
 3RK1902-4BA00-5AA0	M12 plug straight³⁾ • For screw fixing, 5-pole screw terminal, max. 0.75 mm ² , A-coded, max. 4 A	C 3RK1902-4BA00-5AA0
	Addressing cable, with M12 plug to addressing plug (hollow plug)¹⁾ • Included in the scope of supply of the addressing unit • Length 1.5 m	Z236A

¹⁾ Order only GMC-I Messtechnik GmbH possible:









GMC-I Messtechnik GmbH
 Thomas-Mann-Str. 16-20
 D-90471 Nürnberg
 Tel.: +49 (911) 8602-111
 Fax: +49 (911) 8602-777
 E-Mail: info@gossenmetrawatt.com

²⁾ Not included in scope of supply of the 3RK1904-2AB02 addressing unit.

³⁾ For connecting the addressing unit to an AS-i network via AS-Interface M12 feeder, a connecting cable (M12 plug to M12 connector) must be produced and requires the following wiring:
 - M12 cable plug: Pin 1 / core brown ↔ M12 plug: Pin 1
 - M12 cable plug: Pin 3 / core blue ↔ M12 plug: Pin 3
 - Pin 2, 4, 5 not connected.

Miscellaneous accessories

Selection and ordering data

Version		DT	Article No.																																				
	AS-Interface system manual The AS-Interface system manual can be downloaded free of charge, see http://support.automation.siemens.com/WW/view/en/26250840																																						
3RK2703-3AB02-1AA1																																							
	AS-Interface compact distributors, for AS-Interface flat cable <ul style="list-style-type: none">• Current carrying capacity up to 8 A• Degree of protection IP67/IP68/IP69K	A	3RK1901-1NN10																																				
3RK1901-1NN10																																							
	AS-Interface M12 feeders <ul style="list-style-type: none">• Degree of protection IP67• Current carrying capacity up to 2 A																																						
3RX9801-0AA00																																							
	<table><tr><th>For flat cable</th><th>For</th><th>Cable length</th><th>Cable end in feeder</th><th></th></tr><tr><td>AS-i</td><td>M12 socket</td><td>--</td><td>Available</td><td>▶</td></tr></table>	For flat cable	For	Cable length	Cable end in feeder		AS-i	M12 socket	--	Available	▶	3RX9801-0AA00																											
For flat cable	For	Cable length	Cable end in feeder																																				
AS-i	M12 socket	--	Available	▶																																			
	AS-Interface M12 feeders <ul style="list-style-type: none">• Degree of protection IP67/IP68/IP69K• Current carrying capacity up to 4 A																																						
3RK1901-1NR10																																							
	<table><tr><th>For flat cable</th><th>For</th><th>Cable length</th><th>Cable end in feeder</th><th></th></tr><tr><td>AS-i</td><td>M12 socket</td><td>--</td><td>Not available</td><td>A</td></tr><tr><td>AS-i</td><td>M12 cable box</td><td>1 m</td><td>Not available</td><td>A</td></tr><tr><td>AS-i</td><td>M12 cable box</td><td>2 m</td><td>Not available</td><td>A</td></tr><tr><td>AS-i/U_{aux}</td><td>M12 socket</td><td>--</td><td>Not available</td><td>A</td></tr><tr><td>AS-i/U_{aux}</td><td>M12 cable box</td><td>1 m</td><td>Not available</td><td>A</td></tr><tr><td>AS-i/U_{aux}</td><td>M12 cable box</td><td>2 m</td><td>Not available</td><td>A</td></tr></table>	For flat cable	For	Cable length	Cable end in feeder		AS-i	M12 socket	--	Not available	A	AS-i	M12 cable box	1 m	Not available	A	AS-i	M12 cable box	2 m	Not available	A	AS-i/U _{aux}	M12 socket	--	Not available	A	AS-i/U _{aux}	M12 cable box	1 m	Not available	A	AS-i/U _{aux}	M12 cable box	2 m	Not available	A	3RK1901-1NR10	3RK1901-1NR11	3RK1901-1NR12
For flat cable	For	Cable length	Cable end in feeder																																				
AS-i	M12 socket	--	Not available	A																																			
AS-i	M12 cable box	1 m	Not available	A																																			
AS-i	M12 cable box	2 m	Not available	A																																			
AS-i/U _{aux}	M12 socket	--	Not available	A																																			
AS-i/U _{aux}	M12 cable box	1 m	Not available	A																																			
AS-i/U _{aux}	M12 cable box	2 m	Not available	A																																			
3RK1901-1NR11			3RK1901-1NR20	3RK1901-1NR21																																			
			3RK1901-1NR22																																				
	AS-Interface M12 feeders, 4-fold <ul style="list-style-type: none">• Degree of protection IP67• Current carrying capacity up to 4 A																																						
3RK1901-1NR04	<table><tr><th>For flat cable</th><th>For</th><th>Cable length</th><th>Cable end in feeder</th><th></th></tr><tr><td>AS-i/U_{aux}</td><td>4-fold M12 socket, delivery includes coupling module</td><td>--</td><td>Not available</td><td>A</td></tr></table>	For flat cable	For	Cable length	Cable end in feeder		AS-i/U _{aux}	4-fold M12 socket, delivery includes coupling module	--	Not available	A	3RK1901-1NR04																											
For flat cable	For	Cable length	Cable end in feeder																																				
AS-i/U _{aux}	4-fold M12 socket, delivery includes coupling module	--	Not available	A																																			
	M12-T distributors <ul style="list-style-type: none">• IP68• 1 x M12 plug• 2 x M12 box	C	3RK1901-1TR00																																				
3RK1901-1TR00																																							
	M12 Y-shaped coupler plugs For connection of two sensors to one M12 socket with Y assignment	A	6ES7194-1KA01-0XA0																																				
6ES7194-1KA01-0XA0																																							

Miscellaneous accessories

	Version	DT	Article No.
 3RK1901-1KA00	AS-Interface M12 sealing caps For free M12 sockets	▶	3RK1901-1KA00
 3RK1901-1KA01	AS-Interface M12 sealing caps, tamper-proof For free M12 sockets	A	3RK1901-1KA01
 3RK1901-1PN00	AS-Interface M8 sealing caps For free M8 sockets	A	3RK1901-1PN00
 3RK1901-1MD00	AS-Interface M20 seals <ul style="list-style-type: none"> • For AS-Interface cable, shaped • For insertion in M20 glands 	A	3RK1901-1MD00
 3RK1901-3QM00	Cable adapters for flat cables Connection of AS-Interface cable to metric gland with insulation piercing method <ul style="list-style-type: none"> • Continuation using standard cable <ul style="list-style-type: none"> - For M16 gland - For M20 gland • Continuation using pins <ul style="list-style-type: none"> - For M16 gland - For M20 gland 	B B C B	3RK1901-3QM00 3RK1901-3QM10 3RK1901-3QM01 3RK1901-3QM11
 3RK1901-3QA00	Cable clips for cable adapters	▶	3RK1901-3QA00
 3RK1901-1MN00	Cable terminating pieces For sealing of open cable ends (shaped AS-Interface cable) in IP67	▶	3RK1901-1MN00
 3RK1901-2EA00	K45 mounting plates <ul style="list-style-type: none"> • For wall mounting • For standard rail mounting 	▶ ▶	3RK1901-2EA00 3RK1901-2DA00
 3RK1901-0CA00	K60 mounting plates Suitable for all K60 compact modules <ul style="list-style-type: none"> • For wall mounting • For standard rail mounting 	▶ ▶	3RK1901-0CA00 3RK1901-0CB01

Miscellaneous accessories



3RK1902-0AR00



3RK1902-4GB50-4AA0



3RK1902-4CA00-4AA0



3RK1902-4BA00-5AA0



3RK1902-4DA00-5AA0



3RK1902-4H...-5AA0



3RK1902-4PB15-3AA0

Version	DT	Article No.
Sealing sets <ul style="list-style-type: none"> For K60 mounting plate and standard distributor Cannot be used for K45 mounting plate One set contains one straight and one shaped seal 	A	3RK1902-0AR00
Inscription labels <ul style="list-style-type: none"> For K45 and K60 compact modules 20 x 9 mm, pastel turquoise 19 frames with 20 labels each 	C	3RT1900-1SB50
Control cables, assembled at one end Angular M12 socket for screw fixing, 4-pole, 4 x 0.34 mm ² , A-coded, black PUR sheath, max. 4 A <ul style="list-style-type: none"> Cable length 5 m 	C	3RK1902-4GB50-4AA0
Angular M12 socket For screw fixing, 4-pole screw terminals, max. 0.75 mm ² , A-coded, max. 4 A	C	3RK1902-4CA00-4AA0
M12 plug, straight For screw fixing, 5-pole screw terminals, max. 0.75 mm ² , A-coded, max. 4 A	C	3RK1902-4BA00-5AA0
M12 plug, angled For screw fixing, 5-pole screw terminals, max. 0.75 mm ² , A-coded, max. 4 A	C	3RK1902-4DA00-5AA0
Control cable, assembled at one end M12 plugs, angled, for screw fixing, 5-pole, 5 x 0.34 mm ² , A-coded, black PUR sheath, max. 4 A <ul style="list-style-type: none"> Cable length 1.5 m Cable length 5 m Cable length 10 m 	C	3RK1902-4HB15-5AA0
	C	3RK1902-4HB50-5AA0
	C	3RK1902-4HC01-5AA0
Control cable, assembled at both ends Straight M12 plug, straight M12 socket, for screw fixing, 3-pole, 3 x 0.34 mm ² , A-coded, black PUR sheath, max. 4 A <ul style="list-style-type: none"> Cable length 1.5 m Also for addressing AS-i slaves with M12 bus connection (e.g. K20, K60R compact modules, M200D motor starters) 	C	3RK1902-4PB15-3AA0

Overview



SIRIUS 3SK1 safety relays

SIRIUS 3SK1 safety relays are the key elements of a consistent, cost-effective safety chain. Whether you need EMERGENCY-STOP disconnection, protective door monitoring, light arrays, laser scanners or the protection of presses or punches – with SIRIUS safety relays of width 22.5 mm every safety application can be implemented to optimum effect in terms of engineering and price.

The following safety-related functions are available:

- Monitoring the safety functions of sensors
- Monitoring the sensor leads
- Monitoring the correct device function of the safety relay
- Monitoring the actuators in the shutdown circuit
- Safety-related disconnection when dangers arise

SIRIUS 3SK1 safety relays are permitted for applications up to SIL 3 (IEC 61508/IEC 62061) or PL e (EN ISO 13849-1).

SIRIUS 3SK1 safety relays stand out on account of their flexibility in both parameterization and system configurations with several evaluation units. Optimized solutions when selecting components are facilitated by a clearly structured component range:

- Standard basic units
- Advanced basic units
- Output expansions
- Input expansions
- Accessories

The 3SK1 Standard basic units are characterized by the following features:

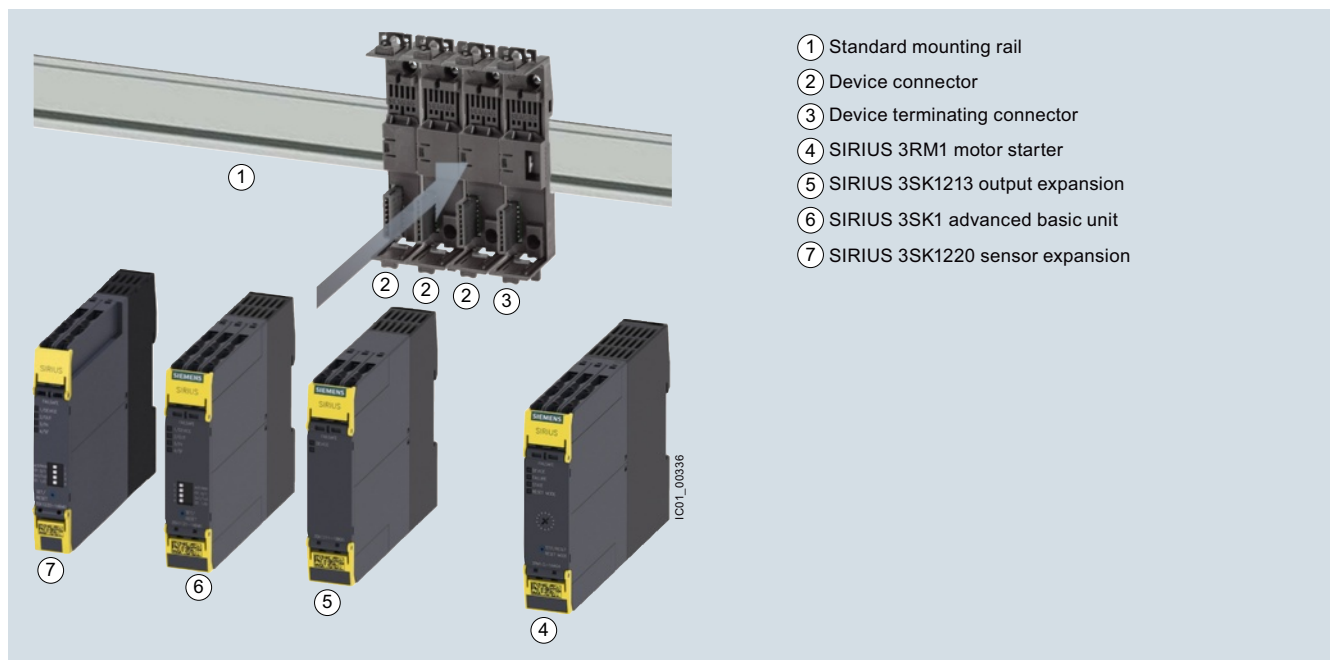
- Compact design
- Simple operation
- Relay and semiconductor outputs
- Economical solution

However, the 3SK1 Advanced basic units also offer the following:

- Universal application possibilities thanks to multifunctionality
- Time-delayed outputs
- Expansion of inputs and outputs

In the case of Advanced basic units, the 3ZY1 device connector allows safety functions involving several sensors and actuators to be constructed very quickly.

The 3SK1 Standard and Advanced series are a high-quality replacement for the 3TK28 safety relays. In their narrower design, and equipped with greater functionality, they can replace every 3TK28 device. The only exceptions are devices with special functions, such as 3TK2826, 3TK2845 and the 3TK2810 devices [see page 3/268](#).



Example of a system design

SIRIUS 3SK1 safety relays

General data

Overview of functions of the 3SK1 series

Type	Standard basic units		Advanced basic units	
	Relay enabling circuits	Electronic enabling circuits	Relay enabling circuits	Electronic enabling circuits
Sensors				
• Mechanical	✓ ²⁾	✓	✓	✓
• Single-ended	✓ ²⁾	✓	✓	✓
• Antivalent	--	--	✓	✓
• Expandable	--	✓ by means of cascading	✓	✓
Parameters				
• Start (auto/monitored)	✓	✓	✓	✓
• Sensor connection 2 x 1-channel/ 1 x 2-channel	✓ by means of wiring	✓	✓	✓
• Cross-circuit detection	✓ by means of wiring	✓	✓	✓
• Start test ON/OFF	--	✓	✓	✓
• Monitoring of two-hand operation consoles	--	--	✓	✓
Enabling circuits				
• Instantaneous	✓	✓	✓	✓
• Time-delayed	--	--	✓	✓
• Expandable with relay enabling circuits	✓ by means of wiring	✓ by means of wiring	✓	✓
• Device connectors	--	--	✓	✓
Rated control supply voltage				
• 24 V DC	✓ ³⁾	✓	✓ ¹⁾	✓ ¹⁾
• 115 ... 240 V AC/DC	✓	--	✓ ¹⁾	✓ ¹⁾

✓ Available

-- Not available

¹⁾ Possible using 3SK1230 power supply via device connector.²⁾ 24 V basic units only.³⁾ 24 V AC/DC

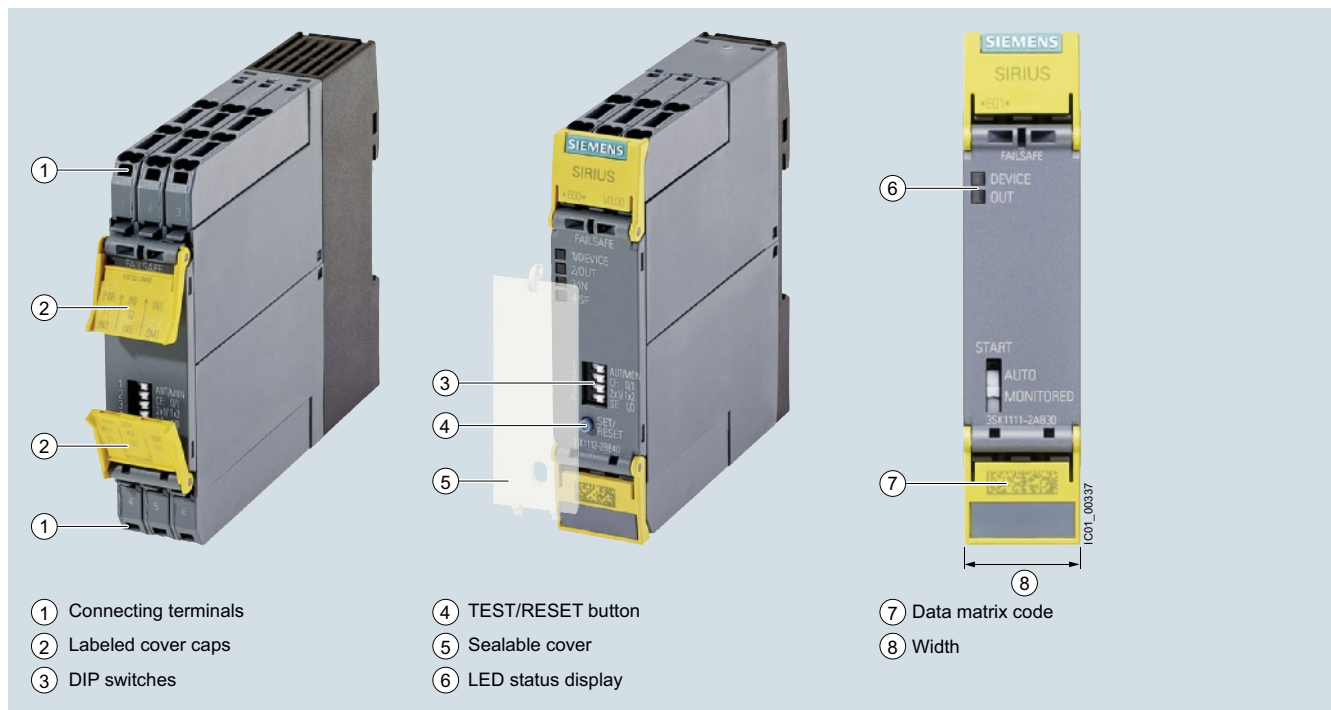
3SK112 and 3SK1112 safety relays with DIP switches

The 3SK112 and 3SK1112 safety relays are configurable safety relays. They are used as evaluation units for typical safety chains (identify, evaluate, realize). A number of functions can be set using the DIP switches on the front. 3SK112 and 3SK1112 are therefore universally applicable.

OFF	Schematic	DIP switch No.	ON
Sensor input Autostart	→ ON	1	Sensor input Monitored start
Without crossover monitoring	1 <input type="checkbox"/>	2	With crossover monitoring
2 x 1-channel sensor connection	2 <input type="checkbox"/>	3	1 x 2-channel sensor connection
With start test	3 <input type="checkbox"/>	4	Without start test
	4 <input type="checkbox"/>		

IC01_00196

3

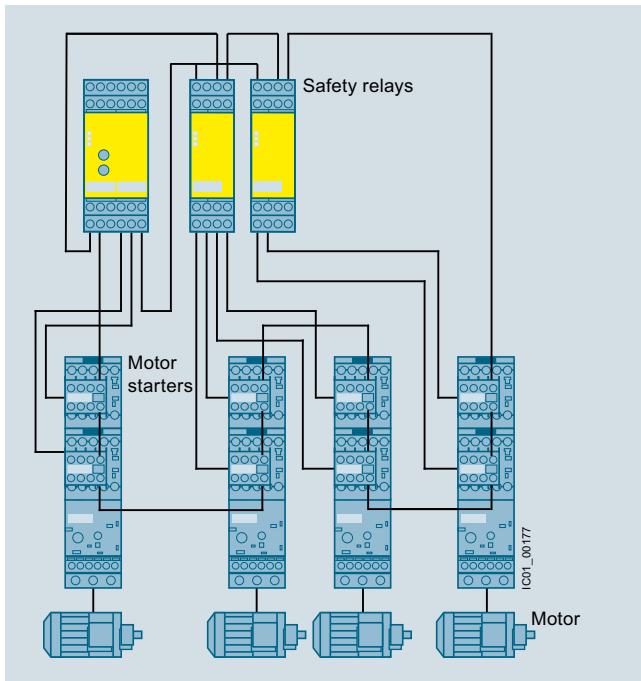


Innovative enclosure concept for SIRIUS 3SK1 safety relays

General data

Can be expanded by adding the 3RM1 motor starter

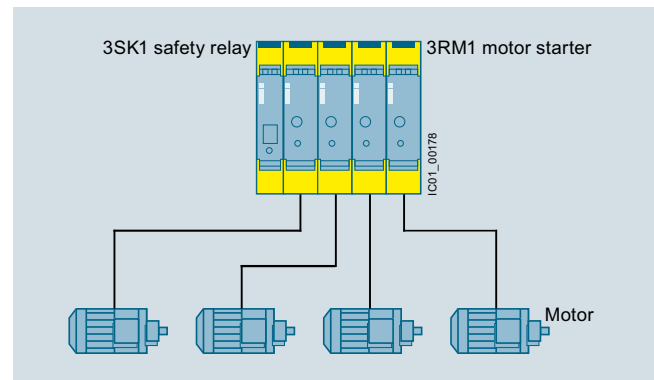
With previous safety relay and motor starter designs, a huge amount of wiring was required to monitor the motor starters in safety applications.



Traditional system design

With the integration of the SIRIUS 3RM1 motor starter into the SIRIUS 3SK1 safety relay system family, this wiring has been minimized for the first time.

Motors up to 3 kW can be easily integrated into the safety relay system using SIRIUS 3ZY1 device connectors, without having to run a cable between the evaluation unit and the motor starter.



System design using 3SK1 and 3RM1

Article No. scheme

Digit of the article No.	1st - 3rd □□□	4th □	5th □	6th □	7th □	–	8th □	9th A	10th □	11th □	12th □
Safety relays	3SK										
Generation		□									
Device version			□								
Device series				□							
Type of outputs					□						
Connection type							□				
Rated control supply voltage									□		
Type of rated control supply voltage										□	
Time delay											□
Example	3SK	1	1	2	1	–	1	A	B	4	0

Note:

The article No. scheme is presented here merely for information purposes and for better understanding of the logic behind the article numbers.

For your orders, please use the article numbers quoted in the catalog in the Selection and ordering data.

SIRIUS 3SK1 safety relays

General data

Code conversion table

The table below lists the existing 3TK28 article numbers with the corresponding 3SK1 article numbers.

Article number 3TK28 basic units	Article number 3SK1 Standard basic units	Article number 3SK1 Advanced basic units	Article number 3TK28 basic units	Article number 3SK1 Standard basic units	Article number 3SK1 Advanced basic units
3TK2820			3TK2828		
3TK2820-1AJ20	3SK1111-1AW20	3SK1121-1AB40 + 3SK1230-1AW20	3TK2828-1AB20	--	--
3TK2820-1AL20	3SK1111-1AW20	3SK1121-1AB40 + 3SK1230-1AW20	3TK2828-1AB21	--	--
3TK2820-1CB30	3SK1111-1AB30	3SK1121-1AB40	3TK2828-1AJ20	--	3SK1121-1CB42 + 3SK1230-1AW20
3TK2820-2AJ20	3SK1111-2AW20	3SK1121-2AB40 + 3SK1230-2AW20	3TK2828-1AJ21	--	3SK1121-1CB41 + 3SK1230-1AW20
3TK2820-2AL20	3SK1111-2AW20	3SK1121-2AB40 + 3SK1230-2AW20	3TK2828-1AL20	--	3SK1121-1CB42 + 3SK1230-1AW20
3TK2820-2CB30	3SK1111-2AB30	3SK1121-2AB40	3TK2828-1AL21	--	3SK1121-1CB41 + 3SK1230-1AW20
3TK2821			3TK2828-1BB40	--	3SK1121-1CB42
3TK2821-1CB30	3SK1111-1AB30	3SK1121-1AB40	3TK2828-1BB41	--	3SK1121-1CB41
3TK2821-2CB30	3SK1111-2AB30	3SK1121-2AB40	3TK2828-2AB20	--	--
3TK2822			3TK2828-2AB21	--	--
3TK2822-1CB30	3SK1111-1AB30	3SK1121-1AB40	3TK2828-2AJ20	--	3SK1121-2CB42 + 3SK1230-2AW20
3TK2822-2CB30	3SK1111-2AB30	3SK1121-2AB40	3TK2828-2AJ21	--	3SK1121-2CB41 + 3SK1230-2AW20
3TK2823			3TK2828-2AL20	--	3SK1121-2CB42 + 3SK1230-2AW20
3TK2823-1CB30	3SK1111-1AB30	3SK1121-1AB40	3TK2828-2AL21	--	3SK1121-2CB41 + 3SK1230-2AW20
3TK2823-2CB30	3SK1111-2AB30	3SK1121-2AB40	3TK2828-2BB40	--	3SK1121-2CB42
3TK2824			3TK2830		
3TK2824-1AJ20	3SK1111-1AW20	3SK1121-1AB40 + 3SK1230-1AW20	3TK2830-1AJ20	3SK1211-1BW20	3SK1211-1BB40
3TK2824-1AL20	3SK1111-1AW20	3SK1121-1AB40 + 3SK1230-1AW20	3TK2830-1AL20	3SK1211-1BW20	3SK1211-1BB40
3TK2824-1BB40	3SK1111-1AB30	3SK1121-1AB40	3TK2830-1CB30	3SK1211-1BB40	3SK1211-1BB40
3TK2824-1CB30	3SK1111-1AB30	3SK1121-1AB40	3TK2830-2AJ20	3SK1211-2BW20	3SK1211-2BB40
3TK2824-2AJ20	3SK1111-2AW20	3SK1121-2AB40 + 3SK1230-2AW20	3TK2830-2AL20	3SK1211-2BW20	3SK1211-2BB40
3TK2824-2AL20	3SK1111-2AW20	3SK1121-2AB40 + 3SK1230-2AW20	3TK2830-2CB30	3SK1211-2BB40	3SK1211-2BB40
3TK2824-2BB40	3SK1111-2AB30	3SK1121-2AB40	3TK2834		
3TK2824-2CB30	3SK1111-2AB30	3SK1121-2AB40	3TK2834-1AB20	--	--
3TK2825			3TK2834-1AJ20	--	3SK1121-1AB40 + 3SK1230-1AW20
3TK2825-1AB20	3SK1111-1AW20	3SK1121-1AB40 + 3SK1230-1AW20	3TK2834-1AL20	--	3SK1121-1AB40 + 3SK1230-1AW20
3TK2825-1AJ20	3SK1111-1AW20	3SK1121-1AB40 + 3SK1230-1AW20	3TK2834-1BB40	--	3SK1121-1AB40
3TK2825-1AL20	3SK1111-1AW20	3SK1121-1AB40 + 3SK1230-1AW20	3TK2834-2AB20	--	--
3TK2825-1BB40	3SK1111-1AB30	3SK1121-1AB40	3TK2834-2AJ20	--	3SK1121-2AB40 + 3SK1230-2AW20
3TK2825-2AB20	3SK1111-2AW20	3SK1121-2AB40 + 3SK1230-2AW20	3TK2834-2AL20	--	3SK1121-2AB40 + 3SK1230-2AW20
3TK2825-2AJ20	3SK1111-2AW20	3SK1121-2AB40 + 3SK1230-2AW20	3TK2834-2BB40	--	3SK1121-2AB40
3TK2825-2AL20	3SK1111-2AW20	3SK1121-2AB40 + 3SK1230-2AW20	3TK2840		
3TK2825-2BB40	3SK1111-2AB30	3SK1121-2AB40	3TK2840-1BB40	3SK1112-1BB40	3SK1122-1AB40
3TK2827			3TK2840-2BB40	3SK1112-2BB40	3SK1122-2AB40
3TK2827-1AB20	--	--	3TK2841		
3TK2827-1AB21	--	--	3TK2841-1BB40	3SK1112-1BB40	3SK1122-1AB40
3TK2827-1AJ20	--	3SK1121-1CB42 + 3SK1230-1AW20	3TK2841-2BB40	3SK1112-2BB40	3SK1122-2AB40
3TK2827-1AJ21	--	3SK1121-1CB41 + 3SK1230-1AW20	3TK2842		
3TK2827-1AL20	--	3SK1121-1CB42 + 3SK1230-1AW20	3TK2842-1BB41	--	3SK1122-1CB41
3TK2827-1AL21	--	3SK1121-1CB41 + 3SK1230-1AW20	3TK2842-1BB42	--	3SK1122-1CB42
3TK2827-1BB40	--	3SK1121-1CB42	3TK2842-1BB44	--	3SK1122-1CB44
3TK2827-1BB41	--	3SK1121-1CB41	3TK2842-2BB41	--	3SK1122-2CB41
3TK2827-2AB20	--	--	3TK2842-2BB42	--	3SK1122-2CB42
3TK2827-2AB21	--	--	3TK2842-2BB44	--	3SK1122-2CB44
3TK2827-2AJ20	--	3SK1121-2CB42 + 3SK1230-2AW20	3TK2850		
3TK2827-2AJ21	--	3SK1121-2CB41 + 3SK1230-2AW20	3TK2850-1AJ20	3SK1111-1AW20 + 3SK1213-1AJ20	3SK1120-1AB40 + 3SK1213-1AB40
3TK2827-2AL20	--	3SK1121-2CB42 + 3SK1230-2AW20	3TK2850-1AL20	3SK1111-1AW20 + 3SK1213-1AL20	3SK1120-1AB40 + 3SK1213-1AB40
3TK2827-2AL21	--	3SK1121-2CB41 + 3SK1230-2AW20	3TK2850-1BB40	3SK1111-1AB30 + 3SK1213-1AB40	3SK1220-1AB40 + 3SK1213-1AB40
3TK2827-2BB40	--	3SK1121-2CB42	3TK2850-2AJ20	3SK1111-2AW20 + 3SK1213-2AJ20	3SK1120-2AB40 + 3SK1213-2AB40
3TK2827-2BB41	--	3SK1121-2CB41	3TK2850-2AL20	3SK1111-2AW20 + 3SK1213-2AL20	3SK1120-2AB40 + 3SK1213-2AB40
			3TK2850-2BB40	3SK1111-2AB30 + 3SK1213-2AB40	3SK1120-2AB40 + 3SK1213-2AB40

Article number 3TK28 basic units	Article number 3SK1 Standard basic units	Article number 3SK1 Advanced basic units
3TK2851		
3TK2851-1AJ20	3SK1111-1AW20 + 3SK1213-1AJ20	3SK1120-1AB40 + 3SK1213-1AB40
3TK2851-1AL20	3SK1111-1AW20 + 3SK1213-1AL20	3SK1120-1AB40 + 3SK1213-1AB40
3TK2851-1BB40	3SK1111-1AB30 + 3SK1213-1AB40	3SK1120-1AB40 + 3SK1213-1AB40
3TK2851-2AJ20	3SK1111-2AW20 + 3SK1213-2AJ20	3SK1120-2AB40 + 3SK1213-2AB40
3TK2851-2AL20	3SK1111-2AW20 + 3SK1213-2AL20	3SK1120-2AB40 + 3SK1213-2AB40
3TK2851-2BB40	3SK1111-2AB30 + 3SK1213-2AB40	3SK1120-2AB40 + 3SK1213-2AB40
3TK2852		
3TK2852-1AL20	3SK1111-1AW20 + 3SK1213-1AL20	3SK1120-1AB40 + 3SK1213-1AB40
3TK2852-1BB40	3SK1111-1AB30 + 3SK1213-1AB40	3SK1120-1AB40 + 3SK1213-1AB40
3TK2852-2AL20	3SK1111-2AW20 + 3SK1213-2AL20	3SK1120-2AB40 + 3SK1213-2AB40
3TK2852-2BB40	3SK1111-2AB30 + 3SK1213-2AB40	3SK1120-2AB40 + 3SK1213-2AB40
3TK2853		
3TK2853-1BB40	3SK1111-1AB30 + 3SK1213-1AB40	3SK1120-1AB40 + 3SK1213-1AB40
3TK2853-2BB40	3SK1111-2AB30 + 3SK1213-2AB40	3SK1120-2AB40 + 3SK1213-2AB40
3TK2856		
3TK2856-1BB40	3SK1213-1AB40	3SK1213-1AB40
3TK2856-2BB40	3SK1213-2AB40	3SK1213-2AB40
3TK2857		
3TK2857-1BB41	--	3SK1213-1AB40 (delay as for basic unit)
3TK2857-1BB42	--	3SK1213-1AB40 (delay as for basic unit)
3TK2857-1BB44	--	3SK1213-1AB40 (delay as for basic unit)
3TK2857-2BB41	--	3SK1213-2AB40 (delay as for basic unit)
3TK2857-2BB42	--	3SK1213-2AB40 (delay as for basic unit)
3TK2857-2BB44	--	3SK1213-2AB40 (delay as for basic unit)

Note:

Conversion-tool e.g. from 3TK28 to 3SK1 [see
www.siemens.com/sirius/conversion-tool](http://www.siemens.com/sirius/conversion-tool) .

SIRIUS 3SK1 safety relays

General data

Benefits

General

- Approved for all safety applications because of its compliance with the highest safety requirements (SIL 3 and PL e)
- Universally usable thanks to adjustable parameters
- Usable worldwide thanks to globally valid certificates
- Compact SIRIUS design
- Device connectors with standard rail mounting for flexible connectability and expandability
- Removable terminals for greater plant availability
- Yellow terminal covers clearly identify the device as a safety component
- Sensor cable length up to 2 000 m allows it to be used in large-scale plants

Relay outputs

- Different voltages can be switched through the floating contacts
- Higher currents can be switched with relay contacts

Electronic outputs

- Wear-free
- Suitable for operation in fast switching applications
- Insensitive to vibrations and dirt
- Good electrical endurance

Power outputs (3SK1213 output expansion)

- Different voltages can be switched through the floating contacts
- The power relay contacts allow currents of up to 10 A AC-15/DC-13 to be connected.
- High mechanical and electrical endurance
- Protective separation between enabling circuits and between enabling circuits and electronics

Can be expanded by adding the 3RM1 motor starter

SIRIUS 3SK1 safety relays are ideal for combining with the 3RM1 motor starters.

Combinations are made by means of

- SIRIUS device connectors (3SK1 Advanced) or
- conventional wiring (3SK1 Standard and Advanced).

This makes collective shutdown very easy in assemblies. The wiring, and ultimately the shutting down of the control supply voltage for the expansion components in EMERGENCY-STOP situations, is performed via the device connector. There is no further need for complex looping of the connecting cables between the safety relay and the motor starters.

The 3RM1 motor starter combines the benefits of semiconductor technology and relay technology. This combination is also known as hybrid technology.

The hybrid technology in the motor starter is characterized by the following features:

- The inrush current in the case of motorized loads is conducted briefly via the semiconductors. Advantages include protection of the relay contacts and a long service life due to low wear.
- The uninterrupted current is conducted via relay contacts. Advantages include lower heat losses compared with the semiconductor.
- Shutdown is implemented again via the semiconductor. The contacts are only slightly exposed to arcs, and this results in a longer service life.
- Integrated overload protection

Note:

SIRIUS 3RM1 motor starters, see catalog IC 10, chapter 8 Feeders and Motor Starters for Use in the Control Cabinet" → "SIRIUS 3RM1 motor starters".

3ZY1 device connectors

Using 3ZY1 device connectors to combine devices reduces the time required to configure and wire the components. At the same time errors are avoided during wiring, and this considerably reduces the testing required for the fully-assembled application.

Microprocessor systems

- Flexible use thanks to many different integrated functions
- Easy parameterization using DIP switches on the front
- High functional reliability based on extensive monitoring functions
- Operated by the machine control system
- Also connection of non-contact sensors (light arrays, light barriers etc.)

Configuration and stock keeping

Variable setting options by means of DIP switches, a wide voltage range and a special power supply unit reduce the cost of keeping stocks and the considerations involved in configuration where the evaluation units to be selected are concerned.

Spring-type terminal with push-in functionality

Push-in connections are a form of spring-type terminals allowing fast wiring without tools for rigid conductors or conductors equipped with end sleeves.

As with other spring-type terminals, a screwdriver (with 3.0 mm x 0.5 mm blade) is required to disconnect the conductor. The same tool can also be used to wire fine-stranded or stranded conductors with no end finishing.

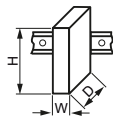
The advantages of the push-in terminals are found, as with all spring-type terminals, in speed of assembly and disassembly and vibration-proof connection. There is no need for the checking and tightening required with screw terminals.

Application

SIRIUS 3SK1 safety relays are used mainly in autonomous safety applications which are not connected to a safety-related bus system. Their function here is to evaluate the sensors and the safety-related shutdown of hazards. Also they check and monitor the sensors, actuators and safety-related functions of the safety relay.

Technical specifications

Type		3SK1111, 3SK1211	3SK1112	3SK1120	3SK1121	3SK1122	3SK1213	3SK1220
Dimensions								
• Width	mm	22.5	22.5	17.5	22.5	22.5	90	17.5
• Height	mm	100	100	100	100	100	100	100
• Depth	mm	121.6	91.6	121.6	121.6	121.6	121.6	121.6



General data

Ambient temperature								
• During operation	°C	-25 ... +60						
• During storage	°C	-40 ... +80						
Installation altitude at height above sea level maximum	m	2 000						
Air pressure According to SN 31205	hPa	900 ... 1 060						
Shock resistance		10 g/11 ms				5 g/10 ms		10 g/11 ms
Vibration resistance acc. to IEC 60068-2-6		5 ... 500 Hz: 0.75 mm						
IP degree of protection of the enclosure		IP20						
Touch protection against electric shock		Finger-safe						
Insulation voltage rated value	V	300	50		300	50	300	50
Rated impulse withstand voltage	V	4 000	500		4 000	500	4 000	800
Safety integrity level (SIL) According to IEC 61508		SIL 3						
Performance level(PL) According to ISO 13849-1		e						
T1 value for proof test interval or service duration According to IEC 61508	a	20						
Electromagnetic compatibility (EMC) EMC emitted interference		IEC 60947-5-1, class B	IEC 60947-5-1, class A			IEC 60947-5-1, class B	IEC 60947-5-1, class A	
Certificate of suitability • UL certification • TÜV approval		Yes Yes						

Type		3SK1111, 3SK1121- .AB40, 3SK1211	3SK1112, 3SK1122	3SK1120	3SK1121- .CB4.	3SK1213
------	--	---	---------------------	---------	-------------------	---------

Switching capacity

Switching capacity current of the NO contacts of the relay outputs						
• At DC-13 at 24 V	A	5	--		3	6
• At AC-15 at 230 V	A	5	--		3	10
Switching capacity current of the semiconductor outputs						
• At DC-13 at 24 V	A	--	2	0.5	--	

Type		3SK1111- .AB30, 3SK1211	3SK1111- .AW20	3SK1112, 3SK1220	3SK1120, 3SK1122- .AB40	3SK1121- .AB40	3SK1121- .CB41	3SK1122- .CB41	3SK1213
------	--	-------------------------------	-------------------	---------------------	-------------------------------	-------------------	-------------------	-------------------	---------

PFHd- and PFDavg-value

Probability of a dangerous failure per hour (PFHD) at a high demand rate according to EN 62061	1/h	1,7 x 10 ⁻⁹	1,5 x 10 ⁻⁹	1,0 x 10 ⁻⁹	1,3 x 10 ⁻⁹	2,5 x 10 ⁻⁹	3,7 x 10 ⁻⁹	1,5 x 10 ⁻⁹	1,0 x 10 ⁻⁹
Central probability of a dangerous failure (PFDavg) at a low demand rate according to IEC 61508	1/h	1,0 x 10 ⁻⁶	1,0 x 10 ⁻⁶	7,0 x 10 ⁻⁶	7,0 x 10 ⁻⁶	7,0 x 10 ⁻⁶	7,0 x 10 ⁻⁶	7,0 x 10 ⁻⁶	1,0 x 10 ⁻⁶

Notes:

3SK1230 technical specifications see
[manual "SIRIUS 3SK1 safety relays",
<http://support.automation.siemens.com/WW/view/en/67585885>.](http://support.automation.siemens.com/WW/view/en/67585885)

More information

Manual "SIRIUS 3SK1 safety relays" see
<http://support.automation.siemens.com/WW/view/en/67585885>

SIRIUS 3SK1 safety relays

Basic Units

Standard basic units

Overview



3SK111 Standard basic units

The 3SK111 Standard basic units are characterized by simple, variable functionality. These devices are recommended for safety functions requiring only a few sensors and a small number of outputs on the safety relay.

Number of safe outputs

Type and number of enabling circuits				Signal- ing circuits	Rear panel connec- tion
Relays		Electronic			
Instanta- neous	Time- delayed	Instanta- neous	Time- delayed		

3SK1 Standard basic units

3SK1111-A..0	3	--	--	--	1	--
3SK1112-BB40	--	--	2	--	1	--

-- Not available



Selection and ordering data



3SK1111-1AB30



3SK1112-1BB40

Rated control supply voltage U_s		DT	Screw terminals 	DT	Spring-type terminals (push-in) 
At 50 Hz At AC V	At DC V		Article No.		Article No.
Standard basic units with 3 relay enabling circuits					
24	24	▶	3SK1111-1AB30	▶	3SK1111-2AB30
110 ... 240	110 ... 240	A	3SK1111-1AW20	▶	3SK1111-2AW20
Standard basic units with 2 safety-related semiconductor outputs					
--	24	A	3SK1112-1BB40	A	3SK1112-2BB40

SIRIUS 3SK1 safety relays

Basic Units

Advanced basic units

Overview



3SK112 Advanced basic units

The 3SK112 Advanced basic units form an innovative system landscape which allows even complex safety functions with large numbers of sensors and outputs to be configured using the device connectors. It is possible to increase both the number of inputs for sensors and the number of enabling circuits of the basic unit without the need for wiring between the devices.

Number of safe outputs

	Type and number of enabling circuits				Signal- ing circuits	Rear panel connec- tion
	Relays		Electronic			
	Instanta- neous	Time- delayed	Instanta- neous	Time- delayed		
3SK1 Advanced basic units						
3SK1120-.AB40	--	--	1	--	--	✓
3SK1121-.AB40	3	--	--	--	1	✓
3SK1121-.CB4.	2	2	--	--	--	✓
3SK1122-.AB40	--	--	3	--	1	✓
3SK1122-.CB4.	--	--	2	2	--	✓

✓ Available

-- Not available

3

Selection and ordering data





3SK1121-1AB40



3SK1122-1AB40



3SK1122-1CB41

Rated control supply voltage U_s at DC	Adjustable OFF-delay time	DT	Screw terminals		DT	Spring-type terminals (push-in)	
			Article No.			Article No.	
V	s						
Advanced basic units with relay outputs							
24	--	▶	3SK1121-1AB40	▶		3SK1121-2AB40	
24	0.05 ... 3	A	3SK1121-1CB41	B		3SK1121-2CB41	
24	0.5 ... 30	▶	3SK1121-1CB42	A		3SK1121-2CB42	
24	5 ... 300	B	3SK1121-1CB44	B		3SK1121-2CB44	
Advanced basic units with semiconductor outputs							
24	--	A	3SK1120-1AB40	A		3SK1120-2AB40	
24	--	A	3SK1122-1AB40	A		3SK1122-2AB40	
24	0.05 ... 3	B	3SK1122-1CB41	B		3SK1122-2CB41	
24	0.5 ... 30	A	3SK1122-1CB42	A		3SK1122-2CB42	
24	5 ... 300	B	3SK1122-1CB44	B		3SK1122-2CB44	

SIRIUS 3SK1 safety relays

Expansion Units

Output expansions

Overview



3SK121 output expansion

The 3SK121 output expansions can be used for Standard and Advanced basic units.

3SK1211 output expansion

The 3SK1211 output expansion is used to expand the enabling circuits of a basic unit by adding another four enabling circuits. These enabling circuits have a switching capacity of AC-15 5 A at a switching voltage of 230 V. The devices can be connected to any 3SK1 basic unit by means of wiring. In addition, the devices with a 24 V DC control supply voltage can also be connected to 3SK1 Advanced basic units by means of the 3ZY12 device connector.

3SK1213 output expansion

The 3SK1213 output expansion is used to expand the enabling circuits of a basic unit by adding three enabling circuits with high switching capacity. These enabling circuits have a switching capacity of AC-15 10 A at a switching voltage of 230 V. The devices can be connected to any 3SK1 basic unit by means of wiring. As with 3SK1211, it is also possible to use the version with a control supply voltage of 24 V DC on the 3ZY12 device connector.

Notes:

It is only possible to expand the Standard basic units by means of wiring. Advanced basic units can be expanded using the 3ZY12 device connector.

Number of safe outputs

	Type and number of enabling circuits				Signal- ing circuits	Rear panel connec- tion
	Relays		Electronic			
	Instanta- neous	Time- delayed	Instanta- neous	Time- delayed		

3SK1 output expansions

- 4RO

3SK1211

- 3RO

3SK1213

✓ Available

-- Not available

1) For 24 V DC.

2) Feedback circuit

Benefits

- Perfect adaptation of the number of inputs
- Simple expansion of instantaneous and time-delayed outputs of Advanced basic units by means of a device connector and slide switch on an expansion module
- Expansion with power contacts for high AC-15/DC-13 currents in the control circuit
- No enabling circuit required in the evaluation unit to control the expansion modules
- No wiring of the feedback circuit to the expansion units
- Shorter installation times
- Less configuring and testing required



Selection and ordering data



3SK1211-1BB00



3SK1213-1AB40

Rated control supply voltage U_s		DT	Screw terminals		DT	Spring-type terminals (push-in)	
At 50 Hz At AC V	At DC V		Article No.			Article No.	
3SK1211 output expansions with 4RO							
24	--	B	3SK1211-1BB00		B	3SK1211-2BB00	
--	24	►	3SK1211-1BB40		A	3SK1211-2BB40	
110 ... 240	110 ... 240	A	3SK1211-1BW20		B	3SK1211-2BW20	
3SK1213 output expansions with 3RO							
--	24	A	3SK1213-1AB40		A	3SK1213-2AB40	
115	--	B	3SK1213-1AJ20		B	3SK1213-2AJ20	
230	--	B	3SK1213-1AL20		B	3SK1213-2AL20	

SIRIUS 3SK1 safety relays

Expansion Units

Sensor expansion

Overview



3SK1220 sensor expansion

With the input expansions

- 3SK1220 sensor expansion
- 3SK1230 power supply

the Advanced basic units can be made more flexible.

3SK1220 sensor expansion

The 3SK1220 sensor expansion allows additional sensors to be integrated easily and flexibly. The device monitors two single-channel sensors or one 2-channel sensor, whatever their output technology (floating/single-ended).

Note:

The 3SK1220 sensor expansion can only be connected to the Advanced basic units by means of the 3ZY12 device connector.

3SK1230 power supply

The 3SK1230 power supply makes the 3SK1 devices universally applicable, whatever control supply voltage is to be used.

Both devices can be combined with the 3SK112 basic units in the Advanced series without the need for wiring.

Note:

Alongside the 3ZY12 device connector, the 3SK1230 power supply can also be wired to act as a power supply for 3SK1 devices.

Benefits

- A wide voltage range of 110 ... 240 V AC/DC allows the devices to be used worldwide
- Low stock keeping due to little variance
- Flexible expansion of the number of sensors without the need for additional wiring between the devices
- Perfect adaptation of the number of inputs to suit the application
- Universally applicable thanks to the wide range of adjustable parameters for sensor expansion (parameters as for Advanced basic units)



Selection and ordering data



3SK1220-1AB40



3SK1230-1AW20

Version	DT	Screw terminals 	DT	Spring-type terminals (push-in) 
		Article No.		Article No.
3SK1220 sensor expansions				
Sensor expansions for safety-related expansion of the Advanced basic units A by adding a further two-channel sensor or two single-channel sensors				
<u>Note:</u> Can only be used in conjunction with 3ZY12 device connectors, see page 3/276.				
3SK1230 power supplies				
Power supplies for supplying Advanced basic units via 3ZY12 device connectors at voltages of 110 ... 240 V AC/DC				
		3SK1220-1AB40	A	3SK1220-2AB40
		3SK1230-1AW20	A	3SK1230-2AW20

SIRIUS 3SK1 safety relays

Accessories

Overview

The following accessories are available for SIRIUS 3SK1 safety relays:

- Device connectors
- Terminals
- Sealing covers
- Push-in lugs
- Coding pins
- Inscription labels
- Tools

Device connectors for 3SK112. and 3SK12..

The device connector allows several safety relays to be interconnected. The last device in a series is placed on a device termination connector. This closes the circuits that were configured with the connectors.




Device connectors are available in various versions specifically for the 3SK1 safety relays:




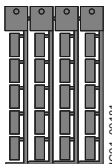


For type	Device connectors		Device termination connectors	
	3ZY1212-1BA00 (for 3SK1, width 17.5 mm)	3ZY1212-2BA00 (for 3SK1, width 22.5 mm)	3ZY1212-2DA00 (for 3SK1, width 22.5 mm)	3ZY1212-0FA01 (for 3SK1, set for enclosure > 45 mm)
3SK1 Advanced basic units				
3SK1120	✓	--	--	--
3SK1121	--	✓	✓	--
3SK1122	--	✓	✓	--
Output expansions				
3SK1211	--	✓	✓	--
3SK1213	--	--	--	✓
Input expansions				
3SK1220	✓	--	--	--
3SK1230	--	✓	--	--

✓ Available

-- Not available

Selection and ordering data

Version	DT	Article No.
Device connectors for the electrical connection of SIRIUS devices in the industrial standard mounting rail enclosure		
 3ZY1212-1BA00	Device connectors • For 3SK1, width 17.5 mm • For 3SK1, width 22.5 mm	
	A	3ZY1212-1BA00
	A	3ZY1212-2BA00
 3ZY1212-2DA00	Device terminating connectors For 3SK1, width 22.5 mm Note: Observe positions of the slide switch, see manual "3SK1 safety relays", http://support.automation.siemens.com/WW/view/en/67585885	
	A	3ZY1212-2DA00
	A	3ZY1212-0FA01
Terminals for SIRIUS devices in the industrial standard mounting rail enclosure		
 3ZY1121-1BA00	Removable terminals • 2-pole, screw terminals up to 2 x 1.5 mm² or 1 x 2.5 mm² • 3-pole, screw terminals up to max. 2 x 1.5 mm² or 1 x 2.5 mm² • 2-pole, push-in terminals up to max. 2 x 1.5 mm² • 3-pole, push-in terminals up to max. 2 x 1.5 mm²	
	A	3ZY1121-1BA00
	A	3ZY1131-1BA00
	A	3ZY1121-2BA00
	A	3ZY1131-2BA00

Version	DT	Article No.
Accessories for enclosures		
 3ZY1321-2AA00	Sealing covers <ul style="list-style-type: none"> • 17.5 mm (for 3SK1120 and 3SK1220) 	A 3ZY1321-1AA00
	<ul style="list-style-type: none"> • 22.5 mm (for all 3SK1 devices except 3SK1120 and 3SK1220) 	A 3ZY1321-2AA00
 3ZY1311-0AA00	Push-in lugs For wall mounting	A 3ZY1311-0AA00
 3ZY1440-0AA00	Coding pins For removable terminals of SIRIUS devices in the industrial standard mounting rail enclosure; enable the mechanical coding of terminals Manual "SIRIUS 3SK1 safety relays" see http://support.automation.siemens.com/WW/view/en/67585885	A 3ZY1440-1AA00
Blank labels		
 3RT2900-1SB20	Unit labeling plates For SIRIUS devices 20 mm x 7 mm, titanium gray ¹⁾	D 3RT2900-1SB20
Tools for opening spring-type terminals		
 3RA2908-1A	Screwdrivers For all SIRIUS devices with spring-type terminals 3.0 mm x 0.5 mm, length approx. 200 mm, titanium gray/black, partially insulated	Spring-type terminals 
	A	3RA2908-1A

¹⁾ PC labeling system for individual inscription of unit labeling plates available from: murrplastik Systemtechnik GmbH see www.murrplastik.de.

SIRIUS 3TK28 safety relays

General data

Overview



SIRIUS 3TK282. safety relay

SIRIUS safety relays are the key modules of a consistent and cost-effective safety chain. Be it EMERGENCY-STOP disconnection, protective door monitoring or the protection of presses or punches – with SIRIUS safety relays every safety application can be implemented to optimum effect in terms of engineering and price.

SIRIUS safety relays provide numerous safety-related functions:

- Monitoring the safety functions of sensors
- Monitoring the sensor leads
- Monitoring the correct operation of the safety relay
- Monitoring actuators for standstill
- Safety-oriented disconnection when dangers arise

Depending on the version of the device, SIRIUS safety relays satisfy the most stringent requirements (PL e) according to ISO 13849-1 and achieve the highest Safety Integrity Level (SIL 3) acc. to IEC 61508.

3TK28 Safety Relays¹⁾

With relay enabling circuits				With electronic enabling circuits			With contactor relay enabling circuits			With special functions	
Basic units	Basic units <i>t_v</i>	Expansion units	Two-hand control units	Basic units	Basic units <i>t_v</i>	Multifunction units	Basic units	Expansion units	Expansion units <i>t_v</i>	Standstill monitors	Overspeed monitors
3TK28 20	3TK28 26	3TK28 30	3TK28 34	3TK28 40	3TK28 42	3TK28 45	3TK28 50	3TK28 34	3TK28 57	3TK28 10-0	3TK28 10-1
3TK28 21	3TK28 27			3TK28 41			3TK28 51				
3TK28 22	3TK28 28						3TK28 52				
3TK28 23							3TK28 53				
3TK28 24											
3TK28 25											
3TK28 26											
see page 3/279				see page 3/282						see page 3/285	

¹⁾ The devices in this table shown in gray have been replaced by the new SIRIUS 3SK1 safety relays. See page 3/265 onwards.

Benefits

General

- Can be used for all safety applications thanks to compliance with the highest safety requirements (PL e according to ISO 13849-1 or SIL 3 according to IEC 61508)
- Suitable for use all over the world through compliance with all globally established certifications
- Compact, service-proven SIRIUS design creates more space in the control cabinet
- Flexible connectability and expandability make subsequent changes easy
- Removable terminal for greater plant availability
- Yellow front plate clearly identifies the device as an item of safety technology
- Sensor cable up to 2000 m long enables use in large-scale plants

Relay outputs

- Different voltages can be switched through the floating contacts
- Higher currents can be switched with relay contacts

Solid-state outputs

- Wear-free
- Suitable for operation in fast switching applications
- Insensitive to vibrations and dirt
- Good electrical endurance

Microprocessor systems

- Flexible use thanks to many different integrated functions
- Easy parameterization using DIP switches on the front
- High functional reliability based on extensive monitoring functions
- Operated by the machine control system
- Also connection of non-contact sensors (light arrays, light barriers etc.)

Application

SIRIUS safety relays are used mainly in autonomous safety applications which are not connected to a safety-oriented bus system.

Their function here is to evaluate the sensors and the safety-oriented shutdown of hazards. Also they check and monitor the sensors, actuators and safety-oriented functions of the safety relay.

Overview



SIRIUS 3TK282. safety relay

Safety relays with relay enabling circuits – safety with floating contacts

SIRIUS safety relays with relay enabling circuits are not only extremely space-saving thanks to their compact design, they also offer extra safety with positively driven NO and feedback contacts in pairs. If one of the contact welds, the other assumes the disconnection of the circuit. A positively driven feedback contact (NC) then performs the fault detection of the faulty NO contact.

For two-hand operation consoles in press control systems, the 3TK2834 press control device serves as a safe evaluation unit, [see IC 10 AO](#).

3SK121. expansion units are available to increase the number of enabling circuits, [see catalog IC 10 AO](#).

3TK2826 safety relays

The 3TK2826 is a parameterizable safety relay. It is used as an evaluation unit for typical safety chains (identify, evaluate, realize). A number of functions can be set using the DIP switches on the front. The 3TK2826 is therefore universally applicable.

Safety sensors (e.g. EMERGENCY-STOP device) are connected at the input side while contactors or valves for disconnecting the "hazardous function" are connected at the output side. The 3TK2826 performs the monitoring of the sensor and actuator functions as well as the safe disconnection of the outputs (enabling circuits).

With relay enabling circuits

3TK2826 with DIP-switch:

OFF	Schematic	DIP switch No.	ON
Without crossover monitoring	→ ON	1	Switching mat operation
NC/NO evaluation	1 <input type="checkbox"/>	2	NC/NC evaluation
2 x 1-channel	2 <input type="checkbox"/>	3	1 x 2-channel
Debounce time for sensor inputs ≈ 50 ms	3 <input type="checkbox"/>	4	Debounce time for sensor inputs ≈ 10 ms
Sensor input Autostart	4 <input type="checkbox"/>	5	Sensor input Monitored start
Cascading input Autostart	5 <input type="checkbox"/>	6	Cascading input Monitored start
With start test	6 <input type="checkbox"/>	7	Without start test
Automatic start after mains failure (not permitted in connection with a start test)	7 <input type="checkbox"/>	8	Without automatic start after mains failure
	8 <input type="checkbox"/>		

Benefits**General**

- Compact design
- Floating safe outputs
- 3TK2834 safety relay also suitable for press and punch controls, [see IC 10 AO](#)
- Can be used up to an ambient temperature of max. 70 °C

3TK2826 safety relays

- Connection for all common sensor types
- Many functions available in just one device
- Status displays
- Extended diagnostic capabilities
- Approvals (EN ISO 13849-1, IEC 61508, UL/CSA)
- Reporting of trip faults in the actuator circuit
- Floating outputs
- Wide-range device
- Sensor condition saved in the event of voltage failure

SIRIUS 3TK28 safety relays

With relay enabling circuits

Selection and ordering data

Type	Basic units			
	3TK2826			
	24 V DC	Wide voltage range	24 V DC t_v	Wide voltage range t_v
Sensors				
• Inputs	1	1	1	1
• Electronic	✓	--	✓	--
• With contacts	✓	✓	✓	✓
• Magnetically operated switch (Reed contacts)	✓	✓	✓	✓
Safety mats	✓	✓	✓	✓
Start				
• Auto	✓	✓	✓	✓
• Monitored	✓	✓	✓	✓
Cascading input				
24 V DC	✓	✓	✓	✓
Key-operated switch	--	--	--	--
Enabling circuit, floating				
• Stop category 0	4 NO	4 NO	2 NO	2 NO
• Stop category 1	--	--	2 NO	2 NO
Enabling circuit, electronic				
• Stop category 0	--	--	--	--
• Stop category 1	--	--	--	--
Signaling outputs				
• Floating	1 NC	1 NO + 1 NC	2 NC	1 NO + 2 NC
• Electronic	2	--	2	--
Standards	IEC 60204-1, EN ISO 12100, EN ISO 13849-1, IEC 61508	IEC 60204-1, EN ISO 12100, EN ISO 13849-1, IEC 61508	IEC 60204-1, EN ISO 12100, EN ISO 13849-1, IEC 61508	IEC 60204-1, EN ISO 12100, EN ISO 13849-1, IEC 61508
Test certificates	TÜV, UL, CSA	TÜV, UL, CSA	TÜV, UL, CSA	TÜV, UL, CSA
SIL level max. according to IEC 61508	3	3	3	3
Performance level PL according to ISO 13849-1	e	e	e	e
Probability of a dangerous failure per hour (PFH_d)	7.8×10^{-9} 1/h	7.8×10^{-9} 1/h	7.8×10^{-9} 1/h	7.8×10^{-9} 1/h
Rated control supply voltage				
• 24 V DC	✓	--	✓	--
• 24 V AC/DC	--	--	--	--
• 24 V AC	--	--	--	--
• 115 V AC	--	--	--	--
• 230 V AC	--	--	--	--
• 24 ... 240 V AC/DC	--	✓	--	✓

✓ Available

-- Not available

SIRIUS 3TK28 safety relays

With relay enabling circuits



3TK2826-1BB40



3TK2826-2BB40

Rated control supply voltage U_s	Start	OFF-delay t_v	DT	Screw terminals	DT	Spring-type terminals
V		s		Article No.		Article No.

Basic units**With floating enabling circuits****3TK2826**

- 24 DC Auto/monitored --
- 24 ... 240 AC/DC Auto/monitored --

A
A**3TK2826-1BB40**
3TK2826-1CW30A
C**3TK2826-2BB40**
3TK2826-2CW30**With time-delayed enabling circuits****3TK2826 t_v**

- 24 DC Auto/monitored 0.05 ... 3
- 24 ... 240 AC/DC Auto/monitored 0.05 ... 3
- 24 DC Auto/monitored 0.5 ... 30
- 24 ... 240 AC/DC Auto/monitored 0.5 ... 30
- 24 DC Auto/monitored 5 ... 300
- 24 ... 240 AC/DC Auto/monitored 5 ... 300

C
C
A
C
C
C**3TK2826-1BB41**
3TK2826-1CW31
3TK2826-1BB42
3TK2826-1CW32
3TK2826-1BB44
3TK2826-1CW34C
C
C
C
C
C**3TK2826-2BB41**
3TK2826-2CW31
3TK2826-2BB42
3TK2826-2CW32
3TK2826-2BB44
3TK2826-2CW34Note:

For additional 3TK28 safety relays see
[catalog Add-On IC 10 AO · 2014](#).

SIRIUS 3TK28 safety relays

With relay enabling circuits

Overview



SIRIUS 3TK284. safety relay

Fast, safe and wear-free switching

Evaluation units with electronic components are becoming increasingly established in safety applications, as a considerably higher number of starting operations and electrical life of the devices is achieved with permanent functional checks and consistently wear-free operation. The compact and light devices also permit series connection or normal operational switching, e. g. through a PLC.

If several enabling circuits or floating enabling circuits are required in one application, the units can be expanded with expansion units from the 3SK121. series, [see catalog IC 10 AO](#).

3TK2845 multi-function units

Up to now, standard combinations of safety applications such as EMERGENCY-STOP and protective door monitoring were possible only by using several individual safety relays. 3TK2845 combines several functions in a single unit. Two electronic and two relay enabling circuits ensure safe disconnection – in just a few actions, quickly and cheaply.

Benefits

- Permanent function checking
- No wear because switched electronically
- High switching frequency
- Long electrical endurance
- Evaluation of electronic sensors
- Sensor lead up to max. 2 000 m
- Cascading possible
- Insensitive to vibrations and dirt
- Compact design, low weight
- Approved for the world market

3TK2845 safety relays

- Two sensor inputs (e. g. EMERGENCY-STOP, protective door)
- Also suitable for protective door interlocking and OK button
- Two electronic and two relay enabling circuits

SIRIUS 3TK28 safety relays

With electronic enabling circuits

Selection and ordering data

Type	Multi-function units							
	3TK2845	"Automatic and monitored start"	"Automatic and monitored start"	"Monitored start"	"Monitored start"	OK button	OK button	"Spring-type interlocking"
		t_v	t_v	t_v	t_v	t_v	t_v	t_v
Sensors								
• Inputs	2	2	2	2	2	2	2	2
• Electronic	✓	✓	✓	✓	✓	✓	✓	✓
• With contacts	✓	✓	✓	✓	✓	✓	✓	✓
• Magnetically operated switch (Reed contacts)	✓	✓	✓	✓	✓	✓	✓	✓
Safety mats	✓	✓	✓	✓	--	--	--	--
Start								
• Auto	1	1	--	--	1	1	--	--
• Monitored	1	1	2	2	1	1	2	2
Cascading input	✓	✓	✓	✓	✓	✓	✓	✓
24 V DC								
Key-operated switch	✓	✓	✓	✓	✓	✓	✓	✓
Enabling circuit, floating								
• Stop category 0	2 NO	1 NO	2 NO	1 NO	2 NO	1 NO	1 NO	1 NO
• Stop category 1	--	1 NO	--	1 NO	--	1 NO	1 NO	1 NO
Enabling circuit, electronic								
• Stop category 0	2	1	2	1	2	1	1	1
• Stop category 1	--	1	--	1	--	1	1	1
Signaling outputs								
• Floating	--	--	--	--	--	--	--	--
• Electronic	1	1	1	1	1	1	1	1
Standards	IEC 60204-1, EN ISO 12100, EN ISO 13849-1, IEC 61508	IEC 60204-1, EN ISO 12100, EN ISO 13849-1, IEC 61508	IEC 60204-1, EN ISO 12100, EN ISO 13849-1, IEC 61508	IEC 60204-1, EN ISO 12100, EN ISO 13849-1, IEC 61508	IEC 60204-1, EN ISO 12100, EN ISO 13849-1, IEC 61508	IEC 60204-1, EN ISO 12100, EN ISO 13849-1, IEC 61508	IEC 60204-1, EN ISO 12100, EN ISO 13849-1, IEC 61508	IEC 60204-1, EN ISO 12100, EN ISO 13849-1, IEC 61508
Test certificates								
SIL level max. according to IEC 61508	3	3	3	3	3	3	3	3
Performance level PL according to EN ISO 13849-1	e	e	e	e	e	e	e	e
Probability of a dangerous failure per hour (PFH_d)	6.9 × 10 ⁻⁹ 1/h	6.9 × 10 ⁻⁹ 1/h	6.9 × 10 ⁻⁹ 1/h	6.9 × 10 ⁻⁹ 1/h	6.9 × 10 ⁻⁹ 1/h	6.9 × 10 ⁻⁹ 1/h	6.9 × 10 ⁻⁹ 1/h	6.9 × 10 ⁻⁹ 1/h
Rated control supply voltage 24 V DC	✓	✓	✓	✓	✓	✓	✓	✓

✓ Available

-- Not available

1) The outputs are only safe when an external contactor is used.

SIRIUS 3TK28 safety relays

With electronic enabling circuits





3TK2845-1HB40



3TK2845-1HB41



3TK2845-2DB40

Rated control supply voltage U_s	Start	OFF-delay t_v	DT	Screw terminals 	DT	Spring-type terminals 
V		s		Article No.		Article No.
Multi-function units						
3TK2845 "Automatic and monitored start"						
• 24 DC	1/1	--	C	3TK2845-1HB40	C	3TK2845-2HB40
3TK2845 t_v "Automatic and monitored start"						
• 24 DC	1/1	0.05 ... 3	C	3TK2845-1HB41	C	3TK2845-2HB41
	1/1	0.5 ... 30	C	3TK2845-1HB42	C	3TK2845-2HB42
	1/1	5 ... 300	C	3TK2845-1HB44	C	3TK2845-2HB44
3TK2845 "Monitored start"						
• 24 DC	--/2	--	C	3TK2845-1DB40	C	3TK2845-2DB40
3TK2845 t_v "Monitored start"						
• 24 DC	--/2	0.05 ... 3	C	3TK2845-1DB41	C	3TK2845-2DB41
	--/2	0.5 ... 30	C	3TK2845-1DB42	C	3TK2845-2DB42
	--/2	5 ... 300	C	3TK2845-1DB44	C	3TK2845-2DB44
3TK2845 "OK button"						
• 24 DC	1/1	--	C	3TK2845-1EB40	C	3TK2845-2EB40
3TK2845 t_v "OK button"						
• 24 DC	1/1	0.05 ... 3	C	3TK2845-1EB41	C	3TK2845-2EB41
	1/1	0.5 ... 30	C	3TK2845-1EB42	C	3TK2845-2EB42
	1/1	5 ... 300	C	3TK2845-1EB44	C	3TK2845-2EB44
3TK2845 t_v "Spring-type interlocking"						
• 24 DC	--/2	0.05 ... 3	C	3TK2845-1FB41	C	3TK2845-2FB41
	--/2	0.5 ... 30	C	3TK2845-1FB42	C	3TK2845-2FB42
	--/2	5 ... 300	C	3TK2845-1FB44	C	3TK2845-2FB44
3TK2845 t_v "Solenoid interlocking"						
• 24 DC	--/2	0.05 ... 3	C	3TK2845-1GB41	C	3TK2845-2GB41
	--/2	0.5 ... 30	C	3TK2845-1GB42	C	3TK2845-2GB42
	--/2	5 ... 300	C	3TK2845-1GB44	C	3TK2845-2GB44

Note:

For additional 3TK28 safety relays see [catalog Add-On IC 10 AO · 2014](#).

Overview



SIRIUS 3TK2810 safety relays

3TK2810-0 standstill monitors

The standstill monitor increases safety in hazardous areas. Without a sensor, it detects motor stoppage from the residual magnetization of the rotating motor. When an adjustable threshold value is undershot, it uses its outputs to allow access to hazardous areas, for example by unlocking a protective door.

3TK2810-1 speed monitors

The speed monitor combines two safety functions in one unit by continuously monitoring machines and plants for standstill and speed.

Through simple parameterization and permanent diagnosis on the display, faults can be quickly remedied at any time – often before they cause plant downtimes.

In addition to standstill and speed monitoring, the unit also features an integrated monitoring function of a protective door with spring-type interlocking. Therefore, an additional evaluation unit is not needed.

Benefits

3TK2810-0 standstill monitors

- No additional sensors required
- Signaling of faults with diagnostics display
- Standstill time can be set
- Unit can be used with frequency converters

3TK2810-1 speed monitors

- Menu-prompted, easy parameterization
- Direct diagnosis on the display means shorter downtimes thanks to early fault detection
- Integrated protective door monitoring means greater safety because access to the plant is allowed only in the safe state
- Suitable for all standard sensors, i.e. high flexibility

SIRIUS 3TK28 safety relays

With special functions

Selection and ordering data

Type	Standstill monitors 3TK2810-0	Speed monitors 3TK2810-1
Sensors		
• Inputs	3	4
• Electronic	--	3
• With contacts	--	1
• Without sensors (measuring inputs)	3	--
• Magnetically operated switch (Reed contacts)	--	--
Safety mats	--	--
Start		
• Auto	✓	✓
• Monitored	--	✓
Cascading input 24 V DC	--	--
Key-operated switch	--	--
Enabling circuit, floating		
• Stop category 0	3 NO + 1 NC	2
• Stop category 1	--	--
Enabling circuit, electronic		
• Stop category 0	--	--
• Stop category 1	--	--

✓ Available
-- Not available

Type	Standstill monitors 3TK2810-0	Speed monitors 3TK2810-1
Signaling outputs		
• Floating	1 CO	--
• Electronic	2	2
Standards	IEC 60204-1, EN ISO 12100, EN ISO 13849-1, IEC 61508	IEC 60947-5-1, EN ISO 13849-1, IEC 60204-1, IEC 61508
Test certificates	TÜV, UL, CSA	TÜV, UL, CSA
SIL level max. according to IEC 61508	3	3
Performance level PL according to ISO 13849-1	e	e
Probability of a dangerous failure per hour (PFH_d)	1.5 x 10 ⁻⁸ 1/h	3.38 x 10 ⁻⁹ 1/h
Rated control supply voltage		
• 24 V DC	✓	✓
• 230 V AC	✓	--
• 400 V AC	✓	--
• 120 ... 240 V AC/DC	--	✓



3TK2810-0BA01



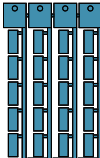




3TK2810-0GA02



3TK2810-1BA41

Rated control supply voltage U_s	OFF-delay t_v	DT	Screw terminals	DT	Spring-type terminals
V	s		Article No.		Article No.
Standstill monitors					
3TK2810-0					
• 24 DC	0.2 ... 6	B	3TK2810-0BA01	C	3TK2810-0BA02
• 230 AC	0.2 ... 6	C	3TK2810-0GA01	C	3TK2810-0GA02
• 400 AC	0.2 ... 6	C	3TK2810-0JA01	C	3TK2810-0JA02
Speed monitors					
3TK2810-1 for NPN/PNP proximity switches and encoders					
• 24 DC	0 ... 600	A	3TK2810-1BA41	A	3TK2810-1BA42
• 120 ... 240 AC/DC	0 ... 600	B	3TK2810-1KA41	B	3TK2810-1KA42
3TK2810-1 for NAMUR proximity switches and encoders					
• 24 DC	0 ... 600	B	3TK2810-1BA41-0AA0	B	3TK2810-1BA42-0AA0
• 120 ... 240 AC/DC	0 ... 600	B	3TK2810-1KA41-0AA0	B	3TK2810-1KA42-0AA0

Accessories

Use	Version	DT	Article No.
Blank labels			
 3RT1900-1SB20	For 3TK28	Unit labeling plates For SIRIUS devices 20 mm x 7 mm, pastel turquoise ¹⁾	D 3RT1900-1SB20
	For 3TK28	Adhesive labels For SIRIUS devices <ul style="list-style-type: none">• 19 mm x 6 mm, pastel turquoise• 19 mm x 6 mm, zinc yellow	C 3RT1900-1SB60 C 3RT1900-1SD60
	Push-in lugs and covers		
 3RP1903	For 3TK28	Push-in lugs For screw fixing, 2 units are required for each device	B 3RP1903
	For 3TK2826	Sealable covers For securing against unauthorized adjustment of setting knobs	A 3TK2826-0DA00-0HA0
	For 3TK28	Sealing foils For securing against unauthorized adjustment of setting knobs	▶ 3TK2820-0AA00
Adapters and connection cables for speed monitors			
 3TK2810-1A 3TK2810-1B 3TK2810-0A	For 3TK2810-1	Adapters For connecting encoders of type Siemens/Heidenhain <ul style="list-style-type: none">• 15-pole	A 3TK2810-1A
		<ul style="list-style-type: none">• 25-pole	A 3TK2810-1B
	For 3TK2810-1	Connection cables For connecting the speed monitor to the 3TK2810-1A or 3TK2810-1B adapter	C 3TK2810-0A
Tools for opening spring-type terminals			
 3RA29 08-1A	For auxiliary circuit connections	Screwdrivers For all SIRIUS devices with spring-type terminals 3.0 mm x 0.5 mm, length approx. 200 mm, titanium gray/black, partially insulated	A 3RA2908-1A
			Spring-type terminals 

¹⁾ PC labeling system for individual inscription of unit labeling plates available from: murrplastik Systemtechnik GmbH see www.murrplastik.de

SIRIUS 3RK3 modular safety system

General data

Overview



SIRIUS 3RK3 Modular Safety System

The 3RK3 Modular Safety System (MSS) is a freely parameterizable modular safety relay. Depending on the external circuit version, safety-related applications up to Performance Level e according to EN ISO 13849-1 or SIL 3 according to IEC 62061 can be realized.

The modular safety relay enables the interconnection of several safety applications.

The comprehensive error and status diagnostics provides the possibility of finding errors in the system and localizing signals from sensors. Plant downtimes can be reduced as the result.

The MSS comprises the following system components:

- Central units
- Expansion modules
- Interface modules
- Diagnostics modules
- Parameterization software
- Accessories

Central units

MSS Basic

The 3RK3 Basic central unit is used wherever more than three safety functions need to be evaluated and the wiring parameterization of safety relays would involve great cost and effort. It reads in inputs, controls outputs and communicates through an interface module with higher-level control systems. An application's entire safety program is processed in the central unit. The 3RK3 Basic central unit is the lowest expansion level and fully functional on its own, without the optional expansion modules.

MSS Advanced

The 3RK3 Advanced central unit is the consistent expansion of the Basic central unit with the functionality of an AS-i safety monitor. In addition to having a larger volume of project data and scope of functionality it can be integrated in AS-Interface and therefore make use of the many different possibilities offered by this bus system. The function can be optionally activated in the central unit.

The service-proven insulation piercing method of AS-Interface enables not only the distributed expansion of the project data volume using safe AS-i outputs, safe AS-i sensors and other MSS Advanced or safety monitors (F cross traffic) but also a highly flexible adaptation of the application, e.g. very fast connection of AS-i outputs such as LV HRC command devices, position switches with and without interlock, or light curtains.

Safety-related disconnection using MSS or by distributed means using safe AS-i outputs and the formation of switch-off groups can be realized very easily. The same applies for any subsequent modifications. They are now easily possible by re-addressing, i.e. re-wiring is no longer necessary.

The AS-i bus is connected directly to the central unit.

MSS ASIsafe

The MSS ASIsafe basic and MSS ASIsafe extended central units are a logical development of the AS-i safety monitors based on the 3RK3 Modular Safety System.

Like MSS Advanced, MSS ASIsafe detects – in a comparable way to the safety monitors – safe sensor technology on the AS-i bus and switches actuators off in a safety-related manner via a configurable safety logic. It stands out by virtue of its greater project data volume, wider range of functions and the possibility of increasing the integrated I/O project data volume by means of expansion modules from the MSS system family. In this case the range of functions, such as the number and type of the logic elements that can be interconnected, is equivalent to that of MSS Advanced.

Expansion modules

With the optional expansion modules, both safety-related and standard, the system is flexibly adapted to the required safety applications.

Interface modules

The DP interface module is used for transferring diagnostics data and device status data to a higher-level PROFIBUS network, e.g. for purposes of visualization using HMI. When using the Basic central unit, 32-bit cyclic data can be exchanged with the control system. If an Advanced/ASIsafe central unit is used, the number is doubled to 64-bit cycle data. The acyclic calling of diagnostics data is possible with both central units.

Diagnostics modules

Faults, e.g. crossover, are indicated directly on the diagnostics display. The fault is diagnosed directly in plain text by the detailed alarm message. The device is fully functional upon delivery. No programming is required.

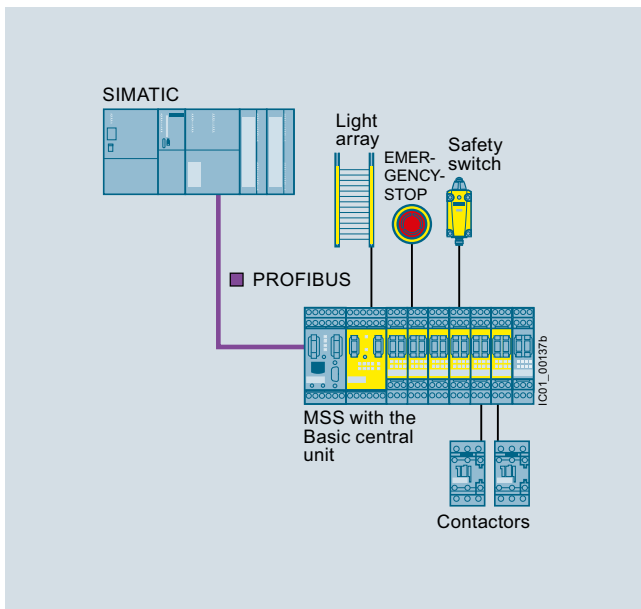
Parameterization software

Using the MSS ES graphical parameterization tool it is very easy to create the safety functions as well as their logical links on the PC. You can define disconnection ranges, ON-delays, OFF-delays and other dependencies for example.

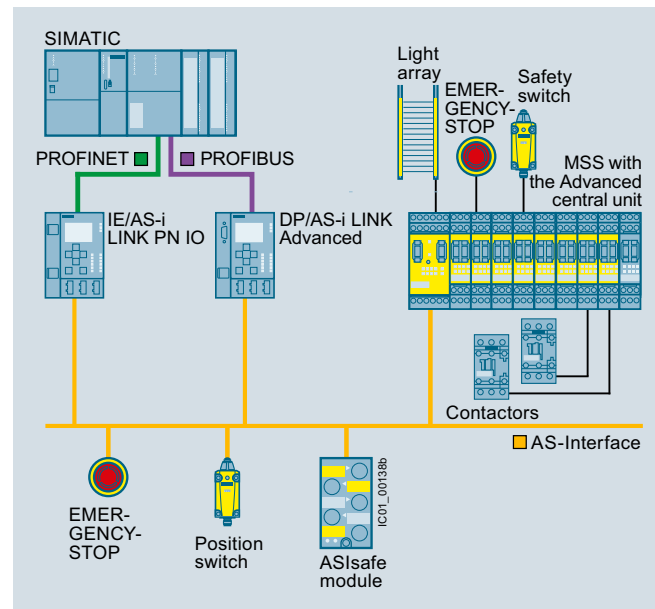
MSS ES also offers comprehensive functions for diagnostics and commissioning. Documentation of the MSS hardware configuration and the parameterized logic is created automatically.

SIRIUS 3RK3 modular safety system

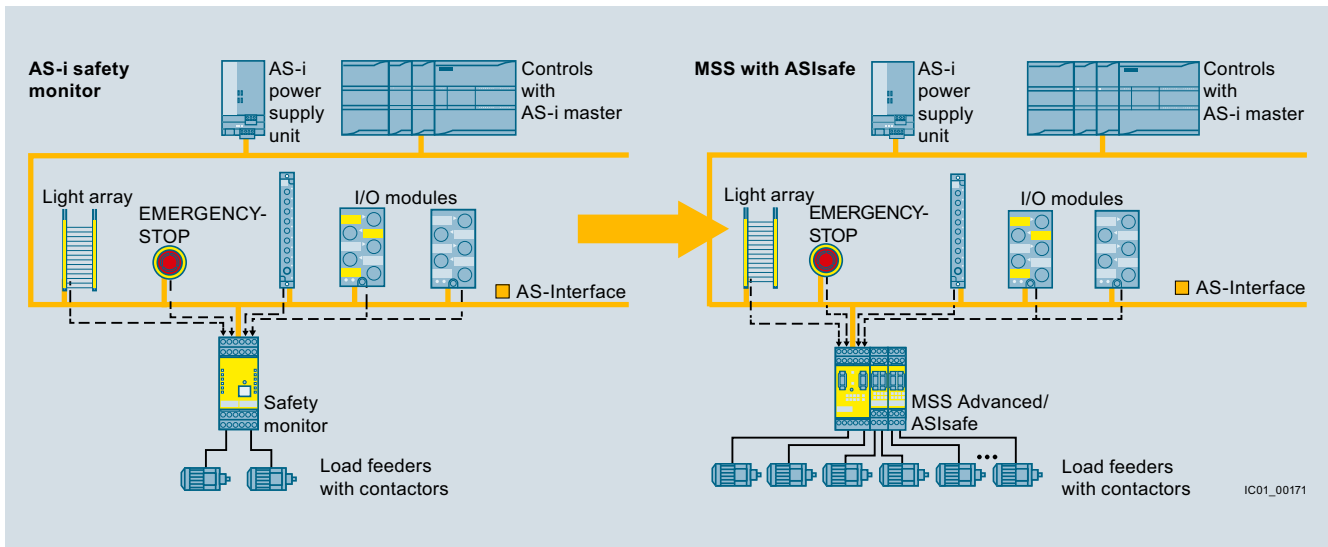
General data



System configuration with the Basic central unit



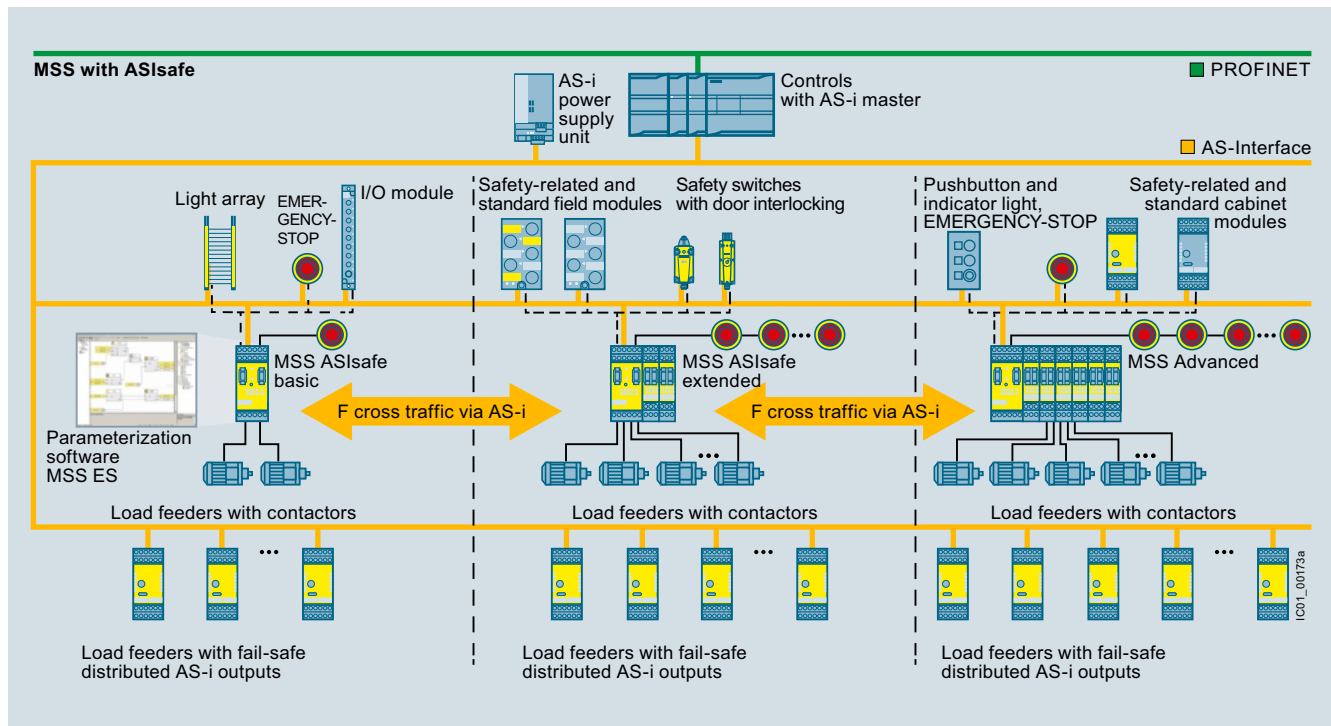
System configuration with the Advanced central unit



Further development of the system design: from the safety monitor to MSS Advanced/MSS ASIsafe

SIRIUS 3RK3 modular safety system

General data



MSS with ASIsafe

Article No. scheme

Digit of the article No.	1st - 4th	5th	6th	7th	8th	9th	10th	11th	12th
	□□□□	□	□	□	-	□	□	□	□
Modular safety system	3 R K 3								
Device type		□							
Device type			□	□					
Connection type					□				
Communications						□	□	□	
Version									□
Example	3 R K 3	1	1	1	-	1	A	A	1 0

Note:

The Article No. scheme is presented here merely for information purposes and for better understanding of the logic behind the article numbers.

For your orders, please use the article numbers quoted in the catalog in the Selection and ordering data.

Benefits

- More functionality and flexibility through freely configurable safety logic
- Suitable for all safety applications thanks to compliance with the highest safety standards in production automation
- For use all over the world through compliance with all product-relevant, globally established certifications
- Modular hardware configuration
- Parameterization by means of software instead of wiring
- Removable terminals for greater plant availability
- Distributed collection from sensors and disconnection of actuators through AS-Interface
- All MSS ES logic functions are also usable for AS-Interface, e. g. muting, interlocking protective door
- Up to 12 independent safe switch-off groups on the AS-i bus
- Volume of project data can be greatly increased by means of AS-Interface
- Up to 50 two-channel enabling circuits per system

Communication through PROFIBUS

The 3RK3 Modular Safety System can be connected to PROFIBUS through the DP interface and exchange data with higher-level control systems.

The MSS supports among other things:

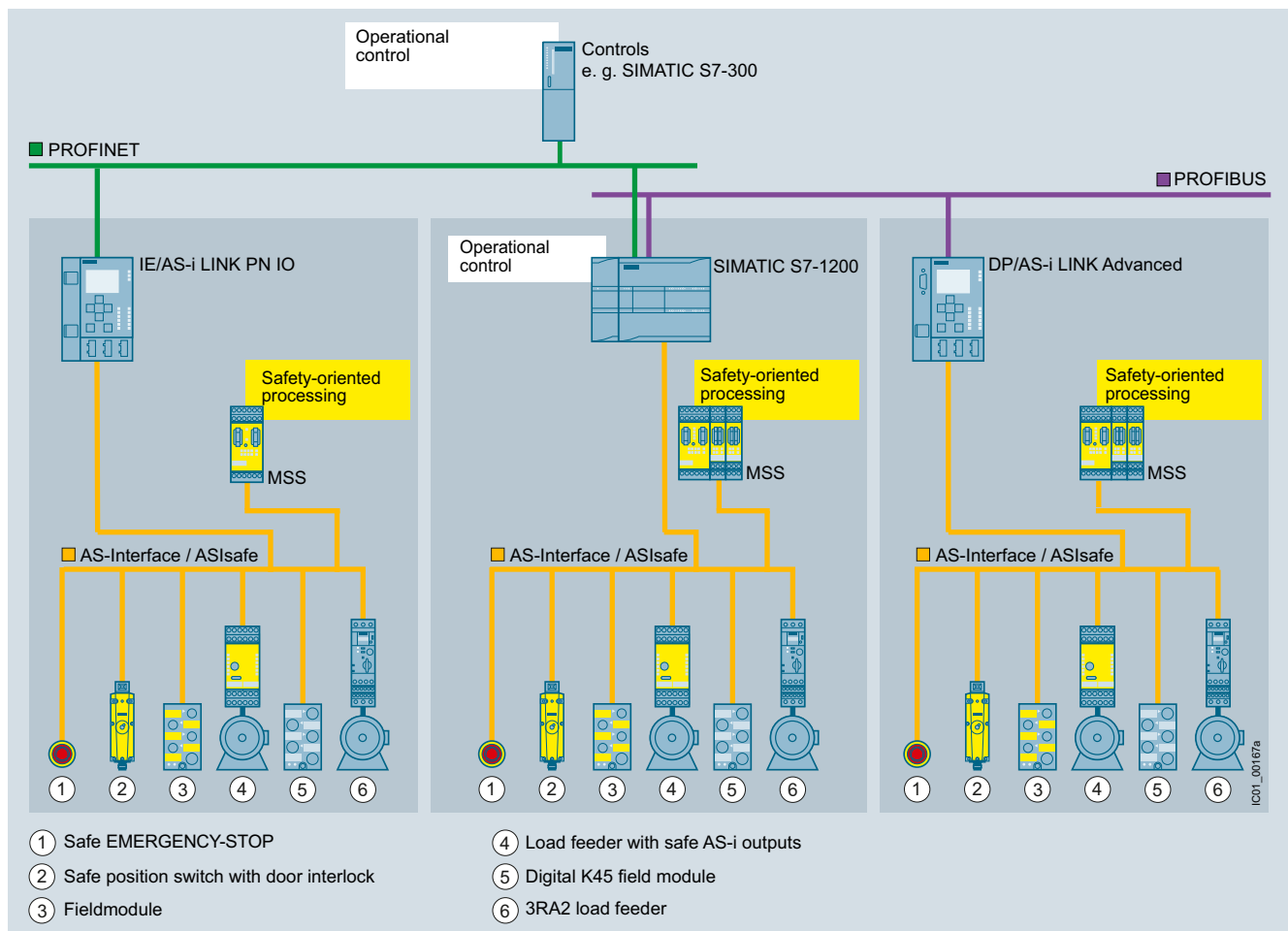
- Baud rates up to 12 Mbit/s
- Automatic baud rate detection
- Cyclic services (DPV0) and acyclic services (DPV1)
- Exchange of 32-bit cyclic data with MSS Basic or 64-bit cyclic data with MSS Advanced/MSS ASIsafe
- Diagnostics using data record invocations

AS-Interface communication

Using the Advanced and ASIsafe central units, the 3RK3 Modular Safety System can be integrated in AS-Interface.

- MSS can read in up to 31 AS-i sensors
- Up to 12 preprocessed signals per MSS can be placed on the AS-i bus, e.g. for F cross traffic or for disconnecting safe AS-i outputs
- Safe cross traffic between MSS Advanced and MSS ASIsafe or between other AS-i safety monitors
- Standard signals, e.g. for acknowledgment, can also be applied to the bus

3



Integration of MSS into AS-Interface as ASIsafe Solution local

MSS with communication function [see page 3/296](#).

Accessories [see page 3/298](#).

More information on AS-Interface with ASIsafe [see page 3/208](#).












More information on MSS ES [see also catalog IC 10, chapter 14 "Parameterization, Configuration and Visualization with SIRIUS"](#).

SIRIUS 3RK3 modular safety system

General data





















Application

The 3RK3 Modular Safety System can be used for all safety-related requirements in the manufacturing industry and offers the following safety functions:

	Symbol	MSS Basic	MSS Advanced, MSS ASIsafe
Monitoring functions			
Universal monitoring Evaluation of any binary signals from single-channel and two-channel sensors		--	✓
EMERGENCY-STOP Evaluation of EMERGENCY-STOP devices with positive-opening contacts		✓	✓
Switching mats Evaluation of safety shutdown mats with NC contacts and/or crossover detection		✓	✓
Protective door monitoring Evaluation of protective door signals and/or protective flap signals		✓	✓
Protective door interlocking Evaluation of protective doors with interlock and of the actuation/release of this interlock		--	✓
OK buttons Evaluation of OK buttons with NO contact		✓	✓
Two-hand operator controls Evaluation of two-hand operator controls		✓	✓
ESPE monitoring Evaluation of non-contact protective devices, e.g. light curtains and laser scanners		✓	✓
Muting Temporary bridging of non-contact protective devices, 2/4 sensors in parallel, 4 sensors in sequence		--	✓
Operating mode selector switches Evaluation of operating mode selector switches with NO contacts		✓	✓
Monitoring AS-i (AS-i 2F-DI) Logic element for monitoring of AS-i input slaves		--	✓

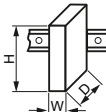
✓ Available

-- Not available

	Symbol	MSS Basic	MSS Advanced, MSS ASIsafe
Logic operation functions			
AND		✓	✓
OR		✓	✓
XOR		✓	✓
NAND		✓	✓
NOR		✓	✓
Negation		✓	✓
Flip-flop		✓	✓
Counting functions			
Counter 0 -> 1		✓	✓
Counter 1 -> 0		✓	✓
Counter 0 -> 1/1 -> 0		✓	✓
Timer functions			
With ON-delay		✓	✓
Passing make contact		✓	✓
With OFF-delay		✓	✓
Clock-pulsing		✓	✓
Start functions			
Monitored start		✓	✓
Manual start		✓	✓
Output functions			
Standard output		✓	✓
F output		✓	✓
AS-i output function		--	✓
Status functions			
Element status		--	✓

Technical specifications

Central units and expansion modules

Type		Central units				Expansion modules							
		Basic	Advanced	ASIsafe basic	ASIsafe extended	4/8F-DI	2/4 F-DI 1/2 F-RO	2/4 F-DI 2F-DO	4/8 F-RO	4 F-DO	8 DI	8 DO	
Dimensions (W x H x D)													
• Screw terminals	mm	45 x 111 x 124				22.5 x 111 x 124			45 x 111 x 124		22.5 x 111 x 124		
• Spring-type terminals	mm	45 x 113 x 124				22.5 x 113 x 124			45 x 113 x 124		22.5 x 113 x 124		
Device data													
Shock resistance (sine pulse)	g/ms	15/11											
Touch protection acc. to EN 50274 or IEC 60529		IP20											
Permissible mounting position		Vertical mounting surface (+10°/-10°), deviating mounting positions are permitted for reduced ambient temperature											
Minimum distances		For heat dissipation through convection from the devices 25 mm to the ventilation openings (top and bottom)											
Permissible ambient temperature													
• During operation	°C	-20 ... +60											
• During storage and transport	°C	-40 ... +85											
Number of sensor inputs (1-channel)													
• Fail-safe		8	8	2	4	8	4	4	--	--	--	--	
• Not fail-safe		--	--	6	4	--	--	--	--	--	8	--	
Number of test outputs		2	2	2	2	2	2	2	--	--	--	--	
Number of outputs													
• Relay outputs													
- Single-channel		--	--	--	--	--	2	--	8	--	--	--	
- Two-channel		1	1	1	1	--	--	--	--	--	--	--	
• Electronic outputs													
- Single-channel		--	--	--	--	--	--	--	--	--	--	8	
- Two-channel		1	1	1	1	--	--	2	--	4	--	--	
Weight	g	300	300	300	300	160	160	160	400	135	125	160	
Installation altitude above sea level	m	2 000											
Environmental data													
EMC interference immunity		IEC 60947-5-1											
Vibrations													
• Frequency	Hz	5 ... 500											
• Amplitude	mm	0.75											
Climatic withstand capability		IEC 60068-2-78											
Electrical specifications													
Rated control supply voltage U_s	V	24 DC ±15 % ¹⁾											
According to IEC 61131-2													
Operating range		0.85 ... 1.15 x U_s											
Rated insulation voltage U_i	V	300	300	300	300	50	300	50	300	50	50	50	
Rated impulse voltage U_{imp}	kV	4	4	4	4	500	4	500	4	500	500	500	
Total current input	mA	185	185	185	185	60	85	85	140	8	78	60	
Rated power at U_s	W	4.5	4.5	4.5	4.5	1.5	2	2	3	4.8	1.9	1.5	
Utilization category according to IEC 60947-5-1 (relay outputs)													
• AC-15 at 230 V	A	2	2	2	2	--	2	--	2	--	--	--	
• DC-13 at 24 V (semiconductor outputs)	A	1	1	1	1	--	1	--	1	--	--	--	
• DC-13 at 24 V	A	1.5	1.5	1.5	1.5	--	--	1	--	2	--	0.5	
Mechanical endurance during rated operation	Operating cycles (relay)	10 x 10 ⁶	10 x 10 ⁶	10 x 10 ⁶	10 x 10 ⁶	--	10 x 10 ⁶	--	10 x 10 ⁶	--	--	--	

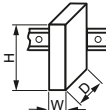
¹⁾ Device current supply through a power supply unit according to IEC 60536 protection class III (SELV or PELV).

SIRIUS 3RK3 modular safety system

General data

Type		Central units				Expansion modules						
		Basic	Advanced	ASIsafe basic	ASIsafe extended	4/8F-DI	2/4 F-DI 1/2 F-RO	2/4 F-DI 2F-DO	4/8 F-RO	4 F-DO	8 DI	8 DO
Electrical specifications (cont.)												
Switching frequency z at rated operational current	1/h	1 000	1 000	1 000	1 000	--	1 000	1 000	360	1 000	--	1 000
Conventional thermal current I _{th}	A	2/1.5	2/1.5	2/1.5	2/1.5	--	1	1	3	2	--	0.5
Protection for output contacts												
Fuse links												
LV HRC Type 3NA, DIAZED Type 5SB, NEOZED Type 5SE												
• Operational class gG	A	4	4	4	4	--	4	--	4	--	--	--
• Operational class quick	A	6	6	6	6	--	6	--	6	--	--	--
Safety specifications												
Probability of a dangerous failure												
• Per hour (PFH _d)	1/h	5.14 x 10 ⁻⁹	3.8 x 10 ⁻⁹ with AS-i 2.8 x 10 ⁻⁹ without AS-i	3.8 x 10 ⁻⁹ with AS-i 2.8 x 10 ⁻⁹ without AS-i	3.8 x 10 ⁻⁹ with AS-i 2.8 x 10 ⁻⁹ without AS-i	1.89 x 10 ⁻⁹	3.79 x 10 ⁻⁹	2.7 x 10 ⁻⁹	7.15 x 10 ⁻⁹	3.18 x 10 ⁻⁹	--	--
• On demand (PFD)		1.28 x 10 ⁻⁵	1.7 x 10 ⁻⁴	1.7 x 10 ⁻⁴	1.7 x 10 ⁻⁴	4.29 x 10 ⁻⁶	5.85 x 10 ⁻⁶	8.34 x 10 ⁻⁶	4.36 x 10 ⁻⁵	2.2 x 10 ⁻⁵	--	--
Parameters for cables												
Line resistance	Ω	100	100	100	100	100	100	100	--	--	100	--
Cable length from terminal to terminal												
With Cu 1.5 mm ² and 150 nF/km		1 000	1 000	1 000	1 000	1 000	1 000	1 000	--	--	1 000	--
Conductor capacity	nF	330	330	330	330	330	330	330	--	--	330	--

Interface and diagnostics modules

Type		Interface modules	Diagnostics modules
Dimensions (W x H x D)			
			
• Screw terminals	mm	45 x 111 x 124	96 x 60 x 44
• Spring-type terminals	mm	45 x 113 x 124	--
Device data			
Shock resistance (sine pulse)	g/ms	15/11	
Touch protection acc. to EN 50274 or IEC 60529		IP20	
Permissible mounting position		Vertical mounting surface (+10°/-10°), deviating mounting positions are permitted for reduced ambient temperature	
Minimum distances		For heat dissipation through convection from the devices 25 mm to the ventilation openings (top and bottom)	
Permissible ambient temperature			
• During operation	°C	-20 ... +60	
• During storage and transport	°C	-40 ... +85	
Weight	g	270	90
Installation altitude above sea level	m	2 000	
Environmental data			
EMC interference immunity		IEC 60947-5-1	
Vibrations			
• Frequency	Hz	5 ... 500	
• Amplitude	mm	0.75	
Climatic withstand capability		IEC 60068-2-78	
Electrical specifications			
Rated control supply voltage U_s According to IEC 61131-2	V	24 DC ±15 %	24 DC ±15 % via connecting cable to the central unit
Operating range		0.85 ... 1.15 x U_s	
Rated insulation voltage U_i	V	50	
Rated impulse voltage U_{imp}	kV	500	
Total current input	mA	--	24
Rated power at U_s	W	--	0.6

More information

System manual "3RK3 Modular Safety System" [see](http://support.automation.siemens.com/WW/view/en/26493228)
<http://support.automation.siemens.com/WW/view/en/26493228>.

SIRIUS 3RK3 modular safety system

Central units

Selection and ordering data



3RK3111-1AA10

3RK3121-1AC00
3RK3122-1AC00
3RK3131-1AC10

Version	DT	Screw terminals	DT	Spring-type terminals
		Article No.		Article No.
Central units				
3RK3 Basic Central unit with safety-related inputs and outputs <ul style="list-style-type: none">• 8 fail-safe inputs• 1 two-channel relay output• 1 two-channel electronic output Max. 7 expansion modules can be connected <u>Note:</u> Memory module 3RK3931-0AA00 is included in the scope of supply.	A	3RK3111-1AA10	A	3RK3111-2AA10
3RK3 Advanced Central units for connecting to AS-Interface with safety-related inputs and outputs and extended scope of functions <ul style="list-style-type: none">• 8 fail-safe inputs• 1 two-channel relay output• 1 two-channel electronic output Max. 9 expansion modules can be connected <u>Note:</u> Memory module 3RK3931-0AA00 is included in the scope of supply.	A	3RK3131-1AC10	A	3RK3131-2AC10
3RK3 ASIsafe Central units for connecting to AS-Interface with safety-related inputs and outputs and extended scope of functions <ul style="list-style-type: none">• 1 two-channel relay output• 1 two-channel electronic output Version "basic" <ul style="list-style-type: none">• 2 fail-safe inputs• 6 non-fail-safe inputs No expansion modules can be connected Version "extended" <ul style="list-style-type: none">• 4 fail-safe inputs• 4 non-fail-safe inputs Max. 2 expansion modules can be connected <u>Note:</u> Memory module 3RK3931-0AA00 is included in the scope of supply.	A	3RK3121-1AC00	A	3RK3121-2AC00
	A	3RK3122-1AC00	A	3RK3122-2AC00

Notes:

More information see, catalog IC 10, chapter 2 "Industrial Communication" and www.siemens.com/sirius-mss.

Selection and ordering data



3RK3211-1AA10
3RK3221-1AA10
3RK3231-1AA10
3RK3242-1AA10



3RK3251-1AA10





3RK3311-1AA10
3RK3321-1AA10



3RK3511-1BA10



3RK3611-3AA00

Version	DT	Screw terminals 	DT	Spring-type terminals 
		Article No.		Article No.
Expansion modules				
4/8 F-DI Safety-related input modules • 8 inputs	A	3RK3211-1AA10	A	3RK3211-2AA10
2/4 F-DI 1/2 F-RO Safety-related input/output modules • 4 inputs • 2 single-channel relay outputs	A	3RK3221-1AA10	A	3RK3221-2AA10
2/4 F-DI 2F-DO Safety-related input/output modules • 4 inputs • 2 two-channel electronic outputs	A	3RK3231-1AA10	A	3RK3231-2AA10
4/8 F-RO Safety-related output modules • 8 single-channel relay outputs	A	3RK3251-1AA10	A	3RK3251-2AA10
4 F-DO Safety-related output modules • 4 two-channel electronic outputs	A	3RK3242-1AA10	A	3RK3242-2AA10
8 DI Standard input module • 8 inputs	A	3RK3321-1AA10	A	3RK3321-2AA10
8 DO Standard output module • 8 electronic outputs	A	3RK3311-1AA10	A	3RK3311-2AA10
Interface modules				
DP interface PROFIBUS DP interface, 12 Mbit/s, RS 485, 32-bit cyclic data exchange with Basic central unit or 64-bit with Advanced central unit, acyclic exchange of diagnostics data	A	3RK3511-1BA10	A	3RK3511-2BA10
Operating and monitoring modules				
Diagnostics module	A	3RK3611-3AA00		--

Notes:








Connection cable required, see page 3/298.

More information see, catalog IC 10, chapter 2 "Industrial Communication" and www.siemens.com/sirius-mss.

SIRIUS 3RK3 modular safety system

Accessories

Selection and ordering data

Version		DT	Article No.
Connection cables (essential accessory)			
 3UF7932-0AA00-0	Connection cable		
	For connection of		
	Central units with expansion modules or interface module	Diagnostics modules with central unit or interface module	
	✓	✓	• Length 0.025 m (flat) ▶ 3UF7930-0AA00-0
	--	✓	• Length 0.1 m (flat) ▶ 3UF7931-0AA00-0
	--	✓	• Length 0.3 m (flat) ▶ 3UF7935-0AA00-0
	--	✓	• Length 0.5 m (flat) ▶ 3UF7932-0AA00-0
	--	✓	• Length 0.5 m (round) ▶ 3UF7932-0BA00-0
	--	✓	• Length 1.0 m (round) ▶ 3UF7937-0BA00-0
	--	✓	• Length 2.5 m (round) ▶ 3UF7933-0BA00-0
PC cables and adapters			
 3UF7940-0AA00-0	RS 232 PC cables		3UF7940-0AA00-0
	For connecting to the serial interface of a PC/PG, for communication with 3RK3 through the system interface		
 3UF7941-0AA00-0	USB PC cables		3UF7941-0AA00-0
	For connecting to the USB interface of a PC/PG, for communication with 3RK3 through the system interface, recommended for use in connection with 3RK3		
	USB/serial adapters	B	3UF7946-0AA00-0
For connecting a RS 232 PC cable to the USB interface of a PC			
Interface covers			
 3UF7950-0AA00-0	Interface covers		3UF7950-0AA00-0
For system interface			
Memory modules			
 3RK3931-0AA00	Memory modules		3RK3931-0AA00
For backing up the complete parameterization of the 3RK3 Modular Safety System without a PC/PG through the system interface		A	
Door adapters			
 3UF7920-0AA00-0	Door adapters		3UF7920-0AA00-0
For external connection of the system interface, e.g. outside a control cabinet			
Push-in lugs			
 3RP1903	Push-in lugs for screw fixing		
e.g. on mounting plate, 2 units required per device			
Can be used for 3RK3		B	3RP1903
Manual			
Manual "Modular Safety system 3RK3 (MSS)"			
• German		C	3ZX1012-0RK31-1AB1
• Englisch		C	3ZX1012-0RK31-1AC1

✓ Available

-- Not available

More accessories [see catalog IC 10, chapter 2 "Industrial Communication"](#).

Parameterization, start-up and diagnostics software for 3RK3

- Runs under Windows XP Professional (Service Pack 2 or 3), Windows 7 32/64 Bit Professional/Ultimate/Enterprise (Service Pack 1)
- Delivered without PC cable (please order separately, [see page 3/298](#))

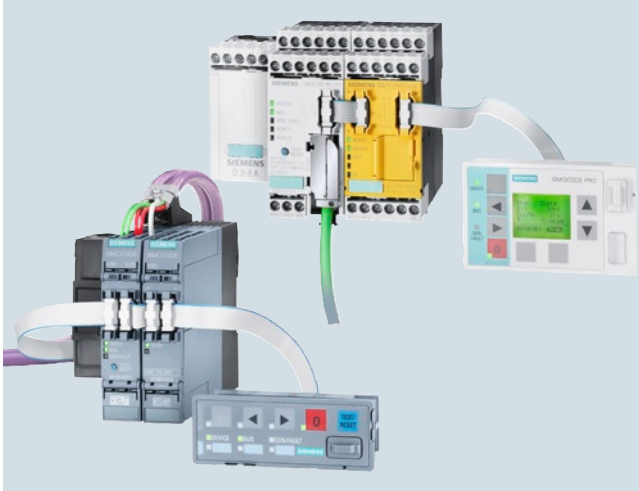
Version	DT	Article No.
Modular Safety System ES 2008 Basic		
 3ZS1314-4CC10-0YA5	Floating license for one user Engineering software in limited-function version for diagnostics purposes, software and documentation on CD, 3 languages (German/English/French), communication through the system interface	
	<ul style="list-style-type: none"> • License key on USB stick, Class A 	A 3ZS1314-4CC10-0YA5
	<ul style="list-style-type: none"> • License key download, Class A 	► 3ZS1314-4CE10-0YB5
Modular Safety System ES 2008 Standard		
 3ZS1314-5CC10-0YA5	Floating License for one user Engineering software, software and documentation on CD, 3 languages (German/English/French), communication through system interface	
	<ul style="list-style-type: none"> • License key on USB stick, Class A 	B 3ZS1314-5CC10-0YA5
	<ul style="list-style-type: none"> • License key download, Class A 	► 3ZS1314-5CE10-0YB5
	Powerpack for MSS ES 2008 Basic to Standard	A 3ZS1314-5CC10-0YD5
	Software Update Service	► 3ZS1314-5CC10-0YL5
	For 1 year with automatic extension, assuming the current software version is in use, engineering software, software and documentation on CD, communication through the system interface	
Modular Safety System ES 2008 Premium		
 3ZS1314-6CC10-0YA5	Floating license for one user Engineering software, software and documentation on CD, 3 languages (German/English/French), communication through PROFIBUS or the system interface, online diagnostics via PROFIBUS, creating, importing and exporting macros	
	<ul style="list-style-type: none"> • License key on USB stick, Class A 	B 3ZS1314-6CC10-0YA5
	<ul style="list-style-type: none"> • License key download, Class A 	► 3ZS1314-6CE10-0YB5
	Powerpack for MSS ES 2008 Standard to Premium	A 3ZS1314-6CC10-0YD5
	Software Update Service	► 3ZS1314-6CC10-0YL5
	For 1 year with automatic extension, assuming the current software version is in use, engineering software, software and documentation on CD, communication through PROFIBUS or the system interface, online diagnostics via PROFIBUS, creating, importing and exporting macros	

SIMOCODE 3 UF motor management and control devices

SIMOCODE pro 3UF7

General data

Overview



SIMOCODE pro S for efficient entry into motor management and SIMOCODE pro V for maximum functionality

SIMOCODE pro is a flexible, modular motor management system for motors with constant speeds in the low-voltage performance range. It optimizes the connection between I&C and motor feeder, increases plant availability and allows significant savings to be made for installation, commissioning, operation and maintenance of a system.

When SIMOCODE pro is installed in the low-voltage switchboard, it is the intelligent interface between the higher-level automation system and the motor feeder and includes the following:

- Multifunctional, solid-state full motor protection that is independent of the automation system
- Integrated control functions instead of hardware for the motor control
- Detailed operating, service and diagnostics data
- Open communication through PROFIBUS DP, PROFINET and OPC UA
- Safety relay function for the fail-safe disconnection of motors up to SIL 3 (IEC 61508, IEC 62061) or PL e with Category 4 (EN ISO 13849-1)
- SIMOCODE ES is the software package for SIMOCODE pro parameterization, start-up and diagnostics.

Device series

SIMOCODE pro is structured into several functionally tiered series:

- SIMOCODE pro C, as a compact system for direct-on-line starters and reversing starters or for controlling a motor starter protector
- SIMOCODE pro S, the smart system for direct-on-line, reversing, and wye-delta starters or for controlling a motor starter protector or soft starter. Its expandability with a multifunction module provides comprehensive input/output project data volume, precise ground-fault detection via the 3UL23 residual-current transformers and temperature measurement.
- SIMOCODE pro V, as a variable system with all control functions and with the possibility of expanding the inputs, outputs and functions of the system at will using expansion modules

Expansion possibilities	SIMOCODE			
	pro C PROFIBUS	pro S PROFIBUS	pro V ³⁾ PROFIBUS ¹⁾	PROFINET
Operator panels	✓	✓	✓	✓
Operator panels with display	--	--	✓	✓
Current measuring modules	✓	✓	✓	✓
Current/voltage measuring modules	--	--	✓	✓
Decoupling modules	--	--	✓	✓
Expansion modules:				
• Digital modules	--	--	2	2
• Fail-safe digital modules ²⁾	--	--	1	1
• Analog modules	--	--	1	2
• Ground-fault modules	--	--	1	1
• Temperature modules	--	--	1	2
• Multifunction modules	--	1	--	--

✓ Available

-- Not available

¹⁾ When an operator panel with display and/or a decoupling module are used, more restrictions on the number of expansion modules connectable per basic unit must be observed, [see page 3/308](#).

²⁾ The fail-safe digital module can be used instead of one of the two digital modules.

³⁾ Maximum of 5 expansion modules.

Per feeder each system always comprises one basic unit and one separate current measuring module. The two modules are connected together electrically through the system interface with a connection cable and can be mounted mechanically connected as a unit (one behind the other) or separately (side by side). The motor current to be monitored is decisive only for the choice of the current measuring module.

An operator panel for mounting in the control cabinet door is optionally connectable through a second system interface on the basic unit. Both the current measuring module and the operator panel are electrically supplied by the basic unit through the connection cable. More inputs, outputs and functions can be added to the SIMOCODE pro V and SIMOCODE pro S by means of optional expansion modules, thus supplementing the inputs and outputs already existing on the basic unit. With the DM-F Local and DM-F PROFIsafe fail-safe digital modules it is also possible to integrate the fail-safe disconnection of motors in the SIMOCODE pro V motor management system.

All modules are connected by connection cables. The connection cables are available in various lengths. The maximum distance between the modules (e.g. between the basic unit and the current measuring module) must not exceed 2.5 m. The total length of all the connection cables per system interface of the basic unit may be up to 3 m.

SIMOCODE 3 UF motor management and control devices

SIMOCODE pro 3UF7

General data

Article No. scheme

Digit of the Article No.	1st - 4th	5th	6th	7th	8th	9th	10th	11th	12th	13th
	□□□□	□	□	□	-	1	□	□	0	□ - 0
SIMOCODE pro motor management system	3 U F 7									
Type of unit/module	□									
Functional version of the unit/module	□ □									
Connection type of the current transformer	□									
Voltage version	□									
Color (0 = lightgray, 1 = titan gray)	□									
Example	3 U F 7	0	1	0	-	1	A	B	0	0 - 0

Note:

The Article No. scheme is presented here merely for information purposes and for better understanding of the logic behind the article numbers.

For your orders, please use the article numbers quoted in the catalog in the Selection and ordering data.

Benefits

General customer benefits

- Integrating the whole motor feeder into the process control by means of PROFIBUS DP, PROFINET or OPC UA significantly reduces the wiring outlay between the motor feeder and PLC
- Decentralization of the automated processes by means of configurable control and monitoring functions in the feeder saves resources in the automation system and ensures full functionality and protection of the feeder even if the I&C or bus system fails
- The acquisition and monitoring of operating, service and diagnostics data in the feeder and process control system increases plant availability as well as maintenance and service-friendliness
- The high degree of modularity allows users to perfectly implement their plant-specific requirements for each motor feeder
- The SIMOCODE pro system offers functionally graded and space-saving solutions for each customer application
- The replacement of the control circuit hardware with integrated control functions decreases the number of hardware components and wiring required and in this way limits stock keeping costs and potential wiring errors
- The use of solid-state full motor protection permits better utilization of the motors and ensures long-term stability of the tripping characteristic and reliable tripping even after years of service

Multifunctional, electronic full motor protection for rated motor currents up to 820 A

SIMOCODE pro offers comprehensive protection of the motor feeder by means of a combination of different, multi-step and delayable protection and monitoring functions:

- Inverse-time delayed solid-state overload protection (CLASS 5 to 40)
- Thermistor motor protection
- Phase failure/unbalance protection
- Stall protection
- Monitoring of adjustable limit values for the motor current
- Voltage and power monitoring
- Monitoring of the power factor (motor idling/load shedding)
- Ground-fault monitoring
- Temperature monitoring, e.g. over PT100/PT1000
- Monitoring of operating hours, downtime and number of starts etc.

Recording of measuring curves

SIMOCODE pro can record measuring curves and therefore is able, for example, to present the progression of motor current during motor start-up.

Flexible motor control implemented with integrated control functions (instead of comprehensive hardware interlocks)

Many predefined motor control functions have already been integrated into SIMOCODE pro, including all necessary logic operations and interlocks:

- Overload relays
- Direct-on-line and reversing starters
- Wye/delta starters (also with direction reversal)
- Two speeds, motors with separate windings (pole-changing starter); also with direction reversal
- Two speeds, motors with separate Dahlander windings (also with direction reversal)
- Positioner actuation
- Solenoid valve actuation
- Actuation of a motor starter protector
- Soft starter actuation (also with direction reversal)

These control functions are predefined in SIMOCODE pro and can be freely assigned to the inputs and outputs of the device (including PROFIBUS/PROFINET).

These predefined control functions can also be flexibly adapted to each customized configuration of a motor feeder by means of freely configurable logic modules (truth tables, counters, timers, edge evaluation, etc.) and with the help of standard functions (power failure monitoring, emergency start, external faults, etc.), without additional auxiliary relays being necessary in the control circuit.

SIMOCODE pro makes a lot of additional hardware and wiring in the control circuit unnecessary which results in a high level of standardization of the motor feeder in terms of its design and circuit diagrams.

SIMOCODE 3 UF motor management and control devices

SIMOCODE pro 3UF7

General data

Detailed operational, service and diagnostics data

SIMOCODE pro makes different operating, service and diagnostics data available and helps to detect potential faults in time and to prevent them by means of preventative measures. In the event of a malfunction, a fault can be diagnosed, localized and rectified very quickly – there are no or very short downtimes.

Operating data

- Motor switching state derived from the current flow in the main circuit
- All phase currents
- All phase voltages and phase-to-phase voltages
- Active power, apparent power and power factor
- Phase unbalance and phase sequence
- Ground-fault current
- Time to trip
- Motor temperature
- Remaining cooling time etc.

Service data

- Motor operating hours
- Motor stop times
- Number of motor starts
- Number of overload trips
- Interval for compulsory testing of the enabling circuits
- Energy consumed
- Internal comments stored in the device etc.

Diagnostics data

- Numerous detailed early warning and fault messages
- Internal device fault logging with time stamp
- Time stamping of freely selectable status, alarm or fault messages etc.

Easy operation and diagnostics

Operator panel

The operator panel is used to control the motor feeder and can replace all conventional pushbuttons and indicator lights to save space. It makes SIMOCODE pro or the feeder directly operable in the control cabinet. It features all the status LEDs available on the basic unit and externalizes the system interface for simple parameterization or diagnosis on a PC/PG.

Operator panel with display

As an alternative to the 3UF720 standard operator panel for SIMOCODE pro V, there is also an operator panel with display: the 3UF721 is thus able in addition to indicate current measured values, operational and diagnostics data or status information of the motor feeder at the control cabinet. The pushbuttons of the operator panel can be used to control the motor. Also, when SIMOCODE pro V PROFINET is used it is possible to set parameters such as rated motor current, limit values, etc. directly via the operator panel with display.

Communications

SIMOCODE pro has either an integrated PROFIBUS DP interface (SUB-D or terminal connection) or a PROFINET interface (2 x RJ45).

Fail-safe disconnection through PROFIBUS or PROFINET with the PROFI-safe profile is also possible in conjunction with a fail-safe controller (F-CPU) and the DM-F PROFI-safe fail-safe digital module.

SIMOCODE pro for PROFIBUS

SIMOCODE pro for PROFIBUS supports for example:

- Cyclic services (DPV0) and acyclic services (DPV1)
- Extensive diagnostics and hardware interrupts
- Time stamp with high timing precision (SIMATIC S7) for SIMOCODE pro V
- DPV1 communication after the Y-Link

SIMOCODE pro for PROFINET

SIMOCODE pro for PROFINET supports for example:

- Line and ring bus topology thanks to an integrated switch
- Media redundancy via MRP protocol
- Operating, service and diagnostics data via standard web browser
- OPC UA server for open communication with visualization and control system
- NTP-synchronized time
- Interval function and measured values for power management via PROFIenergy
- Module exchange without PC memory module through proximity detection
- Extensive diagnostics and maintenance alarms

Notes on safety

For connection of an internal system to an external system, suitable protective measures must be taken to ensure safe operation of the plant (including IT security, e. g. network segmentation).

More information see www.siemens.com/industrialsecurity.

For SIMOCODE pro motor management and control devices with communication function see page 3/309.

Accessories see page 3/314.

More information see catalog IC 10, chapter 14 "Parameterization, Configuration and Visualization with SIRIUS" or Industry Mall.

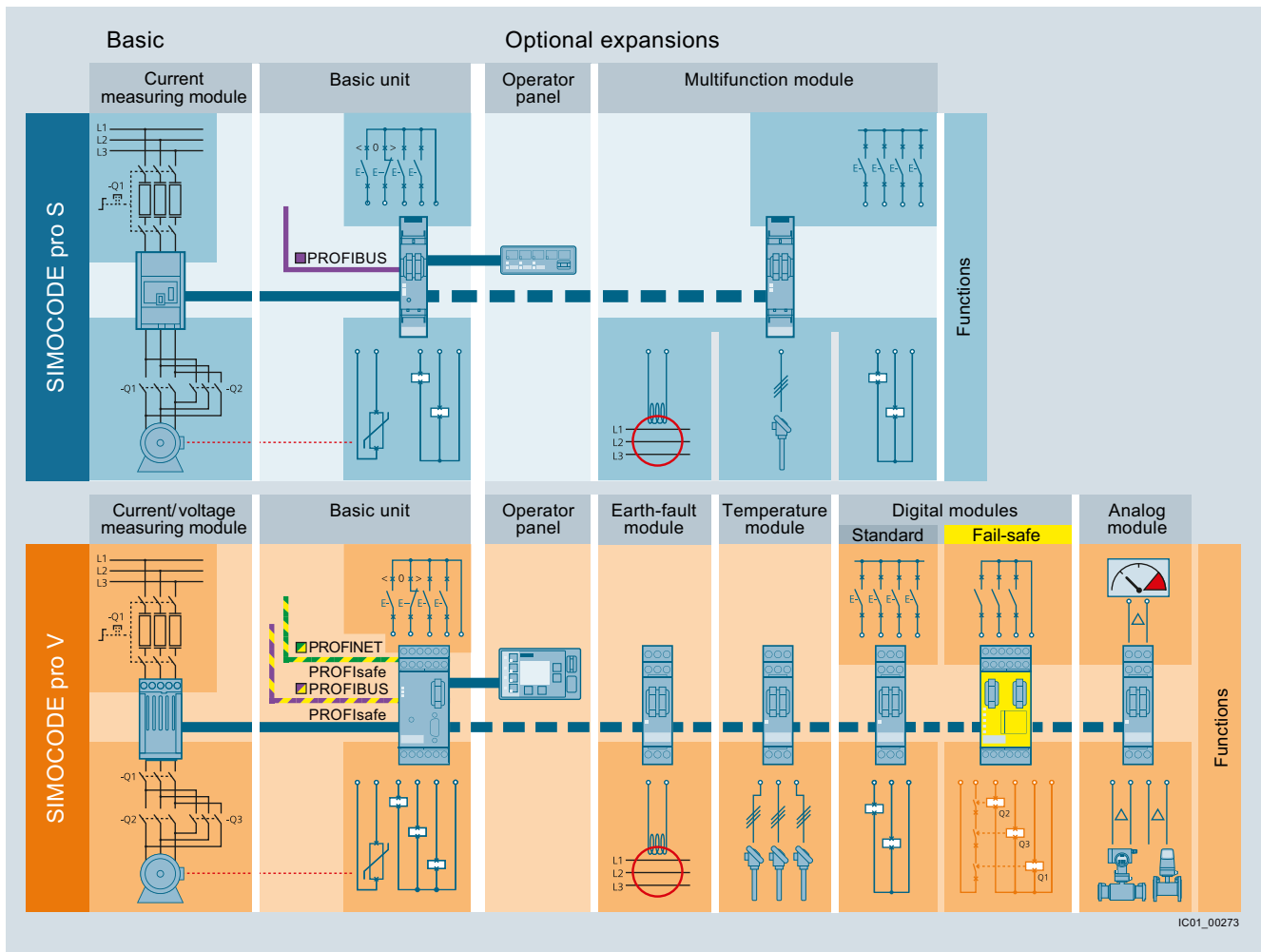
Autonomous operation

An essential feature of SIMOCODE pro is the autonomous execution of all protection and control functions, even when communication to the I&C system is interrupted. This means that even in the event of bus system or automation system failure, full functionality of the feeder is ensured or a specific behavior can be parametrized in case of such a fault, e.g. targeted shutdown of the feeder or execution of particular parametrized control mechanisms (such as reversal of the direction of rotation).

SIMOCODE 3 UF motor management and control devices

SIMOCODE pro 3UF7

General data



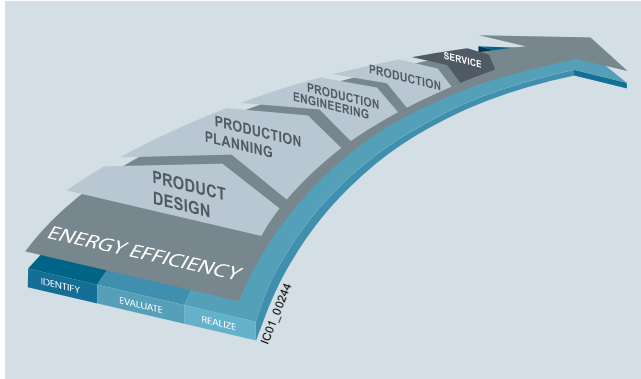
SIMOCODE pro V und SIMOCODE pro S: Systemaufbau

SIMOCODE 3 UF motor management and control devices

SIMOCODE pro 3UF7

General data

Advantages through energy efficiency



Overview of the energy management process

We offer you a unique portfolio for industrial energy management, using an energy management system that helps to optimally define your energy needs. We split up our industrial energy management into three phases – identify, evaluate, and realize – and we support you with the appropriate hardware and software solutions in every process phase.

The innovative SIRIUS industrial controls products can also make a major contribution to the energy efficiency of a plant (www.siemens.com/sirius/energysaving).

The SIMOCODE pro 3UF7 motor management system makes the following contribution to the energy efficiency of the plant as a whole:

- **Energy consumption:**
Clear display of the energy consumption of a motor feeder or process element by means of the acquisition and transmission of all operating and consumption data, such as current, voltage, active and reactive power, energy consumption, motor temperature etc.
- **Energy management:**
Evaluation of energy measured values (e. g. limit value monitoring) with exporting of local or central actions (= forwarding to higher-level)
- **PROFenergy:**
SIMOCODE pro V PROFINET supports the PROFenergy functions. Reduced energy consumption thanks to automatic disconnection in the intervals and forwarding of the measured values for higher-level energy management systems.

Application

SIMOCODE pro is often used for automated processes where plant downtimes are very expensive (e.g. steel or cement industry) and where it is important to prevent plant downtimes through detailed operating, service and diagnostics data or to localize the fault very quickly in the event of a fault.

SIMOCODE pro is modular and space-saving and suited especially for operation in motor control centers (MCCs) in the process industry and for power plant technology.

Applications

Protection and control of motors in hazardous areas for types of protection EEx e/d according to ATEX guideline 94/9/EC

- With heavy starting (paper, cement, metal and water industries)
- In high-availability plants (chemical, oil, raw material processing industries, power plants)

Safety technology for SIMOCODE pro

The safe disconnection of motors in the process industry is becoming increasingly important as the result of new and revised standards and requirements in the safety technology field.

With the DM-F Local and DM-F PROFIsafe fail-safe expansion modules it is easy to integrate functions for fail-safe disconnection into the SIMOCODE pro V motor management system while retaining service-proven concepts. The strict separation of safety functions and operational functions proves particularly advantageous for planning, configuring and construction. Seamless integration in the motor management system leads to greater transparency for diagnostics and during operation of the system.

Suitable components for this purpose are the DM-F Local and DM-F PROFIsafe fail-safe expansion modules, depending on the requirements:

- the DM-F Local fail-safe digital module for when direct assignment between a fail-safe hardware shutdown signal and a motor feeder is required, or
- the DM-F PROFIsafe fail-safe digital module for when a fail-safe controller (F-CPU) creates the signal for the disconnection and transmits it in a fail-safe manner through PROFIBUS/PROFIsafe or PROFINET/PROFIsafe to the motor management system

SIMOCODE 3 UF motor management and control devices

SIMOCODE pro 3UF7

General data

Technical specifications

General data		
Type	3UF7	
Permissible ambient temperature		
• During operation	°C	-25 ... +60 ; 3UF7 21: 0 ... +60
• During storage and transport	°C	-40 ... +80 ; 3UF7 21: -20 ... +70
Degree of protection (to IEC 60529)		
• Measurement modules with busbar connection		IP00
• Operator panel (front) and door adapter (front) with cover		IP54
• Other components		IP20
Shock resistance (sine pulse)	g/ms	15/11
Mounting position		Any
Frequency	Hz	50/60 ± 5 %
EMC interference immunity (according to IEC 60947-1)		(corresponds to degree of severity 3)
• Conducted interference, burst acc. to IEC 61000-4-4	kV	2 (power ports)
	kV	1 (signal ports)
	V	10
• Conducted interference, high frequency acc. to IEC 61000-4-6		
• Conducted interference, surge acc. to IEC 61000-4-5	kV	2 (line to ground); 3UF7320-1AB, 3UF7330-1AB: 1 (line to ground)
	kV	1 (line to line); 3UF7320-1AB, 3UF7330-1AB: 0.5 (line to line)
• Electrostatic discharge, ESD acc. to IEC 61000-4-2	kV	8 (air discharge); 3UF7020: Only operate front side during operation
	kV	6 (contact discharge); 3UF721: 4 (contact discharge)
• Field-related interference acc. to IEC 61000-4-3	V/m	10
EMC emitted interference (according to IEC 60947-1)		
• Conducted and radiated interference emission		EN 55011/EN 55022 (CISPR 11/CISPR 22) (corresponds to degree of severity A)
Protective separation (acc. to IEC 60947-1)		All circuits in SIMOCODE pro are safely separated from each other according to IEC 60947-1, i.e. they are designed with doubled creepage paths and clearances. In this context, compliance with the instructions in the test report "Safe Isolation" No.2668 is required.
Basic units		
Type	3UF7000-1AU00-0 3UF7010-1AU00-0 3UF7011-1AU00-0 3UF7020-1AU01-0	3UF7000-1AB00-0 3UF7010-1AB00-0 3UF7011-1AB00-0 3UF7020-1AB01-0
Control circuit		
Rated control supply voltage U_s (according to IEC 61131-2)	110 ... 240 AC/DC; 50/60 Hz	24 V DC
Operating range		
• SIMOCODE pro C (3UF7000) and SIMOCODE pro V (3UF7010)	0.85 ... 1.1 × U_s	0.80 ... 1.2 × U_s
• SIMOCODE pro V PN (3UF7011) and SIMOCODE pro S (3UF7020)		
- Operation	0.85 ... 1.1 × U_s	0.80 ... 1.2 × U_s
- Start-up	0.85 ... 1.1 × U_s	0.85 ... 1.2 × U_s
Power consumption		
• SIMOCODE pro C (3UF7000) and SIMOCODE pro S (3UF7020)	7 VA/5 W	5 W
• SIMOCODE pro V (3UF7010)	10 VA/7 W	7 W
• incl. two connected expansion modules		
• SIMOCODE pro V PN (3UF7011)	11 VA/8 W	8 W
• incl. two connected expansion modules		
Rated insulation voltage U_i	V	300 (at pollution degree 3)
Rated impulse withstand voltage U_{imp}	kV	4
Relay outputs		
• Number		3 monostable relay outputs
- SIMOCODE pro C, SIMOCODE pro V, SIMOCODE pro V PN		2 monostable relay outputs
- SIMOCODE pro S		
• Specified short-circuit protection for auxiliary contacts (relay outputs)		
- Fuse links		6 A operational class gG; 10 A quick-response (IEC 60947-5-1)
- Miniature circuit breaker		1.6 A, C characteristic (IEC 60947-5-1); 6 A, C characteristic (Ik < 500 A)
• Rated uninterrupted current	A	6
• Rated switching capacity		
- AC-15		6 A/24 V AC 6 A/120 V AC 3 A/230 V AC
- DC-13		2 A/24 V DC 0.55 A/60 V DC 0.25 A/125 V DC
Inputs (binary)		4 inputs supplied internally by the device electronics (with 24 V DC) and connected to a common potential
Thermistor motor protection (binary PTC)		
• Summation cold resistance	kΩ	≤ 1.5
• Response value	kΩ	3.4 ... 3.8
• Return value	kΩ	1.5 ... 1.65

SIMOCODE 3 UF motor management and control devices

SIMOCODE pro 3UF7

General data

Current measuring modules or current/voltage measuring modules

Type		3UF71.0	3UF71.1	3UF71.2	3UF71.3	3UF71.4
Main circuit						
Current setting I_e	A	0.3 ... 3	2.4 ... 25	10 ... 100	20 ... 200	63 ... 630
Rated insulation voltage U_i	V	690; 3UF7103 and 3UF7104: 1 000 (at pollution degree 3)				
Rated operational voltage U_e	V	690				
Rated impulse withstand voltage U_{imp}	kV	6; 3UF7103 and 3UF7104: 8				
Rated frequency	Hz	50/60				
Type of current		Three-phase current				
Short circuit		Additional short-circuit protection is required in the main circuit				
Accuracy of current measurement (in the range of 1 x minimum current setting I_u to 8 x max. current setting I_o)	%	±3				
Typical voltage measuring range						
• Phase-to-phase voltage/line-to-line voltage (e.g. $U_{L1 L2}$)	V	110 ... 690				
• Phase voltage (e.g. $U_{L1 N}$)	V	65 ... 400				
Accuracy						
• Voltage measurement (phase voltage U_L in the range 230 ... 400 V)	%	±3 (typical)				
• Power factor measurement (in the rated load range p.f. = 0.4...0.8)	%	±5 (typical)				
• Apparent power measurement (in the rated load range)	%	±5 (typical)				
Notes on voltage measurement						
• In insulated, high-resistance or asymmetrically grounded forms of power supply system and for single-phase systems		In these networks the current/voltage measuring module can be used only with an upstream decoupling module on the system interface. In the supply lines from the main circuit for voltage measurement of SIMOCODE pro it may be necessary to provide additional line protection!				
• Supply lines for voltage measurement						

Digital modules or multifunction module

Type	3UF7300, 3UF7310, 3UF7600		
Control circuit			
Rated insulation voltage U_i	V	300 (at pollution degree 3)	
Rated impulse withstand voltage U_{imp}	kV	4	
Relay outputs			
• Number		2 monostable or bistable relay outputs (depending on the version)	
• Specified short-circuit protection for auxiliary contacts (relay outputs)			
- Fuse links		6 A operational class gG; 10 A quick-response (IEC 60947-5-1)	
- Miniature circuit breaker		1.6 A, C characteristic (IEC 60947-5-1); 6 A, C characteristic (Ik < 500 A)	
• Rated uninterrupted current	A	6	
• Rated switching capacity			
- AC-15		6 A/24 V AC	6 A/120 V AC
- DC-13		2 A/24 V DC	0.55 A/60 V DC
		3 A/230 V AC	0.25 A/125 V DC
Inputs (binary)		4 inputs, electrically isolated, supplied externally with 24 V DC or 110 ... 240 V AC/DC depending on the version, connected to a common potential	

Ground-fault modules or multifunction modules

Type	3UF7510, 3UF7600
<i>Control circuit</i>	
Connectable residual-current transformers	3UL23
Type of current for monitoring	Type A (AC and pulsating DC residual currents)
Adjustable response value	30 mA ... 40 A
Relative measurement error	7.5 %

Temperature modules or multifunction modules

Type	3UF7600, 3UF7700				
Sensor circuit					
Number of temperature sensors		3 temperature sensors			
• 3UF7700		1 temperature sensor			
• 3UF7600					
Typical sensor circuits					
• PT100	mA	1 (typical)			
• PT1000/KTY83/KTY84/NTC	mA	0.2 (typical)			
Open-circuit/short-circuit detection					
• Sensor type		PT100/PT1000	KTY83-110	KTY84	NTC
- Open circuit		✓	✓	✓	--
- Short circuit		✓	✓	✓	✓
- Measuring range	°C	-50 ... +500	-50 ... +175	-40 ... +300	80 ... 160
Measuring accuracy at 20 °C ambient temperature (T20)	K	< ±2			
Deviation due to ambient temperature (in % of measuring range)	%	0.05 per K deviation from T20			
Conversion time	ms	500			
Connection type		Two- or three-wire connection			

✓ Detection possible

-- Detection not possible

SIMOCODE 3 UF motor management and control devices

SIMOCODE pro 3UF7

General data

Analog modules						
Type		3UF74				
Control circuit						
Inputs <ul style="list-style-type: none">• Channels• Parameterizable measuring ranges• Shielding• Max. input current (destruction limit)• Accuracy• Input resistance• Conversion time• Resolution• Open-circuit detection		mA	2 (passive) 0/4 ... 20 Up to 30 m shield recommended, from 30 m shield required			
		mA	40			
		%	±1			
		Ω	50			
		ms	150			
		bit	12			
			With measuring range 4 ... 20 mA			
Outputs <ul style="list-style-type: none">• Channels• Parameterizable output range• Shielding• Max. voltage at output• Accuracy• Max. output load• Conversion time• Resolution• Short-circuit proof		mA	1 0/4 ... 20 Up to 30 m shield recommended, from 30 m shield required			
		V DC	30			
		%	±1			
		Ω	500			
		ms	25			
		bit	12			
			Yes			
Connection type		Two-wire connection				
Electrical separation of inputs/output to the device electronics		No				
Fail-safe digital modules						
Type		3UF7320-1AB00-0	3UF7320-1AU00-0	3UF7330-1AB00-0	3UF7330-1AU00-0	
Control circuit						
Rated control supply voltage U_s		V	24 DC	110 ... 240 AC/DC; 50/60 Hz	24 DC	110 ... 240 AC/DC; 50/60 Hz
Power consumption			3 W	9.5 VA/4.5 W	4 W	11 VA/5.5 W
Rated insulation voltage		V	300			
Rated impulse withstand voltage U_{imp}		kV	4			
Relay outputs <ul style="list-style-type: none">• Number			2 relay enabling circuits, 2 relay outputs			
Version of the fuse link For short-circuit protection of the relay enabling circuit		A	4, operational class gG			
Rated uninterrupted current		A	5			
Rated switching capacity <ul style="list-style-type: none">• AC-15• DC-13			3 A/24 V AC 4 A/24 V DC	3 A/120 V AC 0.55 A/60 V DC	1.5 A/230 V AC 0.22 A/125 V DC	
Inputs (binary)			5 (with internal power supply from the device electronics)			
Cable length <ul style="list-style-type: none">• Between sensor/start signal and evaluation electronics• For further digital signals		m m	1 500 300			
Safety data ¹⁾						
SIL level max. according to IEC 61508			3			
Performance level PL according to EN ISO 13849-1			e			
Category according to EN ISO 13849-1			4			
Stop category according to EN 60204-1			0			
Probability of a dangerous failure (at 40 °C) for SIL 3 applications <ul style="list-style-type: none">• Per hour (PFH_d) at a high demand rate according to IEC 62061• On demand (PFD_{avg}) at a low demand rate according to IEC 61508		1/h	4.5 x 10 ⁻⁹ 5.4 x 10 ⁻⁶	4.6 x 10 ⁻⁹ 5.5 x 10 ⁻⁶	4.4 x 10 ⁻⁹ 5.1 x 10 ⁻⁶	4.4 x 10 ⁻⁹ 5.2 x 10 ⁻⁶
T1 value for proof-test interval or service life according to IEC 61508		a	20			

¹⁾ More safety data see system manual "SIMOCODE pro Safety Fail-Safe Digital Modules", <http://support.automation.siemens.com/WW/view/en/50564852>.

SIMOCODE 3 UF motor management and control devices

SIMOCODE pro 3UF7

General data

More information

Configuration instructions when using an operator panel with display and/or a decoupling module with SIMOCODE pro V with PROFIBUS

If you want to use an operator panel with display and/or a decoupling module in the SIMOCODE pro V system with PROFIBUS, then the following configuration instructions concerning the type and number of connectable expansion modules must be observed.

The following tables show the maximum possible configuration of the expansion modules for the various combinations.

The DM-F Local and DM-F PROFIsafe fail-safe expansion modules behave in this connection like digital modules for standard applications.

Use of an operator panel with display

Digital modules	Digital modules	Analog modules	Temperature modules	Ground-fault modules
Only operator panel with display for SIMOCODE pro V (24 V DC or 110 ... 240 V AC/DC)				
Max. 4 expansion modules can be used				
Operator panel with display and current/voltage measurement with SIMOCODE pro V (110 ... 240 V AC/DC)				
Max. 3 expansion modules can be used or:				
--	--	✓	✓	--

✓ Available

-- Not available

Use of a decoupling module

(voltage measurement in insulated networks)

Digitalmodul	Digitalmodul	Analogmodul	Temperaturmodul	Erdschlussmodul
SIMOCODE pro V (DC 24 V)				
✓ ¹⁾	✓ ¹⁾	✓	✓	✓
SIMOCODE pro V (AC/DC 110 ... 240 V)				
✓	✓	--	✓	✓
✓ ¹⁾	✓ ¹⁾	✓	✓	--
✓	--	✓	✓	--
✓	--	✓	--	✓

✓ Available

-- Not available

¹⁾ No bistable relay outputs and no more than 5 of 7 relay outputs active simultaneously (> 3 s).

Use of a decoupling module

(voltage measurement in insulated networks)

in combination with an operator panel with display

Digital modules	Digital modules	Analog modules	Temperature modules	Ground-fault modules
SIMOCODE pro V (24 V DC)				
✓	--	✓	✓	✓
✓	✓	--	✓	✓
SIMOCODE pro V (110 ... 240 V AC/DC)				
✓ ²⁾	--	✓	✓	✓
✓	✓	--	--	--
✓ ¹⁾	✓ ¹⁾	✓ ³⁾	--	--
✓	--	--	✓	✓

✓ Available

-- Not available

¹⁾ No bistable relay outputs and no more than 5 of 7 relay outputs active simultaneously (> 3 s).

²⁾ No bistable relay outputs and no more than 3 of 5 relay outputs active simultaneously (> 3 s).

³⁾ Analog module output is not used.

Protective separation

All circuits in SIMOCODE pro are safely isolated from each other in accordance with IEC 60947-1. That is, they are designed with double creepages and clearances. In the event of a fault, therefore, no parasitic voltages can be formed in neighboring circuits. The instructions of Test log No. 2668 must be complied with.

Types of protection EEx e and EEx d

The overload protection and the thermistor motor protection of the SIMOCODE pro system comply with the requirements for overload protection of explosion-proof motors to the type of protection:

- EEx d "flameproof enclosure" e.g. according to IEC 60079-1
- EEx e "increased safety" e.g. according to IEC 60079-7

When using SIMOCODE pro devices with a 24 V DC control voltage, electrical separation must be ensured using a battery or a safety transformer according to IEC 61558-2-6.

EC type test certificate: BVS 06 ATEX F 001

Test log: BVS PP 05.2029 EG.

Selection data for type-tested assemblies/load feeders

For configuration tables according to type of coordination "1" or "2", see

- Manual "Configuring SIRIUS", Article No.: 3ZX1012-ORA21-0AB0, <http://support.automation.siemens.com/WW/view/en/40625241>
- Manual "Configuring SIRIUS Innovations", Article No.: 3ZX1012-ORA21-1AB0, <http://support.automation.siemens.com/WW/view/en/39714188>
- SIMOCODE pro PROFIBUS System Manual, Article No.: 3UF7970-0AA00-0, <http://support.automation.siemens.com/WW/view/en/20017780>
- SIMOCODE pro PROFINET System Manual, Article No.: 3ZX1012-0UF70-1AC1, <http://support.automation.siemens.com/WW/view/en/61896631>

System manual

The SIMOCODE pro system manual describes the motor management system and its functions in detail. It provides information on configuration, start-up, servicing and maintenance. A typical example of a reversing starter application is used to teach the user quickly and practically how to use the system. In addition to help on how to identify and rectify faults in the event of a malfunction, the manual also contains special information for servicing and maintenance. For selection of equipment and for configuration, it is recommended to consult the system manual.

A detailed description of the DM-F Local and DM-F PROFIsafe fail-safe expansion modules is provided in the system manual "SIMOCODE pro Safety Fail-Safe Digital Modules", which can be downloaded from the Internet.

Internet





More information see www.siemens.com/simocode.

SIMOCODE 3 UF motor management and control devices

SIMOCODE pro 3UF7

Basic units

Selection and ordering data







Version		DT	Screw terminals
		Article No.	
SIMOCODE pro			
	SIMOCODE pro C PROFIBUS DP interface, 12 Mbit/s, RS 485 4 I/3 O freely assignable, input for thermistor connection, monostable relay outputs Rated control supply voltage U_s : <ul style="list-style-type: none">• 24 V DC• 110 ... 240 V AC/DC	▶	3UF7000-1AB00-0 3UF7000-1AU00-0
	SIMOCODE pro S PROFIBUS DP interface, 1.5 Mbit/s, RS 485 4 I/2 O freely assignable, input for thermistor connection, monostable relay outputs, can be expanded by a multifunction module Rated control supply voltage U_s : <ul style="list-style-type: none">• 24 V DC• 110 ... 240 V AC/DC	▶	3UF7020-1AB01-0 3UF7020-1AU01-0
	SIMOCODE pro V PROFIBUS DP interface, 12 Mbit/s, RS 485 4 I/3 O freely assignable, input for thermistor connection, monostable relay outputs, can be expanded by expansion modules Rated control supply voltage U_s : <ul style="list-style-type: none">• 24 V DC• 110 ... 240 V AC/DC	▶	3UF7010-1AB00-0 3UF7010-1AU00-0
	SIMOCODE pro V PROFINET¹⁾ ETHERNET/PROFINET IO, OPC UA server and web server, 100 Mbit/s, 2 x connection to bus through RJ45, 4 I/3 O freely assignable, input for thermistor connection, monostable relay outputs, can be expanded by expansion modules Rated control supply voltage U_s : <ul style="list-style-type: none">• 24 V DC• 110 ... 240 V AC/DC	▶	3UF7011-1AB00-0 3UF7011-1AU00-0

¹⁾ When using an operator panel with display, the product version must be E07 or higher (from 08/2012).

SIMOCODE 3 UF motor management and control devices

SIMOCODE pro 3UF7

Basic units

Version		Current setting	Width	DT	Screw terminals	
		A	mm		Article No.	
SIMOCODE pro (continued)						
	Current measuring modules					
	• Straight-through transformers	0.3 ... 3	45	▶	3UF7100-1AA00-0	
		2.4 ... 25	45	▶	3UF7101-1AA00-0	
		10 ... 100	55	▶	3UF7102-1AA00-0	
		20 ... 200	120	▶	3UF7103-1AA00-0	
	• Busbar connections	20 ... 200	120	▶	3UF7103-1BA00-0	
		63 ... 630	145	▶	3UF7104-1BA00-0	
	Current/voltage measuring modules for SIMOCODE pro V					
	Voltage measuring up to 690 V If required in connection with a decoupling module					
	• Straight-through transformers	0.3 ... 3	45	▶	3UF7110-1AA00-0	
		2.4 ... 25	45	▶	3UF7111-1AA00-0	
		10 ... 100	55	▶	3UF7112-1AA00-0	
		20 ... 200	120	▶	3UF7113-1AA00-0	
	• Busbar connections	20 ... 200	120	▶	3UF7113-1BA00-0	
		63 ... 630	145	▶	3UF7114-1BA00-0	
	Decoupling modules					
For connecting upstream from a current/voltage measuring module on the system interface when using voltage detection in insulated, high-resistance or asymmetrically grounded systems and in single-phase systems				▶	3UF7150-1AA00-0	
	Operator panels					
	Installation in control cabinet door or front plate, for plugging into all SIMOCODE pro basic units, 10 LEDs for status indication and user-assignable buttons for controlling the motor					
	• Light gray			▶	3UF7200-1AA00-0	
	• Titanium gray			▶	3UF7200-1AA01-0	
	Operator panel with display for SIMOCODE pro V					
	Installation in control cabinet door or front plate, for plugging into SIMOCODE pro V and SIMOCODE pro V PN, 7 LEDs for status indication and user-assignable buttons for controlling the motor, multilingual display, e.g. for indication of measured values, status information or fault messages				▶	3UF7210-1AA00-0

Notes:

System manual "SIMOCODE pro PROFIBUS" see <http://support.automation.siemens.com/WW/view/en/20017780>.

System manual "SIMOCODE pro V PROFINET" see <http://support.automation.siemens.com/WW/view/en/61896631>.


SIMOCODE pro V basic unit in a hardened version via SIPLUS extreme upon request.

SIMOCODE 3 UF motor management and control devices

SIMOCODE pro 3UF7

Expansion modules

Selection and ordering data

Version	DT	Screw terminals	
		Article No.	

Expansion modules for SIMOCODE pro V

With SIMOCODE pro V, it is possible to expand the type and number of inputs and outputs in steps. Each expansion module has two system interfaces on the front. Through the one system interface the expansion module is connected to the system interface of the SIMOCODE pro V using a connection cable; through the second system interface, further expansion modules or the operator panel can be connected. The power supply for the expansion modules is provided by the connection cable through the basic unit.

Note:

Please order connection cable separately, [see page 3/294](#).

Digital modules

Up to two digital modules can be used to add additional binary inputs and relay outputs to the basic unit. The input circuits of the digital modules are supplied from an external power supply.

4 binary inputs and 2 relay outputs,
up to 2 digital modules can be connected

Relay outputs	Input voltage	
Monostable	24 V DC	▶ 3UF7300-1AB00-0
	110 ... 240 V AC/DC	▶ 3UF7300-1AU00-0
Bistable	24 V DC	▶ 3UF7310-1AB00-0
	110 ... 240 V AC/DC	▶ 3UF7310-1AU00-0



3UF7300-1AU00-0

Analog modules

Basic unit can be optionally expanded with analog inputs and outputs (0/4 ... 20 mA) by means of the analog module. ▶ **3UF7400-1AA00-0**

2 inputs (passive) for input and 1 output for output of 0/4 ... 20 mA signals, max. 1 analog module can be connected per pro V basic unit and max. 2 analog modules per pro V PN basic unit



3UF7400-1AA00-0

Ground-fault modules¹⁾

Ground-fault monitoring using 3UL23 residual-current transformers and ground-fault modules is used in cases where precise detection of the ground-fault current is required or power systems with high impedance are grounded. ▶ **3UF7510-1AA00-0**

With the ground-fault module, it is possible to determine the precise fault current as a measured value, and to define freely selectable warning and trip limits in a wide range from 30 mA ... 40 A.

1 input for connecting a 3UL23 residual-current transformer, up to 1 ground-fault module can be connected

Note:

For corresponding residual-current transformers, [see catalog IC 10](#).



3UF7510-1AA00-0

Temperature modules

Independently of the thermistor motor protection of the basic units, up to 3 analog temperature sensors can be evaluated using a temperature module. ▶ **3UF7700-1AA00-0**

Sensor types: PT100/PT1000, KTY83/KTY84 or NTC

3 inputs for connecting up to 3 analog temperature sensors, up to 1 temperature module can be connected per pro V basic unit and max. 2 temperature modules per pro V PN basic unit



3UF7700-1AA00-0

¹⁾ Possible with pro V basic unit from product version E10 or pro V PN basic unit from product version E04.

SIMOCODE 3 UF motor management and control devices

SIMOCODE pro 3UF7

Expansion modules

Selection and ordering data

Version

DT

Screw terminals



Article No.

Expansion modules for SIMOCODE pro S

With SIMOCODE pro S, it is possible to expand the type and number of inputs and outputs. The expansion module has two system interfaces on the front. Through the one system interface the expansion module is connected to the system interface of the SIMOCODE pro S using a connection cable; through the second system interface, the operator panel can be connected. The power supply for the expansion module is provided by the connection cable through the basic unit.

Note:

Please order connection cable separately, [see page 3/294](#).

Multifunction modules

The multifunction module is the expansion module of the SIMOCODE pro S device series with the following functions:

- Digital module function with four digital inputs and two monostable relay outputs
- Ground-fault module function with an input for the connection of a 3UL23 residual-current transformer with freely selectable warning and trip limits in a wide zone of 30 mA ... 40 A
- Temperature module function with an input for connecting an analog temperature sensor PT100, PT1000, KTY83, KTY84, or NTC

max. 1 multifunction module can be connected per pro S basic unit

Input voltage of the digital inputs:

- 24 V DC
- 110 ... 240 V AC/DC



3UF7600-1AB01-0



3UF7600-1AU01-0




3UF7600-1AU01-0

SIMOCODE 3 UF motor management and control devices

SIMOCODE pro 3UF7

Fail-safe expansion modules

Selection and ordering data

Version	DT	Screw terminals 
		Article No.

Fail-safe expansion modules for SIMOCODE pro V

Thanks to the fail-safe expansion modules, SIMOCODE pro V can be expanded with the function of a safety relay for the fail-safe disconnection of motors. A maximum of 1 fail-safe digital module can be connected; it can be used instead of a digital module.

The fail-safe expansion modules are equipped likewise with two system interfaces at the front for making the connection to other system components. Unlike other expansion modules, power is supplied to the modules through a separate terminal connection.

Note:

Please order connection cable separately, [see page 3/294](#).



3UF7320-1AB00-0

DM-F Local fail-safe digital modules¹⁾

For fail-safe disconnection using a hardware signal
2 relay enabling circuits, joint switching; 2 relay outputs, common potential disconnected fail-safe; inputs for sensor circuit, start signal, cascading and feedback circuit, safety function adjustable using DIP switches
Rated control supply voltage U_s :

- 24 V DC
- 110 ... 240 V AC/DC

- ▶ **3UF7320-1AB00-0**
- ▶ **3UF7320-1AU00-0**



3UF7330-1AB00-0

DM-F PROFIsafe fail-safe digital modules¹⁾

For fail-safe disconnection using PROFIBUS/PROFIsafe or PROFINET/PROFIsafe

2 relay enabling circuits, joint switching; 2 relay outputs, common potential disconnected fail-safe;
1 input for feedback circuit; 3 binary standard inputs
Rated control supply voltage U_s :

- 24 V DC
- 110 ... 240 V AC/DC

- ▶ **3UF7330-1AB00-0**
- ▶ **3UF7330-1AU00-0**

¹⁾ Only possible with SIMOCODE pro V basic unit, product version E07 and higher (from 05/2011) or SIMOCODE pro V PN basic unit.

Note:








System manual "SIMOCODE pro Safety Fail-Safe Digital Modules" [see](#)
<http://support.automation.siemens.com/WW/view/en/50564852>.

SIMOCODE 3 UF motor management and control devices

SIMOCODE pro 3UF7

Accessories

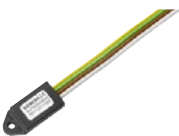


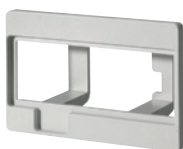


Selection and ordering data

Version		DT	Article No.															
Connection cables (essential accessory)																		
	Connection cables In different lengths for connecting basic unit, current measuring module, current/voltage measuring module, operator panel or expansion modules or decoupling module																	
3UF7932-0AA00-0	<table><thead><tr><th>Version</th><th>Length</th></tr></thead><tbody><tr><td>Flat</td><td>0.025 m</td></tr><tr><td>Flat</td><td>0.1 m</td></tr><tr><td>Flat</td><td>0.3 m</td></tr><tr><td>Flat</td><td>0.5 m</td></tr><tr><td>Round</td><td>0.5 m</td></tr><tr><td>Round</td><td>1.0 m</td></tr><tr><td>Round</td><td>2.5 m</td></tr></tbody></table>	Version	Length	Flat	0.025 m	Flat	0.1 m	Flat	0.3 m	Flat	0.5 m	Round	0.5 m	Round	1.0 m	Round	2.5 m	<div>▶ 3UF7930-0AA00-0</div> <div>▶ 3UF7931-0AA00-0</div> <div>▶ 3UF7935-0AA00-0</div> <div>▶ 3UF7932-0AA00-0</div> <div>▶ 3UF7932-0BA00-0</div> <div>▶ 3UF7937-0BA00-0</div> <div>▶ 3UF7933-0BA00-0</div>
Version	Length																	
Flat	0.025 m																	
Flat	0.1 m																	
Flat	0.3 m																	
Flat	0.5 m																	
Round	0.5 m																	
Round	1.0 m																	
Round	2.5 m																	
PC cables and adapters																		
	RS 232 PC cables For connecting to the serial interface of a PC/PG, for communication with SIMOCODE pro through the system interface	▶	3UF7940-0AA00-0															
3UF7940-0AA00-0																		
	USB PC cables For connecting to the USB interface of a PC/PG, for communication with SIMOCODE pro through the system interface	▶	3UF7941-0AA00-0															
3UF7941-0AA00-0																		
	USB/serial adapters To connect an RS 232 PC cable to to the USB interface of a PC, recommended for use in conjunction with SIMOCODE pro 3UF7	B	3UF7946-0AA00-0															
3UF7941-0AA00-0																		
Memory modules																		
	This enables transmission to a new system, e.g. when a device is replaced, without the need for additional aids or detailed knowledge of the device.																	
	Memory module for SIMOCODE pro C, SIMOCODE pro S and SIMOCODE pro V For saving the complete parameterization of a SIMOCODE pro C, SIMOCODE pro S or SIMOCODE pro V system	▶	3UF7900-0AA00-0															
3UF7900-0AA00-0																		
	Memory module for SIMOCODE pro V PROFINET For saving the complete parameterization of a SIMOCODE pro V PROFINET system	▶	3UF7901-0AA00-0															
Interface covers																		
	Interface covers For system interface																	
3UF7950-0AA00-0	<div>• Light gray</div> <div>• Titanium gray</div>	<div>▶</div> <div>A</div>	<div>3UF7950-0AA00-0</div> <div>3RA6936-0B</div>															
Addressing plugs																		
	Addressing plugs For assigning the PROFIBUS address without using a PC/PG to SIMOCODE pro through the system interface	▶	3UF7910-0AA00-0															
3UF7910-0AA00-0																		

SIMOCODE 3 UF motor management and control devices

SIMOCODE pro 3UF7

Accessories







Version	DT	Article No.								
Accessories for motor control center										
<p>With the draw-out technology often used in motor control centers it is possible to integrate a SIMOCODE pro initialization module in the switchboard on a permanent basis. Feeder-related parameter and address data can then be permanently assigned to this feeder.</p>										
 3UF7902-0AA00-0	<p>Initialization module¹⁾</p> <p>For automatic parameterization of SIMOCODE pro S, SIMOCODE pro V and SIMOCODE pro V PROFINET, for fixed-mounted installation in switchboards</p>	▶ 3UF7902-0AA00-0								
	<p>Y connection cable¹⁾</p> <p>For use in conjunction with the initialization module; connects the basic unit, current measuring module or current/voltage measuring module, and initialization module</p>									
	<table><tr><th>System interface length</th><th>Open cable end</th></tr><tr><td>0.1 m</td><td>1.0 m</td></tr><tr><td>0.5 m</td><td>1.0 m</td></tr><tr><td>1.0 m</td><td>1.0 m</td></tr></table>	System interface length	Open cable end	0.1 m	1.0 m	0.5 m	1.0 m	1.0 m	1.0 m	▶ 3UF7931-0CA00-0 ▶ 3UF7932-0CA00-0 ▶ 3UF7937-0CA00-0
	System interface length	Open cable end								
0.1 m	1.0 m									
0.5 m	1.0 m									
1.0 m	1.0 m									
Bus connection terminals										
 3UF7960-0AA00-0	<p>Bus connection terminal</p> <p>For shield support and strain relief of the PROFIBUS cable on a SIMOCODE pro S</p>	▶ 3UF7960-0AA00-0								
Door adapters										
 3UF7920-0AA00-0	<p>Door adapters</p> <p>For external connection of the system interface, e.g. outside a control cabinet</p>	▶ 3UF7920-0AA00-0								
Adapters for operator panel										
 3UF7922-0AA00-0	<p>Adapters for operator panel</p> <p>The adapter enables the smaller 3UF7200 operator panel from SIMOCODE pro to be used in a front panel cutout in which previously, e.g. after a change of system, a larger 3UF52 operator panel from SIMOCODE-DP had been used, degree of protection IP54</p>	▶ 3UF7922-0AA00-0								
Labeling strips										
 3UF7925-0AA02-0	<p>Labeling strips</p> <ul style="list-style-type: none">• For pushbuttons of the 3UF720 operator panel• For pushbuttons of the 3UF721 operator panel with display• For LEDs of the 3UF720 operator panel	▶ 3UF7925-0AA00-0 ▶ 3UF7925-0AA01-0 ▶ 3UF7925-0AA02-0								
Push-in lugs										
 3RV2928-0B	<p>Push-in lugs for screw fixing</p> <p>e.g. on mounting plate, 2 units required per device</p> <ul style="list-style-type: none">• Can be used for 3UF71.0, 3UF71.1 and 3UF71.2• Can be used for 3UF700, 3UF701, 3UF73, 3UF74, 3UF75 and 3UF77• Can be used for 3UF7020, 3UF7600	A 3RV2928-0B B 3RP1903 A 3ZY1311-0AA00								

¹⁾ Possible with pro V basic unit, product version E09 (11/2012) and higher, pro S basic unit or pro V PN basic unit.

SIMOCODE 3 UF motor management and control devices

SIMOCODE pro 3UF7

Accessories

Version	DT	Article No.
Terminal covers		
 3RT1956-4EA1	Covers for cable lugs and busbar connections <ul style="list-style-type: none"> Length 100 mm, can be used for 3UF71.3-1BA00-0 Length 120 mm, can be used for 3UF71.4-1BA00-0 	
	▶	3RT1956-4EA1
	▶	3RT1966-4EA1
 3RT1956-4EA2	Covers for box terminals <ul style="list-style-type: none"> Length 25 mm, can be used for 3UF71.3-1BA00-0 Length 30 mm, can be used for 3UF71.4-1BA00-0 	
	▶	3RT1956-4EA2
	▶	3RT1966-4EA2
 3RT1956-4EA3	Covers for screw terminals Between contactor and current measuring module or current/voltage measuring module for direct mounting	
	▶	3RT1956-4EA3
	▶	3RT1966-4EA3
Box terminal blocks		
 3RT195-4G	Box terminal blocks For round and ribbon cables	
	▶	3RT1955-4G
	▶	3RT1956-4G
 3RT196-4G	<ul style="list-style-type: none"> Up to 70 mm², can be used for 3UF71.3-1BA00-0 Up to 120 mm², can be used for 3UF71.3-1BA00-0 Up to 240 mm², can be used for 3UF71.4-1BA00-0 	
	▶	3RT1955-4G
	▶	3RT1966-4G
Bus termination modules		
 3UF1900-1KA00	Bus termination modules With separate control supply voltage for bus termination following the last unit on the bus line Supply voltage:	
	• 115/230 V AC	C 3UF1900-1KA00
	• 24 V DC	C 3UF1900-1KB00


SIMOCODE 3 UF motor management and control devices

SIMOCODE pro 3UF7

Accessories

Parameterization and service software for SIMOCODE pro 3UF7

- Delivered without PC cable

Version	DT	Article No.
SIMOCODE ES (TIA Portal) V12 Basic		
	Floating License for one user Engineering software, software and documentation on DVD, 6 languages (German/English/French/Italian/Spanish/Chinese), for all SIMOCODE pro with PROFIBUS, online functions through system interface)	
	<ul style="list-style-type: none"> License key on USB stick, Class A License key download, Class A 	<ul style="list-style-type: none"> ▶ 3ZS1322-4CC10-0YA5 ▶ 3ZS1322-4CE10-0YB5
3ZS1312-4CC10-0YA5		
SIMOCODE ES (TIA Portal) V12 Standard		
	Floating License for one user Engineering software, software and documentation on DVD, 6 languages (German/English/French/Italian/Spanish/Chinese), for all SIMOCODE pro with PROFIBUS, online functions through system interface parameterizing with integrated graphics editor (CFC-based)	
	<ul style="list-style-type: none"> License key on USB stick, Class A License key download, Class A 	<ul style="list-style-type: none"> ▶ 3ZS1322-5CC10-0YA5 ▶ 3ZS1322-5CE10-0YB5
	Upgrade for SIMOCODE ES 2007	A 3ZS1322-5CC10-0YE5
	Floating license for one user, engineering software, software and documentation on DVD, license key on USB stick, Class A, 6 languages (German/English/French/Italian/Spanish/Chinese), combo license for parallel use of SIMOCODE ES 2007 and SIMOCODE ES V12, for all SIMOCODE pro with PROFIBUS, online functions through the system interface, parameterizing with integrated graphics editor (CFC-based)	
	Powerpack for SIMOCODE ES V12 Basic	A 3ZS1322-5CC10-0YD5
	Floating license for one user, engineering software, license key on USB stick, Class A, 6 languages (German/English/French/Italian/Spanish/Chinese), for all SIMOCODE pro with PROFIBUS, online functions through the system interface, parameterizing with integrated graphics editor (CFC-based)	
	Software Update Service	▶ 3ZS1322-5CC10-0YL5
	For 1 year with automatic extension, assuming the current software version is in use, engineering software, software and documentation on DVD, online functions through the system interface, parameterizing with integrated graphics editor (CFC-based)	

Notes:

Please order PC cable separately, [see page 3/294](#).

More information see catalog IC 10, chapter 14 "Parameterization, Configuration and Visualization with SIRIUS" or Industry Mall.

SIMOCODE 3 UF motor management and control devices

SIMOCODE pro 3UF7

Accessories

Version	DT	Article No.
SIMOCODE ES (TIA Portal) V12 Premium		
Floating License for one user Engineering software, software and documentation on DVD, 6 languages (German/English/French/Italian/ Spanish/Chinese), for all SIMOCODE pro with PROFIBUS, online functions through system interface and PROFIBUS, parameterizing with integrated graphics editor (CFC-based)		
<ul style="list-style-type: none"> • License key on USB stick, Class A 	►	3ZS1322-6CC10-0YA5
<ul style="list-style-type: none"> • License key download, Class A 	►	3ZS1322-6CE10-0YB5
Upgrade for SIMOCODE ES 2007 Floating license for one user, engineering software, software and documentation on DVD, license key on USB stick, Class A, 6 languages (German/English/French/Italian/ Spanish/Chinese), combo license for parallel use of SIMOCODE ES 2007 and SIMOCODE ES V12, for all SIMOCODE pro with PROFIBUS, online functions through the system interface and PROFIBUS, parameterizing with integrated graphics editor (CFC-based)	A	3ZS1322-6CC10-0YE5
Powerpack for SIMOCODE ES V12 Standard Floating license for one user, engineering software, license key on USB stick, Class A, 6 languages (German/English/French/Italian/ Spanish/Chinese), for all SIMOCODE pro with PROFIBUS, online functions through system interface and PROFIBUS, parameterizing with integrated graphics editor (CFC-based)	A	3ZS1322-6CC10-0YD5
Software Update Service For 1 year with automatic extension, assuming the current software version is in use, engineering software, software and documentation on DVD, online functions through the system interface and PROFIBUS, parameterizing with integrated graphics editor (CFC-based)	►	3ZS1322-6CC10-0YL5

Notes:

Please order PC cable separately, [see page 3/294](#).

More information [see catalog IC 10, chapter 14 "Parameterization, Configuration and Visualization with SIRIUS"](#) or [Industry Mall](#).

SIMOCODE 3 UF motor management and control devices

SIMOCODE pro 3UF7

Accessories

Version	DT	Article No.
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SIMOCODE ES 2007 Basic



Floating License for one user

Engineering software,
software and documentation on CD,
3 languages (German/English/French),
communication through system interface

- License key on USB stick, Class A
- License key download, Class A

- ▶ **3ZS1312-4CC10-0YA5**
- ▶ **3ZS1312-4CE10-0YB5**

3ZS1312-4CC10-0YA5

SIMOCODE ES 2007 Standard

Floating License for one user

Engineering software,
software and documentation on CD,
3 languages (German/English/French),
communication through system interface,
integrated graphics editor

- License key on USB stick, Class A
- License key download, Class A

- ▶ **3ZS1312-5CC10-0YA5**
- ▶ **3ZS1312-5CE10-0YB5**

Upgrade for SIMOCODE ES 2004 and later

A **3ZS1312-5CC10-0YE5**

Floating license for one user,
engineering software,
software and documentation on CD,
license key on USB stick, Class A,
3 languages (German/English/French),
communication through system interface,
integrated graphics editor

Powerpack for SIMOCODE ES 2007 Basic

A **3ZS1312-5CC10-0YD5**

Floating license for one user,
engineering software,
license key on USB stick, Class A,
3 languages (German/English/French),
communication through system interface,
integrated graphics editor

Software Update Service

▶ **3ZS1312-5CC10-0YL5**

For 1 year with automatic extension,
assuming the current software version is in use,
engineering software,
software and documentation on CD,
communication through system interface,
integrated graphics editor

Notes:

Please order PC cable separately, [see page 3/294](#).

More information [see catalog IC 10](#), chapter 14 "Parameterization, Configuration and Visualization with SIRIUS" or Industry Mall.

SIMOCODE 3 UF motor management and control devices

SIMOCODE pro 3UF7

Accessories

Version	DT	Article No.
SIMOCODE ES 2007 Premium		
Floating License for one user Engineering software, software and documentation on CD, 3 languages (German/English/French), communication through PROFIBUS/PROFINET or system interface, integrated graphics editor, STEP7 Object Manager		
<ul style="list-style-type: none"> • License key on USB stick, Class A 	►	3ZS1312-6CC10-0YA5
<ul style="list-style-type: none"> • License key download, Class A 	►	3ZS1312-6CE10-0YB5
Upgrade for SIMOCODE ES 2004 and later Floating license for one user, engineering software, software and documentation on CD, license key on USB stick, Class A, 3 languages (German/English/French), communication through PROFIBUS/PROFINET or system interface, integrated graphics editor, STEP7 Object Manager	A	3ZS1312-6CC10-0YE5
Powerpack for SIMOCODE ES 2007 Standard Floating license for one user, engineering software, license key on USB stick, Class A, 3 languages (German/English/French), communication through PROFIBUS/PROFINET or system interface, integrated graphics editor, STEP7 Object Manager	A	3ZS1312-6CC10-0YD5
Software Update Service For 1 year with automatic extension, assuming the current software version is in use, engineering software, software and documentation on CD, communication through PROFIBUS/PROFINET or system interface, integrated graphics editor, STEP7 Object Manager	►	3ZS1312-6CC10-0YL5

Notes:


Please order PC cable separately, [see page 3/294](#).

More information [see catalog IC 10, chapter 14 "Parameteriza-
tion, Configuration and Visualization with SIRIUS"](#) or Industry
Mall.

SIMOCODE 3 UF motor management and control devices

SIMOCODE pro 3UF7

Accessories

Version	DT	Article No.
SIMOCODE pro block library for SIMATIC PCS 7 Version V8 with Advanced Process Library (APL)		
 3ZS1632-1XX02-0YA0	Engineering software V8 ▶	3ZS1632-1XX02-0YA0
	Runtime license V8 ▶	3ZS1632-2XX02-0YB0
	Upgrade for PCS 7 block library SIMOCODE pro, V6.0 or V7 to version SIMOCODE pro V8 A	3ZS1632-1XX02-0YE0

Engineering software V8

For one engineering station (single license) including runtime software for execution of the AS modules in an automation system (single license), German/English

Scope of supply:
AS modules and faceplates for integrating SIMOCODE pro into the PCS 7 process control system, with Advanced Process Library, for PCS 7 version V8.0

Type of delivery:
Software and documentation on CD,
one license for one engineering station,
one license for one automation system

Runtime license V8

For execution of the AS modules in an automation system (single license)
Required for using the AS modules of the engineering software V8 within a plant

Type of delivery:
One license for one automation system, without software and documentation

Upgrade for PCS 7 block library SIMOCODE pro, V6.0 or V7 to version SIMOCODE pro V8

For one engineering station (single license) including runtime software for execution of the AS modules in an automation system (single license), German/English

Scope of supply:
AS modules and faceplates for integrating SIMOCODE pro into the PCS 7 process control system, with Advanced Process Library, for PCS 7 version V8.0

Type of delivery:
Software and documentation on CD,
one license for one engineering station,
one license for one automation system

Notes:


Please order PC cable separately, [see page 3/294](#).

More information [see catalog IC 10, chapter 14 "Parameterization, Configuration and Visualization with SIRIUS"](#) or [Industry Mall](#).

SIMOCODE 3 UF motor management and control devices

SIMOCODE pro 3UF7

Accessories

Version	DT	Article No.
SIMOCODE pro block library for SIMATIC PCS 7 Version 7		
 <p>Engineering software V7 ▶</p> <p>For one engineering station (single license) including runtime software for execution of the AS modules in an automation system (single license), German/English/French</p> <p>Scope of supply: AS modules and faceplates for integrating SIMOCODE pro into the PCS 7 process control system, for PCS7 version V7.0/V7.1</p> <p>Type of delivery: Software and documentation on CD, one license for one engineering station, one license for one automation system</p>		3UF7982-0AA10-0
<p>Runtime license V7 ▶</p> <p>For execution of the AS modules in an automation system (single license)</p> <p>Required for using the AS modules of the engineering software V7 or the engineering software migration V7-V8 on an additional automation system within a plant</p> <p>Type of delivery: One license for one automation system, without software and documentation</p>		3UF7982-0AA11-0
<p>Upgrade for PCS 7 block library SIMOCODE pro, V6.0 or V6.1 to version SIMOCODE pro V7.0/V7.1 A</p> <p>For one engineering station (single license) including runtime software for execution of the AS modules in an automation system (single license), German/English/French</p> <p>Scope of supply: AS modules and faceplates for integrating SIMOCODE pro into the PCS 7 process control system, for PCS7 version V7.0 or V7.1</p> <p>Type of delivery: Software and documentation on CD, one license for one engineering station, one license for one automation system</p>		3UF7982-0AA13-0
<p>Engineering software migration V7-V8 ▶</p> <p>For upgrading (migrating) an existing engineering software V7 of the SIMOCODE pro block library for PCS 7</p> <p>Conditions of use: Availability of the engineering software V7 (license) of the SIMOCODE pro block library for PCS 7 for the PCS 7 version V7.0 or V7.1</p> <p>The engineering software migration V7-V8 can be installed directly onto a system with PCS 7 version V8.0; installation of the previous version is unnecessary.</p> <p>For one engineering station (single license) including runtime software for execution of the AS modules in an automation system (single license), German/English/French</p> <p>Scope of supply: AS modules and faceplates for integrating SIMOCODE pro into the PCS 7 process control system, for PCS 7 version V8.0</p> <p>Type of delivery: software and documentation on CD, license for upgrading an existing license for one engineering station and a plant's assigned runtime licenses</p>		3UF7982-0AA20-0

Notes:

Please order PC cable separately, [see page 3/294](#).




More information [see catalog IC 10, chapter 14 "Parameterization, Configuration and Visualization with SIRIUS" or Industry Mall](#).

Programming and Operating Manual SIMOCODE pro Library for PCS 7 [see](#)
<http://support.automation.siemens.com/WW/view/en/49963525>.

Overview

The 3UF18 current transformers are protection transformers and are used for actuating overload relays. Protection transformers are designed to ensure proportional current transfer up to a multiple of the primary rated current. The 3UF18 current transformers convert the maximum current of the corresponding operating range into the standard value of 1 A secondary.

Selection and ordering data

Mounting type	Operating range	DT	Screw terminals	
			Article No.	
A				
For stand-alone installation				
	Screw fixing and snap-on mounting onto TH 35 standard mounting rail according to IEC 60715	0.25 ... 2.5 ¹⁾	C	3UF1843-1BA00
		1.25 ... 12.5 ¹⁾	C	3UF1843-2AA00
		2.5 ... 25 ¹⁾	C	3UF1843-2BA00
		12.5 ... 50	C	3UF1845-2CA00
		16 ... 65	C	3UF1847-2DA00
		25 ... 100	C	3UF1848-2EA00
3UF1843				
For mounting onto contactors and stand-alone installation				
	Screw fixing	32 ... 130	C	3UF1850-3AA00
		50 ... 200	C	3UF1852-3BA00
		63 ... 250	C	3UF1854-3CA00
		100 ... 400	C	3UF1856-3DA00
		125 ... 500	C	3UF1857-3EA00
		160 ... 630	C	3UF1868-3FA00
		205 ... 820	C	3UF1868-3GA00
3UF1868				


¹⁾ The following setting ranges for the protection of EEx e motors are applicable:

3UF1843-1BA00, 0.25 ... 1.25 A;

3UF1843-2AA00, 1.25 ... 6.3 A;

3UF1843-2BA00, 2.5 ... 12.5 A.

Accessories

For contactor type	DT	Article No.
Terminal covers		
 3TX7466-0A	For transformer/contactor combinations and stand-alone installation for transformer (cover required per connection side)	
	3UF1845	D
	3UF1848	D
	3UF1850, 3UF1852	B
	3UF1854 to 3UF1857	B
	3UF1868-3FA00	B
	3UF1868-3GA00	B
For covering the screw terminal for direct mounting on contactor (cover required per contactor/transformer combination)		
3UF1848	D	3TX7466-0B
3UF1850, 3UF1852	D	3TX7506-0B
3UF1854 to 3UF1857	D	3TX7536-0B
3UF1868-3FA00	C	3TX7686-0B
3UF1868-3GA00	C	3TX7696-0B

SIMOCODE 3 UF motor management and control devices

Notes

3

Reacting



4/2	SIRIUS Industrial controls	4/55	Distributed IO for usage in the field	4/158	Engineering software
4/2	SIRIUS modular system	4/55	ET 200pro motor starters	4/158	SIZER for Siemens Drives engineering tool
4/4	Distributed IO for usage in control cabinets	4/59	Standard motor starters	4/159	STARTER commissioning tool
4/4	SIRIUS 3RM1 motor starters failsafe	4/60	High-Feature motor starters	4/160	Startdrive commissioning tool
4/10	3RM11 direct-on-line starters	4/61	ET 200pro Safety motor starters solutions local / PROFIsafe	4/162	SIMOTION motion control system
4/11	3RM13 reversing starters	4/65	Safety modules local	4/162	SIMOTION D - Drive-based
4/12	Accessories	4/70	Accessories	4/165	SIMOTION D Safety Integrated
4/17	ET 200S motor starters and safety motor starters	4/72	SINAMICS drives with integrated safety functions	4/166	SINUMERIK CNC automation systems
4/24	Standard motor starters	4/73	Converter/inverter selection	4/166	Safety Integrated with SINUMERIK
4/25	Standard terminal modules	4/74	The members of the SINAMICS family	4/166	SINUMERIK 840D sl
4/27	High-Feature motor starters	4/77	Safety Integrated by SINAMICS	4/168	SINUMERIK 828D
4/29	High-Feature terminal modules	4/88	Safety Integrated by SINAMICS G120C	4/169	SIDOOR door control system
4/30	Power modules	4/94	Safety Integrated by SINAMICS G120	4/169	For industrial applications
4/31	Power module terminal modules	4/114	Safety Integrated by SINAMICS G110D	4/169	SIDOOR ATD400W
4/32	ET 200S failsafe motor starters	4/119	Safety Integrated by SINAMICS G120D		
4/34	Terminal modules for failsafe motor starters	4/127	Safety Integrated by SINAMICS G130		
4/35	Safety modules local and PROFIsafe	4/132	Safety Integrated by SINAMICS G150		
4/44	Safety modules local and PROFIsafe terminal modules	4/138	Safety Integrated by SINAMICS S110		
4/46	Accessories	4/146	Safety Integrated by SINAMICS S120		
4/54	Optional accessories for ET 200S, ET 200pro, motor starters	4/153	Safety Integrated by SINAMICS S150		
4/51	ET 200S - Software				
4/51	Motor starter ES				

Delivery time class (DT)

► Preferred type	Preferred types are available immediately from stock, i.e. are dispatched within 24 hours.
A 2 working days	
B 1 week	
C 3 weeks	Normal quantities of the products are usually delivered within the specified time following receipt of your order at our branch.
D 6 weeks	In exceptional cases, the actual delivery time may differ from that specified.
X On request	The standard transport time for Germany is 1 day.
	The delivery times specified here represent the situation in October 2013.

SIRIUS industrial controls

Controls made easy: SIRIUS modular system

In the area of safety engineering users want cost-effective solutions which can be easily integrated in control cabinets, distribution boards or distributed systems and which can communicate perfectly with each other.

**Our response to their demands are
SIRIUS industrial controls.**

The SIRIUS range has everything you need for switching, protecting and starting loads. Products for monitoring, control, detection, commanding, signaling and power supply round off the spectrum of industrial controls.

Building control cabinets should be quick, easy, flexible and space-saving. But how can all these requirements be met simultaneously? The answer lies in the unique SIRIUS modular system up to 250 kW / 400 V, where you will find everything that you need for switching, protecting and starting motors and industrial systems.

Furthermore, all components of the SIRIUS modular system are characterized by a space-saving design and high flexibility and are optimally coordinated with each other. Configuring, installing, wiring and maintenance are extremely easy and time-saving to perform.

Regardless of whether you want to build up your own load feeders with motor starter protectors/circuit breakers or overload relays, contactors or soft starters, or decide instead in favor of pre-assembled feeders: SIRIUS has the right product for every application.

Continuous further development and regular innovations ensure that our customers are optimally equipped with SIRIUS and benefit from efficient solutions - today and tomorrow.

Systematic further development – SIRIUS Innovations

SIRIUS has long been synonymous world-wide with industrial controls and has been a trendsetter in this field from the very beginning. The SIRIUS modular system with its components for the switching, starting, protection and monitoring of motors and industrial systems stands for the fast, flexible and space-saving construction of control cabinets.

The consistent further development of SIRIUS takes even better account of current market requirements, particularly the call for fewer variants, greater flexibility and reduced cost and time. The advantages for you are: higher productivity and cost efficiency in your company.

Clicking replaces wiring

In the portfolio of the SIRIUS modular system you can trust on finding perfectly coordinated and flexibly combinable components which now are even easier to install: plug in place, connect, click and that's it! Complicated wiring is a thing of the past, as are wiring errors. For you this means a significant reduction of time and cost.



Innovative through and through

The SIRIUS modular system in sizes S00 and S0 up to 40 A has been completely revised - with respect to the main and control circuit. As the result, the innovative basic components such as circuit breakers and contactors provide a host of advantages to optimize your plant, today and in the future. Often the innovation is to be found in the details. For example, more power in the same design and the bundling of functions in basic devices for notable space savings.

At the same time the innovations enable the greatest flexibility. Be it direct starting, reverse starting or wye-delta starting for customer assembly, as a tested combination or an "all-in-one" solution complete with the compact starter, for soft starting or for frequent switching: the SIRIUS modular system offers the perfect answer.

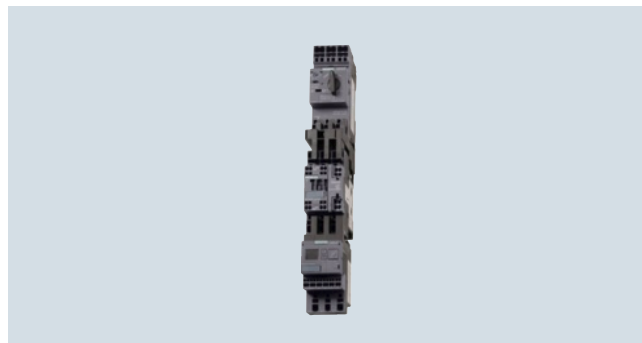
More information on SIRIUS Industrial Controls, e.g. on contactors and safety relays, is provided in catalog IC 10.



Overview**More space in the control cabinet**

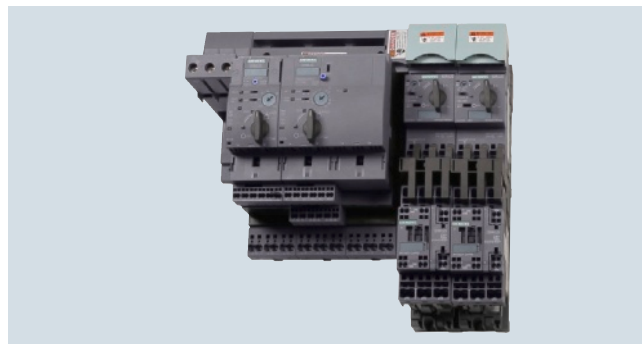
The modular system packs powerful performance into its compact sizes:

- Integrated monitoring relay in the motor feeder
- Application monitoring in the main circuit
- Integrated plug-in design combined with spring-type terminals

**Achieve faster results with pre-configured components**

Simply connect pre-configured components via the infeed system and save wiring outlay:

- Time-saving plug-in design for motor feeders
- Replacement of the compact starters and load feeders without disconnecting the main circuit wiring
- Reduce effort and downtimes
- Solutions for direct-on-line starters, reversing starters, contactor assemblies for wye-delta starting, soft starters and safe load feeders

**Produktauswahl**

For the SIRIUS product range, we offer a variety of configurators. These facilitate the selection of the right products and systems for your application.

Simply choose the desired characteristics and after a few clicks, the optimal solution will be presented to you.

The products can then be ordered conveniently through the Industry Mall.

You can find more information under www.siemens.com/sirius/configurators.

Planning Efficiency

With Planning Efficiency, Siemens Industry has provided answers to typical questions that often come up in electrical planning:

- What is the right product for my application?
- Where can I find product data?
- How can I design processes in a more efficient and time-saving way?

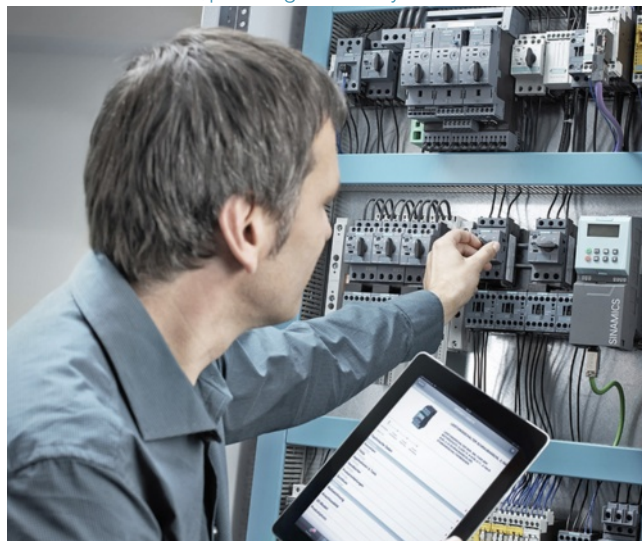
Planning Efficiency brings together the whole of Siemens Industry's electronic support. At each stage of the project, online functions make the everyday life of the planner easier through greater efficiency. At the same time, Planning Efficiency focuses on aspects such as optimization in the configuring of control cabinets.

In this early phase in electrical planning in particular, savings of up to 80 % can be made in time and costs.

Without Planning Efficiency a lot of time used to be wasted in manual data transmission. Now you can concentrate on the essentials again.

All the information and product data you need are provided by Siemens Industry and are easily accessible. This makes configuring control cabinets more efficient and makes your everyday work easier.

For more information see www.siemens.com/planning-efficiency.



Distributed IO for usage in control cabinets

SIRIUS 3RM1 motor starters failsafe

General data

Overview



3RM13 motor starter with reversing functionality, electronic overload protection and safety-related shutdown

SIRIUS 3RM1 motor starters are compact devices 22.5 mm wide, combining a large number of functions in a single enclosure. They consist of combinations of relay contacts, power semiconductors (hybrid technology), and a solid-state overload relay for operational switching of three-phase motors up to 3 kW (at 400 V) and resistive loads up to 10 A at AC voltages up to 500 V

Characteristic	Value
Rated current (wide setting range of the electronic overload release)	0.1 ... 0.5 A 0.4 ... 2.0 A 1.6 ... 7.0 A (10 A)
Rated operational voltage	48 ... 500 V
Rated frequency	50/60 Hz
Rated control supply voltage	24 V DC, 110 V DC, 110 ... 230 V AC
Trip class	CLASS 10A

The 3RM1 motor starters with overload protection with wide setting range are offered as direct-on-line starters and reversing starters with safety-related shutdown.

The 3RM1 motor starters are available in two versions:

Characteristic	3RM11	3RM13
Direct-on-line starters	✓	--
Reversing starters	--	✓
Overload protection with wide setting range	✓	✓
ATEX certification overload protection	✓	✓
Safety-related shutdown up to SIL 3/PL e	✓	✓

✓ Function available

-- Function not available

Hybrid technology

The 3RM1s combine the benefits of semiconductor technology and relay technology. This combination is also known as hybrid technology. The hybrid technology in the motor starter is characterized by the following features:

- The inrush current is conducted briefly via the semiconductors.
Advantage: protection of relay contacts, long service life due to low wear
- The uninterrupted current is conducted via relay contacts.
Advantage: lower heat losses compared with the semiconductor.
- Shutdown is implemented again via the semiconductor.
Advantage: the contacts are only slightly exposed to arcs, and this results in a longer service life.

Functional density/space requirement

The 3RM1 motor starters combine the functions of direct-on-line/reversing starting, electronic overload protection and safety-related shutdown in a single device, without changing in size.

For simple applications (such as starting and reversing three-phase loads with overload protection), motor starter combinations of power contactors and a solid-state overload relay, for example, can be replaced by a 3RM1 device. The more functions are required, the more devices can be replaced. The surface area required for each motor starter in the control cabinet is reduced by values of 20 to 80 %.

In the case of assemblies and grouped feeder units there are further advantages.

Wiring outlay

By combining various functions in a single device, wiring outlay is reduced. The greater the scope of functions, the greater the saving in wiring. Savings can be made in:

- supply line, motor feeder and connections between the devices in the main circuit
- wiring of the reversing contactor assembly in the main circuit, if required
- contact locking if there is a reversing contactor assembly in the control circuit
- control cables for coil terminals in the control circuit

These savings reduce the time required for the wiring itself, while at the same time reducing both the risk of wiring errors and the amount of testing required after control cabinets have been completed.

Configuration and stock keeping

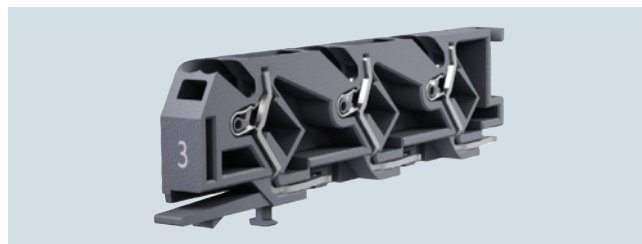
The wide setting range of the electronic overload release (up to 1:5) reduces the cost of keeping stocks and the considerations involved in configuration where the actual motor current to be expected is concerned. Compared with protection equipment with thermal overload protection, only 3 versions are now required, instead of 17, to cover a current range of 0.1 to 7 A when using the 3RM1.

Connection methods

The 3RM1 is available with screw terminals and spring-type terminals or mixed connection method (screw terminals for the main circuit and push-in terminals for the control circuit).



Screw terminal for removable terminal (3-pole) for 3RM1 motor starters and 3SK1 safety relays



Spring-type terminal as push-in connection for removable terminal (3-pole) for 3RM1 motor starters and 3SK1 safety relays

Distributed IO for usage in control cabinets

SIRIUS 3RM1 motor starters failsafe

General data

Push-in connection method

Push-in connections are a form of spring-type connection allowing fast wiring without tools for rigid conductors or conductors equipped with end sleeves.

Finely-stranded or stranded conductors with no end sleeve are wired using a screwdriver (with a 3.0 x 0.5 mm blade).

As with other spring-type terminals, a screwdriver is also required to release the conductor. The same tool as above can be used for this purpose.

The advantages of the push-in terminals are found, as with all spring-type terminals, in speed of assembly and disassembly and vibration-proof connection. There is no need for the checking and tightening required with screw terminals.



Screw terminals



Spring-type terminals

The terminals are indicated in the corresponding tables by the symbols shown on orange backgrounds.

Innovative enclosure concept

① Terminals

The terminals are easy to replace, optionally with screw or spring-type connections:

- 1,2,3: 3-pole terminals for the control circuit
- 4,5,6: 2-pole terminals for the main circuit

② Labeled cover caps

To access the top and bottom terminals, the covers must be opened. To facilitate orientation, there is a laser inscription on the inside of the caps for the connections.

③ Sealable cover

To protect against unauthorized access, a sealable cover can be attached.

④ LED status display

You can see at a glance from the LED status display whether operation is normal or whether faults exist. This allows fast, selective commissioning. Faults can be quickly traced and even more quickly corrected.

⑤ Rotary coding switch

The current of the motor to be monitored can be set using the rotary coding switch. When a motor is replaced, it can be adapted within the respective wide setting range. This means that in most cases the motor starter does not have to be replaced.

⑥ TEST/RESET button

Acknowledgment in the event of a fault:

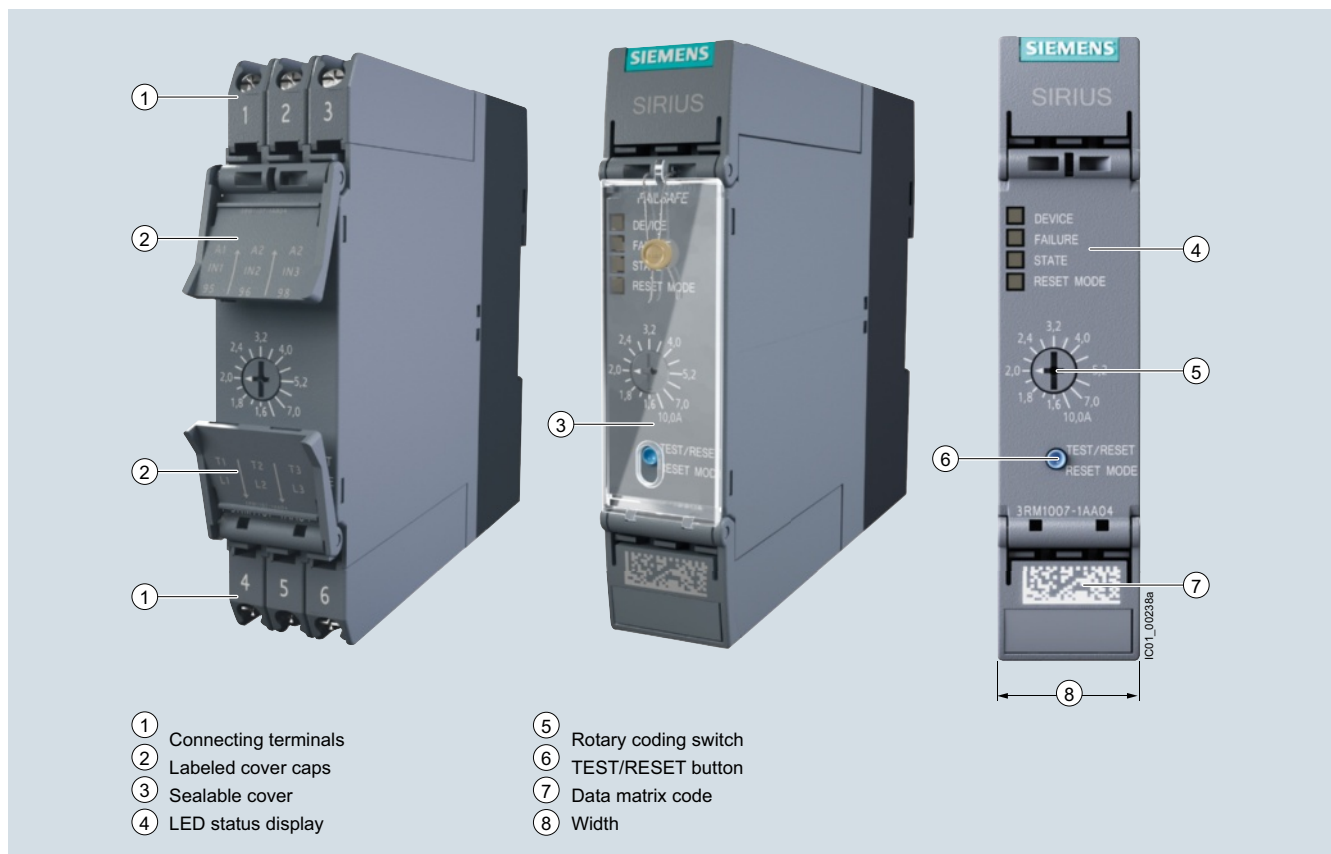
1. Resetting in the event of overload
2. Performance of the test function
3. Switching from manual to auto reset

⑦ 2D matrix code

The 2D matrix code enables simple and fast scanning in of article numbers and serial numbers.

⑧ Width

The width of only 22.5 mm saves space in the control cabinet, and is thus cost-effective, especially in plants with a large number of small motors up to 3 kW.



Innovative enclosure concept for the SIRIUS 3RM1 motor starters

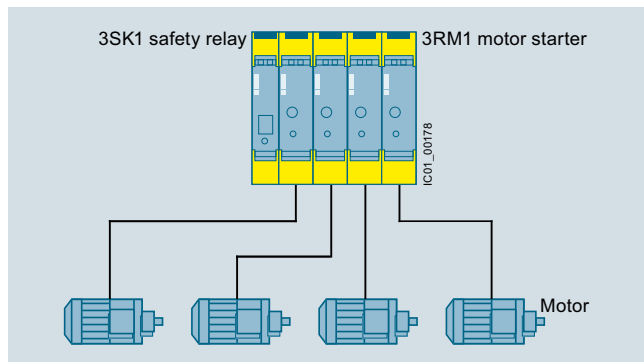
Distributed IO for usage in control cabinets

SIRIUS 3RM1 motor starters failsafe

General data

Safety-related shutdown/safety integration

Thanks to the redundant design of the main circuit and internal monitoring, safety-related shutdown in accordance with SIL 3/PL e is possible by shutting down the control supply voltage with 3RM11 Failsafe and 3RM13 Failsafe motor starters. Additional safety relays are not required in the main circuit.



Combination of four SIRIUS 3RM1 Failsafe motor starters with SIRIUS 3SK1 safety relay to allow safety-related collective disconnection of connected motors

3RM1 motor starters are ideal for combining with the 3SK1 safety relay (see ["Safety Technology" → "SIRIUS 3SK1 Safety Relays"](#)). They can be combined by means of:

- conventional wiring
- a special device connector

This makes it very simple to shut down connected motors collectively. The wiring, and ultimately the shutting down of the control supply voltage in Emergency-Stop situations, is performed via the device connector. There is no further need for complex looping of the connecting cables.

Infeed system for the main circuit

The 3RM19 infeed system available as an accessory for the main circuit with three-phase busbars allows fast, virtually error-free wiring of motor starters on the mains connection side and may reduce the number of short-circuit protective devices.

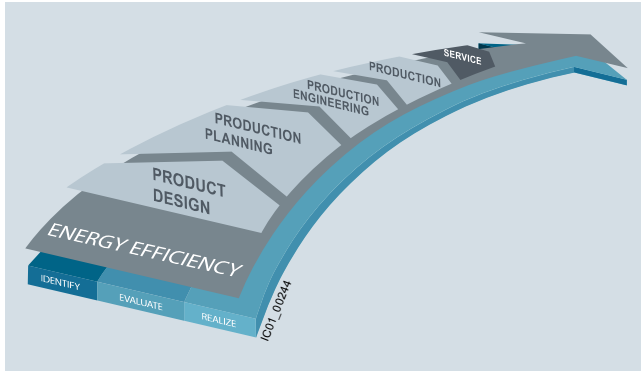
Distributed IO for usage in control cabinets

SIRIUS 3RM1 motor starters failsafe

General data

Benefits

Advantages through energy efficiency



Overview of the energy management process

We offer you a unique portfolio for industrial energy management, using an energy management system that helps to optimally define your energy needs. We split up our industrial energy management into three phases – identify, evaluate, and realize – and we support you with the appropriate hardware and software solutions in every process phase.

The innovative products of the SIRIUS industrial controls portfolio can also make a substantial contribution to a plant's energy efficiency (see www.siemens.com/sirius/energysaving).

With 3RM1 motor starters, control cabinets warm up less because power losses have been reduced by operation:

- Lower intrinsic power loss (than comparable motor feeders with thermal overload trips) thanks to electronic current analysis
- Lower control circuit power losses (compared with conventional switching devices) as a result of electronic control of switching points
- Thanks to the above advantages, additional energy savings are possible because less cooling is required (and a more compact design is possible)

Product advantages

The SIRIUS 3RM1 motor starters offer a number of benefits:

- Greater endurance and reduced heat losses thanks to hybrid technology
- Less space required in the control cabinet (20 to 80 %) as a result of greater functional density
- Less wiring and testing required as a result of integrating several functions into a single device
- Lower costs for stock keeping and configuration as a result of the wide setting range of the electronic overload release (up to 1:5)
- Fast wiring without tools for rigid conductors or conductors equipped with end sleeves thanks to push-in spring-type connections
- Safety-related shutdown in accordance with SIL3/PLe by shutting down the control supply voltage without additional devices in the main circuit
- Virtually error-free wiring on the mains connection side and reduction in short-circuit protective devices by means of 3RM19 infeed system
- ATEX certification: "Increased safety" type of protection EEx e according to ATEX Directive 94/9/EC (3RM1 motor starters in the Failsafe version are suitable for overload protection of explosion-proof motors with "increased safety" type of protection EEx e)

Application

3RM1 motor starters are designed for applications in which small motors have to be connected in the most confined spaces.

Main areas of use

- Conveyor systems
- Logistics systems
- Production machines
- Machine tools
- Small elevators

Standards and approvals

The motor starter complies with the following standards:

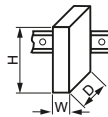
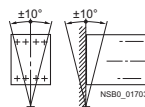
- IEC/EN 60947-4-2
- UL 508
- ATEX
- IEC 61508-1: SIL3
- ISO 13849: PLe

Distributed IO for usage in control cabinets

SIRIUS 3RM1 motor starters failsafe

General data

Technical specifications

Type	3RM1	
Mechanics and environment		
Dimensions (W x H x D) <ul style="list-style-type: none">WidthHeightDepth		mm 22.5 mm 100 mm 136.5 (from the standard mounting rail) 141.6 (entire enclosure depth)
Ambient temperature <ul style="list-style-type: none">During operationDuring storageDuring transport	°C °C °C	-25 ... +60 -40 ... +70 -40 ... +70
Installation altitude at height above sea level, maximum	m	2 000
Shock resistance		6g / 11 ms
Vibration resistance		1 ... 6 Hz, 15 mm; 20 m/s², 500 Hz
IP degree of protection		IP20
Mounting position		
Electromagnetic compatibility (EMC)		
Emitted interference <ul style="list-style-type: none">Conducted RF interference emission according to CISPR11Non-conducted RF interference emission according to CISPR11		Class B for residential, business and commercial applications Class B for residential, business and commercial applications
Interference immunity <ul style="list-style-type: none">Electrostatic discharge according to IEC 61000-4-2Conducted interference as high frequency interference according to IEC 61000-4-6Conducted interference BURST according to IEC 61000-4-4Conducted interference - phase-to-ground SURGE according to IEC 61000-4-5Conducted interference - phase-to-phase SURGE according to IEC 61000-4-5		4 kV contact discharge / 8 kV air discharge 10 V 2 kV / 5 kHz 2 kV 1 kV

Article No.

3RM1 .01

3RM1 .02

3RM1 .07

Main circuit

Operational voltage rated value maximum		V	500		
Operating frequency					
• 1 rated value	Hz	50			
• 2 rated value	Hz	60			
Insulation voltage rated value		V	600		
Impulse withstand voltage rated value		kV	6		
Operational current at 400 V at AC rated value		A	0.5	2	7
Active power loss typical		W	0.02	0.3	3.4
Minimum load in % of I_M		%	20		
Adjustable response value current					
• of the inverse-time delayed overload release	A	0.1 ... 0.5	0.4 ... 2	1.6 ... 7	

Distributed IO for usage in control cabinets

SIRIUS 3RM1 motor starters failsafe

General data

Article No.		3RM1 ...-AA0.	3RM1 ...-AA1.
Control circuit			
Type of voltage of the control supply voltage		DC	AC/DC
Control supply voltage 1			
• At DC	V	24	110
• At 50/60 Hz			
- At AC	V	--	110 ... 230
Frequency of the control supply voltage			
• 1 rated value	Hz	--	50
• 2 rated value	Hz	--	60
Operating range factor of the control supply voltage, rated value			
• At DC		0.8 ... 1.25	0.85 ... 1.1
• At 50 Hz/60 Hz			
- At AC		--	0.85 ... 1.1
Control current	A	0.08	0.05
Input voltage at the digital input			
• At DC	V	24	110
• At AC	V	--	110 ... 230
- Rated value			
Input voltage at the digital input with signal <1>			
• At DC	V	19.2 ... 30	93 ... 121
• At AC	V	--	93 ... 253
Input current at the digital input with signal <1>, typical	A	0.01	0.002

Article No.		Screw terminals	Spring-type terminals
Connection methods for 3RM1			
Connectable conductor cross-section for main contacts			
• Solid	mm ²	0.5 ... 4	
• Finely stranded			
- With end sleeves	mm ²	0.5 ... 2.5	
- Without end sleeves	mm ²	--	0.5 ... 4
Connectable conductor cross-section for auxiliary contacts			
• Solid	mm ²	0.5 ... 2.5	0.5 ... 1.5
• Finely stranded			
- With end sleeves	mm ²	0.5 ... 2.5	0.5 ... 1
- Without end sleeves	mm ²	--	0.5 ... 1.5
AWG number as coded connectable conductor cross-section			
• For main contacts		20 ... 12	
• For auxiliary contacts		20 ... 14	20 ... 16

Note:

All the above technical specifications are relevant for selecting the motor starters. Details about installation conditions and the use of the motor starters, and particularly about the derating of the rated current, can be found in the manual ([see Accessories](#)) and the data sheets.

Distributed IO for usage in control cabinets

SIRIUS 3RM1 motor starters failsafe

3RM11 Failsafe direct-on-line starters

Selection and ordering data



3RM110.-1AA.4



3RM110.-2AA.4, 3RM110.-3AA.4

Rating
for three-phase motor
at 400 V at 50/60 Hz
with 3-phase AC¹⁾

kW

Adjustable
current response value
of the inverse-time delayed
overload release

A

DT

Configurator



Article No.

3RM11 motor starter for direct-on-line start, with electronic overload protection and safety-related shutdown

Rated control supply voltage

$U_s = 24 \text{ V DC}$

0 ... 0.12

0.1 ... 0.5

A

3RM1101-□AA04

0.09 ... 0.75

0.4 ... 2

A

3RM1102-□AA04

0.55 ... 3

1.6 ... 7

A

3RM1107-□AA04

Rated control supply voltage

$U_s = 110 \dots 230 \text{ V AC } 50/60 \text{ Hz; } 110 \text{ V DC}$

0 ... 0.12

0.1 ... 0.5

A

3RM1101-□AA14

0.09 ... 0.75

0.4 ... 2

A

3RM1102-□AA14

0.55 ... 3

1.6 ... 7

A

3RM1107-□AA14

Article No. supplements for connection types

- With screw terminals for main and control circuit
- With spring-type terminals for main and control circuit
- With screw terminals for main circuit and spring-type terminals for control circuit

For online configurator see www.siemens.com/sirius/configurators

¹⁾ The actual startup characteristics of the motor as well as its rated data are important factors here.

1
2
3

Distributed IO for usage in control cabinets

SIRIUS 3RM1 motor starters failsafe

3RM13 Failsafe reversing starters

Selection and ordering data



3RM130.-1AA.4



3RM130.-2AA.4, 3RM130.-3AA.4

Rating
for three-phase motor
at 400 V at 50/60 Hz
with 3-phase AC¹⁾

kW

Adjustable
current response value
of the inverse-time delayed
overload release

A

DT

Configurator



Article No.

**3RM13 motor starter with reversing functionality,
electronic overload protection and
safety-related shutdown**

Rated control supply voltage

$U_s = 24 \text{ V DC}$

0 ... 0.12	0.1 ... 0.5
0.09 ... 0.75	0.4 ... 2
0.55 ... 3	1.6 ... 7

Rated control supply voltage

$U_s = 110 \dots 230 \text{ V AC } 50/60 \text{ Hz; } 110 \text{ V DC}$

0 ... 0.12	0.1 ... 0.5
0.09 ... 0.75	0.4 ... 2
0.55 ... 3	1.6 ... 7

Article No. supplements for connection types

- With screw terminals for main and control circuit
- With spring-type terminals for main and control circuit
- With screw terminals for main circuit and spring-type terminals for control circuit

For online configurator see www.siemens.com/sirius/configurators

¹⁾ The actual startup characteristics of the motor as well as its rated data are important factors here.

A	3RM1301-□AA04
A	3RM1302-□AA04
A	3RM1307-□AA04

A	3RM1301-□AA14
A	3RM1302-□AA14
A	3RM1307-□AA14

1
2
3

Distributed IO for usage in control cabinets

SIRIUS 3RM1 motor starters failsafe

Accessories

Overview

Accessories for 3RM1 motor starters

The following accessories are available for the 3RM1 motor starter:

- 3-phase infeed system for the main circuit
- Device connectors for the control circuit
- Spare terminals for main and control circuits
 - With screw terminals
 - With push-in spring-type terminals
- Push-in lugs for wall mounting the motor starters
- Sealable cover as protection against unauthorized access

Three-phase infeed system (3RM19 three-phase busbar system)

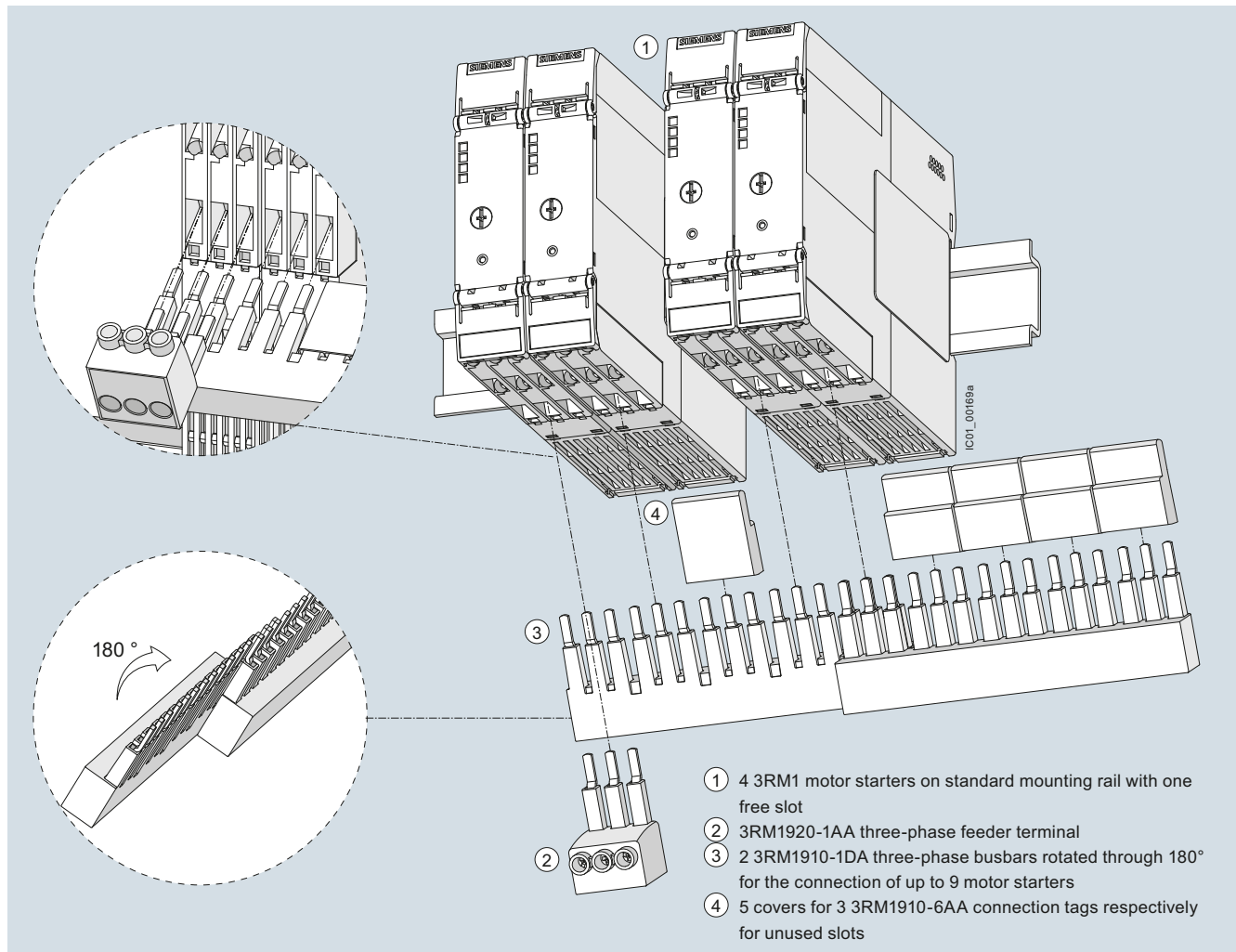
Special three-phase busbar systems can be used to provide an easy, time-saving and safe means of feeding two or more 3RM1 motor starters with screw terminals.

These busbars are available in three lengths, thus allowing 2, 3 or 5 motor starters (arranged side-by-side) to be connected at the same time. More than 5 devices can be connected by clamping the connection tags of an additional busbar rotated by 180° (e.g. 6 devices using one 5-pole busbar and one 2-pole busbar).

A single motor starter can be removed from the assembly without loosening the terminal screws of neighboring motor starters.

The maximum summation current must not exceed 25 A. Primary infeed is connected via a three-phase infeed terminal.

The three-phase busbars are finger-safe but empty connection tags must be fitted with covers.



3RM19 infeed system with three-phase infeed terminal: In the above example, two three-phase busbars (5-pole busbars) rotated through 180° allow up to 9 3RM1 motor starters to be connected. Contact with the unused connection tags in unoccupied positions is prevented safely by the covers.

Distributed IO for usage in control cabinets

SIRIUS 3RM1 motor starters failsafe

Accessories

Device connectors for the control circuit

The outlay for cabling between the devices is reduced using device connectors snapped onto a mounting rail, or screwed onto a level mounting panel (one device connector per motor starter).

Using the device connectors only for feeding in the control supply voltage

By using device connectors, several motor starters can be jointly supplied with a control supply voltage of 24 V DC. This requires the control supply voltage to be applied to the A1 and A2 terminals of only one motor starter.

Up to five motor starters can be connected with device connectors. The last motor starter in a row must be placed on a device termination connector.

If the motor starters are not to be interconnected side-by-side, device daisy chain connectors must be used for the gaps.

When removing a motor starter, the corresponding device connector must be replaced by a device daisy chain connector if the control voltage is not to be interrupted for motor starters on the right.

Using device connectors in conjunction with 3SK1 safety relays

Interconnection of several Standard or Failsafe version motor starters into a group can also be used for joint disconnection by a 3SK1 safety relay.

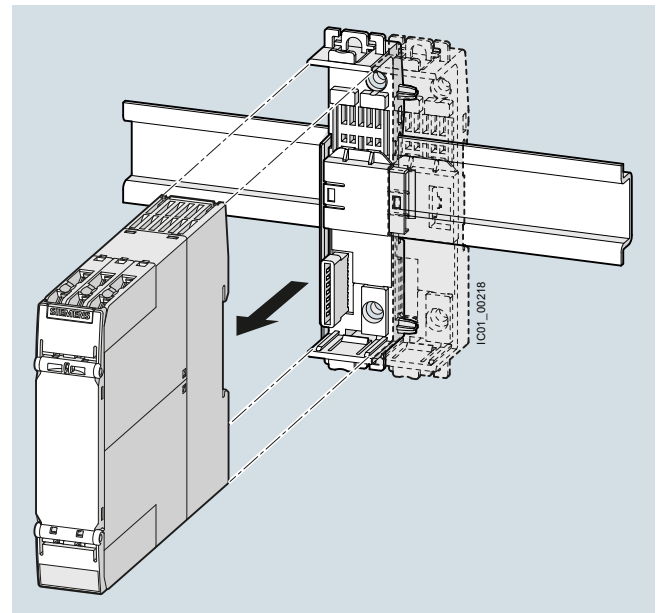
Disconnection of the motor starters occurs through the removal of the control supply voltage by means of the 3SK1 relay. For this reason, the voltage must not also be applied to the motor starters.

The motors can then also be shut down safely according to SIL 3/PL e with the motor starters.

Up to five motor starters can be operated on one safety relay with device connectors. If the motor starters are not to be interconnected side-by-side, device daisy chain connectors must be used for the gaps.

The last motor starter in a row must be placed on a device termination connector. This closes the circuits that were built up with the connectors.

For 3SK1 safety relays and associated device connectors [see chapter 3 page 246 → "SIRIUS 3SK1 Safety Relays"](#)



Device connectors snapped onto a standard mounting rail to allow the joint connection of the control supply voltage for 3RM1 motor starters or connection to the 3SK1 safety relays

Usage restrictions for accessories

- The 3RM19 3-phase infeed system for the main circuit can only be used with 3RM1 motor starters with screw terminals.
- The device connectors are only suitable for 3RM1 motor starters with a control supply voltage of 24 V DC.

Distributed IO for usage in control cabinets

SIRIUS 3RM1 motor starters failsafe

Accessories

Selection and ordering data

	Product designation	DT	Article No.
3RM19 three-phase infeed system for 3RM1 with screw terminals			
 3RM1920-1AA	Three-phase infeed terminals	A	3RM1920-1AA
 3RM1910-1AA	Three-phase busbars • For 2 motor starters	A	3RM1910-1AA
 3RM1910-1BA	• For 3 motor starters	A	3RM1910-1BA
 3RM1910-1DA	• For 5 motor starters	A	3RM1910-1DA
 3RM1910-6AA	Covers for 3 connection tags of the three-phase busbars	A	3RM1910-6AA
Device connectors for the electrical connection of SIRIUS devices in the industrial standard mounting rail enclosure¹⁾			
 3ZY1212-2EA00	Device connectors for 3RM1 motor starters 24 V DC, 22.5 mm	A	3ZY1212-2EA00
 3ZY1212-2AB00	Device daisy chain connectors for 3RM1 motor starters 24 V DC, 22.5 mm for gaps without motor starters in assemblies.	X	3ZY1212-2AB00
 3ZY1212-2FA00	Device termination connectors for 3RM1 motor starters 24 V DC, 22.5 mm	A	3ZY1212-2FA00

¹⁾ Device connectors are only suitable for 3RM1 motor starters with a control supply voltage of 24 V DC.

Distributed IO for usage in control cabinets

SIRIUS 3RM1 motor starters failsafe




Accessories

Product designation		DT	Article No.
Removable terminals for SIRIUS devices in the industrial standard mounting rail enclosure for use in the main circuit			
Terminals, 2-pole			
 3ZY1122-1BA00	<ul style="list-style-type: none">Screw terminals, 1x4 mm²	A	Screw terminals 
			3ZY1122-1BA00
 3ZY1122-2BA00	<ul style="list-style-type: none">Spring-type terminals as push-in terminals, 1x4 mm²	A	Spring-type terminals 
			3ZY1122-2BA00
Removable terminals for SIRIUS devices in the industrial standard mounting rail enclosure for use in the control circuit			
Terminals, 3-pole			
 3ZY1131-1BA00	<ul style="list-style-type: none">Screw terminals, 1x2.5 mm²	A	Screw terminals 
			3ZY1131-1BA00
 3ZY1131-2BA00	<ul style="list-style-type: none">Spring-type terminals as push-in terminals, 1x2.5 mm²	A	Spring-type terminals 
			3ZY1131-2BA00

Distributed IO for usage in control cabinets

SIRIUS 3RM1 motor starters failsafe

Accessories

	Product designation	DT	Article No.
Further accessories			
 3ZY1311-0AA00	Push-in lugs for wall mounting (2 lugs per motor starter are required, i.e. 1 PS is sufficient for 5 motor starters)	A	3ZY1311-0AA00
 3ZY1321-2AA00	Sealable covers, 22.5 mm (Simple protection against unauthorized access)	A	3ZY1321-2AA00
 3ZY1440-1AA00	Coding pins for removable terminals of SIRIUS devices in the industrial standard mounting rail enclosure For mechanical coding of removable terminals	A	3ZY1440-1AA00
Documentation			
	Manual¹⁾ SIRIUS 3RM1 Motor Starters • German • English		

¹⁾ Available as a PDF (also in other languages) see
<http://support.automation.siemens.com/WW/view/en/66295730>

Distributed I/O for usage in control cabinets

ET 200S motor starters and safety motor starters

General data

Overview

ET 200S motor starters in the ET 200S I/O system

The SIMATIC ET 200S is the multifunctional and bit-modular I/O system in degree of protection IP20 for exact adaptation to the automation task.

Interface modules (IM) are used for connecting the ET 200S to PROFIBUS DP or PROFINET. If interface modules with integrated S7-CPU are used, the ET 200S can act as a miniature controller.

The ET 200S is designed for combining with a large range of digital and analog input or output modules, technology modules, IO-Link master modules, pneumatic connections, or motor starters and frequency converters for the control of drives.

In addition to the standard versions, SIPLUS versions are available both for interface modules and I/O modules. They can be used for an extended temperature range and increased medial loads.

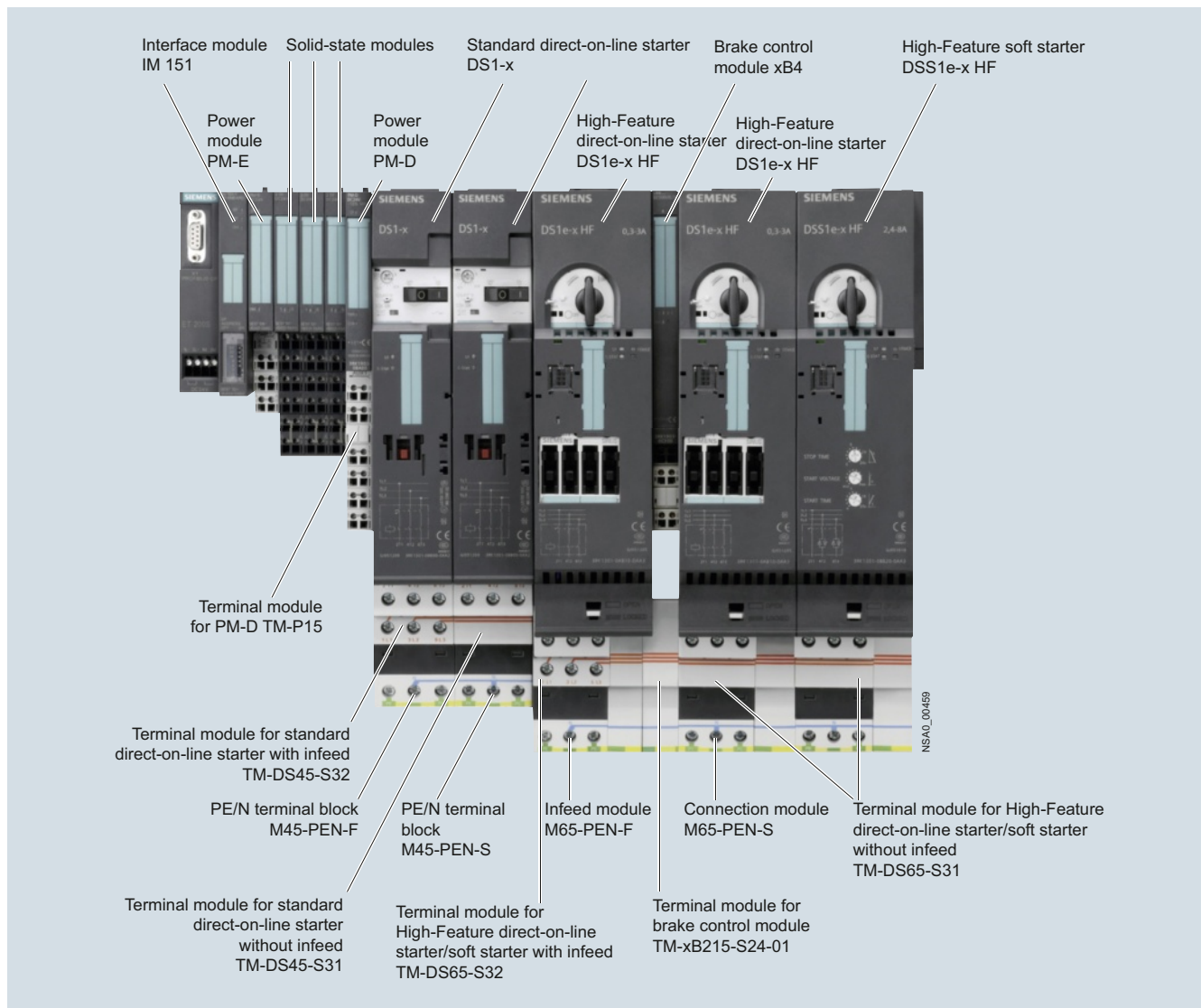
Device replacement is easy and quick thanks to permanent wiring and automatic re-parameterization.

Hot swapping, i. e. the disconnection and connection of modules without prior isolation, guarantees high availability of the automation system along with extensive diagnostics information.

The ET 200S motor starters are connected to the control system and parameterized through the fieldbus using either PROFIBUS or PROFINET via IM modules – available in both standard and **safety-related versions**.

For detailed information about SIMATIC ET 200S see [catalog ST 70 · 2013](#).

With the ET 200S motor starters, any AC loads can be protected and switched. The communication interface makes them ideal for operation in distributed control cabinets or control enclosures.



Interaction of ET 200S motor starter components in the ET 200S I/O system

Distributed IO for usage in control cabinets

ET 200S motor starters and safety motor starters

General data

Motor starter versions

The ET 200S motor starters are available as direct-on-line, reversing or soft starter versions:

- **Standard motor starters** up to 5.5 kW (direct-on-line and reversing starters)
- **High-Feature motor starters** up to 7.5 kW (direct-on-line, reversing and direct-on-line soft starters)
- **Failsafe motor starters** up to 7.5 kW (direct-on-line and reversing starters)
 - Properties of the High-Feature motor starter
 - Failsafe functionality

Innovation of the ET 200S High-Feature motor starters

The ET 200S High-Feature motor starters have undergone radical innovation and now support the acyclic services on PROFIBUS and PROFINET as well as PROFlenergy on PROFINET. They are now:

- Even more flexible – flexible assignment of parameters
- Even better integrated in TIA (Totally Integrated Automation)
- Even more transparent – through comprehensive diagnostic data records
- Even more anticipatory – through maintenance functions
- Energy-efficient – through PROFlenergy

Basic functionality of the ET 200S motor starters

All versions of the ET 200S motor starters have the following functionality. Any additional specific functionality is described for the respective versions.

- Fully pre-wired motor starters for switching and protecting any AC loads up to 7.5 kW at 400 V AC and 500 V AC
- With self-assembling 40/50 A power bus, i. e. the load voltage is only fed in once for a group of motor starters
- All control supply voltages connected only once, i.e. when modules are added they are automatically connected to the next module
- Hot swapping is permissible
- Inputs and outputs for activating and signaling the status are already integrated
- Control of the motor starter from the control system and of the diagnostics status via the cyclic process image
- Diagnostics capability for active monitoring of the switching and protection functions
- The signal states in the process image of the motor starter provide information about protective devices (short circuit or overload), the switching states of contactor(s) or soft starters, and system faults.
- Interface for controlling an expansion module, e. g. brake control module xB1 ... xB4 for controlling mechanical brakes in three-phase motors for 24 V DC and 500 V DC.
- Brake control module xB5 and xB6 for 400 V AC
- Can be combined with safety technology for use in safety-related system components (IEC 62061 and ISO 13849-1).

Mounting

As the motor starters are fully pre-wired, up to 80 % of the wiring outlay can be saved. The control cabinets can be assembled far more quickly and compactly.

Expansions are easily possible through the subsequent adding of terminal modules. With their terminal block design (10 mm²), the latter also do away with the distribution wiring otherwise required. Through the permanent wiring and the "hot swapping" function (disconnection and connection during operation) a motor starter can be replaced within seconds if necessary. The motor starters are therefore recommendable in particular for applications with special demands on availability.

Parameterization and configuration

Configuration is made easier by the bit-modular structure.

When using the ET 200S motor starters, the list of parts per load feeder is reduced to two main items: The passive terminal module and the motor starter. This makes the ET 200S ideal for modular machine concepts as well.

All ET 200S motor starters are set up without fuses. Contactors and soft starters are activated through the integrated outputs. The inputs of the motor starters evaluate the signal states of the protective devices (short circuit or overload), the switching states of contactor(s) or soft starters, and system faults.

The motor starter protector signaling is freely programmable with regard to group fault signals (group fault at motor starter protector "Off"/group fault signal at motor starter protector "Off" only in case of "On" command from the motor starter).

Brake control modules and optional digital inputs and outputs

With one of the optional brake control modules (xB1-xB6), which is butt-mounted to the right of a motor starter, it is possible to control a mechanical holding brake on a three-phase motor from the process image of the motor starter.

Motors with 24 V DC brakes (xB1, xB3) as well as motors with 500 V DC brakes (xB2, xB4) can be controlled using the brake control modules xB1-xB4.

The modules xB5 (without digital input) and xB6 (with two digital inputs) have been added to the range in order to control a mechanical holding brake with a rated operational voltage of 400 V AC. A further motor brake voltage commonly found on the market is thus supported.

The 24 V DC brakes have an external supply and can be released independently of the switching state of the motor starter. By contrast the 500 V DC brakes and the 400 V AC brakes usually have a direct supply from the terminal board of the motor through a rectifier module and therefore cannot be released when the motor starter is switched off. These brakes cannot be used in combination with the DSS1e-x motor starter (soft starter).

The outputs of the brake control modules can be used alternatively for other purposes, e.g. for controlling DC valves.

With two digital inputs available on the brake control modules (xB3, xB4, xB6) and another two digital inputs available on the optional control module it is possible to realize autonomous special functions which work independently of the bus and the higher-level control system, e.g. as a quick stop on gate valve controls. The signals of these digital inputs are in the process image and are reported to the control system.

Power supply through terminal modules

Power is supplied through the terminal modules for motor starters:

- The auxiliary voltages are fed in only once via the PM-D or PM-DFx power module which must be connected to the left of the first motor starter.
- The load voltage is fed in at the first (left) TM-xxxxS32 terminal module of a motor starter. The other TM-xxxxS31 terminal modules are automatically supplied with power through the integrated power bus when they are mounted side by side. If the power bus is utilized to its full capacity of 40 A for Standard motor starters or 50 A for High-Feature motor starters, a new supply must be fed in through an additional TM-xxxxS32 terminal module.

Distributed I/O for usage in control cabinets

ET 200S motor starters and safety motor starters

General data

TM-DS and TM-RS terminal modules for motor starters

- Mechanical modules in which the motor starter and expansion modules are inserted
- For constructing the permanent wiring and self-assembling voltage bus
- For connecting the motor connection cables
- Positive-locking connection to ensure enhanced vibration resistance

Terminal modules are purely mechanical components for accommodating the ET 200S I/O modules. The self-assembling voltage buses integrated into the terminal modules reduce wiring outlay to the single infeed (both of auxiliary and load voltage). All modules following on the right are automatically supplied upon plugging the terminal modules together. The rugged design and keyed connection technology enables use in harsh industrial conditions.

The TM-DS and TM-RS terminal modules are available in various versions for the Standard motor starters and the High-Feature motor starters.

Terminal modules with the suffix "-S32"

- The terminal modules with the suffix "-S32" have connection terminals for feeding into the integrated 40A/50A power bus and connection terminals for the motor connection cable. They are mounted at the beginning (left) of a power bus segment.
- To configure a new load group, another "-S32" terminal module is plugged in.
- The "-S32" terminal modules are supplied with three caps for closing the power bus contacts on the final terminal module of a segment.
- Optionally expandable with PE/N modules

Terminal modules with the suffix "-S31"

- The terminal modules with the suffix "-S31" only have connection terminals for the motor connection cable. These terminal modules follow on the right after a "-S32" terminal module.
- Optionally expandable with PE/N modules

All connection terminals of the terminal modules for motor starters are equipped with powerful 10 mm² screw terminals.

Power modules (page 4/30)

PM-D power modules are used for monitoring the two 24 V DC auxiliary voltages for the group of motor starters following on the right or for supplying power to the group of frequency converters following on the right.

TM-P terminal modules for PM-D power modules (page 4/31)

- Connection using screw terminals
- Light colored enclosure for visual distinction
- Always before the first TM-DS/TM-RS

ET 200S Safety motor starters with integrated safety technology

The safety-related, communication-capable ET 200S motor starters offer the right solution for every safety application. The range extends from the simple local safety solution through to the user-friendly version with PROFIsafe, which can be used in conjunction with a safe control system (see "Safety Modules local and PROFIsafe", page 4/35).

The safety technology is an integral part and is therefore pre-wired at the factory.

The ET 200S Safety Motor Starter Solutions comprise:

- Safety modules (page 4/36)
- Standard motor starters (page 4/24)
- High-Feature motor starters (page 4/27)
- Failsafe motor starters (page 4/32)

System configuration with ET 200S motor starters

When constructing an ET 200S station with motor starters a distinction can be made between the following configurations:

- Conventional ET 200S motor starter solution consisting of:
 - PM-D module
 - Standard motor starter or High-Feature motor starter
- ET 200S Safety Motor Starter Solution local (see page 4/35)
- ET 200S Safety Motor Starter Solutions PROFIsafe (see page 4/39)

SIRIUS motor starter block library for SIMATIC PCS 7

With the SIRIUS motor starter PCS 7 block library, SIRIUS ET 200S motor starters (direct and reversing starters, direct-on-line soft starters) can be easily and simply integrated into the SIMATIC PCS 7 process control system. The SIRIUS motor starter PCS 7 block library contains the diagnostics and driver concept of SIMATIC PCS 7 corresponding diagnostics and driver blocks as well as the elements required for operation and monitoring (symbols and faceplates), see catalog IC 10, chapter 14 "Parameterization, Configuration and Visualization with SIRIUS".

Configuration tool for ET 200S station

The "SIMATIC Selection Tool" enables the fast and accurate selection of SIMATIC hardware. It is available as a configurator in the Siemens Industry Mall free of charge. Combine your stations (e.g. S7-1200, S7-300, S7-400, S7-400H) and select the desired distributed I/O (e.g. ET 200S, ET 200pro). You can transfer the parts list you receive to the Industry Mall shopping cart and place your order quickly, conveniently and with no problems.

You can find detailed information about the ET 200S system at:

www.siemens.com/ET200S

Here you will find a link to the SIMATIC Selection Tool.

Distributed IO for usage in control cabinets

ET 200S motor starters and safety motor starters

General data



SIMATIC ET 200S
Standard motor starters



SIMATIC ET 200S
High-Feature motor starters¹⁾

Device functions (firmware features)

Slave on the bus

Fieldbus ✓ Dependent on interface module

Parameterization

PROFIBUS/PROFINET data records -- ✓

Parameterization using data record start-up -- ✓

Diagnostics

Acyclic through data records -- ✓

Diagnostic interrupt support ✓

Diagnostics using PROFIBUS/PROFINET -- ✓ See manual²⁾

Process image

Process image ✓ 3I/3O ✓ 16I/7O

Address area required per module ✓ 4 bits ✓ 2 bytes

Data channels

Manual mode local interface -- ✓ Through module

Motor Starter ES via local interface -- ✓ Starting end of 2011

Motor Starter ES via bus -- ✓ Starting end of 2011

Data records (acyclic)

Parameterization -- ✓

Support for PROFINET profile -- ✓ Measuring the motor current and disconnection in idle times

Diagnostics -- ✓

Measured values -- ✓

Statistics -- ✓

Commands -- ✓

Slave pointer -- ✓

Logbook -- ✓

Device identification -- ✓

I&M data -- ✓

Inputs

Number ✓ Maximum 2, via xB3, xB4, xB6

✓ Maximum 4, 2 via xB3, xB4, xB6 and 2 via module 2DI 24 V DC COM

• Of which in the process image -- ✓ 4

Input action ✓ End position on left, right

✓ Parameterizable: flexible

Quick stop -- ✓ Parameterizable

Outputs

Number ✓ Internal, for controlling the brake module

Output action ✓ Brake

Brake output with additional module

Motor brake voltage: brake module ✓ 24 V DC: xB1/xB3, 500 V DC: xB2/xB4, 400 V AC: xB5/xB6

Motor protection

Overload protection ✓ Thermal, range 1:1.3

✓ Solid-state, wide range 1:10

Overload warning -- Only tripping

✓

Short-circuit protection ✓ Motor starter protectors

✓

Full motor protection --

Motor protection response in case of overload
Thermal motor model response

✓ Parameterizable: disconnection without restart, disconnection with restart, warning

Automatic reset --

Temperature sensor --

Emergency start function -- (✓ with control unit 3RK1903-0CG00)

✓

✓ Function available

-- Function not available

¹⁾ The specified device functions apply in full only to the new ...AB4 starters.

²⁾ <http://support.automation.siemens.com/WW/view/en/6008567>

Distributed IO for usage in control cabinets

ET 200S motor starters and safety motor starters

General data



SIMATIC ET 200S
Standard motor starters



SIMATIC ET 200S
High-Feature motor starters

Device functions (firmware features)

Device functions

Repair switch	✓ Rocker switch	✓ Motor starter protectors
Motor starter protector signaling	✓	✓ Parameterizable
Lower current limit monitoring	--	✓ Parameterizable, increment 3.125 %, 18.75 ... 100 %
Upper current limit monitoring	--	✓ Parameterizable, increment 3.125 %, 50 ... 400 %
Zero current detection	--	✓ Parameterizable: warning, disconnection
Stall protection/disconnecting the blocking current	--	✓ Parameterizable
Unbalance	✓	✓ Parameterizable: warning, disconnection
Load type	--	✓ Parameterizable: 1 and 3-phase
Tripping class	✓ CLASS 10	✓ Parameterizable for DS1e-x, RS1e-x: CLASS 5 (10a), 10, 15, 20 for DSS1e-x: CLASS 5 (10a), 10 (only at 0.3 ... 3 A)
Protection against voltage failure	✓	✓ Parameterizable: Activated/deactivated

Local diagnostics functions using LEDs

"C-STAT" switching status	✓ Red/green/yellow LEDs
"SF" group fault	✓ Red LEDs
"DEVICE" device status	--

Auxiliary switches for enabling circuit of the ET 200S – safety technology already integrated (for use up to SIL 3 (IEC 61508) or PL e (EN ISO 13849-1) in combination with infeed contactor)

-- Failsafe kit needed

✓ Red/green/yellow LEDs
✓ Except DSS1e-x (max. SIL 1 or PL b can be achieved)

- ✓ Function available
-- Function not available

	ET 200S Standard motor starters DS1-x, RS1-x	ET 200S High-Feature motor starters DS1e-x, RS1e-x	DSS1e-x
--	---	---	---------

Device functions (firmware features)

Soft starter control function

Soft start function	--	✓
Bypass function	--	
Starting time	--	✓ Locally adjustable, not through bus 0 ... 20 s
Ramp-down time	--	✓ Locally adjustable, not through bus 0 ... 20 s
Ramp-down mode	--	✓ Locally adjustable, not through bus
Start voltage	--	✓ Locally adjustable, not through bus 30 ... 100 % of U_e
Stopping voltage	--	✓ Locally adjustable, not through bus
Trace	--	

- ✓ Function available
-- Function not available

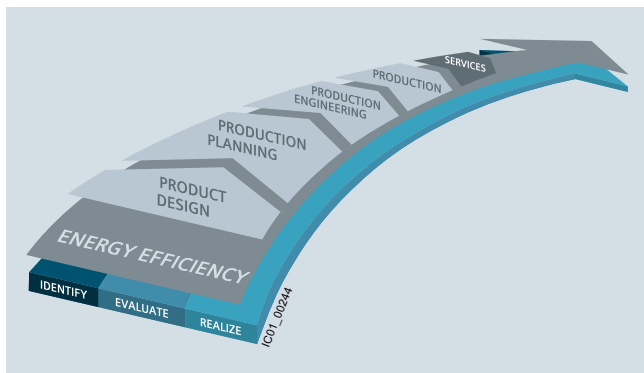
Distributed IO for usage in control cabinets

ET 200S motor starters and safety motor starters

General data

Benefits

Advantages through energy efficiency



Overview of the energy management process

We offer you a unique portfolio for industrial energy management, using an energy management system that helps to optimally define your energy needs. We split up our industrial energy management into three phases – identify, evaluate, and realize – and we support you with the appropriate hardware and software solutions in every process phase.

The innovative products of the SIRIUS industrial controls portfolio can also make a substantial contribution to a plant's energy efficiency (see www.siemens.com/sirius/energysaving).

SIMATIC ET 200S motor starters contribute to energy efficiency as follows:

- **Energy management**
Provision of energy data (current) by bus to higher-level systems using PROFenergy (see "High-Feature Motor Starters", page 4/27)
- **Elimination of energy consumption in dead times** through disconnection using PROFenergy (see "High-Feature Motor Starters", page 4/27)
- **Current management**
Avoidance of current peaks, thus reducing the load on the grid and the mechanical system
- **Reduced heating of the control cabinet**
Technology-reduced inherent power loss as speed-controlled drive systems, enabling also lower cooling costs (and a more compact design)

Application

The SIMATIC ET 200S motor starters are ideal for the use of several spatially concentrated distributed drive solutions in which several motors, digital or analog sensors and actuators are addressed by a distributed control cabinet or control box. They are perfectly suited for protecting and switching any AC loads.

Application areas

The SIMATIC ET 200S motor starters are suitable for numerous sectors of industry, e. g. machinery and plant engineering or conveying applications.

The ET 200S High-Feature motor starters are an excellent choice for the operation of ventilation systems, pump drives or winches.

Technical specifications

		ET 200S Standard motor starters DS1-x, RS1-x	ET 200S High-Feature motor starters DS1e-x, RS1e-x		DSS1e-x
Mechanics and environment					
Motor starters for connection to ET 200S, max. ¹⁾		42	17		
Mounting dimensions (W x H x D)					
• Direct-on-line starters	mm	45 x (265 + 45) x (120 + 27); (45: PE/N block; 27: auxiliary switch contactor from F-Kit)	65 x (290 + 45) x (150 + 23); (45: PE/N block; 23: control module)		
• Reversing starters	mm	90 x (265 + 45) x (120 + 27); (45: PE/N block; 27: auxiliary switch contactor from F-Kit)	130 x (290 + 45) x (150 + 23); (45: PE/N block; 23: control module)		
Permissible ambient temperature					
• During operation	°C	0 ... +60, from +40 with derating	0 ... +60, for horizontal mounting up to +40		
• During storage	°C	-40 ... +70	-40 ... +70		
• Permissible mounting position	°C	Vertical, horizontal with derating	Vertical, horizontal		
Weight					
• Direct-on-line/reversing starters incl. terminal module	kg	1.0/1.6	1.6/2.2	1	
• Direct-on-line/reversing starters incl. terminal block PE/N		1.1/1.8	1.7/2.3	1.1	
Vibration resistance acc. to IEC 60068, parts 2-6		g	2		
Shock resistance acc. to IEC 60068, parts 2-27		g/ms	Square 5/11		
Conductor cross-section					
• Solid	mm ²	2 x (1 ... 2.5) ²⁾ ; 2 x (2.5 ... 6) ²⁾ , according to IEC 60947: max. 1 x 10			
• Finely stranded with end sleeve	mm ²	2 x (1 ... 2.5) ²⁾ ; 2 x (2.5 ... 6) ²⁾			
• AWG cables, solid or stranded	AWG	2 x (14 ... 10)			
Degree of protection		IP20, finger-safe (also applies to terminal modules on a dismantled motor starter)			
Mechanical endurance					
• Motor starter protectors	Operating cycles	100 000	10 million	--	
• Contactors		30 million		--	
• Contactors with safety function (F-Kit)		10 million		--	

Distributed IO for usage in control cabinets

ET 200S motor starters and safety motor starters

General data

		ET 200S Standard motor starters DS1-x, RS1-x	ET 200S High-Feature motor starters DS1e-x, RS1e-x	DSS1e-x
Electrical specifications				
Power consumption				
• From auxiliary circuit L+/M (U_1)	mA	Approx. 20	Approx. 40	
• From auxiliary circuit A1/A2 (U_2)	mA	Approx. 100	Approx. 1 700 (80 ms long), approx. 350 (after 80 ms)	Approx. 30
Rated operational current for terminal modules TM-D I_e	A	40	50	
Rated operational voltage U_e	V	400		
Approval DIN VDE 0106, part 101	V	Yes, up to 500		Yes, up to 480
CSA and U_L approval	V	Yes, up to 600		Yes, up to 480
Rated operational current I_e for motor starters				
• AC-1/2/3 at 60 °C				
- At 400 V	A	12	16	3 / 8 / 16
- At 500 V	A	9	11	--
• AC-4 at 60 °C				
- At 400 V	A	4.1	9	--
Rated short-circuit breaking capacity	kA	50 at 400 V		
Power of three-phase motors at 500 V	kW	5.5	7.5	
Utilization categories		AC-1, AC-2, AC-3, AC-4		
Protective separation between main and auxiliary circuits	V	400, according to DIN VDE 0106, part 101		
Positively-driven operation of contactor relay (NC)		Yes		--
Trip class		CLASS 10	Parameterizable CLASS 5 (10 A), 10, 15, 20	0.3 ... 3 A: CLASS 10/10A, parameterizable; 2.4 ... 8 A: CLASS 10A 2.4 ... 16 A: CLASS 10A
Type of coordination		Up to 1.6 A: 2 Up to 12 A: 1	Up to 16 A: 2	Up to 16 A: 1
Electrical endurance				
• Motor starter protectors	h	100 000		
• Contactors		See manual ³⁾		--
Permissible switching frequency with starting time $t_A = 0.1$ s and relative ON period $t_{ED} = 50\%$	1/h	< 80	See manual ³⁾	
Induction protection		Already installed		

¹⁾ Additional limits: process image, max. design width 2 m.

²⁾ If two different conductor cross-sections are connected to one clamping point, both cross-sections must be in the range specified. If identical cross-sections are used, this restriction does not apply.

³⁾ <http://support.automation.siemens.com/WW/view/en/6008567>

More information

Notes on safety

System networking requires suitable protective measures (including network segmentation for IT security) in order to ensure safe plant operation.

More information about the subject of Industrial Security see www.siemens.com/industrialsecurity.

Distributed IO for usage in control cabinets

ET 200S motor starters and safety motor starters

Standard motor starters

Overview

Functionality of the Standard motor starters

- For basic functionality see "General data" → "Overview", page 4/18
- Direct-on-line and reversing starters up to 5.5 kW
- Power bus up to 40 A
- With motor starter protector and contactor assembly

- Integrated isolating function via motor starter protector
- Can be combined with local safety technology for use in safety-related system components with F-Kit and PM-D F modules (see "Accessories" → "Overview", page 4/46)

Device functions (firmware features)

See "General data" → "Overview", page 4/20

Technical specifications

See "General data" → "Technical specifications", page 4/22

Selection and ordering data

Motor rating three-phase motor 4-pole at 400 V AC, standard output P	Setting range of the overcurrent release	DT	Article No.
kW	A		

Standard motor starters, with diagnostics, electromechanical, fuseless, expandable with Brake Control Module



DS1-x

Direct starter DS1-x

< 0.06	0.14 ... 0.20	A	3RK1301-0BB00-0AA2
0.06	0.18 ... 0.25	A	3RK1301-0CB00-0AA2
0.09	0.22 ... 0.32	A	3RK1301-0DB00-0AA2
0.10	0.28 ... 0.40	A	3RK1301-0EB00-0AA2
0.12	0.35 ... 0.50	A	3RK1301-0FB00-0AA2
0.18	0.45 ... 0.63	A	3RK1301-0GB00-0AA2
0.21	0.55 ... 0.80	A	3RK1301-0HB00-0AA2
0.25	0.70 ... 1.00	A	3RK1301-0JB00-0AA2
0.37	0.90 ... 1.25	A	3RK1301-0KB00-0AA2
0.55	1.1 ... 1.6	A	3RK1301-1AB00-0AA2
0.75	1.4 ... 2.0	A	3RK1301-1BB00-0AA2
0.90	1.8 ... 2.5	A	3RK1301-1CB00-0AA2
1.1	2.2 ... 3.2	A	3RK1301-1DB00-0AA2
1.5	2.8 ... 4.0	A	3RK1301-1EB00-0AA2
1.9	3.5 ... 5.0	A	3RK1301-1FB00-0AA2
2.2	4.5 ... 6.3	A	3RK1301-1GB00-0AA2
3.0	5.5 ... 8.0	A	3RK1301-1HB00-0AA2
4.0	7 ... 10	A	3RK1301-1JB00-0AA2
5.5	9 ... 12	A	3RK1301-1KB00-0AA2



RS1-x

Reversing starter RS1-x

< 0.06	0.14 ... 0.20	A	3RK1301-0BB00-1AA2
0.06	0.18 ... 0.25	C	3RK1301-0CB00-1AA2
0.09	0.22 ... 0.32	A	3RK1301-0DB00-1AA2
0.10	0.28 ... 0.40	A	3RK1301-0EB00-1AA2
0.12	0.35 ... 0.50	A	3RK1301-0FB00-1AA2
0.18	0.45 ... 0.63	A	3RK1301-0GB00-1AA2
0.21	0.55 ... 0.80	A	3RK1301-0HB00-1AA2
0.25	0.70 ... 1.00	A	3RK1301-0JB00-1AA2
0.37	0.90 ... 1.25	A	3RK1301-0KB00-1AA2
0.55	1.1 ... 1.6	A	3RK1301-1AB00-1AA2
0.75	1.4 ... 2.0	A	3RK1301-1BB00-1AA2
0.90	1.8 ... 2.5	A	3RK1301-1CB00-1AA2
1.1	2.2 ... 3.2	A	3RK1301-1DB00-1AA2
1.5	2.8 ... 4.0	A	3RK1301-1EB00-1AA2
1.9	3.5 ... 5.0	A	3RK1301-1FB00-1AA2
2.2	4.5 ... 6.3	A	3RK1301-1GB00-1AA2
3.0	5.5 ... 8.0	A	3RK1301-1HB00-1AA2
4.0	7 ... 10	A	3RK1301-1JB00-1AA2
5.5	9 ... 12	A	3RK1301-1KB00-1AA2

Distributed IO for usage in control cabinets

ET 200S motor starters and safety motor starters

Standard terminal modules

Overview

Terminal modules **TM-DS, TM-RS**

More information see also "General data" → "Overview" → from the section "Power supply through terminal modules", page 4/18.

- "S32" version with supply terminals: 2 x 3 x 10 mm² screw terminals for power bus and motor feeder
- "S31" version without supply terminals: 1 x 3 x 10 mm² screw terminals for motor feeder

- Optionally expandable with PE/N modules (see "Accessories", page 4/49)
- Applies only to Standard motor starters: For applications with high motor currents (> 6.3 A) or high ambient temperatures (> 40 °C), it is recommended to use the DM-V15 distance module between two DS1-x motor starters (see "Accessories", page 4/47).

Technical specifications

TM-DS45 and TM-DS65/TM-FDS65 terminal modules

		TM-DS45	TM-DS65/TM-FDS65
Dimensions			
• Mounting dimensions (W x H x D)	mm	45 x 264 x 100	65 x 290 x 100
• Height with PE/N terminal block	mm	306	332
• Depth with motor starter	mm	127	150
• Depth with motor starter and F-Kit (safety technology)	mm	152	--
• Depth with motor starter and 2DI control module	mm	--	173
Rated voltages, currents and frequencies for the power bus			
• Rated insulation voltage U_i	V	690	
• Rated operational voltage U_e	V AC	500	
• Rated impulse withstand voltage U_{imp}	kV	6	
• Rated operational current I_e	A	40	50
• Rated frequency	Hz	50/60	
Conductor cross-sections			
• Solid	mm ²	2 x (1 ... 2.5) ¹⁾ or 2 x (2.5 ... 6) ¹⁾	
• Finely stranded with end sleeve	mm ²	1 x 10 or 2 x (1 ... 2.5) ¹⁾ or 2 x (2.5 ... 6) ¹⁾ according to IEC 60947	
• AWG cables, solid or stranded	AWG	2 x (14 ... 10)	
• With additional three-phase infeed terminal if required			
- Solid or stranded	mm ²	1 x 2.5 ... 25	
- Finely stranded with end sleeve	mm ²	1 x 2.5 ... 25	
- AWG cables, solid or stranded	AWG	1 x 12 ... 4	
Wiring			
• Required tool		Standard screwdriver size 2 and Pozidriv 2	
• Tightening torque	Nm	2.0 ... 2.5	

¹⁾ If two different conductor cross-sections are connected to one clamping point, both cross-sections must be in the range specified. If identical cross-sections are used, this restriction does not apply.

TM-RS90 and TM-RS130/TM-FRS130 terminal modules

		TM-RS90	TM-RS130/TM-FRS130
Dimensions			
• Mounting dimensions (W x H x D)	mm	90 x 264 x 100	130 x 290 x 100
• Height with PE/N	mm	306	332
• Depth with motor starter	mm	127	150
• Depth with motor starter and F-Kit (safety technology)	mm	152	--
• Depth with motor starter and 2DI control module	mm	--	173
Rated voltages, currents and frequencies for the power bus			
• Rated insulation voltage U_i	V	690	
• Rated operational voltage U_o	V AC	500	
• Rated impulse withstand voltage U_{imp}	kV	6	
• Rated operational current I_o	A	40	50
• Rated frequency	Hz	50/60	

Distributed IO for usage in control cabinets

ET 200S motor starters and safety motor starters

Standard terminal modules

		TM-RS90	TM-RS130/TM-FRS130
Conductor cross-sections			
• Solid	mm ²	2 x (1 ... 2.5) ¹⁾ or 2 x (2.5 ... 6) ¹⁾	
• Finely stranded with end sleeve	mm ²	1 x 10 or 2 x (1 ... 2.5) ¹⁾ or 2 x (2.5 ... 6) ¹⁾ according to IEC 60947	
• AWG cables, solid or stranded	AWG	2 x (14 ... 10)	
• With additional three-phase infeed terminal if required			
- Solid or stranded	mm ²	1 x 2.5 ... 25	
- Finely stranded with end sleeve	mm ²	1 x 2.5 ... 25	
- AWG cables, solid or stranded	AWG	1 x 12 ... 4	
Wiring			
• Required tool		Standard screwdriver size 2 and Pozidriv 2	
• Tightening torque	Nm	2.0 ... 2.5	

¹⁾ If two different conductor cross-sections are connected to one clamping point, both cross-sections must be in the range specified. If identical cross-sections are used, this restriction does not apply.

Selection and ordering data

Version	DT	Article No.
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Terminal modules for Standard motor starters



3RK1903-0AB00

TM-DS45-S32
for DS1-x direct-on-line starters
with incoming power bus connection
including three caps for terminating the power bus

A

3RK1903-0AB00



3RK1903-0AB10

TM-DS45-S31
for DS1-x direct-on-line starters
without incoming power bus connection

A

3RK1903-0AB10



3RK1903-0AC00

TM-RS90-S32
for RS1-x reversing starters
with incoming power bus connection
including three caps for terminating the power bus

A

3RK1903-0AC00

TM-RS90-S31
for RS1-x reversing starters
without incoming power bus connection

A

3RK1903-0AC10

Distributed IO for usage in control cabinets

ET 200S motor starters and safety motor starters

High-Feature motor starters

Overview

Functionality of the High-Feature motor starters

- For basic functionality see "General data" → "Overview", page 4/18.
- Direct-on-line, reversing or soft starter up to 7.5 kW
- With wide range in 3 setting ranges, with 0.3 to 3 A, 2.4 up to 8 A, 2.4 to 16 A available
- With combination of starter circuit breaker, electronic overload protection (parameterizable), and contactor or soft starter
- Power bus up to 50 A
- Upper and lower current limits for plant and process monitoring
- Motor stall protection, zero current detection and asymmetry detection integrated
- The actual motor current is measured and transmitted for diagnostics in the cyclic process image
- Control of the motor starter from the control system and extensive diagnostics status via the cyclic process image
- Optional digital inputs available in the cyclic process image and flexibly assignable with functions for adaptation to all applications
- Integrated isolating function using starter circuit breakers
- Detection of the switching state of the starter circuit breaker via auxiliary switches and of the contactor via current evaluation
- Local safety engineering possible (without F-kit in the case of the HF starter, because the function of the failsafe kit is already integrated)
- Front-mounting 2DI LC COM control module for another 2 parameterizable digital inputs
- Optional "Motor Starter ES" software for easy commissioning and diagnostics (see catalog IC 10, chapter 14 "Parameterization, Configuration and Visualization with SIRIUS")
- PROFinergy capable
- Supplying the motor current in PROFinergy format and shutting down in dead times
- Support of all DPV1 acyclic services on PROFIBUS and PROFINET
 - Changing of parameters during operation, e.g. the rated operational current
 - Reading and writing acyclic data for exact diagnostics of the unit or process and for analysis of the plant status

Selective protection concept for ET 200S High-Feature motor starters

As the result of the selective protection concept (separate tripping of short circuit and overload) with electronic overload evaluation, additional advantages are realized on the High-Feature motor starters – advantages which soon make themselves positively felt particularly in manufacturing processes with high plant stoppage costs:

- Only two versions up to 7.5 kW – hence little order variance and stock keeping
- All settings can be parameterized by bus – hence full TIA capability
- Separate signaling of overload and short circuit – enables selective diagnostics
- Overload can be acknowledged by remote reset – ideal for highly automated plants
- Current asymmetry monitoring – complete monitoring of the motor
- Stall protection – complete monitoring of the motor
- Emergency start function in case of overload – operation is possible in an emergency

- Current value transmission via bus – monitoring of the application
- Current limit monitoring
- Trip class can be parameterized – overload tripping can be adapted to the application
- Type of coordination "2" – still functional after short circuit with magnitude of 50 kA
- Very high contact endurance



ET 200S High-Feature motor starters: DS1e-x direct-on-line starter



ET 200S High-Feature motor starters: DSS1e-x direct-on-line soft starter



ET 200S High-Feature motor starters: RS1e-x reversing starter

Distributed IO for usage in control cabinets

ET 200S motor starters and safety motor starters

High-Feature motor starters

PROFenergy for ET 200S High-Feature motor starters¹⁾

Increasing energy prices, far-reaching ecological problems worldwide and the threat of climate change make it necessary for you to be more conscious about your use of energy.

Active and effective energy management is possible with PROFenergy.

PROFenergy is a manufacturer-independent profile on PROFINET, which can be used by all manufacturers, has been standardized by PNO¹⁾ and supports shutting down electrical devices during dead times and reading out measured values.

The ET 200S HF motor starter supplies the motor current in PROFenergy format and switches off during dead times.

Support of all acyclic services on PROFIBUS and PROFINET

Thanks to the acyclic services, the ET 200S HF motor starters now offer plenty of diagnostics data via data records. There are new extensive options for reading out data from the motor starter for monitoring devices, systems or processes. The motor starter is equipped internally with three logbooks for device faults, motor starter trips and events, which are issued with a time stamp. These logbooks can be read out of the motor starter on demand at any time and provide the plant operator with plenty of information about the state of his plant and process which he can use to carry out improvements.

With the slave pointer and statistical data functions it is possible to read out, for example, the maximum internal current values or the number of motor starter connection operations. This allows deviations in the process to be monitored, but also optimum initial commissioning to take place.

Statistical data or measured values make plant monitoring easy for the user.

The device diagnostics data record contains details of all the states of the motor starter, the device configuration and the communication status as a basis for central device and plant monitoring.

The Installation and Maintenance functions (I&M) store, firstly, information (I&M) about the modules used in the motor starter and, secondly, data (I&M) that can be defined during configuration, e.g. location designations. I&M functions are used for troubleshooting faults and localizing changes in hardware at a plant or checking the system configuration.

Supported data records:

- DS 0 S7-V1 system diagnostics (S7 diagnostics alarm)
- DS 72, 73, 75 logbooks, device faults, trips, events
- DS 92 device diagnostics
- DS 93 command
- DS 94 measured values
- DS 95 statistics
- DS 96 slave pointer
- DS 100 device identification
- DS 131 device parameters
- DS 134 maintenance
- DS 165 comment
- DS 226 PROFenergy technology function
- DS 231 I&M 0 (= device identification)
- DS 232 I&M 1 (= equipment identifier)
- DS 233 I&M 2 (= installation)
- DS 234 I&M 3 (= description)

Device functions (firmware features)

See "General data" → "Overview", page 4/20

¹⁾ In the PNO (PROFIBUS Nutzerorganisation e. V. - PROFIBUS User Organization), manufacturers and users have come together to agree on the standardized communication technologies PROFIBUS and PROFINET.

Technical specifications

See "General data" → "Technical specifications", page 4/22

Selection and ordering data

High-Feature motor starters in fully innovated design ("-.AB4 starters")¹⁾

Setting range of
the overcurrent release
A

DT

Article No.

High-Feature motor starters,
with diagnostics, electronic overload protection,
fuseless, expandable with brake control module



DS1e-x

DS1e-x direct-on-line starters

0.3 ... 3
2.4 ... 8
2.4 ... 16

A
A
A

3RK1301-0AB10-0AB4
3RK1301-0BB10-0AB4
3RK1301-0CB10-0AB4

RS1e-x reversing starters

0.3 ... 3
2.4 ... 8
2.4 ... 16

A
A
A

3RK1301-0AB10-1AB4
3RK1301-0BB10-1AB4
3RK1301-0CB10-1AB4

DSS1e-x direct-on-line soft starters

0.3 ... 3
2.4 ... 8
2.4 ... 16

A
A
A

3RK1301-0AB20-0AB4
3RK1301-0BB20-0AB4
3RK1301-0CB20-0AB4

¹⁾ When a device is replaced, the innovated motor starter will behave like the not yet innovated motor starter ("-.AA4 starter"), i.e. it will run in DPV0 mode.

Distributed IO for usage in control cabinets

ET 200S motor starters and safety motor starters

High-Feature terminal modules

Overview

Terminal modules **TM-DS**, **TM-RS**

More information see also "General data" → "Overview" → from the section "Power supply through terminal modules", page 4/18.

- "-S32" version with incoming connection: 2 x 3 x 10 mm² screw terminals for power bus and motor feeder
- "-S31" version without incoming connection: 1 x 3 x 10 mm² screw terminals for motor feeder
- Optionally expandable with PE/N modules (see "Accessories", page 4/49)

Technical specifications

See "Standard terminal modules" → "Technical specifications", page 4/25.

Selection and ordering data

Version	DT	Article No.
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Terminal modules for High-Feature motor starters



3RK1903-0AK00

TM-DS65-S32 for DS1e-x and DSS1e-x direct-on-line starters with incoming power bus connection including three caps for terminating the power bus	A	3RK1903-0AK00
TM-DS65-S31 for DS1e-x and DSS1e-x direct-on-line starters without incoming power bus connection	A	3RK1903-0AK10
TM-RS130-S32 for RS1e-x reversing starters with incoming power bus connection including three caps for terminating the power bus	A	3RK1903-0AL00
TM-RS130-S31 for RS1e-x reversing starters Without incoming power bus connection	A	3RK1903-0AL10

Distributed IO for usage in control cabinets

ET 200S motor starters and safety motor starters

Power modules

Overview

- Disconnection of a complete group of motor starters is possible without any additional outlay (PL b according to ISO 13849-1 or SIL 1 according to IEC 62061)
- PM-D power modules are plugged onto the TM-P15 terminal modules. (A PM-D power module must be followed by at least one motor starter or one frequency converter.)

PM-D power modules are used for monitoring the two 24 V DC auxiliary voltages for the group of motor starters following on the right or for supplying power to the group of frequency converters following on the right. The voltage is fed in through TM-D terminal modules to the self-assembling potential bars.

A voltage failure is signaled through PROFIBUS diagnostics to the higher-level master. Additional LEDs inform locally about the status of the auxiliary voltages.

The separation of auxiliary voltages for signal checkback and power unit actuation enables the entire group to be shut down while maintaining the diagnostics capability.

Technical specifications

		PM-D power module 3RK1903-0BA00
Rated control supply voltage U_s up to 60 °C	V	20.4 ... 28
Rated operational current I_e		
• Recommended short-circuit protection	A	10
• Melting fuse	A	10
• Miniature circuit breaker	A	10, tripping characteristic B
Power consumption from backplane bus	mA	≤ 10
Supply of		
• Motor starters		Yes
• Frequency converters		Yes
• Motor starters for safety technology		No
• Electronic modules		No
• Ex(i) modules		No
Alarms		None
Diagnostics functions		Yes
• System fault/device fault		Red "SF" LED
• Monitoring of the electronics power supply U_1		Green "PWR" LED
• Monitoring of the supply voltage for contactors U_2		Green "CON" LED
• Diagnostics information can be read out		Yes
Conductor cross-sections		
• Flexible with end sleeve	mm ²	1.5
• Rigid	mm ²	2.5
Mounting dimensions (W x H x D)	mm	15 x 195.5 x 117.5

Selection and ordering data

Version	DT	Article No.
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Power modules



3RK1903-0BA00

PM-D power modules
for 24 V DC with diagnostics

A **3RK1903-0BA00**

Distributed IO for usage in control cabinets

ET 200S motor starters and safety motor starters

Power module terminal modules


Overview

Terminal module for power module

For supplying load and sensor voltage to the self-assembling potential bars of the Standard motor starters, High-Feature motor starters and frequency converters. Power modules for voltage monitoring are plugged onto TM-P modules.

TM-P modules can be used any number of times within the ET 200S. A power module must always be plugged upstream from the first motor starter/frequency converter.

Selection and ordering data

Version		DT	Article No.
Terminal module for power module			
	TM-P15 S27-01 terminal module for PM-D power module	A	3RK1903-0AA00

3RK1903-0AA00

Distributed IO for usage in control cabinets

ET 200S motor starters and safety motor starters

ET 200S Failsafe motor starters

Overview



ET 200S Failsafe motor starters F-DS1e-x direct-on-line starters

The Failsafe motor starter has been developed on the basis of the High-Feature motor starter (.-AA4 starter). It differs in that, in addition to a motor starter protector and contactor assembly, a safe electronic evaluation circuit is installed for fault detection purposes which makes the motor starter failsafe.

If the contactor to be switched fails in an EMERGENCY-STOP case, the evaluation electronics detects a fault and opens the motor starter protector in the motor starter through a shunt release in a safety-related manner. The second redundant shut-down component is therefore no longer a main contactor, as is generally the case, but the motor starter protector installed in the motor.

All functions of the High-Feature starter are already integrated

The new Failsafe motor starters are characterized by easy, space-saving assembly as well as minimal wiring outlay. Like the High-Feature starters, the Failsafe motor starters have a switching capacity of up to 7.5 kW (16 A) which is achieved with just two motor starter versions. Another important feature is the high availability due to the high short-circuit strength (type of coordination "2").

Use

The Failsafe motor starter is predestined for use in combination with PROFIsafe (see connection diagram "ET 200S Safety Motor Starter Solution PROFIsafe with Failsafe motor starters", page 4/40). Another field of application is in combination with ASIsafe or safety relays (see example 2, page 4/38).

High degree of flexibility with safety technology

PROFIsafe solution with PM-D F PROFIsafe

In EMERGENCY-STOP applications, the Failsafe motor starters are selectively switched off through the upstream PM-D F PROFIsafe safety module. For each safety module, six switch-off groups can be formed. In the first delivery stage, the fail-safe freely-programmable logic of the SIMATIC controller is used to interface with the relevant fail-safe sensor technology. The interface between PROFIsafe and installations that use conventional safety technologies is implemented through the F-CM Failsafe contact multiplier with four floating contacts.

Solution local with PM-D FX1

Failsafe motor starters with safety relay (version 1) or ASIsafe (version 2, see example 2, page 4/38):

Signals with relevance for safety can be input to ET 200S through a PM-D F X1 infeed terminal module through the enabling circuits of the AS-i safety monitor or the safety relay to control the Failsafe motor starters which then selectively switch off the downstream motors.

Benefits

Advantages over conventional safety technology

- Significant savings in components (less hardware)
- Less mounting and installation work
- Motor starters are fail-safe and offer high availability

Technical specifications

F-DS1e-x direct-on-line starters/F-RS1e-x reversing starters

		F-DS1e-x direct-on-line starters	F-RS1e-x reversing starters
Dimensions			
Dimensions (W x H x D)	mm	65 x 290 x 150 (incl. terminal module)	130 x 290 x 150 (incl. terminal module)
Height with PE/N module	mm	332	
Depth with 2DI control module (not safe)	mm	173	
Module-specific specifications			
Type of coordination		Type 2 up to $I_e \leq 16$ A at 400 V	
Internal power supply		U1 (from PM-D F / PM-D X1)	
Maximum achievable safety class		SIL 3 Tripping class 6 (AK6) PL e	
Safety characteristics			
Low demand	PFD _{AVG} (10a)	3.5 x 10 ⁻⁵ 8.0 x 10 ⁻⁵	
• Test interval 3 months			
• Test interval 6 months			
High demand/continuous mode	PFH	8.1 x 10 ⁻¹⁰ 1.8 x 10 ⁻⁹	
• Test interval 3 months	1/h		
• Test interval 6 months	1/h		
Proof-test interval	Years	10	


Distributed IO for usage in control cabinets

ET 200S motor starters and safety motor starters

ET 200S Failsafe motor starters

		F-DS1e-x direct-on-line starters	F-RS1e-x reversing starters
Voltages, currents, potentials			
Switching capacity	A	Up to 7.5 kW at 400 V AC in three setting ranges • 0.3 ... 3 • 2.4 ... 8 • 2.4 ... 16	
	A		
	A		
Status, alarms, diagnostics			
Status display		SF, DEVICE and C-STAT, SG1 ... SG6	
Diagnostics functions		Red LED (SF) Available	
• Group fault display			
• Diagnostics information can be read out			
Control circuit			
Rated operational voltage for electronics U_1	V DC	24 (20.4 ... 28.8)	24 (21.6 ... 26.4)
Reverse polarity protection for electronics U_1		Yes	
Rated operational voltage for contactor U_2	V DC	24 (20.4 ... 28.8)	
Reverse polarity protection for contactor U_2		Yes	
Power consumption			
• From electronics supply U_1	mA	Approx. 40	Approx. 100
• From contactor supply U_2			
- Pickup	A	1.7 (for 80 ms)	--
- Hold	mA	Max. 350	--
• From SG1 to 6			
- Pickup	mA	250 (for 200 ms)	
- Hold	mA	Max. 55	
• Test function of the shunt release/starter circuit breaker (50 ms) from U_1	A	Approx. 1.5	
• From the backplane bus	mA	Approx. 20	
Main circuit			
Rated operational voltage U_e			
• Acc. to DIN VDE 0106, part 1014, IEC 60947-1, EN 60947-1	V AC	500	
• Protective separation between main and auxiliary circuits	V	400	
• UL, CSA	V AC	600	
Rated insulation voltage U_i	V AC	500	
Rated impulse withstand voltage U_{imp}	kV	6	
Rated frequency	Hz	50/60	

Selection and ordering data


		Setting range of the overcurrent release	DT	Article No.
		A		
ET 200S Failsafe motor starters				
	F-DS1e-x direct-on-line starters			
	Failsafe direct-on-line starters up to 7.5 kW at 400 V AC			
	Mechanically switching			
	Electronic overload protection			
	• 0.3 ... 3		A	3RK1301-0AB13-0AA4
	• 2.4 ... 8		A	3RK1301-0BB13-0AA4
	• 2.4 ... 16		A	3RK1301-0CB13-0AA4
F-DS1e-x direct-on-line starters	F-RS1e-x reversing starters			
	Failsafe reversing starters up to 7.5 kW at 400 V AC			
	Mechanically switching			
	Electronic overload protection, fuseless			
	• 0.3 ... 3		A	3RK1301-0AB13-1AA4
	• 2.4 ... 8		A	3RK1301-0BB13-1AA4
	• 2.4 ... 16		A	3RK1301-0CB13-1AA4

Distributed IO for usage in control cabinets

ET 200S motor starters and safety motor starters

Failsafe terminal modules

Selection and ordering data

	Version	DT	Article No.
Terminal modules for Failsafe motor starters			
 3RK1903-3AC00	TM-FDS65-S32-01/S31-01 terminal modules for F-DS1e-x direct-on-line starters with coding		
	• With incoming power bus connection (TM-FDS65-S32-01)	A	3RK1903-3AC00
	• Without incoming power bus connection (TM-FDS65-S31-01)	A	3RK1903-3AC10
	TM-FRS130-S32-01/S31-01 terminal modules for F-RS1e-x reversing starter with coding		
	• With incoming power bus connection (TM-FRS130-S32-01)	A	3RK1903-3AD00
	• Without incoming power bus connection (TM-FRS130-S31-01)	A	3RK1903-3AD10

Distributed IO for usage in control cabinets

ET 200S motor starters and safety motor starters

Safety modules local and PROFIsafe

Overview

ET 200S Safety Motor Starter Solutions local/PROFIsafe

The ET 200S Safety Motor Starter Solutions are preferred in all production and process automation fields in which the enhancement of plant availability and flexibility play a key role.

- **ET 200S Safety Motor Starters Solutions local** are preferred from the safety technology point of view for locally restricted safety applications. These motor starters are not dependent on a safe control system.
- **ET 200S Safety Motor Starters Solutions PROFIsafe**, on the other hand, are often found in safety applications of the more complex type that are interlinked. In this case a safe control system is used with the PROFINET or PROFIBUS bus systems with the PROFIsafe profile.

The ET 200S Safety Motor Starter Solutions comprise:

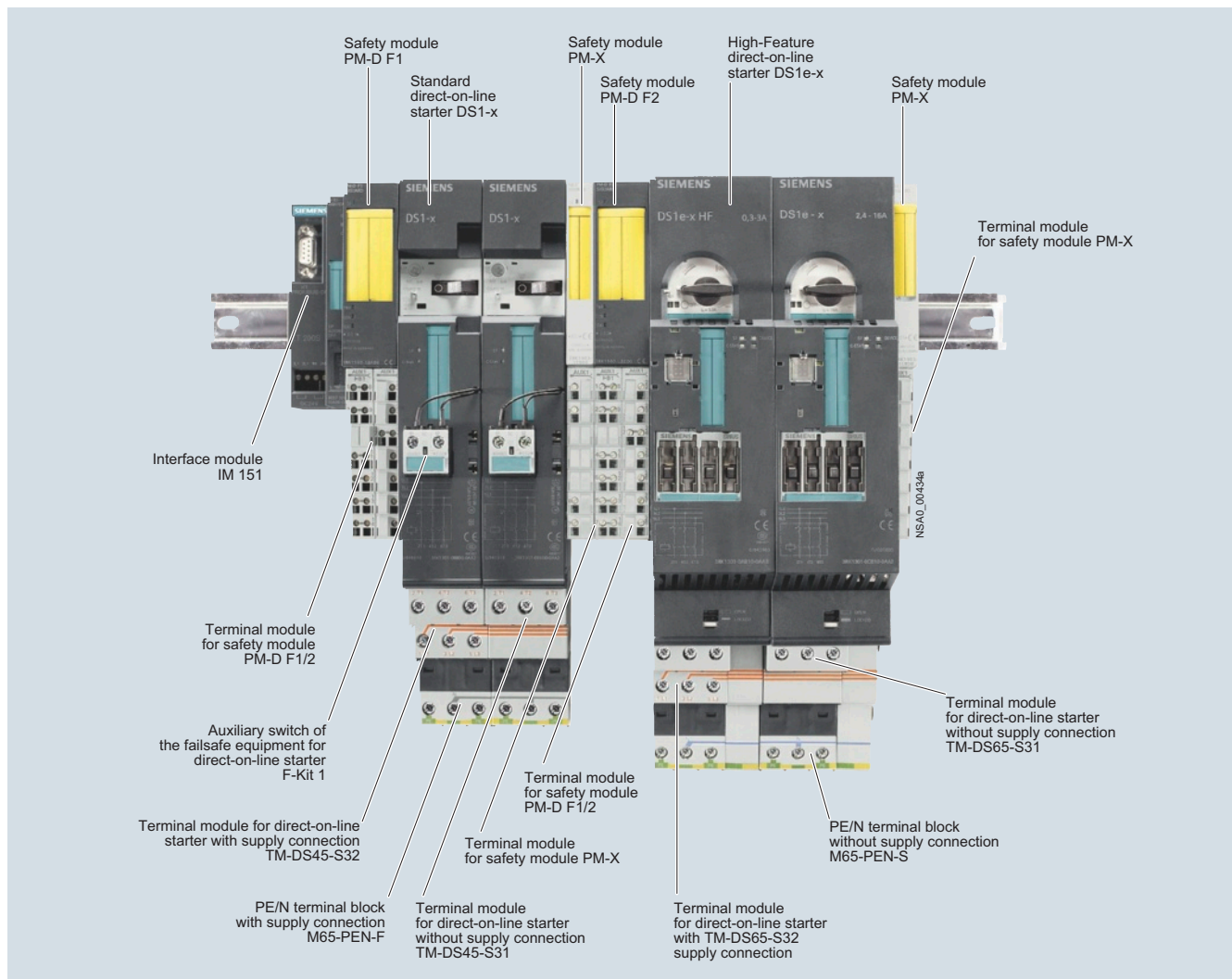
- Safety modules ([page 4/36](#))
- Standard motor starters ([page 4/24](#))
- High-Feature motor starters ([page 4/27](#))
- Failsafe motor starters ([page 4/32](#))

With the ET 200S Safety Motor Starter Solution local there is no complicated and hence cost-intensive configuring and wiring compared to conventional safety systems. The ET 200S Safety Motor Starter Solutions local are designed for PI e according to ISO 13849-1 or SIL 3 IEC 62061.

They enable the use of safety-related direct-on-line starters or reversing starters in the SIMATIC ET 200S distributed peripherals system on PROFINET or PROFIBUS. The bit-modular architecture of the system permits optimum imaging of machine or plant applications.

Within an ET 200S station the Safety Motor Starter Solutions local can also be combined with Standard motor starters or High-Feature motor starters without safety functions up to max. 4 kW up to PI d according to ISO 13849-1 or SIL 2 according to IEC 62061.

Safety Motorstarter ET 200S Solution local



Interaction of ET 200S Safety Motor Starter Solutions local components

Distributed IO for usage in control cabinets

ET 200S motor starters and safety motor starters

Safety modules local and PROFIsafe

Components for ET 200S Safety Motor Starter Solution local

The ET 200S Safety Motor Starter Solutions local comprise:

Version 1 (see example 1, page 4/38):

- Safety modules PMD F1 ... 5
- PM-X module
- Standard motor starter or High-Feature motor starter

Version 2 (see example 2, page 4/38):

- PM-D FX1 safety module
- Failsafe motor starter

Functionality of the ET 200S Safety Motor Starter Solution local

- For using Standard, High-Feature or Failsafe motor starters in systems with safety category SIL 1 (according to IEC 62061) or PL c to PL e (according to ISO 13849-1)
- Can also be used in combination with external safety relays
- Can also be used to activate external safety systems
- No complex wiring for conventional safety technology
- Safety module available for function-monitored and automatic starting
- Safety module available for Stop category 0 and 1
- Safety module for monitoring the auxiliary voltages for motor starters
- Safety modules can be plugged into the TM-PF30 terminal modules

With Safety Motor Starter Solutions local the highest safety category can be achieved according to ISO 13849-1 and IEC 62061. They can thus be used for evaluation of EMERGENCY-STOP circuits or for monitoring protective doors and also for time-delayed disconnections. With the contact multiplier the safety-relevant signals can also be made available to external systems.

All standard safety applications can be covered through combination of different TM-PF30 terminal modules. Needless to say, ET 200S motor starters can also be used in conjunction with external safety relays or with ASIsafe.

With the Safety Motor Starter Solutions local, up to 80 % of wiring is saved compared to conventional safety systems with local safety applications.

With the Safety Motor Starter Solutions local it is easy to configure several safety circuits. The safety sensors are connected directly and locally to the safety modules. These safety modules perform the work of the otherwise obligatory safety relays and safely shut down the downstream motor starters in accordance with the function selected. The crosslinks required for this are already integrated in the system and need no additional wiring. All signals from the safety modules are automatically relayed as diagnostic signals, e.g. in the event of cross-circuit in the EMERGENCY-STOP circuit.

The safety module evaluates the signal state of the connected safety sensors and, using the integrated safety relays, shuts down the group(s) of downstream motor starters. The shutdown function is monitored by the module, and the auxiliary voltages likewise.

Safety-relevant system signals, e.g. due to an actuated EMERGENCY-STOP switch or a missing auxiliary voltage, are automatically generated and notified to the interface module. The latter assigns an unambiguous ID to the fault. Using the PROFIBUS DP diagnostics block, faults of this type can be identified and localized without a great deal of programming work.

PM-D F1/F2/F3/F4/F5 safety modules

- PM-D F1/F2/F3/F4 safety modules monitor auxiliary voltages and contain the complete functionality of a safety relay:
 - PM-D F1: For evaluation of EMERGENCY-STOP circuits with the function "Monitored start"
 - PM-D F2: For monitoring of protective doors with the function "Automatic start"
 - PM-D F3: Expansion to PM-D F1/F2 for time-delayed disconnection
 - PM-D F4: For expanding safety circuits with other ET 200S motor starters, e. g. in a different tier
 - PM-D F5: Transmits the status from PM-D F1 ... 4 via four floating enabling circuits to external safety devices (contact multipliers)
- The PM-D F1 and PM-D F2 modules can be combined with the PM-D F3 or PM-D F4 modules.
- A PM-D F5 can be positioned at any point between a PM-D F1 ... 4 and a PM-X¹⁾.
- Safety modules monitor the U1 and U2 auxiliary voltages. A voltage failure is relayed as a diagnostic signal over the bus.
 - No additional PM-D safety module is required when the safety modules are used.
 - Each safety circuit, beginning with a PM-D F1 ... 4, must be terminated with one PM-X each¹⁾.

¹⁾ See "Accessories for Safety modules local", page 4/50.



PM-D F1 safety module

PM-D FX1 safety module

The PM-D FX1 safety module is used for feeding in 1 to 6 switch-off groups. The infeed voltage can be switched using 1 to 6 external safety shutdown devices (either ASIsafe monitors or 3TK28 safety relays). This safety module is used in applications with external safety shutdown devices where there is a need for the fully selective safety shutdown of Failsafe motor starters/frequency converters (see example 2, page 4/38).

Terminal modules for (TM-PF30) safety module

For feeding load and sensor voltage to the potential bars of the motor starters, and for connection of the 2-channel sensor circuit (e.g. EMERGENCY-STOP pushbutton) and a RESET button. Different terminal modules are available for the configuring of separate safety circuits or for the cascading of safety circuits, and for applications with time-delayed disconnection (see page 4/44).

Distributed IO for usage in control cabinets

ET 200S motor starters and safety motor starters

Safety modules local and PROFIsafe

Terminal module (TM-X)

For connection of an external infeed contactor (2nd shutdown possibility), with terminals for contactor coil and feedback contact, is always required to terminate a group of safety-related motor starters.

Failsafe Kit

The Failsafe Kit (F-Kit) must be added to each Standard motor starter in a safety segment in order to monitor the switching function.

F-Kit 1 supplements the DS1-x direct-on-line starter, F-Kit 2 the RS1-x reversing starter.

The F-Kits are comprised of:

- Contact supports for the terminal modules
- One or two auxiliary switch blocks for the contactor/contactors of the motor starter
- Connecting cables

High-Feature motor starters and their terminal modules come as standard with the functionality of the F-Kits integrated.

Components needed for applications with safety requirement

Components needed	Maximum achievable safety integrity according to ISO 13849-1 or IEC 62061				
	ISO 13849-1 IEC 62061	PL b/c SIL 1	PL c SIL 1	PL d ¹⁾ SIL 2	PL d / PL e ¹⁾ SIL 3
PM-D		✓	--	--	--
PM-D F1/-F2/-F4		--	✓	✓	✓
PM-D F3		--	✓	✓	--
Fail-safe kit 1/fail-safe kit 2		--	✓ ²⁾	✓ ²⁾	✓ ²⁾
PM-X		--	✓	✓	✓
PM-D FX1		--	✓	✓	✓

✓ Required

-- Not required

¹⁾ An external infeed contactor is required in the main circuit (2-channel capability).

²⁾ F-Kit is only required for the Standard motor starter; it is already integrated in the High-Feature motor starter.

Possible combinations of safety and terminal modules

Terminal modules	PM-D F1	PM-D F2	PM-D F3	PM-D F4	PM-D F5	PM-X	PM-DFX1	FCM
TM-PF30 S47-B0	✓	✓	--	--	--	--	--	--
TM-PF30 S47-B1	✓	✓	--	--	--	--	--	--
TM-PF30 S47-C0	--	--	✓	✓	--	--	--	--
TM-PF30 S47-C1	--	--	✓	✓	--	--	--	--
TM-PF30 S47-D0	--	--	--	--	✓	--	--	--
TM-X15 S27-01	--	--	--	--	--	✓	--	--
TM-PFX30 S47-G0	--	--	--	--	--	--	✓	--
TM-PFX30 S47-G1	--	--	--	--	--	--	✓	--
TM-FCM30 S47	--	--	--	--	--	--	--	✓

✓ Available

-- Not available

Distributed IO for usage in control cabinets

ET 200S motor starters and safety motor starters

Safety modules local and PROFIsafe

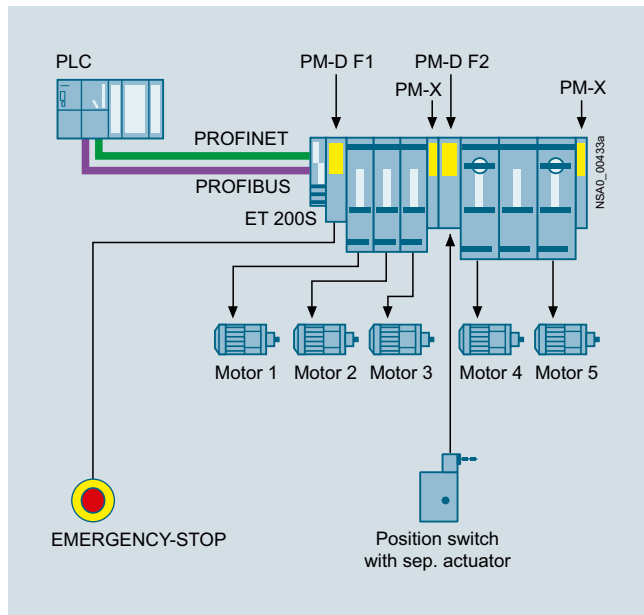
Examples

The diverse possible uses of the Safety Motor Starter Solutions local are presented in the manual SIMATIC ET 200S Motor Starters in the context of typical sample applications.

Safety functional examples for easy, quick and low-cost implementations of applications with Safety Motor Starter Solutions local are available on the Internet:

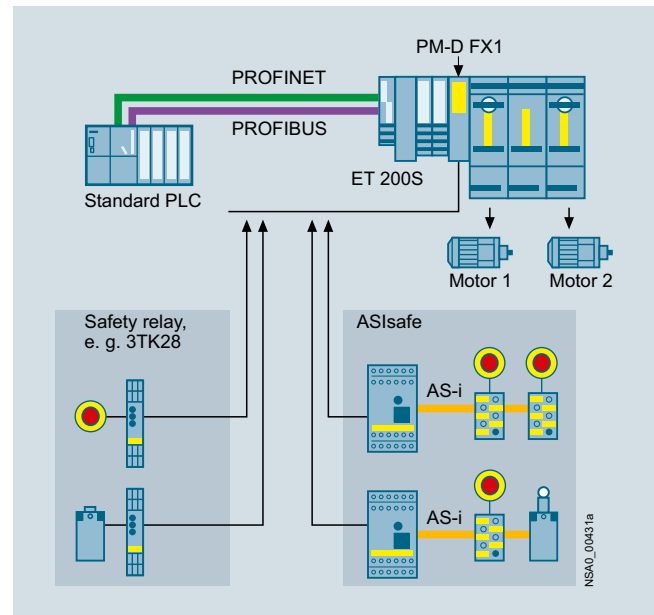
More information can be found on the Internet at:
www.siemens.com/ET200S-motorstarter

Example 1:



ET 200S Safety Motor Starter Solutions local with 2 safety circuits (= switch-off groups), Standard motor starters and High-Feature motor starters.

Example 2:



ET 200S Safety Motor Starter Solutions local with 2 external safety combinations (= safety relays or ASIsafe monitors) and with Failsafe motor starters (PM-DFX1 application). 2 of the 6 available safe switch-off groups are used.

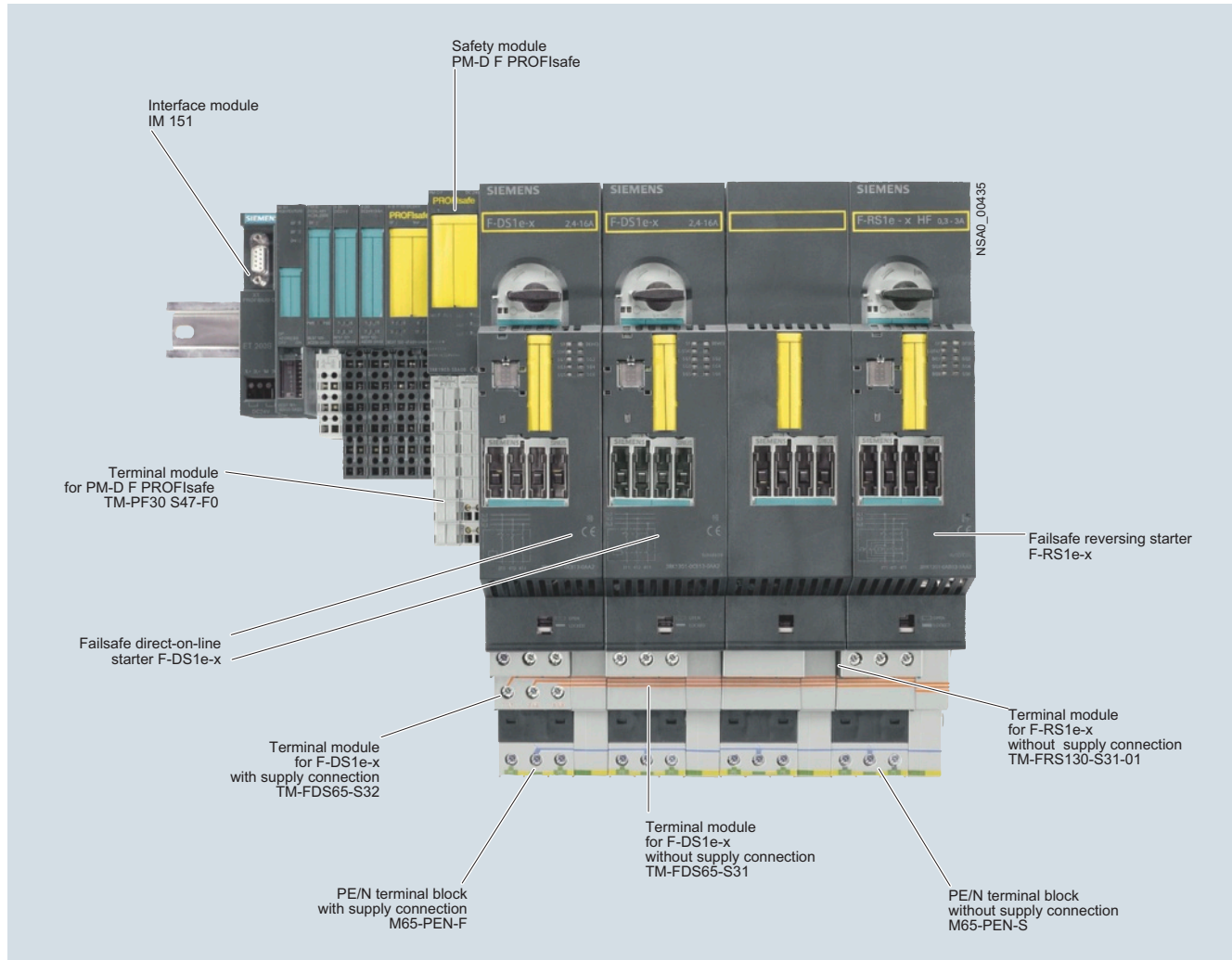
Signals with relevance for safety can be input to ET 200S through a PM-DFX1 infeed terminal module through the enabling circuits of the ASIsafe monitor or the safety relay to control the Failsafe motor starters which then selectively switch off the downstream motors.

Distributed IO for usage in control cabinets

ET 200S motor starters and safety motor starters

Safety modules local and PROFIsafe

ET 200S Safety Motor Starter Solution PROFIsafe



Interaction of ET 200S Safety Motor Starter Solution PROFIsafe components

Components for Safety Motor Starter ET 200S Solution PROFIsafe

The ET 200S Safety Motor Starter Solutions PROFIsafe consist of (see example, page 4/40):

- PMD F PROFIsafe safety modules
- Failsafe motor starters
- Safe control system is used with the PROFINET or PROFIBUS bus systems with the PROFIsafe profile

Functionality of the ET 200S Safety Motor Starter Solution PROFIsafe

- For the use of Failsafe motor starters in plants with PL c to PL e according to ISO 13849-1 and SIL 2 and 3 according to IEC 62061. The use of Standard or High-Feature motor starters is also possible with certain assemblies.
- High flexibility (any assignment of sensors to motor starters using the PLC)
- Full selectivity of disconnection of the Failsafe motor starters
- No complex wiring for conventional safety systems, e.g. no infeed contactors even in the highest safety category
- Can also be used to activate external safety systems through F-CM contact multiplier
- Safety module available for any safety function
- Safety module available for Stop category 0 and 1

- Safety module for monitoring the auxiliary voltages for motor starters
- Safety modules can be plugged into the TM-PF30 terminal modules

Sensor and actuator assignment are freely configurable within the framework of the distributed safety concept:

The logic of the safety functions is implemented by software. Safety-related PROFIsafe communication and the use of a safety-related control system are required. Integration of the safety technology in the standard automation is realized through a single bus system (see Advantages of PROFIsafe), using PROFIBUS as well as PROFINET.

High degree of flexibility with safety technology Failsafe motor starters for PROFIsafe:

In EMERGENCY-STOP applications, the Failsafe motor starters are selectively switched off through the upstream PM-D F PROFIsafe safety module. For each safety module, six switch-off groups can be formed. In the first delivery stage, the fail-safe freely-programmable logic of the SIMATIC controller is used to interface with the relevant fail-safe sensor technology.

F-CM contact multipliers

The interface between PROFIsafe and installations that use conventional safety technology is implemented through the F-CM Failsafe contact multiplier with four floating contacts.

Distributed IO for usage in control cabinets

ET 200S motor starters and safety motor starters

Safety modules local and PROFIsafe

PM-D F PROFIsafe safety modules

The PM-D F PROFIsafe safety module receives the shutdown signal from the interface module of the ET 200S and safely switches off 1 to 6 switch-off groups. This safety module is used in PROFIsafe applications where there is a need for the selective safety shutdown of Failsafe motor starters/frequency converters

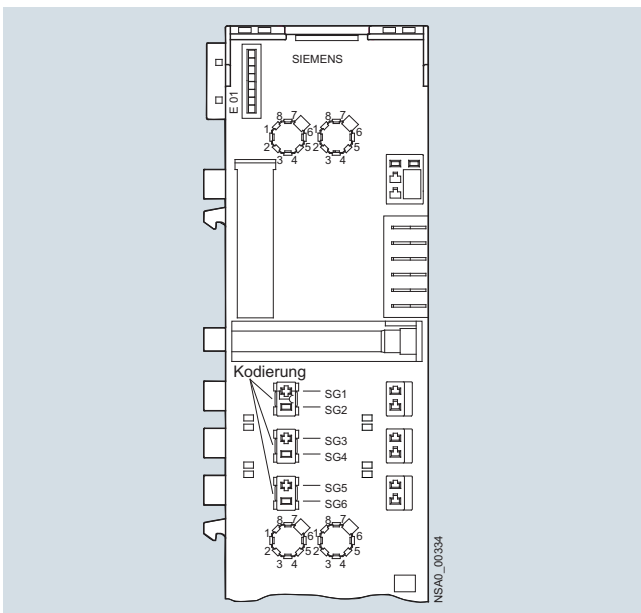


PM-D F PROFIsafe with TM-PF30 S47-F0 terminal module

Terminal modules

The terminal assignment of the terminal modules for safe motor starters corresponds to the terminal assignment of the 45 mm and 65 mm terminal modules. The terminal modules for safe motor starters have a coding module in addition. This enables the safe motor starter to be assigned to one of the six switch-off groups.

The terminal module contains three coding elements which fully cover the three coding openings in the terminal module. The labeled coding element contains (in the chamber marked with the dash) the busbar tap; the non-labeled coding elements are used only to cover the coding openings. Switch-off group 1 (AG1 or SG1) is coded in the as-delivered state. The coding can be changed to switch-off group 2 by releasing the coding element and turning it through 180°. Changing the coding to switch-off group 3 is possible by exchanging the labeled and blank coding elements. In this case, the dash on the labeled coding element must correlate with the dash of the required switch-off group (symbolized busbar).



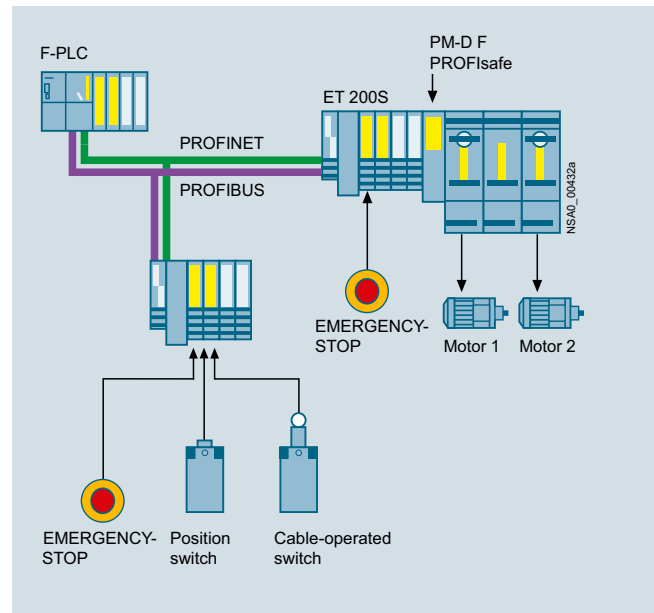
The Failsafe motor starters are assigned to one of the six possible switch-off groups.

Example:

The diverse possible uses of the Safety Motor Starter Solutions PROFIsafe are presented in the manual SIMATIC ET 200S Motor Starters in the context of typical sample applications.

Safety functional examples for easy, quick and low-cost implementations of applications with Safety Motor Starter Solution PROFIsafe are available on the Internet:

More information can be found on the Internet at:
www.siemens.com/ET200S



ET 200S Safety Motor Starter Solution PROFIsafe with Failsafe motor starters and fully selective disconnection (PM-DF PROFIsafe application)

Within an ET 200S station the Failsafe motor starters are assigned to one of 6 safety segments. For plants with distributed configuration the shutdown signals of these safety segments are preferably issued by a higher-level, safety-related control system through PROFIsafe. This permits the greatest flexibility for assigning the motor starters to different safety circuits.

Alternatively, an ET 200S F-CPU can also be used for control purposes.

If a safety-related SIMATIC CPU is used, the ET 200S is available as a safety-related I/O. Nevertheless, in such a station it is possible to configure conventional motor starters and input/output modules mixed with modules with safety functions.

Thanks to the PROFIsafe profile, the safety functions are available in the complete network, which means that the Safety Motor Starter Solutions PROFIsafe enable the selective disconnection of a Failsafe motor starters or the disconnection of a group of Standard and High-Feature motor starters regardless of where and on which peripheral station the safe control devices were connected. As such, this solution provides an unprecedented level of flexibility and reduction of wiring for applications in widespread plants or with a sporadic demand for changes in the assignment of safety segments.

The Safety Motor Starter Solutions PROFIsafe are ideally suited for safety concepts with Cat. 2 to 4 according to ISO 13849-1 and up to SIL 3 according to IEC 62061.

Each safety module switches up to 6 switch-off groups for Failsafe motor starters/frequency converters.

Distributed IO for usage in control cabinets

ET 200S motor starters and safety motor starters

Safety modules local and PROFIsafe

Technical specifications

Safety modules PM-D F1, F2, F3, F4 and F5		
Mechanical endurance	Operating cycles	10 x 10 ⁶
Electrical endurance	Operating cycles	200 000 at I_e
Utilization category		DC-13
Control times		
• Minimum command duration	ms	200
• Recovery time	s	< 1
• OFF-delay	ms	30
Control circuit U_1		
• Rated control supply voltage U_s	V DC	24
• Operating range DC up to 60 °C		0.85 ... 1.2 x U_s
• Power consumption	W	2.4
• Recommended short-circuit protection		gG 2 A
• Output OUT+/OUT- for control of expansion modules		24 V DC/< 50 mA (PTC fuse)
Switched auxiliary circuit U_2		
• Rated control supply voltage U_s	V DC	24
• Operating range DC up to 60 °C		0.85 ... 1.2 x U_s
• Rated operational current I_e (13 ... 24 V DC)	A	4
• Uninterrupted thermal current I_{th}	A	5
Recommended short-circuit protection for enabling and signaling circuits		Fuse links: LV HRC type 3NA, DIAZED type 5SB, NEOZED type 5SE Operating class gG 6 A
Supply of		
• Motor starters		Yes
• Electronic modules		No
• Ex(i) modules		No
• BG certification		Yes
• UL, CSA certification		Yes
Cable length for EMERGENCY-STOP and ON buttons	m	max. 1 000
Mounting dimensions (W x H x D)	mm	30 x 196.5 x 117.5 (incl. terminal module)
Enabling circuits with PM-D F5		4 (floating)
PM-D FX1 safety module (infeed terminal module)		
Dimensions		
Mounting dimensions (W x H x D)	mm	30 x 196.5 x 117.5 (incl. terminal module)
Module-specific specifications		
Ambient temperature	°C	0 ... +60
Degree of protection		IP20
Maximum achievable safety classes		SIL 3 Tripping class 5 and 6 PL e
Safety characteristics		
Proof-test interval		10 years
Voltages, currents, potentials		
Rated control supply voltage U_s	V DC	21.6 ... 26.4 to 60 °C
Rated operational current I_e	A	6 Internal fuse protection 7 A (quick-response)
Recommended upstream short-circuit protection	A	Melting fuse gG 6.3
Supply of		
• Failsafe motor starters		Yes
• Failsafe frequency converters		Yes
• Electronic modules		No
• Ex[i] modules		No
Power consumption		
• From the backplane bus	mA	≤ 10
• From U_1	mA	≤ 35
• From SGx	mA	≤ 15
Status, alarms, diagnostics		
Alarms		None
Diagnostics functions		
• Group fault/device fault		Red LED SF
• Monitoring of the electronics power supply U_1 (PWR)		Green LED PWR
• Monitoring of six switch-off groups		Green LED SG1 ... SG6
• Diagnostics information can be read out		Yes
Standards, approvals		
• TÜV		Yes
• UL, CSA certification		Yes

Distributed IO for usage in control cabinets

ET 200S motor starters and safety motor starters

Safety modules local and PROFIsafe

F-CM contact multipliers

Dimensions

Dimensions (W x H x D) mm 30 x 196.5 x 117.5 (incl. terminal module)

Module-specific specifications

Number of relay outputs 4 (4 x 1-channel or 2 x 2-channel safe coupling/contact multiplication)

Internal power supply for busbar U1 (from PM-D F / PM-D FX1)

Maximum achievable safety class

- According to IEC 62061
- According to DIN VDE 0801
- According to ISO 13849-1

SIL3
AK 6
Cat. 4

Voltages, currents, potentials

Switching capacity of relay outputs Utilization category DC-13 (I_e/U_e): 1.5 A/24 V

Electrical separation

- Between outputs and backplane bus
- Between outputs and power supply
- Between outputs
- Between outputs/power supply and shield

Yes
Yes
Yes
Yes

Status, alarms, diagnostics

Status display PWR and STAT

Alarms: Diagnostic interrupt None

Diagnostics functions

- Group fault display
- Diagnostics information can be read out
- Monitoring of the electronics power supply U_1 (PWR)
- Monitoring of the switching status of the enabling circuit

Yes
Red LED (SF)
Available
Green PWR LED
Red/green LED STAT

PM-D F PROFIsafe safety modules

Dimensions

Dimensions (W x H x D) mm 30 x 196.5 x 117.5 (incl. terminal module)

Module-specific specifications

Number of outputs, switching to P potential 6 switch-off groups (safety group 1 ... 6)

Internal power supply for busbar U1

Assigned address range

- in the PII
- in the PIQ

Byte 5

Byte 5

Maximum achievable safety class

- According to IEC 62061
- According to DIN VDE 0801
- According to ISO 13849-1

SIL3
AK 6
Cat. 4

Voltages, currents, potentials

Supply voltage V 24 DC

Electrical separation

- Between outputs and backplane bus
- Between outputs and power supply
- Between outputs
- Between outputs/power supply and shield

Yes
No
No
Yes

Status, alarms, diagnostics

Status display

Green LED per SG
Green LED for electronics supply
Green LED for load voltage
"ON"

Alarms: Diagnostic interrupt

Diagnostics functions

- Group fault display
- Diagnostics information can be read out

Red LED (SF)
Available

Settings

Module address

Diverse:

1. Using a safety-related parameter in the parameterization message frame via the backplane bus
2. Using the 10-pole DIL switch (binary-coded) on the left side of the module


The received address is then compared with the DIL switch setting.

Distributed IO for usage in control cabinets

ET 200S motor starters and safety motor starters

Safety modules local and PROFIsafe

Selection and ordering data

	Version	DT	Article No.
Safety modules local			
 3RK1903-3DA00	PM-D F1 With diagnostics Safety module for EMERGENCY-STOP application Monitored start	A	3RK1903-1BA00
	PM-D F2 With diagnostics Safety module for protective door monitoring Automatic start	A	3RK1903-1BB00
	PM-D F3 With diagnostics Safety module for expanding PM-D F1/2 for another voltage group Time-delayed 0 to 15 s	A	3RK1903-1BD00
	PM-D F4 With diagnostics Safety module for expanding PM-D F1/2 for another voltage group	A	3RK1903-1BC00
	PM-D F5 With diagnostics Safety module for expanding PM-D F1...4 with four floating enabling circuits Contact multipliers	A	3RK1903-1BE00
	PM-D FX1 With diagnostics Infeed terminal module for supply of 1 to 6 switch-off groups	A	3RK1903-3DA00
	FC-M contact multipliers With 4 safe floating contacts	A	3RK1903-3CA00
Safety modules PROFIsafe			
	PM-D F PROFIsafe safety modules For PROFIBUS and PROFINET For Failsafe motor starters For Failsafe contact multipliers With six switch-off groups (SG1 to SG6)	A	3RK1903-3BA02
	F-CM contact multipliers With 4 safe floating contacts	A	3RK1903-3CA00

Distributed IO for usage in control cabinets

ET 200S motor starters and safety motor starters

Safety modules local and PROFIsafe terminal modules

Overview

Terminal modules for PM-D F1/F2/F3/F4/F5 safety modules

For supplying load and sensor voltage to the self-assembling potential bars of the Standard motor starters, High-Feature motor starters and frequency converters. Safety modules for voltage monitoring are plugged onto TM-P modules. TM-P modules can be used any number of times within the ET 200S. A safety module must always be plugged upstream from the first motor starter.

Different safety circuits can be functionally separated or else cascaded using different terminal modules. Each group in such a case must be terminated with a PM-X safety module (connection module).

TM-PF30 S47-B1

The terminal module is always positioned at the beginning of a safety segment and accommodates the PM-DF1 safety module for EMERGENCY-STOP applications or the PM-DF2 safety module for protective door monitoring. The 24 V control supply voltages for the electronics (U1) and those for supplying the contactors (U2) of the motor starters must be connected along with the 2-channel connection of the safety sensors (e.g. EMERGENCY-STOP pushbuttons) to this terminal module. Connections for the ON button (enabling) and safe output of the safety module are available in addition.

TM-PF30 S47-B0

The terminal module is used to cascade lower level safety segments and accommodates the PM-DF1 safety module for EMERGENCY-STOP applications or the PM-DF2 safety module for protective door monitoring. No other auxiliary voltage has to be connected to this terminal module. The supply comes from the preceding PM-DF1 or PM-DF2 module over the potential bars of the terminal modules. Once the potential of the preceding safety module is disconnected, this sub-potential also has no voltage.

TM-PF30 S47-C1

The terminal module is always positioned at the beginning of a safety segment expansion in a new station, e.g. at an interlace point. It accommodates the PM-D F3 safety module for time-delayed shutdown or the PM-D F4 safety module for direct shutdown in separately located ET 200S stations. The 24 V control supply voltages for the electronics (U1) and those for supplying the contactors (U2) are fed in anew.

The shutdown command from an upstream ET 200S station is received through a safe input. Separate terminals are available to connect the feedback circuit to the upstream ET 200S station. No safety sensors can be connected to this terminal module.

TM-PF30 S47-C0

The terminal module is used to cascade lower level safety segments and accommodates the PM-D F3 safety module for time-delayed shutdown or the PM-D F4 safety module. Only the U2 control supply voltage for the contactors must be connected to this terminal module. The U1 supply comes from the preceding safety module (sub-potential group) over the potential bars of the terminal modules. No safety sensors can be connected to this terminal module.

TM-PF30 S47-D0

The terminal module is used to accommodate the PM-D F5 safety module. On this terminal module, safe signals can be relayed to external systems through four groups, each with two safety relay contacts configured with redundancy. The terminal module must always be positioned between one of the above mentioned terminal modules and a terminal module for the TM-X connection module. No safety sensors can be connected to this terminal module.

Terminal module for PM-X safety module (TM-X)

TM-X15 S27-01

For connection of an external infeed contactor (second shutdown option) for SIL 2 and SIL 3 or PL d and PL e. The PM-X safety module (connection module) is plugged on the right next to the last motor starter of a safety segment. On the TM-X terminal module there are the terminals for connecting the positively driven NC contact of the contactors as well as the terminals for connecting the contactor coil. If no contactor with redundant switching is required, e.g. for PL c (ISO 13849-1), the feedback circuit has to be closed at these terminals with a jumper. In applications with external safety relays it is also used instead of the safety module as interface to the external safety relay.

Distributed IO for usage in control cabinets


ET 200S motor starters and safety motor starters

Safety modules local
and PROFIsafe terminal modules

Technical specifications

TM-PFX30 S47/TM-PF30 S47 terminal modules			
Dimensions			
• Mounting dimensions (W x H x D)	mm	30 x 196.5 x 102	
• Depth with power module	mm	117.5	
Insulation voltages and rated currents			
• Insulation voltage	V	500	
• Rated operational voltage	V DC	24	
• Rated operational current	A	10	
Conductor cross-sections			
• Solid	mm ²	1 x (0.14 ... 2.5), according to IEC 60947 1 x 2.5	
• Finely stranded with end sleeve	mm ²	1 x (0.14 ... 1.5), according to IEC 60947	
• AWG cables, solid or stranded	AWG	1 x (18 ... 22)	
Wiring			
• Required tool		Standard screwdriver size 1	
• Tightening torque	Nm	0.4 ... 0.7	

Selection and ordering data

Version	DT	Article No.
Terminal modules for Safety modules local		
 3RK1 903-1AA00	TM-PF30 S47-B1 terminal modules For PM-D F1/2 safety modules With infeed U1/U2 and sensor connection	A 3RK1903-1AA00
	TM-PF30 S47-B0 terminal modules For PM-D F1/2 safety modules With sensor connection	A 3RK1903-1AA10
	TM-PF30 S47-C1 terminal modules For PM-D F3/4 safety modules With infeed U1/U2 and control input IN+/IN-	A 3RK1903-1AC00
	TM-PF30 S47-C0 terminal modules For PM-D F3/4 safety modules With infeed U2	A 3RK1903-1AC10
	TM-PF30 S47-D0 terminal module For PM-D F5 safety modules	A 3RK1903-1AD10
	TM-X15 S27-01 terminal module For PM-X safety module	A 3RK1903-1AB00
	TM-P15-S27-01 terminal modules For PM-D power module	A 3RK1903-0AA00
	TM-PFX30 S47-G0/G1 terminal modules For PM-D FX1 safety modules (infeed terminal modules)	
	• Infeed left (TM-PFX30 S47-G0)	A 3RK1903-3AE10
	• Infeed center (TM-PFX30 S47-G1)	A 3RK1903-3AE00
	TM-FCM30 S47-F01 terminal module For F-CM contact multipliers	A 3RK1903-3AB10
Terminal modules for Safety modules PROFIsafe		
	TM-PF30 S47-F0 terminal modules For PM-D F PROFIsafe safety modules	A 3RK1903-3AA00
	TM-FCM30 S47-F01 terminal module For F-CM contact multipliers	A 3RK1903-3AB10

Distributed IO for usage in control cabinets

ET 200S motor starters and safety motor starters

Accessories

Overview

Accessories for Standard motor starters

Control kit

The control kit for the Standard motor starter provides the possibility of testing the motor during start-up or service by actuating the motor starter protector. Using the control kit with the motor starter protector tripped, the contactor is mechanically locked in ON position.

Control unit

With the control unit the contactor coils of the Standard motor starter can be directly controlled using 24 V DC. The motor starter can thus be started as normal using a local control station without PLC or bus.

Note:

The control unit cannot be used in combination with the safety system or a brake control module.

DM-V15 distance module

- Passive module without bus connection and terminals
- Does not need a separate terminal module
- Follows a TM-DS45 or TM-RS90 or TM-xB if required
- Does not need to be taken into account when configuring the GSD file

The distance module is available for applications with high motor currents or high ambient temperatures involving Standard motor starters. It can be used to the right and left of a DS1-x direct-on-line starter or to the right of an xB1...4 brake module in order to improve heat dissipation to the side. The distance module is a completely passive module and does not need to be taken into account with regard to the control system during configuration. Details of the distance module can be found in the manual "SIMATIC ET 200S". If you have any queries concerning the use of the distance module, contact Technical Support for Siemens Industrial Controls (Fax: +49(0)911/895-5907).

Accessories for High-Feature motor starters

2DI LC COM control module

The 2DI LC COM control module is plugged into the interface on the front of the motor starter. The module provides two inputs which can receive signals from the process and be assigned directly to the starter.

The functionality can be selected from a list of various control functions as part of the PROFIBUS parameterization. Local control point, emergency start and quick stop, for example, are available as functions. The signal levels can also be parameterized (NO/NC). For more extensive control functions the two inputs of an xB3 or xB4 brake control module, which is plugged in alongside on the right, can be integrated in addition. The signal states of all inputs are transmitted in parallel with the internal use to the higher-level control system.

When a motor starter is replaced, the parameterization is automatically transmitted by download to the new starter. The inputs on the motor starter ensure autonomous operation, e.g. in the event of PLC failure, on the one hand and short response times through direct processing in the starter on the other hand. Another advantage results from the direct assignment of functions to modular machine concepts.

The 2DI LC COM control module has in addition a PC interface for connecting the Switch ES Motorstarter parameterization and diagnostics software (Version 2.0 and higher). The module works solely on High-Feature motor starters with Motor Starter ES interface. The Logo! PC cable is used as connecting cable between the 2DI LC COM control module and the High-Feature motor starter.

Accessories for Standard and High-Feature motor starters

PE/N bridge modules

PE/N bridge modules are used to bridge gaps of the PE/N bus which are caused, for example, by using brake control modules, PM-D(F) power modules or PM-X connection modules. If a bridge module is used, the supply must not be fed in anew. They are available in 15 mm and in 30 mm widths.

L123 bridge modules

The L123 bridge modules are used to bridge gaps of the power bus (see above). They are available in 15 mm and in 30 mm widths.

Brake control module

For motors with mechanical brake (see "General Data" → "Overview", page 4/18)

Terminal modules for brake control modules

The TM-xB terminal modules are used to accommodate the xB1, xB2, xB3 and xB4 brake control modules. The TM-xB terminal module must always follow directly after a terminal module for Standard motor starters, High-Feature motor starters or frequency converters as control of the solid-state braking switch is provided through an output of the motor starter/frequency converter. The xB215 terminal modules for the brake control modules have not only the terminals for connecting the cable for the motor brake but also the terminals of the two local acting inputs. These local inputs are not evaluated by a frequency converter, which is why the xB215 terminal module can only be switched downstream of a motor starter.

Accessories for Standard, High-Feature and Failsafe motor starters

PE/N terminal blocks

The PE/N terminal block is required for direct connection of the protective conductor in the motor cable without intermediate terminals. It is plugged together with the terminal module for motor starters or frequency converters before the latter is mounted on the standard mounting rail. With two PE terminals and one N terminal the "-F" version is connected to the "-S32" terminal modules for motor starters or frequency converters. The "-S" version is combined with the "-S31" terminal module. The "F" terminal blocks are delivered with two caps for closing the PE/N bus contacts on the final terminal block of a segment. The modules for the Standard motor starters have a width of 45 mm and the modules for the High-Feature motor starters and frequency converters have a width of 65 mm.

There is no electrical connection between the terminals of the PE/N terminal block and the integrated shielding of the frequency converter. The PE/N terminal block must therefore not be used for the shielding of the motor cable.

Accessories for Safety modules local

The Fail-safe Kit (F-Kit) is required for Standard motor starters in a safety segment (see page 4/37).

Distributed IO for usage in control cabinets

ET 200S motor starters and safety motor starters

Accessories

Technical specifications

Brake control modules Xb1, Xb2, Xb3, Xb4, Xb5, Xb6

		xB1	xB3	xB2	xB4	xB5	xB6
Dimensions (W x H x D)	mm	15 x 196.5 x 125.5 including terminal module on 7.5 mm standard mounting rail					
Rated operational voltage	V	24 DC		500 DC (at least 100)		400 AC	
Power supply		Externally through terminal module		From brake rectifier through terminal module		Externally through terminal module	
Rated operational current	A	4		0.7		0.5	
Reverse polarity protection		No, in the event of polarity reversal the brake is released and the overload/short-circuit protection is ineffective				Not relevant	
Overload/short-circuit protection		Electronic				1 A melting fuse	
Conductor cross-section of terminal module for brake control module	mm ²	1 x 2.5 without end sleeve 1 x 1.5 with end sleeve					
Number of outputs		0	1 (used internally)	0	1 (used internally)	0	1 (used internally)
Number of inputs		0	2	0	2	0	2
Address area required per module							
• With summary		0	2 bits	0	2 bits	0	2 bits
• Without summary		0	1 byte	0	1 byte	0	1 byte
Diagnostics functions							
• Group fault "SF"		Red LED					
• Switching status for brake "STAT"		Yellow LED					
• Inputs 1 and 5		--	Green LED	--	Green LED	--	Green LED
Parameters (default value underlined)							
• Brake overload diagnostics		--	Disable/Enable	--	Disable/Enable	--	
• Input delay	ms	--	0 / 0.1 / 0.5 / <u>3</u> / 15	--	0 / 0.1 / 0.5 / <u>3</u> / 15	--	0 / 0.1 / 0.5 / <u>3</u> / 15

Selection and ordering data

Version	DT	Article No.
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Accessories for Standard motor starters



3RK1903-OCA00

Control kits
for manually operating the contactor contacts during start-up and servicing
(one set contains five control kits)

A

3RK1903-OCA00



3RK1903-OCG00

Control units
for direct contactor control
(manual control)
24 V DC

A

3RK1903-OCG00



3RK1903-OCD00

DM-V15 distance modules
for DS1-x direct-on-line starters
with high temperatures or high current loading
15 mm wide






A

3RK1903-OCD00

Distributed IO for usage in control cabinets

ET 200S motor starters and safety motor starters

Accessories

Version	DT	Article No.
Accessories for Standard motor starters (continued)		
 <p>3RK1903-2AA00</p>	<p>PE/N M45-PEN-F terminal blocks 45 mm wide including two caps in combination with TM-DS45-S32/ TM-RS90-S32</p>	<p>A 3RK1903-2AA00</p>
 <p>3RK1903-2AA10</p>	<p>PE/N M45-PEN-S terminal blocks 45 mm wide in combination with TM-DS45-S31/TM-RS90-S31</p>	<p>A 3RK1903-2AA10</p>
Accessories for High-Feature motor starters		
 <p>3RK1903-0CH20</p>	<p>2DI LC COM control modules Digital input module with 2 inputs (cable length up to 100 m) for local motor starter functions for mounting onto the front of motor starters, operational voltage 24 V DC (supplied from U_1), short-circuit proof, floating contact with serial interface for connecting Motor Starter ES, connected using LOGO! PC cable</p>	<p>A 3RK1903-0CH20</p>
 <p>3RK1922-3BA00</p>	<p>Hand-held devices For ET 200S High-Feature motor starters (or for ET 200pro and M200D motor starters) for local operation. The motor starter-specific serial interface cables must be ordered separately. The LOGO! PC cable is used for the MS ET 200S HF.</p>	<p>B 3RK1922-3BA00</p>
 <p>6ED1057-1AA00-0BA0</p>	<p>LOGO! PC cables For connecting the ET 200S High-Feature motor starters to the RS 232 interface of a PG/PC/laptop (with the Motor Starter ES software) or the hand-held device 3RK1922-3BA00.</p>	<p>A 6ED1057-1AA00-0BA0</p>
<p>M65-PEN-F terminal blocks 65 mm wide, including two caps, in combination with TM-DS65-S32/TM-RS130-S32</p>		<p>A 3RK1903-2AC00</p>
<p>M65-PEN-S terminal blocks 65 mm wide, in combination with TM-DS65-S31/TM-RS130-S31</p>		<p>A 3RK1903-2AC10</p>

Distributed IO for usage in control cabinets

ET 200S motor starters and safety motor starters





Accessories

Version	DT	Article No.
Accessories for Standard/High-Feature motor starters		
 3RK1903-0AH00	M15-PE/N bridge modules 15 mm wide for bridging a 15 mm module	A 3RK1903-0AH00
 3RK1903-0AJ00	M30-PE/N bridge modules 30 mm wide for bridging a 30 mm module	A 3RK1903-0AJ00
 3RK1903-0AE00	M15-L123 bridge modules 15 mm wide for bridging a 15 mm module	A 3RK1903-0AE00
 3RK1903-0AF00	M30-L123 bridge modules 30 mm wide for bridging a 30 mm module	A 3RK1903-0AF00
 3RK1903-0AF20	Sealing caps for L123 and PE/N bridge modules (bag containing 20 units)	A 3RK1903-0AF20
 3RK1903-0CB00	Brake control modules for motors with mechanical brake <ul style="list-style-type: none"> • xB1 for motor starters 24 V DC/4 A • xB2 for motor starters 500 V DC/0.7 A • xB3 for motor starters 24 V DC/4 A/2 DI 24 V DC local control with diagnostics, with two inputs • xB4 for motor starters 500 V DC/0.7 A/2 DI 24 V DC local control with diagnostics, with two inputs • xB5 for motor starters 400 V AC without digital input • xB6 for motor starters 400 V AC with two digital inputs 	A 3RK1903-0CB00 A 3RK1903-0CC00 A 3RK1903-0CE00 A 3RK1903-0CF00 A 3RK1903-0CJ00 A 3RK1903-0CK00
	Terminal modules for brake control modules <ul style="list-style-type: none"> • TM-xB15 S24-01 for xB1, xB2 or xB5 • TM-xB215 S24-01 for xB3, xB4 or xB6 	A 3RK1903-0AG00 A 3RK1903-0AG01

Distributed IO for usage in control cabinets

ET 200S motor starters and safety motor starters

Accessories

Version	DT	Article No.
Accessories for Failsafe motor starters		
M65-PEN-F terminal blocks With incoming connection, with caps	A	3RK1903-2AC00
M65-PEN-S terminal blocks Without incoming connection	A	3RK1903-2AC10
Accessories for Safety modules local		
 PM-X safety modules (connection modules) With diagnostics, for plugging onto TM-X15 S27-01 Module for connecting a safety group and for connecting an external infeed contactor or for connecting to an external safety circuit	A	3RK1903-1CB00
 F-Kit 1 Failsafe equipment for DS1-x Standard motor starters ¹⁾	A	3RK1903-1CA00
 F-Kit 2 Failsafe equipment for RS1-x Standard motor starters ¹⁾	A	3RK1903-1CA01
 3RK1903-1CA00 3RK1903-1CA01		
Documentation		
Manual²⁾ SIMATIC ET 200S Motor Starters, Failsafe Motor Starters, Safety-Integrated Systems		

¹⁾ The function of the Failsafe Kit is already integrated into High-Feature motor starters.

²⁾ <http://support.automation.siemens.com/WW/view/en/6008567>

Distributed IO for usage in control cabinets

ET 200S - Software

Motor starter ES

Following delivery versions are also available for Motor Starter ES 2007:

- **Upgrade**
Switching from an old to a new version with expanded functions, e.g. upgrade from Motor Starter ES 2006 to Motor Starter ES 2007
- **Powerpack**
Special pack for switching within the same software version to a more powerful version with more functionality, e.g. Powerpack Motor Starter ES 2007 for switching from Standard to Premium
- **Software Update Service**
To keep you up to date at all times we offer a special service which supplies you automatically with all service packs and upgrades.
- **License download**
User-friendly license key download from our Mall (for selected countries) as an easy and quick way for you to receive additional licenses for your software.
For more information see www.siemens.com/tia-online-software-delivery.

System requirements

Parameterization, start-up and diagnostics software Motor Starter ES 2007 For ECOFAST Motor Starter, SIMATIC ET 200S High-Feature Starter, SIMATIC ET 200pro Starter and M200D (AS-I Standard, PROFIBUS, PROFINET)	
Operating system	Windows XP Professional (Service Pack 2 or 3) Windows 7 32/64 Bit Professional/Ultimate/Enterprise (Service Pack 1)
Processor	≥ Pentium 800 MHz/≥ 1 GHz (Windows 7)
RAM	≥ 512 Mbyte (Windows XP Professional)/≥ 1 GB (Windows 7 32 Bit)/ ≥ 2 GB (Windows 7 64 Bit)
Monitor resolution	≥ 1024 x 768
Free space on hard disk¹⁾	≥ 400 Mbyte
CD-ROM/DVD drive	Yes (only when installing from CD)
Interface	Depends on PC cable: serial (COM) or USB
PC cable/parameterization cable/connection cable	Yes
PROFIBUS card/PROFIBUS processor	Optional, for parameterization and diagnostics through PROFIBUS
Ethernet interface/PROFINET card	Optional, for parameterization and diagnostics through PROFINET

¹⁾ Additional free space recommended, e.g. for swap-out file.

Benefits

- Fast, error-free configuration and startup of motor starters even without extensive previous knowledge
- Transparent setting of the device functions and their parameters – online and offline
- Effective diagnostics functions on the soft starter and display of the most important measured values
- Trace function (oscilloscope function) for recording measured values and events (included in the Motor Starter ES Standard and Premium software version for M200D PROFIBUS and PROFINET).

Selection and ordering data

**Parameterization, start-up and diagnostics software
Motor Starter ES 2007**

For ECOFAST Motor Starter, SIMATIC ET 200S High-Feature Starter, SIMATIC ET 200pro Starter and M200D (AS-I Standard, PROFIBUS, PROFINET)

Version	DT	Article No.
---------	----	-------------

Motor Starter ES 2007 Basic**Floating license for one user**

Engineering software in limited-function version for diagnostics purposes, software and documentation on CD, 3 languages (German/English/French), communication through system interface

- License key on USB stick, Class A, including CD
- License key download, Class A, without CD

B

3ZS1310-4CC10-0YA5

►

3ZS1310-4CE10-0YB5

3ZS1310-4CC10-0YA5

Motor Starter ES 2007 Standard**Floating license for one user**

Engineering software, software and documentation on CD, 3 languages (German/English/French), communication through system interface

- License key on USB stick, Class A, including CD
- License key download, Class A, without CD

B

3ZS1310-5CC10-0YA5

►

3ZS1310-5CE10-0YB5**Upgrade for Motor Starter ES 2006**

B

3ZS1310-5CC10-0YE5

Floating license for one user, engineering software, software and documentation on CD, license key on USB stick, Class A, 3 languages (German/English/French), communication through the system interface

Powerpack for Motor Starter ES 2007 Basic

B

3ZS1310-5CC10-0YD5

Floating license for one user, engineering software, license key on USB stick, Class A, 3 languages (German/English/French), communication through system interface

Software Update Service

B

3ZS1310-5CC10-0YL5

For 1 year with automatic extension, assuming the current software version is in use, engineering software, software and documentation on CD, communication through the system interface

Notes:

Please order PC cable separately, [see next page](#).

For description of the software versions [see page 4/51](#).

Distributed IO for usage in control cabinets

ET 200S - Software

Motor starter ES

Version	DT	Article No.
Motor Starter ES 2007 Premium		
Floating license for one user		
Engineering software, software and documentation on CD, 3 languages (German/English/French), communication through system interface or PROFIBUS/PROFINET/STEP7 Object Manager		
• License key on USB stick, Class A, including CD	B	3ZS1310-6CC10-0YA5
• License key download, Class A, without CD	►	3ZS1310-6CE10-0YB5
Upgrade for Motor Starter ES 2006		
Floating license for one user, engineering software, software and documentation on CD, license key on USB stick, Class A, 3 languages (German/English/French), communication through the system interface or PROFIBUS	B	3ZS1310-6CC10-0YE5
Powerpack for Motor Starter ES 2007 Standard		
Floating license for one user, engineering software, license key on USB stick, Class A, 3 languages (German/English/French), communication through the system interface or PROFIBUS	B	3ZS1310-6CC10-0YD5
Software Update Service		
For 1 year with automatic extension, assuming the current software version is in use, engineering software, software and documentation on CD, communication through the system interface or PROFIBUS	B	3ZS1310-6CC10-0YL5



Notes:

Please order PC cable separately, [see Accessories](#).

For description of the software versions [see page 4/51](#).

4

Accessories

Version	DT	Article No.
Optional accessories		
 3UF7940-0AA00-0	RS 232 PC cables	► 3UF7940-0AA00-0
	For connecting to the serial interface of a PC/PG, for communication with Soft Starter ES through the system interface	
 3UF7941-0AA00-0	USB PC cables	► 3UF7941-0AA00-0
	For connecting to the USB interface of a PC/PG, for communication with Soft Starter ES through the system interface	
	USB/serial adapters	B 3UF7946-0AA00-0
	For connecting the RS 232 PC cable to the USB interface of a PC, recommended for use in conjunction with Soft Starter ES	
	Optional PROFIBUS communication module for SIRIUS 3RW44	► 3RW4900-0KC00
	Optional PROFINET communication module for SIRIUS 3RW44	► 3RW4900-0NC00

Distributed IO for usage in the field

ET 200pro motor starters

General data

Overview

ET 200pro motor starters in the ET 200pro I/O system

SIMATIC ET 200pro is a modular I/O system in the degree of protection IP65/66/67 for near-machine, cabinet-free use. ET 200pro motor starters in the high degree of protection IP65 are an integral part of ET 200pro.



ET 200pro motor starter: Isolator module, Standard starter and High-Feature starter mounted on a wide module rack

ET 200pro motor starters

- Only two versions up to 5.5 kW
- All settings can be parameterized by bus
- Comprehensive diagnostic signals
- Support for PROFlenergy
- Overload can be acknowledged by remote reset
- Current unbalance monitoring
- Stall protection
- Emergency start function in the event of overload
- Current value transmission by bus
- Current limit monitoring
- Full support of acyclic services
- Direct-on-line or reversing starters
- Power bus connection can be plugged in using Han Q4/2 plug-in connectors
- Motor feeder with Han Q8/0 connector
- Conductor cross-sections up to 6 x 4 mm²
- 25 A per segment (power looped through using jumper plug)
- In the Standard and High-Feature versions (with 4 DI onBoard)
- Electromechanical switching and electronic switching
- Electronic starter for direct activation or with integrated soft starter function
- Supplied with 400 V AC brake contact as an option
- Provision of the motor current in PROFlenergy format to higher-level systems, motor current shutdown in dead times using PROFlenergy

ET 200pro isolator modules (see page 4/61)

The isolator module with switch disconnecter function is used for safe disconnection of the 400 V operational voltage during repair work in the plant and provides an integrated group fusing function (i.e. additional group short-circuit protection for all downstream supplied motor starters).

Depending on the power distribution concept, all stations can be equipped with an isolator module as an option.

Safety applications

Safety Solution local (see page 4/61)

With the Safety local modules

- Safety local isolator module and
- 400 V disconnecting module

it is possible to achieve safety level SIL 3 (according to IEC 62061) and PL e (according to ISO 13849-1) with an appropriate connection.

Safety Solution PROFIsafe (see page 4/64)

With the Safety PROFIsafe modules

- F-Switch and
- 400 V disconnecting module

it is likewise possible to achieve safety level SIL 3 (according to IEC 62061) and PL e (according to ISO 13849-1).

Functionality

With the ET 200pro motor starters, any AC loads can be protected and switched.

The ET 200pro motor starters are available both with mechanical as well as electronic contacts.

The ET 200pro electromechanical starters are offered as direct-on-line (DSe) and reversing starters (RSe) in the versions **Standard** and **High-Feature**. There are device versions with or without control for externally fed brakes with 400 V AC.

Compared to the Standard motor starter, the **High-Feature mechanical motor starter** also has:

- 4 digital inputs
- Advanced parameterization options

The ET 200pro electronic starters are offered as direct-on-line starters (sDSSSte/sDStSte) and reversing starters (sRSSSte/sRStSte) in the High-Feature version.

Compared to the High-Feature mechanical motor starter, the **High-Feature electronic motor starter** also has:

- Soft starting and smooth ramp-down function
- Deactivated soft start function as an electronic starter for applications with a high switching frequency
- Advanced parameterization options

As a result of the protection concept with electronic overload evaluation and the use of SIRIUS controls, size S00, additional advantages are realized on the Standard and High-Feature motor starters – advantages which soon make themselves positively felt particularly in manufacturing processes with high plant downtime costs:

- Configuration is made easier by the fine modular structure with ET200pro. When using the ET 200pro motor starters, the parts list per load feeder is reduced to 2 main items: the bus module and the motor starter. This makes the ET 200pro ideal for modular machine concepts or solutions for conveyor systems and in machine-tool construction.
- Expansions are easily possible through the subsequent adding of modules. The innovative plug-in technology also does away with the wiring needed up to now. Through the hot swapping function (disconnection and connection during operation) a motor starter can be replaced within seconds if necessary, without having to shut down the ET 200pro station and with it the process in the plant. The motor starters are therefore recommendable in particular for applications with special demands on availability. Storage costs are optimized in addition by the low level of variance (2 units up to 5.5 kW).

The ordering option for motor starters with a 400 V AC brake output provides the possibility of controlling motors with 400 V AC brakes. With four locally acting inputs available on the High-Feature motor starter it is possible to realize autonomous special functions which work independently of the bus and the higher-level control system, e.g. as a quick stop on gate valve controls or limit position disconnectors. In parallel with this, the states of these inputs are signaled to the control system.

Distributed IO for usage in the field

ET 200pro motor starters

General data

Type		Standard motor starters	High-Feature motor starters
Technology designation ¹⁾		DSe, RSe	DSe, RSe sDSSSte, sDSte, sRSSSte, sRSte
Device functions (firmware features)			
Parameterizable rated operational current		✓	
Integrated short-circuit protection		✓	
Parameterizable current limit values		--	✓, 2 limit values
Parameterizable response in case of current limit violation		--	✓
Zero current monitoring		✓	
Parameterizable response in case of zero current violation		✓	
Parameterizable current unbalance limit	%	--, fixed limit value (30 x I _e)	✓, 30 ... 60 x I _e
Parameterizable response in case of unbalance limit violation		✓	
Motor blocking monitoring		--	✓
Parameterizable blocking current limit	%	--	✓, 150 ... 1 000 x I _e
Parameterizable blocking time limit	s	--	✓, 1 ... 5
Current value transmission		✓	
Group warning diagnostics		--	✓, parameterizable
Group diagnostics		✓, parameterizable	
Emergency start		✓	
Digital inputs		--	✓, 4 inputs
• Parameterizable input signal		--	✓, latching/non-latching
• Parameterizable input level		--	✓, NC/NO
• Parameterizable input signal delay	ms	--	✓, 10 ... 80
• Parameterizable input signal extension	ms	--	✓, 0 ... 200
• Parameterizable input control actions		--	✓, 12 different actions
Brake output (400 V AC)		✓, order option	
Parameterizable brake enabling delay	s	✓, -2.5 ... 2.5	
Parameterizable holding time of the brake during stopping	s	✓, 0 ... 25	
Parameterizable start-up type		--	✓
Parameterizable ramp-down time		--	✓
Parameterizable starting voltage		--	✓
Parameterizable stopping voltage		--	✓
Local device interface		✓	
Firmware update		✓, by specialists	
Thermal motor model		✓	
Parameterizable trip class		--, CLASS 10 fixed	✓, CLASS 5, 10, 15, 20
Parameterizable response in case of overload of thermal motor model		--	✓, 3 possible states
Advance warning limit for motor heating	%	--	✓, parameterizable 0 ... 95
Advance warning limit time-related trip reserve	s	--	✓, parameterizable 0 ... 500
Parameterizable recovery time	min	--	✓, 1 ... 30
Parameterizable protection against voltage failure		--, permanently integrated	✓
Reversing start function		✓, order option	
Parameterizable interlock time for reversing starters		--, 150 ms fixed	✓, 0 ... 60 s
Integrated logbook functions		✓, 3 device logbooks	
Integrated statistics data memory		✓	
Parameterizable response in case of CPU / master stop		✓	
PROFenergy profile support			
• Disconnection of the motor current during idle times		✓	
• Measured motor current values		✓	
Device indications			
• Group fault		SF LED (red)	
• Switching state		STATE LED (red, yellow, green)	
• Device status		DEVICE LED (red, yellow, green)	
• Digital inputs		--	IN 1 ... IN 4, LED

✓ Function available

-- Function not available

- ¹⁾ DS direct-on-line starter
 RS reversing starter
 DSS .. direct soft starter
 RSS .. reversing soft starter
 e electronic motor protection
 te full motor protection (thermal + electronic)
 s electronic switching with semiconductor.

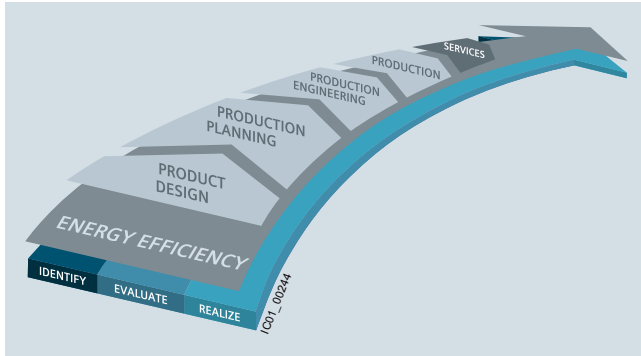
Distributed IO for usage in the field

ET 200pro motor starters

General data

Benefits

Advantages through energy efficiency



Overview of the energy management process

We offer you a unique portfolio for industrial energy management, using an energy management system that helps to optimally define your energy needs. We split up our industrial energy management into three phases – identify, evaluate, and realize – and we support you with the appropriate hardware and software solutions in every process phase.

The innovative products of the SIRIUS industrial controls portfolio can also make a substantial contribution to a plant's energy efficiency (see www.siemens.com/sirius/energysaving).

SIMATIC ET 200pro motor starters contribute to energy efficiency as follows:

- Energy management
Provision of energy data (current) by bus to higher-level systems using PROFIenergy
- Elimination of energy consumption in dead times through disconnection using PROFIenergy
- Current management
With solid-state soft starters, avoidance of current peaks and therefore reduction of the load on the grid and the mechanical system
- Technology-reduced inherent power loss as speed-controlled drive systems
- Solid-state modules equipped with soft start technology with bypass contactor, resulting in lower power losses than with conventional soft starters after start-up

Product advantages

ET 200pro motor starters provide the following advantages:

- High flexibility thanks to a modular and compact design
- Little variance among all motor starter versions (2 units up to 5.5 kW)
- Extensive parameterization using STEP 7 HW Config
- Increase of plant availability through fast replacement of units (easy mounting and plug-in technology)
- Extensive diagnostics and information for preventive maintenance
- Parameterizable inputs for local control functions (High-Feature)
- Cabinet-free design thanks to high degree of protection IP65

Technical specifications

Type		Standard motor starters Mechanically switching without inputs	High-Feature motor starters Mechanically switching with inputs	Mechanically switching with inputs and soft starter function
Technology designation ¹⁾		DSe, RSe	DSe, RSe	sDSSSte, sDSte, sRSSSte, sRSte
Mechanics and environment				
Motor starters or modules that can be connected to ET 200pro With width of 110 mm		max. 8		
Mounting dimensions (W x H x D) • Direct-on-line starters and reversing starters		mm	110 x 230 x 150	110 x 230 x 160
Permissible ambient temperature • During operation • During storage		°C	-25 ... +55, from +40 with derating	
		°C	-40 ... +70	
Permissible mounting position			Vertical, horizontal	
Vibration resistance acc. to IEC 60068, Part 2-6		g	2	
Shock resistance acc. to IEC 60068 Part 2-27		g/ms	Half-sine 15/11	
Degree of protection			IP65	
Pollution degree			3, IEC 60664 (IEC 61131)	

¹⁾ DS direct-on-line starter
RS reversing starter
DSS .. direct soft starter
RSS .. reversing soft starter
e electronic motor protection
te full motor protection (thermal + electronic)
s electronic switching with semiconductor.

Distributed IO for usage in the field

ET 200pro motor starters

General data

Type		Standard motor starters	High-Feature motor starters	
		Mechanically switching without inputs	Mechanically switching with inputs	Mechanically switching with inputs and soft starter function
Technology designation ¹⁾		DSe, RSe	DSe, RSe	sDSSSte, sDSte, sRSSSte, sRSte
Electrical specifications				
Power consumption at 24 V DC • From auxiliary circuit L+/M (U1) • From auxiliary circuit A1/A2 (U2)	mA mA	Approx. 40 Approx. 200		
Rated operational current for power bus I_e	A	25		
Rated operational voltage U_e • Approval according to EN 60947-1, Appendix N • Approval according to CSA and UL	V AC V AC V AC	400 (50/60 Hz) Up to 400 (50/60 Hz) Up to 600 (50/60 Hz)		Up to 400 (50/60 Hz) Up to 480 (50/60 Hz)
Approval • DIN VDE 0106, Part 101 • CSA and UL approval	V V	Up to 400 Up to 600		Up to 480 Up to 480
Conductor cross-sections • Incoming power supply	mm ²	Max. 6 x 4		
Touch protection		Finger-safe		
Rated impulse withstand voltage U_{imp}	kV	6		
Rated insulation voltage U_i	V	400		
Rated operational current for starters I_e • AC-1/2/3 at 40 °C - At 400 V - At 500 V • AC-4 at 40 °C - At 400 V	 A A A	 0.15 ... 2.0/1.5 ... 12.0 0.15 ... 2.0/1.5 ... 9.0 0.15 ... 2.0/1.5 ... 4.0		0.15 ... 2.0/1.5 ... 12.0 ²⁾
Rated short-circuit breaking capacity	kA	100 at 400 V		
Type of coordination acc. to IEC 60947-4-1		1		
Power of three-phase motors at 400 V	kW	Max. 5.5		Max. 5.5/4 ³⁾
Utilization categories		AC-1, AC-2, AC-3, AC-4		AC-53a ⁴⁾ (max. 9 A with deactivated soft start function up to CLASS 10)
Protective separation between main and auxiliary circuits	V	400, Acc. to EN 60947-1, Appendix N		
Endurance of contactor • Mechanical • Electrical	 Operat- ing cycles Operat- ing cycles	 30 million Up to 10 million; depending on the current loading (see manual ⁵⁾)		 -- --
Permissible switching frequency		Depending on the current load, motor starting time, and relative ON period (see manual ⁵⁾)		
Operating times for 0.85 ... 1.1 x U_e • Closing delay • Opening delay	 ms ms	 11 ... 50 5 ... 45		 -- --

1) DS direct-on-line starter
RS reversing starter
DSS .. direct soft starter
RSS .. reversing soft starter
e electronic motor protection
te full motor protection (thermal + electronic)
s electronic switching with semiconductor.

2) Note:
If the soft starter control function is deactivated, the permissible rated operational current is reduced to 9 A up to CLASS 10.
3) With parameterization as electronic starter max. 4 kW.
4) 8-hour operation.
5) <http://support.automation.siemens.com/WW/view/en/22332388>

¹⁾ DS direct-on-line starter
 RS reversing starter
 DSS .. direct soft starter
 RSS .. reversing soft starter
 e electronic motor protection
 te full motor protection (thermal + electronic)
 s electronic switching with semiconductor.

²⁾ **Note:**
 If the soft starter control function is deactivated, the permissible rated operational current is reduced to 9 A up to CLASS 10.
³⁾ With parameterization as electronic starter max. 4 kW.
⁴⁾ 8-hour operation.
⁵⁾ <http://support.automation.siemens.com/WW/view/en/22332388>

More information

Notes on safety


System networking requires suitable protective measures (including network segmentation for IT security) in order to ensure safe plant operation.

More information about the subject of Industrial Security see www.siemens.com/industrialsecurity.

Overview

The functionality, device functions, and technical specifications of the Standard motor starter are described in "ET 200pro Motor Starters, General Data" ([see from page 4/55](#)).

Selection and ordering data

Version		DT ²⁾	Article No.
Standard motor starters, mechanical Motor protection: thermal model			
 DSe Standard	DSe direct-on-line starters¹⁾		
	• Without brake output	A	3RK1304-5□S40-4AA0
	• With brake output 400 V AC	A	3RK1304-5□S40-4AA3
	RSe reversing starters¹⁾		
	• Without brake output	A	3RK1304-5□S40-5AA0
	• With brake output 400 V AC	A	3RK1304-5□S40-5AA3
Setting range			
Rated operational current			
• 0.15 ... 2.0 A			
• 1.5 ... 12.0 A			

¹⁾ Only functions when used together with the backplane bus module and the wide module rack. The backplane bus module and the wide module rack must be ordered separately ([see "Accessories for ET 200pro Motor Starters" on page 4/69](#)).

²⁾ Delivery time class A for setting range of rated operational current 0.15 ... 2.0 A.

Distributed IO for usage in the field

ET 200pro motor starters



High-Feature motor starters

Overview

The functionality, device functions, and technical specifications of the High-Feature motor starter are described in "ET 200pro motor starters, General data" ([see from page 4/55](#)).

The High-Feature motor starter differs from the Standard motor starter in having more parameters and four integrated, freely-parameterizable digital inputs.

Selection and ordering data

Version	DT	Article No.
High-Feature motor starters, mechanical Motor protection: thermal model		
	DSe direct-on-line starters ¹⁾	
	• Without brake output and with 4 inputs	A 3RK1304-5□S40-2AA0
	• With brake output 400 V AC and 4 inputs	C 3RK1304-5□S40-2AA3
	RSe reversing starters ¹⁾	
	• Without brake output and with 4 inputs	A 3RK1304-5□S40-3AA0
	• With brake output 400 V AC and 4 inputs	A 3RK1304-5□S40-3AA3
Setting range Rated operational current		K L
• 0.15 ... 2.0 A		
• 1.5 ... 12.0 A		
High-Feature motor starters ²⁾ , electronic Full motor protection, comprising thermal motor protection and thermistor motor protection		
	sDSSSte/sDSte direct-on-line starters ¹⁾²⁾	
	• Without brake output and with 4 inputs	A 3RK1304-5□S70-2AA0
	• With brake output 400 V AC and 4 inputs	C 3RK1304-5□S70-2AA3
	sRSSSte/sRSte reversing starters ¹⁾²⁾	
	• Without brake output and with 4 inputs	A 3RK1304-5□S70-3AA0
	• With brake output 400 V AC and 4 inputs	A 3RK1304-5□S70-3AA3
Setting range Rated operational current		K L
• 0.15 ... 2.0 A		
• 1.5 ... 12.0 A		

¹⁾ Only functions when used together with the backplane bus module and the wide module rack. The backplane bus module and the wide module rack must be ordered separately ([see "Accessories for ET 200pro Motor Starters" on page 4/69](#)).

²⁾ The solid-state motor starters can be used not only as solid-state motors starters with a high level of switching frequency but also as fully fledged soft starters for soft starting and stopping. The changeover from motor starter to soft starter takes place through reparameterization in HW Config. Depending on the setting, this results in the following current ranges:

- Parameterization as solid-state motor starter: 0.15 to 2 A and 1.5 to 9 A (4 kW)
- Parameterization as soft starter: 0.15 to 2 A and 1.5 to 12 A (5.5 kW).

Distributed IO for usage in the field

ET 200pro motor starters

ET 200pro safety motor starters Solutions local/
PROFIsafe – Safety modules local

Overview

Safety Solution local

With the Safety local modules

- Safety local isolator module and
- 400 V disconnecting module

it is possible to achieve safety level SIL 3 (according to IEC 62061) and PL e (according to ISO 13849-1) with an appropriate connection.



ET 200pro motor starters (Safety Solution local): Safety local isolator module, disconnecting module, Standard starter and High-Feature starter mounted on a wide module rack

Safety local isolator module

The Safety local isolator module is a repair switch with integrated safety evaluation functions that can be parameterized using DIP switches.

It is used for:

- Connection of a 1- or 2-channel EMERGENCY-STOP circuit up to SIL 3/PL e (protective door or EMERGENCY-STOP pushbuttons) and parameterizable start behavior
- For controlling the 400 V disconnecting module by means of a safety rail signal

400 V disconnecting module

The 400 V disconnecting module enables the safe disconnection of an operational voltage of 400 V up to SIL 3/PL e. For operation in a Safety Solution local application, it functions only in combination with the Safety local isolator module.

For operation in a Safety PROFIsafe application it functions only in combination with the F-Switch.

Functionality

Safety local isolator module

The Safety local isolator module features the same functions as a standard isolator module with an additional local safety function.

The Safety local isolator module contains a 3TK2841 module and is equipped with M12 terminals for the connection of external safety components.

Terminals 1 and 2 can be used to connect either 1-channel or 2-channel EMERGENCY-STOP circuits or protective door circuits (IN 1, IN 2).

For monitored starts, an external START switch can be connected to terminal 3.

The required safety functions can be set using 2 slide switches located under the left M12 opening.

In the event of an EMERGENCY-STOP, the Safety local isolator module trips the downstream 400 V disconnecting module. This safely separates the 400 V circuit up to SIL 3/PL e.

In combination with the 400 V disconnecting module, the Safety local isolator module can be used for safety applications up to SIL 3/PL e.

400 V disconnecting module

The 400V disconnecting module can be used together with the Safety local isolator module for local safety applications and together with the F-Switch for PROFIsafe safety applications.

It contains two contactors connected in series for safety-related disconnection of the main circuit.

The auxiliary circuit supply of the device is over a safety power rail in the backplane bus module.

The 400 V disconnecting module can be used in conjunction with the Safety local isolator module or with the F-Switch for safety applications up to SIL 3/PL e.

Distributed IO for usage in the field



ET 200pro motor starters

ET 200pro safety motor starters Solutions local/
PROFIsafe – Safety modules local

Technical specifications

Type		Safety local isolator module	400 V disconnecting module
General data			
Mounting dimensions (W x H x D) in mm			
• Direct-on-line starters and reversing starters	mm	110 x 230 x 170	110 x 230 x 150
Permissible ambient temperature			
• During operation	°C	-25 ... +55	
• During storage	°C	-40 ... +70	
Permissible mounting position		Any	
Vibration resistance acc. to IEC 60068, Part 2-6		2 g	
Shock resistance acc. to IEC 60068 Part 2-27		Half-wave 15 g/11 ms	
Power consumption			
• From auxiliary circuit L+/M (U1)	mA	Approx. 20	
• From auxiliary circuit A1/A2 (U2)		--	
Rated operational current for power bus I_e	A	25	
Rated operational voltage U_e	V	400 (50/60 Hz)	
Approval to DIN VDE 0106 Part 101	V	Up to 500	
CSA and UL approval	V	Up to 600	
Conductor cross-sections Incoming power supply	mm ²	Max. 6 x 4	
Degree of protection		IP65	
Touch protection		Finger-safe	
Pollution degree		3, IEC 60664 (IEC 61131)	
Rated impulse withstand voltage U_{imp}	kV	6	
Rated insulation voltage U_i	V	400	
Rated operational current for starters I_e			
• AC-1/2/3 at 40 °C			
- At 400 V	A	16	25
- At 500 V	A	16	25
Rated short-circuit breaking capacity	kA	50 at 400 V	
Type of coordination acc. to IEC 60947-4-1		2	
Protective separation between main and auxiliary circuits	V	400, acc. to DIN VDE 0106 Part 101	
Operating times for 0.85 ... 1.1 x U_e			
• Closing delay	ms	--	25 ... 100
• Opening delay	ms	--	7 ... 10
Device functions			
• Group diagnostics		Yes, parameterizable	
Device indications			
• Group fault		SF LED (red)	

Selection and ordering data

Version	DT	Article No.
Safety modules local		
 <p>3RK1304-0HS00-7AA0</p>	<p>Safety local isolator modules¹⁾²⁾ Rated operational current 16 A</p>	<p>C 3RK1304-0HS00-7AA0</p>
 <p>3RK1304-0HS00-8AA0</p>	<p>400 V disconnecting modules³⁾⁴⁾ Rated operational current 25 A</p>	<p>A 3RK1304-0HS00-8AA0</p>

¹⁾ The Safety local isolator module only functions when used together with the 400 V disconnecting module.

²⁾ Only in combination with the special backplane bus module for the Safety local isolator module (see page 4/69 Accessories for ET 200pro Motor Starters*).

³⁾ The 400 V disconnecting module functions only when used together with the Safety local isolator module or with the F-Switch.

⁴⁾ The 400 V disconnecting module functions only when used together with the backplane bus module and the wide module rack. The backplane bus module and the wide module rack must be ordered separately (see page 4/69 Accessories for ET 200pro Motor Starters*).

Distributed IO for usage in the field

ET 200pro motor starters

ET 200pro Safety motor starters Solutions local PROFIsafe – Safety modules PROFIsafe

Overview

Safety Solution PROFIsafe

With the Safety PROFIsafe modules

- F-Switch and
- 400 V disconnecting module

it is possible to achieve safety level SIL 3 (according to IEC 62061) and PL e (according to ISO 13849-1) with an appropriate connection.

F-Switch PROFIsafe

Fail-safe digital inputs/outputs in degrees of protection IP65 to IP67 for near-machine, cabinet-free use.

Fail-safe digital inputs

- For the fail-safe reading in of sensor information (1-/2-channel)
- Including integrated discrepancy evaluation for 2v2 signals
- Internal sensor supplies (incl. testing) available

Fail-safe digital outputs

- 3 fail-safe PP-switching outputs for safe switching of the backplane busbars

The F-Switch is certified up to SIL 3 / PL e and has detailed diagnostics.

It supports PROFIsafe in PROFIBUS configurations as well as in PROFINET configurations.

Note:

Safety characteristics [see chapter 5 "Appendix"](#)
→ "Standards and Approvals" → "Overview".



400 V disconnecting module

See "Safety modules local", Overview page 4/61 and Technical specifications page 4/62.

Functionality

The PROFIsafe F-Switch is a fail-safe electronic module for PROFIsafe safety applications. It has two fail-safe inputs and outputs for safe switching of the 24 V supply over backplane busbars. In combination with the 400 V disconnecting module, the fail-safe disconnection of ET 200pro motor starters is possible in PROFIsafe applications up to SIL 3/PL e.

Selection and ordering data

	Version	DT	Article No.
ET 200pro safety modules			
 3RK1304-OHS00-8AA0	400 V disconnecting modules¹⁾²⁾ Rated operational current 25 A		3RK1304-OHS00-8AA0
	F-Switch PROFIsafe 24 V DC, including bus module Connection module must be ordered separately		6ES7148-4FS00-0AB0
 6ES7148-1FS00-0AB0	Connection modules for F-Switch 24 V DC		6ES7194-4DA00-0AA0

¹⁾ The 400 V disconnecting module functions only when used together with the Safety local isolator module or with the F-Switch.

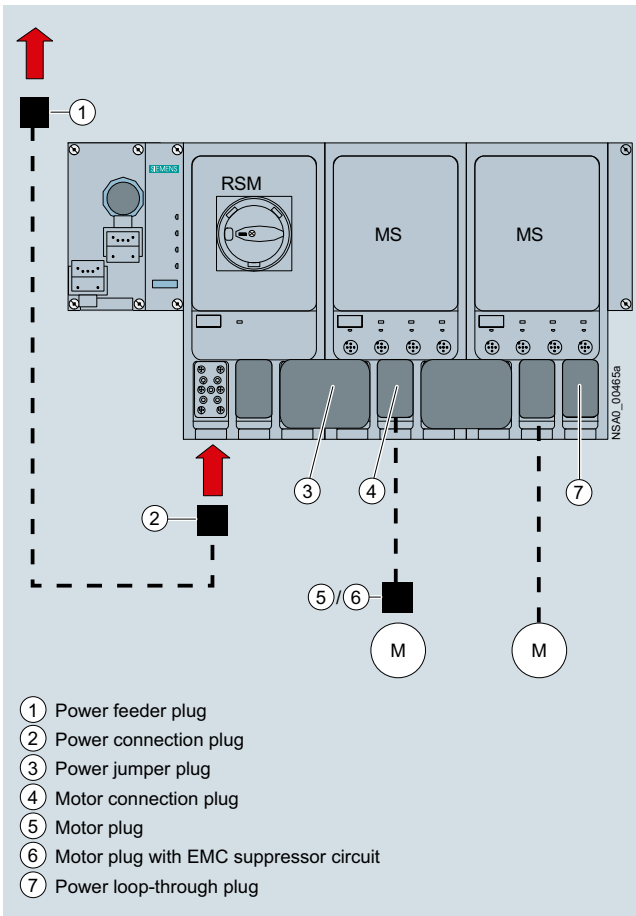
²⁾ The 400 V disconnecting module functions only when used together with the backplane bus module and the wide module rack. The backplane bus module and the wide module rack must be ordered separately (see page 4/69 "Accessories for ET 200pro Motor Starters").

Distributed IO for usage in the field

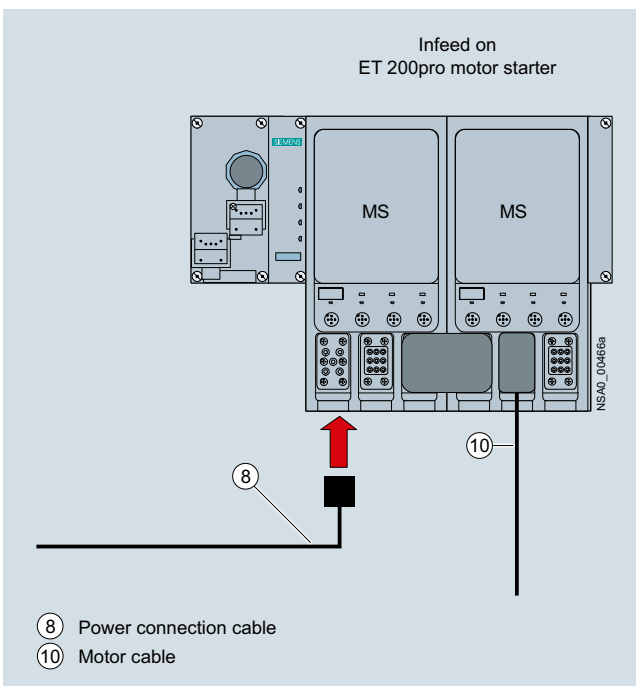
ET 200pro motor starters

Accessories for ET 200pro motor starters

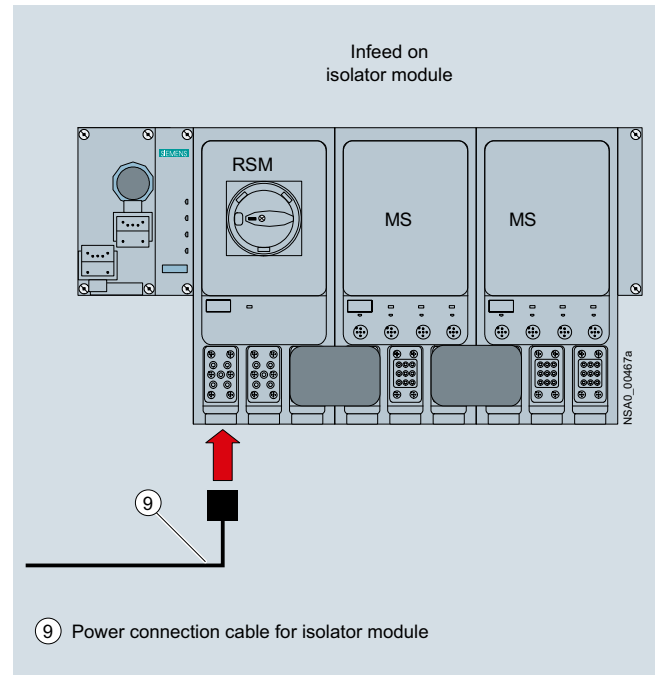
Overview



Basic design of an ET 200pro version with (from the left) connection module for IM, interface module for communication (IM), RSM isolator module, two ET 200pro motor starters (MS), and connections for energy



Infeed on the ET 200pro motor starter



Infeed on the RSM isolator module

Legend:

- ① Power feeder plug ([see page 4/67](#))
- ② Power connection plug ([see page 4/67](#))
- ③ Power jumper plug ([see page 4/67](#))
- ④ Motor connection plug ([see page 4/67](#))
- ⑤ Motor plug ([see page 4/67](#))
- ⑥ Motor plug with EMC suppressor circuit ([see page 4/67](#))
- ⑦ Power loop-through plug ([see page 4/67](#))
- ⑧ Power connection cable ([see page 4/67](#))
- ⑨ Power connection cable for isolator modules ([see page 4/67](#))
- ⑩ Motor cable ([see page 4/68](#))

Distributed IO for usage in the field

ET 200pro motor starters

Accessories for ET 200pro motor starters

Power bus

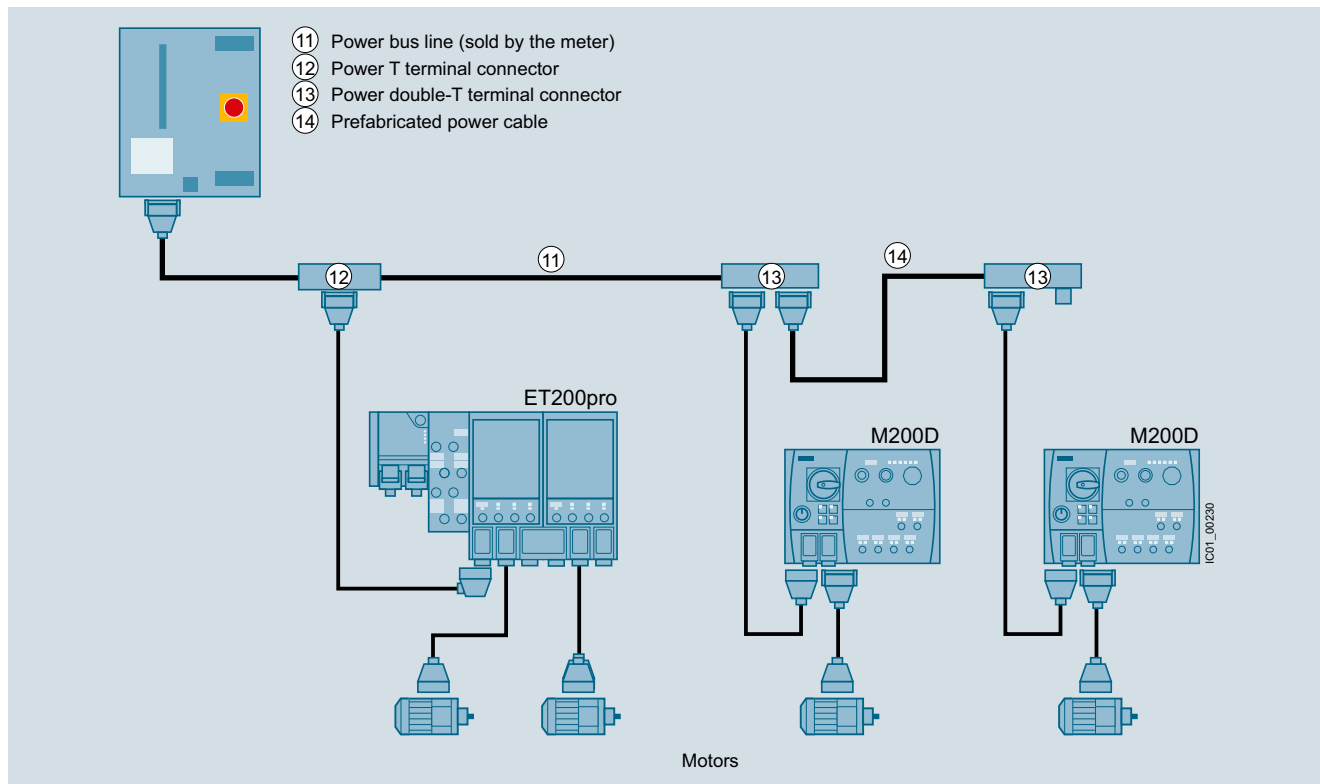
The power supply to the field devices (ET 200pro motor starters, M200D motor starters) is provided via the power bus, in which the power T terminal connectors or power double-T terminal connectors are connected by power bus cables.

Feeders

From the terminal connectors, spur lines with Han Q4/2 plugs lead to the field devices, from which the motors are supplied with power via motor connection cables.

Interruption-free thanks to power terminal connectors

In finger-safe connection technology the power T terminal connectors and power double-T terminal connectors connect the components of a feeder to the power bus. They ensure interruption-free operation, i. e. when the components are plugged in, the power bus is not interrupted.



Power supply to the motors via the power bus with power T and double-T terminal connectors linked by power bus cables, spur lines to the field devices (motor starters), and power loop-through connections to the motors via motor connection cables

Motor control via PROFIBUS

The interface modules (IM) for PROFIBUS can be combined with three different connection modules for connecting PROFIBUS DP and the power supply:

- Direct connection with cable glands
- ECOFAST connection with hybrid fieldbus cables (with two copper cores for data transmission with PROFIBUS DP, and four copper cores for the power supply), and ECOFAST connectors (HanBrid)¹⁾
- M12, 7/8" connection
 - with M12 connecting cable and M12 plugs for data transmission with PROFIBUS DP
 - with 7/8" connecting cable and 7/8" plugs for the power supply²⁾

The connection modules with the relevant accessories can be found among the accessories for the ET 200pro interface modules IM 154-1 and IM 154-2 (see page 3/142).

¹⁾ Hybrid fieldbus connections with HanBrid sockets designed as cabinet bushings transmit data and energy from the control cabinet (IP20) to the field (IP65). They are the interface for jointly routing PROFIBUS DP and the auxiliary voltages into the hybrid fieldbus cable (see catalog IC 10, chapter 9).

²⁾ On the control cabinet bushings with two M12 sockets for the PROFIBUS M12 connecting cables, (see catalog IC 10, chapter 9) the 24 V supply of the motor starters is implemented via separate 7/8" connecting cables.

Motor control via PROFINET

The connection modules with the relevant accessories can be found among the accessories for the ET 200pro interface module IM 154-4 PN (see page 3/145).

Motor control via Industrial Wireless LAN

As well as wired solutions, communication can also be made via Industrial Wireless LAN (see interface module IM 154-6 PN IWLAN, page 3/148).

Distributed IO for usage in the field

ET 200pro motor starters

Accessories for ET 200pro motor starters


Selection and ordering data

Version	DT	Article No.
Incoming power supply		
① Power feeder plugs Connector set for energy supply, e.g. for connecting to T terminal connectors, comprising a coupling enclosure, straight outgoing feeder (with bracket), pin insert for HAN Q4/2, incl. gland		
• 5 male contacts 2.5 mm ²	B	3RK1911-2BS60
• 5 male contacts 4 mm ²	B	3RK1911-2BS20
• 5 male contacts 6 mm ²	B	3RK1911-2BS40
② Power connection plugs Connector set for energy supply for connection to ET 200pro motor starters/ET 200pro isolator modules, comprising a cable-end connector hood, angular outgoing feeder, female insert for HAN Q4/2, incl. gland		
• 5 female contacts 2.5 mm ²	B	3RK1911-2BE50
• 5 female contacts 4 mm ²	B	3RK1911-2BE10
• 5 female contacts 6 mm ²	B	3RK1911-2BE30
⑧ Power connection cables, assembled at one end Power connection cable for ET 200pro motor starters, open at one end, for HAN Q4/2, angular, insert turned at isolator module end, 4 x 4 mm ²		
• Length 1.5 m	B	3RK1911-0DB13
• Length 5.0 m	B	3RK1911-0DB33
⑨ Power connection cables for isolator module, assembled at one end Power connection cable for ET 200pro isolator modules, open at one end, for HAN Q4/2, angular, insert turned at isolator module end, 4 x 4 mm ²		
• Length 1.5 m	C	3RK1911-0DF13
• Length 5.0 m	C	3RK1911-0DF33
Power loop-through on the field device		
③ Power jumper plugs		
	A	3RK1922-2BQ00
⑦ Power loop-through plugs Connector set for power loop-through for connection to ET 200pro motor starters/ET 200pro isolator modules, comprising a cable-end connector hood, angular outgoing feeder, pin insert for HAN Q4/2, incl. gland		
• 4 male contacts 2.5 mm ²	B	3RK1911-2BF50
• 4 male contacts 4 mm ²	B	3RK1911-2BF10
Motor cables		
④ Motor connection plugs Connector set for motor cable for connection to ET 200pro motor starters, comprising a cable-end connector hood, angular outgoing feeder, pin insert for HAN Q8/0, incl. gland		
• 8 male contacts 1.5 mm ²	B	3RK1902-0CE00
• 6 male contacts 2.5 mm ²	B	3RK1902-0CC00
⑤ Motor plugs Connector set for motor cable for connection to motors, comprising a cable-end connector hood, straight outgoing feeder, female insert for HAN 10e, incl. star jumper, incl. gland		
• 7 female contacts 1.5 mm ²	C	3RK1911-2BM21
• 7 female contacts 2.5 mm ²	C	3RK1911-2BM22
⑥ Motor plugs with EMC suppressor circuit Connector set for motor cable for connection to motors, comprising a cable-end connector hood, straight outgoing feeder, female insert for HAN 10e with EMC suppressor circuit, incl. star jumper, incl. gland		
• 7 female contacts 1.5 mm ²	C	3RK1911-2BL21
• 7 female contacts 2.5 mm ²	C	3RK1911-2BL22

Distributed IO for usage in the field

ET 200pro motor starters

Accessories for ET 200pro motor starters

Version	DT	Article No.
Motor cables (continued)		
⑩ Motor cables, assembled at one end Open at one end, HAN Q8, angular, length 5 m		
• Motor cable for motor without brake, for ET 200pro, 4 x 1.5 mm ²	C	3RK1911-0EB31
• Motor cable for motor with brake for ET 200pro, 6 x 1.5 mm ²	C	3RK1911-0ED31
Power bus		
⑫ Power T terminal connectors For 400 V AC, for connection of feeders (e.g. motor starters) by means of standard round cable at any point of the power bus, by insulation displacement connection, used with preassembled bus segments		
• 2.5 mm ² /4 mm ²	B	3RK1911-2BF01
• 4 mm ² /6 mm ²	B	3RK1911-2BF02
⑬ Power double-T terminal connectors For 400 V AC, for connection of feeders (e.g. motor starters) by means of standard round cable at any point of the power bus, by insulation displacement connection, used with preassembled bus segments, connection of two motor starters possible		
• 4 mm ² /6 mm ²	B	3RK1911-2BG02
Sealing set (comprising 2 seals) For power T/power double-T terminal connectors		
• For power cables with Ø 10 ... 13 mm	B	3RK1911-5BA00
• For power cables with Ø 13 ... 16 mm	B	3RK1911-5BA10
• For power cables with Ø 16 ... 19 mm	B	3RK1911-5BA20
• For power cables with Ø 19 ... 22 mm	B	3RK1911-5BA30
• Blanking plugs	B	3RK1911-5BA50
Further accessories for energy connections		
 Crimping tools for pins/sockets 4 mm² and 6 mm²		
	C	3RK1902-0CW00
Dismantling tools • For male and female contacts for 9-pole HAN Q4/2 inserts		
	C	3RK1902-0AB00
• For male and female contacts for 9-pole HAN Q8 inserts	B	3RK1902-0AJ00
Sealing caps For power socket connectors		
• 1 unit per pack	B	3RK1902-0CK00
• 10 units per pack	B	3RK1902-0CJ00

More connection technology products can be found at our "Siemens Solution Partners Automation" under "Distributed Field Installation System" technology:
www.siemens.com/automation/partnerfinder

Distributed IO for usage in the field

ET 200pro motor starters

Accessories for ET 200pro motor starters

Version	DT	Article No.
Further accessories		
Module racks, wide¹⁾		
• Length 500 mm	A	6ES7194-4GB00-0AA0
• Length 1 000 mm	A	6ES7194-4GB60-0AA0
• Length 2 000 mm	A	6ES7194-4GB20-0AA0
Module racks, wide, compact¹⁾		
• Length 500 mm	A	6ES7194-4GD00-0AA0
• Length 1 000 mm	A	6ES7194-4GD10-0AA0
• Length 2 000 mm	A	6ES7194-4GD20-0AA0
Backplane bus modules 110 mm²⁾	A	3RK1922-2BA00
Backplane bus modules for Safety local isolator modules	A	3RK1922-2BA01
Handheld devices For ET 200pro motor starters (or for ET 200S High-Feature and M200D motor starters) for local operation. The motor starter-specific serial interface cables must be ordered separately. The RS 232 interface cable 3RK1922-2BP00 is used for the MS ET 200pro.	B	3RK1922-3BA00
RS 232 interface cable Serial data connection between ET 200pro (or M200D) motor starters and the RS232 interface of a PC/PG/laptop (with the Motor Starter ES software) or the handheld device 3RK1922-3BA00.	B	3RK1922-2BP00
USB interface cable, 2.5 m Serial data connection between ET 200pro (or M200D) motor starters and the USB interface of a PC/PG/laptop (with the Motor Starter ES software).	B	6SL3555-0PA00-2AA0
M12 sealing caps For sealing unused M12 input or output sockets (one set contains ten sealing caps)	►	3RK1901-1KA00
Motor control with PROFIBUS		
See page catalog IC 10, chapter 9		
Motor control with PROFINET		
See page catalog IC 10, chapter 9		
Motor control via Industrial Wireless LAN		
See page catalog IC 10, chapter 9		
Documentation		
Manual³⁾ SIMATIC ET 200pro Motor Starters		



3RK1922-3BA00



3RK1901-1KA00

¹⁾ The wide module rack can accommodate all ET 200pro motor starters and any optional modules (isolator module, Safety local isolator module and 400 V disconnecting module).

²⁾ The backplane bus module is a prerequisite for operation of the ET 200pro motor starter and the optional module.

³⁾ <http://support.automation.siemens.com/WW/view/en/22332388>

SINAMICS

Introduction

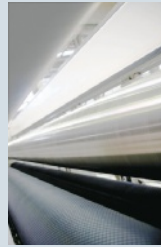
The SINAMICS drive family



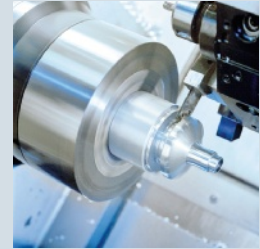
Mixers/mills



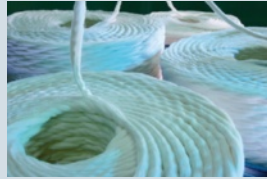
Plastics



Converting



Machine tools

Pumps/fans/
compressors

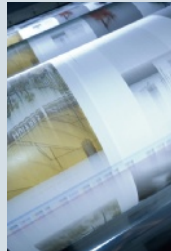
Textiles



Packaging



Conveyor systems



Printing machines



Woodworking



Renewable energies

G_D211_EN_00137a

Application areas of the SINAMICS drive family

Application

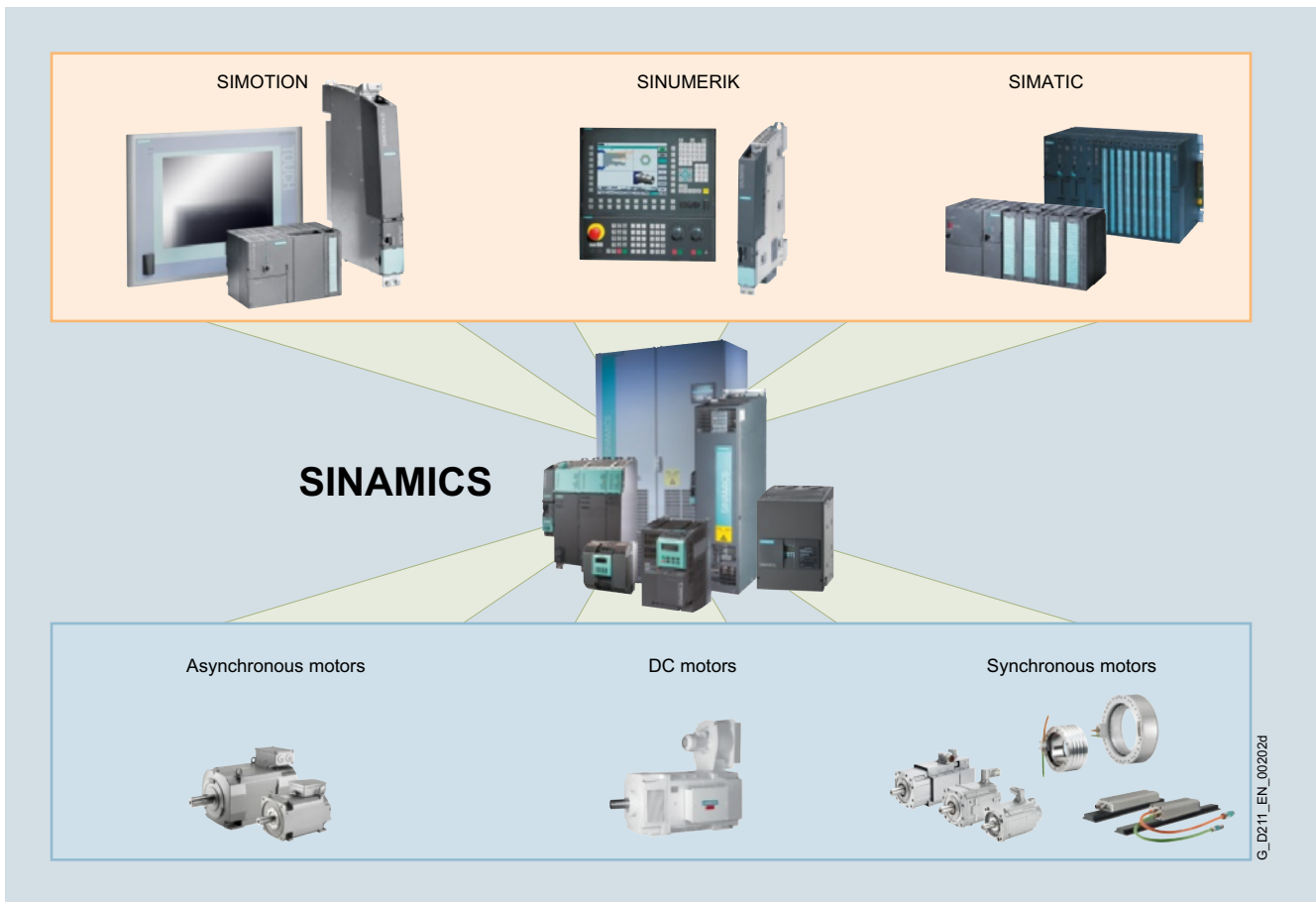
SINAMICS is the family of drives from Siemens designed for industrial machine and plant construction. SINAMICS offers solutions for all drive tasks:

- Simple pump and fan applications in the process industry.
- Complex single-motor drives in centrifuges, presses, extruders, elevators, as well as conveyor and transport systems
- Drive line-ups in textile, plastic film, and paper machines, as well as in rolling mill plants
- High-precision servo drives for the manufacture of wind turbines
- Highly dynamic servo drives for machine tools, as well as packaging and printing machines

Product variants

Depending on the application, the SINAMICS range offers the ideal variant for any drive task.

- SINAMICS G is designed for standard applications with asynchronous (induction) motors. These applications have less stringent requirements regarding the dynamic performance of the motor speed.
- SINAMICS S handles demanding drive tasks with synchronous and asynchronous (induction) motors and fulfills stringent requirements regarding
 - the dynamic performance and accuracy
 - integration of extensive technological functions in the drive control system.



G_D211_EN_002024

SINAMICS as part of the Siemens modular automation system

Platform concept and Totally Integrated Automation

All SINAMICS versions are based on a platform concept. Common hardware and software components, as well as standardized tools for design, configuration, and commissioning tasks, ensure high-level integration across all components. SINAMICS handles a wide variety of drive tasks without system gaps. The different SINAMICS versions can be easily combined with each other.

SINAMICS is part of the Siemens "Totally Integrated Automation" concept. Integrated SINAMICS systems covering engineering, data management and communication at the automation level results in extremely cost-effective solutions based on SIMOTION, SINUMERIK and SIMATIC control systems.

Quality management according to DIN EN ISO 9001

SINAMICS conforms to the most exacting quality requirements. Comprehensive quality assurance measures in all development and production processes ensure a consistently high level of quality.

Our quality management system is certified by an independent authority in accordance with DIN EN ISO 9001.

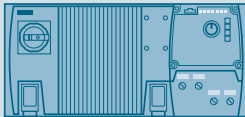

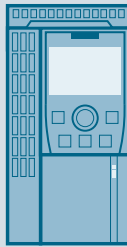
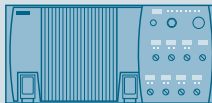
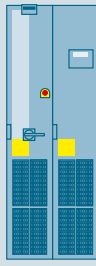
More information

You will find all the latest marketing materials, such as brochures and catalogs at:


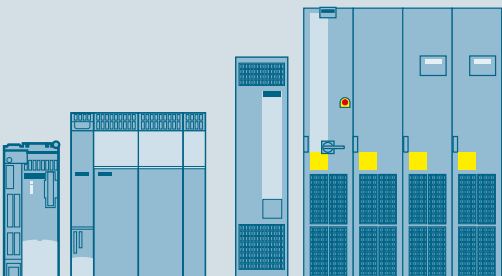
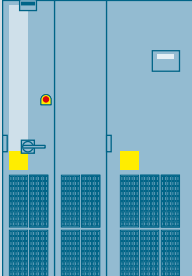
www.siemens.com/sinamics

Introduction

SINAMICS drives with integrated safety functions

Low-Voltage AC					
SINAMICS G110D	SINAMICS G120	SINAMICS G120C	SINAMICS G120D	SINAMICS G130/ SINAMICS G150	
					
For basic applications		For high-quality applications			
V/f Control/FCC		V/f Control/ Vector Control		V/f Control/Vector Control	
0.75 - 7.5 kW		0.37 kW - 250 kW	0.55 kW - 18.5 kW	0.75 kW - 7.5 kW	75 kW - 2700 kW
Conveyor systems		Pumps, fans, conveyor belts, compressors, mixers, mills, extruders			
Common Engineering Tools					
SIZER for Siemens Drives – for simple planning and configuration (see page 4/158)					
STARTER and Startdrive - for fast commissioning, optimization and diagnostics (see page 4/159f.)					

4

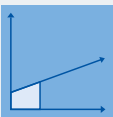
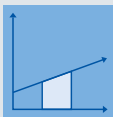
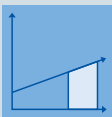
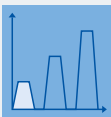
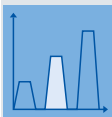
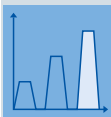

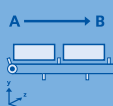
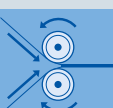

Low-Voltage AC		
SINAMICS S110	SINAMICS S120	SINAMICS S150
		
For basic positioning	For demanding applications	
Servo Control	V/f Control / Vector Control / Servo Control	
0.12 kW - 90 kW	0.12 kW - 4500 kW	75 kW - 1200 kW
Single-axis positioning applications for machine and plant engineering	Production machines (packaging, textile, printing, paper, plastic), machine tools, plants, process lines and rolling mills	Test stands, cross cutters, centrifuges
Common Engineering Tools SIZER – for simple planning and configuration (see page 4/158) STARTER and Startdrive – for fast commissioning, optimization and diagnostics (see page 4/159f.)		

The SINAMICS range is characterized by the following system properties:

- Standard functionality based on a single platform concept
- Standardized engineering
- High degree of flexibility and combination capability
- Broad power range
- Designed for global use
- SINAMICS Safety Integrated
- Higher efficiency and effectiveness
- Versatile interfacing facilities to higher-level controllers
- Totally Integrated Automation

Overview

SINAMICS selection guide – typical applications

Application	Continuous motion			Non-continuous motion		
	Requirements for torque accuracy / speed accuracy / position accuracy / coordination of axes / functionality			Requirements for torque accuracy / speed accuracy / position accuracy / coordination of axes / functionality		
	Basic 	Medium 	High 	Basic 	Medium 	High 
Pumping, ventilating, compressing 	Centrifugal pumps Radial / axial fans Compressors	Centrifugal pumps Radial / axial fans Compressors	Eccentric screw pumps	Hydraulic pumps Metering pumps	Hydraulic pumps Metering pumps	Descaling pumps Hydraulic pumps
	G120C G130, G150	G120C, G120 G130, G150	S120	G120	S110, S120	S120
Moving 	Conveyor belts Roller conveyors Chain conveyors	Conveyor belts Roller conveyors Chain conveyors Lifting/lowering devices Elevators Escalators/moving stairways Indoor cranes Marine drives Cable railways	Elevators Container cranes Mining hoists Excavators for open-cast mining Test stands	Acceleration conveyors Storage and retrieval machines	Acceleration conveyors Storage and retrieval machines Cross cutters Reel changers	Storage and retrieval machines Robotics Pick & place Rotary indexing tables Cross cutters Roll feeds Engagers/disengagers
	G110D, G120C G130, G150	G120D, G120C, G120, S120, S150 G130, G150	S120, S150	G120D, G120	S110, S120	S120
Processing 	Mills Mixers Kneaders Crushers Agitators Centrifuges	Mills Mixers Kneaders Crushers Agitators Centrifuges Extruders Rotary furnaces	Extruders Winders and unwinders Master/slave drives Calenders Main press drives Printing machines	Tubular bagging machines Single-axis motion control such as <ul style="list-style-type: none">• Position profiles• Path profiles	Tubular bagging machines Single-axis motion control such as <ul style="list-style-type: none">• Position profiles• Path profiles	Servo presses Rolling mill drives Multi-axis motion control such as <ul style="list-style-type: none">• Multi-axis positioning• Cams• Interpolations
	G120C G130, G150	G120C, G120, S150 G130, G150	S120, S150	G120	S110, S120	S120
Machining 	Main drives for <ul style="list-style-type: none">• Rotating• Drilling• Milling	Main drives for <ul style="list-style-type: none">• Drilling• Sawing	Main drives for <ul style="list-style-type: none">• Rotating• Drilling• Milling• Gear cutting• Grinding	Axle drives for <ul style="list-style-type: none">• Rotating• Drilling• Milling	Axle drives for <ul style="list-style-type: none">• Drilling• Sawing	Axle drives for <ul style="list-style-type: none">• Rotating• Drilling• Milling• Lasering• Gear cutting• Grinding• Nibbling and punching
	S110	S110, S120	S120	S110	S110, S120	S120

Introduction

The members of the SINAMICS family

Overview

SINAMICS G – The efficient drives

SINAMICS G120C



The compact drive with high power density

Main applications

For machine manufacturers and distributors in industrial and commercial applications (secondary drive in production machines or generally for water/waste water, automotive)

Application examples

- Mixers
- Extruders
- Simple pumps, fans, compressors
- Vibrator motors
- Simple wire drawing machines

Highlights

- Compact
- High power density
- Simple and fast commissioning
- USB port
- Plug-in terminal strips
- Standard commissioning with SD card
- Optimum interaction with SIMOTION and SIMATIC

Catalog

D 31

SINAMICS G120



The modular single drive for low to medium power ratings

Machines and plants in industrial and commercial applications (machinery construction, automotive, textiles, chemical industry, printing, steel)

- Pumps and fans
- Compressors
- Centrifuges
- Conveyor systems

- Modular
- Can be flexibly expanded
- Simple and fast commissioning
- Regenerative feedback
- Innovative cooling concept
- Optimum interaction with SIMOTION and SIMATIC

D 31

More information

You will find all the latest marketing materials, such as brochures and catalogs at:

www.siemens.com/sinamics-g120c
www.siemens.com/sinamics-g120

under "Marketing materials (brochures, catalogs)"

Overview

SINAMICS G – The efficient drives

SINAMICS G110D



The distributed single drive for basic solutions

SINAMICS G120D



The distributed single drive for high-performance solutions

SINAMICS G130, SINAMICS G150



The universal drive solution for single drives with high output ratings

Main applications

Horizontal conveyor applications in industrial environments, main focus on distribution and logistics in airports; generally suitable for basic conveyor-related tasks with local control or connected to a bus via AS interface

Conveyor drive applications in industrial environments, main focus on the automotive industry; also suitable for high-performance applications e.g. at airports and in the food, beverage and tobacco industry (without surfactants)

Machines and plants in the process and production industry, water/waste, power stations, oil and gas, petrochemicals, chemical raw materials, paper, cement, stone, steel

Application examples

- Conveyor systems
- Airports
- Distribution logistics

- Conveyor systems
- Electric monorail systems in distribution logistics

- Pumps and fans
- Compressors
- Extruders and mixers
- Mills

Highlights

- Low profile design with standard drilling dimensions (standard footprint) in IP65 degree of protection
- Simple and fast commissioning
- Versions with and without a maintenance switch
- Optional key-operated switch
- AS-Interface with bus parameterization
- Quick stop function
- Integrated brake control, 180 V DC
- Optimum interaction with SIMATIC and LOGO!

- Low profile design with standard drilling dimensions (standard footprint) in IP65 degree of protection
- Modular
- Can be flexibly expanded
- Simple and fast commissioning
- Regenerative feedback
- Optimum interaction with SIMOTION and SIMATIC

- Space-saving
- Low noise
- Simple and fast commissioning
- SINAMICS G130: Compact built-in unit
- SINAMICS G150: Ready-to-connect cabinet unit
- Optimum interaction with SIMATIC

Catalog

D 31

D 31

D 11

More information

You will find all the latest marketing materials, such as brochures and catalogs at:

www.siemens.com/sinamics-g110d
www.siemens.com/sinamics-g120d
www.siemens.com/sinamics-g130
www.siemens.com/sinamics-g150

under "Marketing materials (brochures, catalogs)"

SINAMICS

Introduction

The members of the SINAMICS family

Overview

SINAMICS S – The flexible drives

SINAMICS S110



The specialist for simple positioning tasks

SINAMICS S120



The flexible, modular drive system for demanding drive tasks

SINAMICS S150



The drive solution for sophisticated single drives with high output ratings

Main applications

Machines and plants in the industrial applications, where machine axes should be quickly and precisely positioned in the simplest possible way.

Machines and plants in industrial applications (packaging, plastics, textile, printing, wood, glass, ceramics, presses, paper, lifting equipment, automated assembly and testing equipment, handling, machine tools, metal)

Machines and plants in the process and production industry, food, beverages and tobacco, automotive and steel industry, mining/open-cast mining, shipbuilding, lifting equipment, conveyors

Application examples

- Handling equipment
- Feed and withdrawal devices
- Stacking units
- Automatic assembly machines
- Laboratory automation
- Metalworking
- Woodworking, glass and ceramic industries
- Printing machines
- Plastics processing machines
- Tracking systems for solar technology

- Motion control applications (positioning, synchronous operation)
- Numerical control, interpolating motion control
- Converting
- Technological applications

- Test stand drives
- Centrifuges
- Elevators and cranes
- Cross cutters and shears
- Conveyor belts
- Presses
- Cable winches

Highlights

- For universal use
- Flexible and modular
- Scalable in terms of power rating, function, number of axes, performance
- Simple and fast commissioning, auto-configuration
- Wide range of motors
- Optimum interaction with SIMATIC

- For universal use
- Flexible and modular
- Scalable in terms of power rating, function, number of axes, performance
- Simple and fast commissioning, auto-configuration
- Wide range of motors
- Optimum interaction with SIMOTION, SINUMERIK and SIMATIC

- Four-quadrant operation as standard
- High control accuracy and dynamic response
- Minimum harmonic effects on the supply system, considerably lower than the limits specified in IEEE 519 THD
- Tolerant to line voltage fluctuations
- Simple and fast commissioning
- Ready-to-connect cabinet unit
- Optimum interaction with SIMOTION and SIMATIC

Catalog

D 31

PM 21, D 21.3, D 31 NC 61 and NC 62

D 21.3

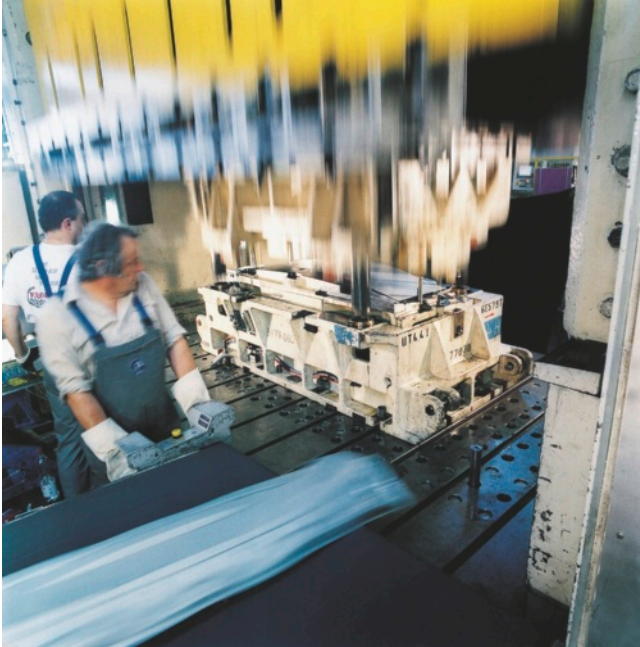
More information

You will find all the latest marketing materials, such as brochures and catalogs at:

www.siemens.com/sinamics-s110
www.siemens.com/sinamics-s120
www.siemens.com/sinamics-s150

under "Marketing materials (brochures, catalogs)"

Overview



Trend toward integrated safety systems

The trend toward greater complexity and increasing modularity of machines has seen a shift in safety functions away from the classical central safety functions (for example, shutdown of all machines using a main switch) and into the machine control system and the drives. Frequently, this also significantly increases the productivity. This is because, for instance, equipping times can be reduced and during these set-up times, depending on the machine type, other parts can still continue to produce.

Integrated safety functions act much faster than those of a conventional design. The safety of a machine is increased further with Safety Integrated. Furthermore, thanks to the faster method of operation, safety measures controlled by integrated safety systems are perceived as less of a hindrance by the machine operator, therefore significantly reducing the motivation to consciously bypass safety functions.

Function

Safety functions integral to the SINAMICS drives

SINAMICS drives are characterized by a full range of integrated safety functions. In combination with the sensors and safety control required for the safety functionality, they ensure that highly-effective protection for persons and machines is implemented in a practice-oriented manner.

They comply with the following requirements:

- Performance Level (PL) d and category 3 according to EN ISO 13849-1
- Safety Integrity Level (SIL) 2 according to IEC 61508

The Safety Integrated functions of SINAMICS drives are certified by independent institutions. You can obtain the corresponding test certificates and manufacturer's declarations from your Siemens contact person.

The Safety Integrated functions are completely integrated into the drive system. They are implemented electronically and therefore offer short response times in comparison to solutions with externally implemented monitoring functions.

The SIMOTION Motion Control System provides support for SINAMICS drives that can execute safety-related monitoring functions (SOS, SLS, SDI) or stop reactions (STO, SS1, SS2). This support ensures that limit violations are prevented at the drive end in that SIMOTION controls (with SLS) the drive through the application, for example, within the permissible velocity range (with SLS) or brings it to a standstill (with SOS).

The functions SS1, SS2, SOS, SLS and SDI are activated and deactivated and their status is displayed with specific technological alarms and system variables on the axis.

The drive software from SINAMICS S120 is integrated into the SIMOTION D Motion Control System. The safety functions integrated into the drive can therefore also be used in combination with SIMOTION D.

The integrated safety functions that are currently available for the SINAMICS drive system are described in the following. Their functional safety satisfies the requirements defined in the international standard IEC 61800-5-2 for variable-speed drive systems.

The safety functions integrated into the SINAMICS drive system can be roughly divided into three categories:

- Functions for safely stopping a drive:
 - Safe Torque Off (STO)
 - Safe Brake Control (SBC)
 - Safe Stop 1 (SS1)
 - Safe Stop 2 (SS2)
 - Safe Operating Stop (SOS)
 - Safe Brake Test (SBT)¹⁾
- Functions for safely monitoring the motion of a drive:
 - Safely-Limited Speed (SLS)
 - Safe Speed Monitor (SSM)
 - Safe Direction (SDI)
- Functions for safely monitoring the position of a drive:
 - Safely Limited Position (SLP)
 - Safe Position (SP)¹⁾

¹⁾ This function is not defined in IEC 61800-5-2.

Function

Safe Torque Off (STO)

The STO function is the most common and basic drive-integrated safety function. It ensures that no torque-generating energy can continue to affect a motor and prevents unintentional start-ups.

Effect

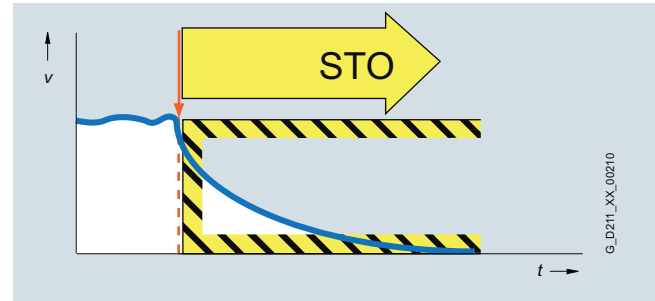
This function is a mechanism that prevents the drive from restarting unexpectedly, in accordance with EN 60204-1, Section 5.4. The STO function suppresses the drive pulses (corresponds to Stop Category 0 according to EN 60204-1). The drive is reliably torque-free. This state is monitored internally in the drive.

Application

STO has the immediate effect that the drive can no longer supply any torque-generating energy. STO can be used wherever the drive will naturally reach a standstill due to load torque or friction in a sufficiently short time or when "coasting down" of the drive will not have any relevance for safety.

Customer benefits

The advantage of the integrated STO safety function compared to standard safety technology using electromechanical switch-gear is the elimination of separate components and the effort that would be required to wire and service them. Because of the fast electronic switching times, the function provides a shorter reaction time than a conventional solution comprising electromechanical components.

**Safe Brake Control (SBC)**

The SBC function permits the safe control of a holding brake. SBC is always activated in parallel with STO.

Effect

A holding brake which is active in a de-energized state is controlled and monitored using safe two-channel technology. Due to the two-channel control, the brake may still be operated in the event of an insulation fault in the control cable. Errors of this kind are detected early by means of test pulses.

Notes:

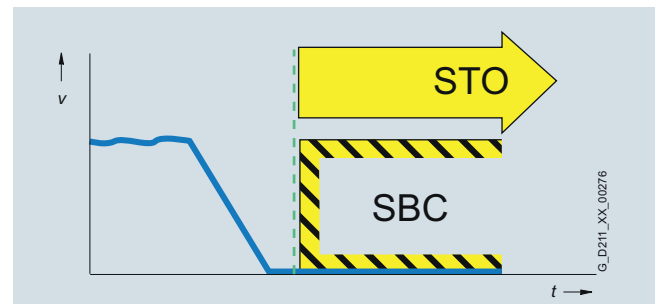
Safe Brake Control does not detect mechanical faults in the brake itself, such as worn brake linings. For Motor Modules in booksize format, the terminals for the motor brake are integrated. In the case of blocksize format an additional Safe Brake Relay is required, and in the case of chassis format an additional Safe Brake Adapter is necessary.

Application

The SBC function is used in conjunction with the functions STO or SS1 to prevent the movement of an axis in the torque-free state, e.g. because of gravity.

Customer benefits

Again, the function saves the use of external hardware and the associated wiring.

**Safe Brake Test (SBT)**

The SBT function performs safe braking.

Effect

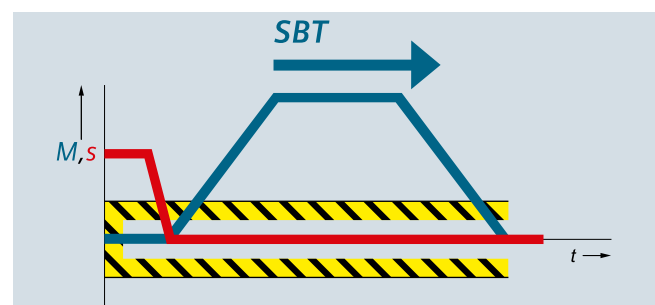
A good way to check the proper functioning of brakes that have become worn is to apply a torque to the closed brake. Drive systems that have two brakes, e.g. motor brake and external brake can be tested with different torque values

Application

The SBT function is suitable for implementing a safe brake in combination with the SBC function.

Customer benefits

The function detects faults or wear in the brake mechanics. Automatically testing the effectiveness of brakes reduces maintenance costs and increases the safety and availability of plants/machines.



Function

Safe Stop 1 (SS1)

The SS1 function causes a motor to stop rapidly and safely and switches the motor to torque-free mode after coming to a standstill by activating STO.

Effect

The SS1 function can safely stop the drive in accordance with EN 60204-1, Stop Category 1. When the SS1 function is selected, the drive brakes autonomously along a quick-stop ramp and automatically activates the Safe Torque Off and Safe Brake Control functions (if configured) when the parameterized safety delay time expires.

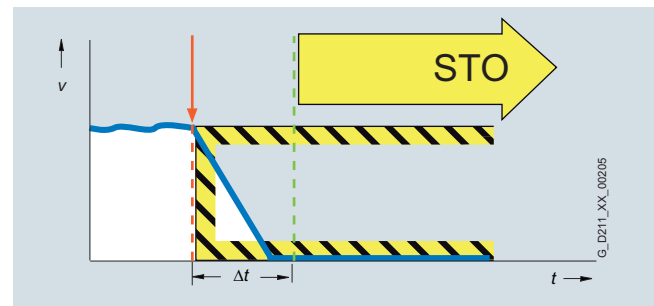
In firmware version V4.5 and higher, an additional variant of SS1 is available (SS1E). In this case, when SS1 is selected, automatic braking of the drive does not start, but the safe delay time starts to elapse instead. The higher-level controller remains in control of the setpoint which must bring the drive to a standstill within this time.

Application

The SS1 function is used when, in the event of a safety-relevant incident, the drive must stop as quickly as possible with a subsequent transition into the STO state. It is thus used to bring large centrifugal masses to a stop as quickly as possible for the safety of the operating personnel, or to brake motors at high speeds as quickly as possible. Examples of typical application are saws, grinding machine spindles, centrifuges and storage and retrieval machines.

Customer benefits

The targeted stopping of a drive by means of SS1 reduces the risk of danger, increases the productivity of a machine, and allows the safety clearances in a machine to be reduced. The principle is to bring the drive actively to a standstill, compared with just using the STO function.



Safe Stop 2 (SS2)

The SS2 function brings the motor to a standstill quickly and safely and then monitors the standstill position.

Effect

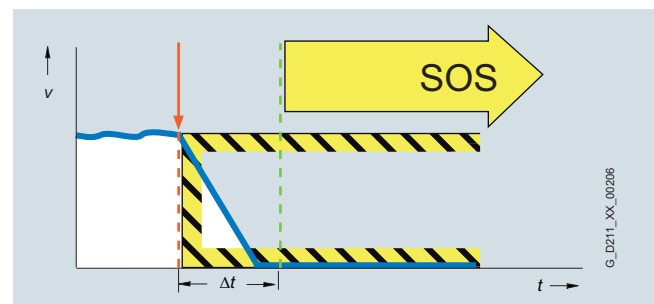
The SS2 function can safely stop the drive in accordance with EN 60204-1, Stop Category 2. When the SS2 function is selected, the drive brakes autonomously along a quick-stop ramp. In contrast to SS1, the drive control remains operational afterwards, i.e. the motor can supply the full torque required to maintain zero speed. Standstill is safely monitored (SOS – Safe Operating Stop function).

Application

As with SS1, the SS2 function ensures the quickest possible deceleration of the motor. However, the motor power is not switched off. Instead, a control system prevents it from leaving the standstill position – even if it is affected by external forces.

Customer benefits

The SS2 function ensures a rapid axis stop. Because the control remains active, after the safety function is deselected, productive operation can continue without referencing. This ensures short setup and standstill times and high productivity.



Function

Safe Operating Stop (SOS)

With the SOS function, the stopped drive is kept in position and monitored by drive control.

Effect

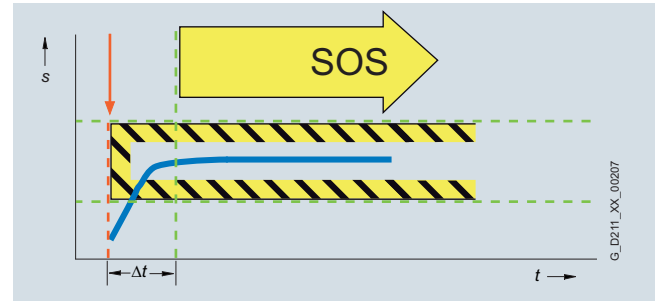
The SOS function constitutes safe standstill monitoring. The drive control remains in operation. The motor can therefore deliver the full torque to hold the current position. The actual position is reliably monitored. In contrast to safety functions SS1 and SS2, the speed setpoint is not influenced autonomously.

Application

SOS is an ideal solution for all those applications for which the machine or parts of the machine must be at a safe standstill for certain machining steps, but where the drive must also supply a holding torque. The speed control continues to operate and ensures that the drive remains in its current position despite counter torque. SOS monitors the current standstill position. When SOS is selected, in contrast to SS1 and SS2, the drive does not influence the speed setpoint autonomously. Conversely, before SOS is activated the higher-level control has the option of ramping down the relevant axes as a coordinated group within an adjustable delay time. This can be used to prevent any damage to the machine or product.

Customer benefits

No mechanical components are necessary to keep the axis in position despite any counterforce that may occur. Due to the short switching times and the fact that the drive control always remains active, setup and downtimes are reduced. Recalibration of the axis after exiting the SOS function is not necessary. The axis can immediately be moved again after deactivation of the SOS function.

**Safely-Limited Speed (SLS)**

The SLS function ensures that the drive does not exceed a preset speed limit.

Effect

The SLS function monitors the drive against a parameterized speed limit. Four different limit values can be selected. Just the same as for SOS, the speed setpoint is not influenced autonomously. After SLS has been selected, the higher-level control must bring the drive down below the selected speed limit within a parameterizable time. If the speed limit is exceeded, a customizable drive-integrated fault reaction occurs.

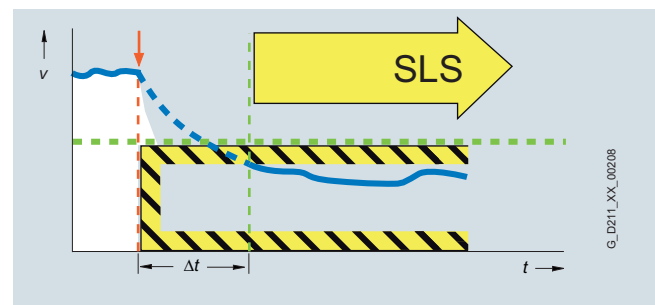
In firmware version V4.5 and higher, a factor can be applied to SLS limit 1 that is transferred over PROFIsafe in 16-bit resolution. This allows an almost unlimited number of limits to be specified.

Application

The SLS function is used if people are in the danger zone of a machine and their safety can only be guaranteed by reduced speed. Typical application cases include those in which an operator must enter the danger zone of the machine for the purposes of maintenance or setting up, such as a winder in which the material is manually threaded by the operator. To prevent injury to the operator, the roller may only spin at a safely reduced speed. SLS is often also used as part of a two-stage safety concept. While a person is in a less critical zone, the SLS function is activated, and the drives are only stopped in a smaller area with higher potential risk. SLS can be used not only for operator protection, but also for machinery protection, e.g. if a maximum speed must not be exceeded.

Customer benefits

The SLS function can contribute to a significant reduction in downtime, or greatly simplify or even accelerate setup. The overall effect achieved is a higher availability of the machine. Moreover, external components such as speed monitors can be omitted.



Function

Safe Speed Monitor (SSM)

The SSM function warns when a drive is working below an adjustable speed limit. As long as it remains below the threshold, the function issues a safety-related signal.

Effect

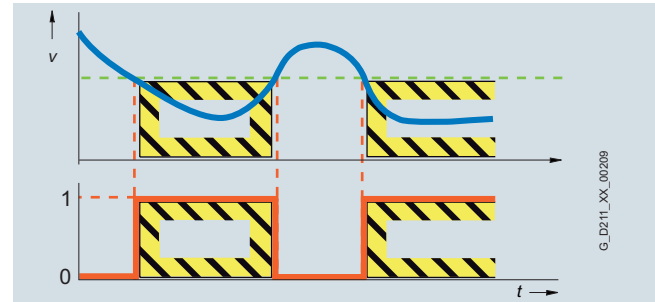
If a speed value drops below a parameterized limit, a safety-related signal is generated. This can, for example, be processed in a safety controller to respond to the event by programming, depending on the situation.

Application

With the SSM function, in the simplest case, a safety door can be released if the speed drops below a non-critical level.

Customer benefits

Unlike SLS, there is no drive-integrated fault reaction when the speed limit is exceeded. The safe feedback can be evaluated in a safety control unit, allowing the user to respond appropriately to the situation.



Safe Direction (SDI)

The SDI function ensures that the drive can only move in the selected direction.

Effect

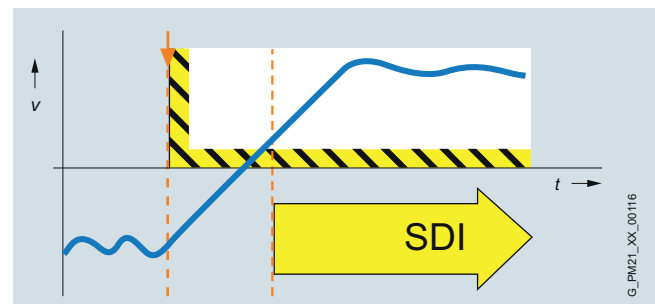
A deviation from the currently monitored direction of motion is reliably detected and the configured autonomous fault response of the drive is initiated. It is possible to select which direction of rotation is to be monitored.

Application

The SDI function is used when the drive may only in one direction. A typical application is to permit the operator access to a danger zone, as long as the machine is rotating in the safe direction, i.e. away from the operator. In this state, the operator can feed material into the work zone / remove material from the work zone without danger.

Customer benefits

The function saves the use of external components such as speed monitors and the associated wiring. The release of a danger zone, while the machine is moving away from the operator, increases productivity. Without the SDI function, the machine must be safely stopped during material loading and removal.



Function

Safely Limited Position (SLP)

The SLP function monitors the axis to ensure that it remains within the permissible traversing range.

Effect

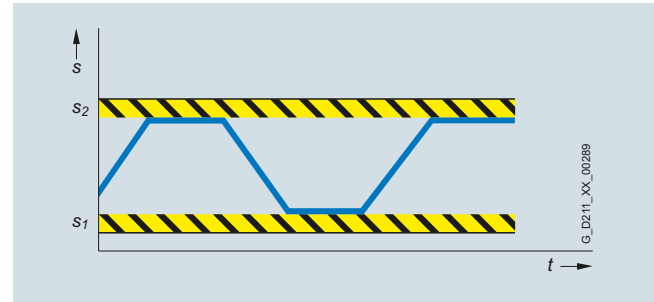
When SLP is activated, the traversing range limited by the configured software limit switch is safely monitored. It is possible to switch between two limit switch pairs. If the permitted traversing range is exited, a customizable fault reaction occurs. SLP can only be used when the axis has been safely referenced.

Application

SLP is used for applications in which machine operators have to enter a protection area, e.g. for feeding in and removing material. Safe monitoring of the axis position ensures that the axis cannot move into the protection area released for operators, placing them in danger.

Customer benefits

SLP can be used for highly-effective protection area monitoring. The function does away with the use of external components such as hardware limit switches and the associated wiring expense. Due to the short reaction time following a limit overshoot, safety clearances can be reduced.

**Safe Position (SP)**

The SP function transfers the actual position values determined safely in the drive over safe PROFIsafe communication to a safety control.

Effect

In contrast to the SLP function that monitors the current actual position value against a limit and, in the case of an overshoot, activates a drive-autonomous fault reaction, SP transfers the current actual position values to the safety control. Position monitoring is implemented in the safety program of the control. Extended PROFIsafe telegrams are available for transferring the position values. The position values can be transferred in 16-bit or 32-bit resolution, as required. A time stamp is also transferred with the position values.

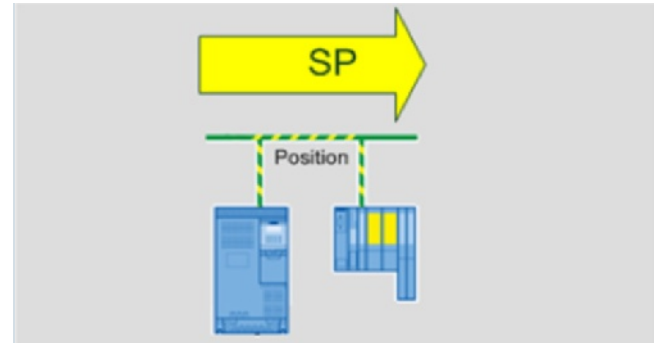
Application

The monitoring function has to be implemented in the safety control, so this offers extensive possibilities. For example, a safe cam controller can be implemented in this manner. Depending on the performance capability of the control, multi-dimensional position or speed monitoring functions can be implemented.

SP will only output valid, absolute actual position values if the axis has been safely referenced. A time stamp is transferred with the actual position values to enable safe speed values to be calculated in the safety control. The axis does not have to be safely referenced for safe speed values to be calculated.

Customer benefits

Position monitoring or speed monitoring is implemented in the safety program of the control, so the user has the flexibility for implementing tailor-made safety functions. The reaction to a limit overshoot must also be specified in the safety program. This means a higher initial programming outlay, but it does offer the opportunity for initiating different fault reactions.



Basic Functions and Extended Functions

The Safety Integrated functions of the SINAMICS drive system are grouped into Basic Functions and Extended Functions.

- Basic Functions
 - Safe Torque Off (STO)
 - Safe Brake Control (SBC)
 - Safe Stop 1 (SS1)
- Extended Functions
 - Safe Stop 1 (SS1) with SBR or SAM
 - Safe Stop 2 (SS2) with SAM
 - Safe Operating Stop (SOS)
 - Safely-Limited Speed (SLS)
 - Safe Speed Monitor (SSM)
 - Safe Direction (SDI)
 - Safely-Limited Position (SLP)
 - Safe Position (SP)
 - Safe Brake Test (SBT)

For the Extended Functions Safe Stop 1 (SS1) and Safe Stop 2 (SS2), safe acceleration monitoring (SAM) is performed during braking to identify any faults already during the braking phase.

If Safe Stop 1 is used as an encoderless function, a Safe Brake Ramp (SBR) can be configured as an alternative.

The Basic Functions – activated via on-board terminals on the device or via PROFIsafe – do not require an encoder.

Activation of the integrated safety functions

The safety functions for SINAMICS drives can be activated via terminals, e.g. for use of a conventional safety circuit.

For standalone safety solutions for small to medium sized applications, it is frequently sufficient that the various sensing components are directly hardwired to the drive.

For integrated safety solutions, the safety-relevant sequences are generally processed and coordinated in the fail-safe SIMATIC controller. Here, the system components communicate via PROFINET or PROFIBUS fieldbus. The safety functions are controlled via the safe PROFIsafe communication protocol.

SINAMICS drives can be easily integrated into the plant or system topology.

PROFIsafe

SINAMICS drives support the PROFIsafe profile based on PROFIBUS as well as on PROFINET.

PROFIsafe is an open communications standard that supports standard and safety-related communication over the same communication path (wired or wireless). A second, separate bus system is therefore not necessary. To ensure safe communication, the transmitted message frames are continuously monitored.

Possible errors such as lost or repeated messages, or those received in the wrong order, are avoided in that safety-related messages are numbered consecutively, their arrival is monitored within a defined period, and an ID for the sender and receiver of a message is transferred. A CRC (cyclic redundancy check) data security mechanism is also used.

The operating principle of Safety Integrated

Two independent switch-off signal paths

Two independent switch-off signal paths are available. All switch-off signal paths are low active, thereby ensuring that the system is always switched to a safe state if a component fails or in the event of an open circuit. If an error is discovered in the switch-off signal paths, the "Safe Torque Off" or "Safe Stop 1" function is activated (depending on the parameterization, refer also to the above table) and a system restart is inhibited.

Two-channel monitoring structure

All the main hardware and software functions for Safety Integrated are implemented in two independent monitoring channels (e.g. switch-off signal paths, data management, data comparison). A cyclic crosswise comparison of the safety-relevant data in the two monitoring channels is carried out.

The monitoring functions in each monitoring channel work on the principle that a defined status must prevail before each action is carried out and a specific acknowledgement must be made after each action. If these expectations of a monitoring channel are not fulfilled, the drive coasts to a standstill (two-channel) and an appropriate message is output.

Forced dormant error detection using test stop

The functions and switch-off signal paths must be tested at least once within a defined period to establish whether they are working properly in order to meet the requirements of EN ISO 13849-1 and IEC 61508 in terms of timely error detection. This must be implemented either in cyclic manual mode or the test stop must be automatically initiated as part of the process. The test stop cycle is monitored, and after a specific time has been exceeded, an alarm is output.

A test stop does not require a power on. The acknowledgment is set by canceling the test stop request.

Examples of when forced dormant error detection must be performed:

- When the drives are at a standstill after the system has been switched on
- Before the protective door is opened
- At defined intervals (e.g. every 8 hours)
- In automatic mode, time and event-driven

Introduction

Safety Integrated

Safe actual value acquisition with or without encoders

A drive monitor with encoder is necessary for operation of a series of safety functions.

For applications with encoderless mode or with encoders that have no safety capability, the safety functions can also be implemented without encoder. It is not possible to use all safety functions in this case.

In operation without encoder, the actual speed values are calculated from the measured electrical actual values. Therefore, speed monitoring is also possible during operation without encoder.

Safety Integrated Extended Functions "without encoder" must not be used if the motor, after it has been switched off, can still be accelerated by the mechanical elements of the connected machine component.

In the hoisting gear of a crane, for example, the suspended load can accelerate the motor as soon as the motor is switched off. In this case, the safety functions "without encoder" are not permitted.

A horizontal conveyor, on the other hand, is always braked to a standstill due to friction as soon as the motor is switched off. In this case, the safety functions "without encoder" can be used without any restriction.

The "Safety Integrated Function Manual" contains additional information about the encoderless safety functions.

The safety functions are listed below with criteria for actual value acquisition.

	Functions	Abbreviation	With encoder	Without encoder	Description
Basic Functions	Safe Torque Off	STO	Yes	Yes	Safe Torque Off
	Safe Stop 1	SS1	Yes	Yes	Safe stopping process according to stop category 1
	Safe Brake Control	SBC	Yes	Yes	Safe Brake Control
Extended Functions	Safe Torque Off	STO	Yes	Yes ¹⁾	Safe Torque Off
	Safe Stop 1	SS1	Yes	Yes ¹⁾	Safe stopping process according to stop category 1
	Safe Brake Control	SBC	Yes	Yes ¹⁾	Safe Brake Control
	Safe Operating Stop	SOS	Yes	No	Safe monitoring of the standstill position
	Safe Stop 2	SS2	Yes	No	Safe stopping process according to stop category 2
	Safely-Limited Speed	SLS	Yes	Yes ¹⁾	Safe monitoring of the maximum speed
	Safe Speed Monitor	SSM	Yes	Yes ¹⁾	Safe monitoring of the minimum speed
	Safe Direction	SDI	Yes	Yes ¹⁾	Safe monitoring of the direction of motion
	Safely-Limited Position	SLP	Yes	No	Safely Limited Position
	Safe Position	SP	Yes	Yes	Safe transfer of position values
	Safe Brake Test	SBT	Yes	No	Safe test of the required holding torque of a brake

¹⁾ The use of this safety function without encoder is permitted only for induction motors or synchronous motors of the SIEMOSYN series.

Safe speed/position sensing with encoder

Incremental encoders or absolute encoders with photoelectric sampling are permitted for safe sensing of the position values on a drive. HTL/TTL incremental encoders may also be used.

Safe actual value sensing relies on redundant evaluation of the incremental tracks A/B that supply sin/cos signals with 1 Vpp. Only encoders of the type whose A/B track signals are created and processed using purely analog techniques can be used.

For HTL/TTL incremental encoders, safe actual value sensing is achieved by using two independent encoders.

When motors with a DRIVE-CLiQ interface are used, the speed/position actual values are generated directly in the motor as safe values and transferred to the Control Unit over a safe DRIVE-CLiQ communication link.

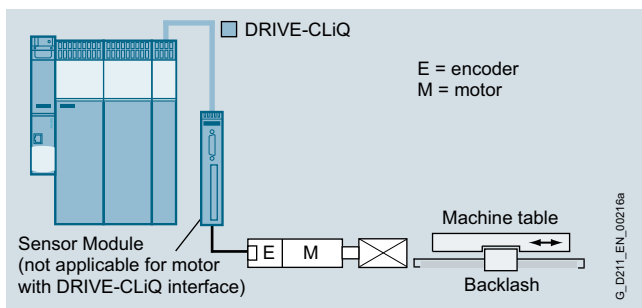
The following can be used for safe speed/position sensing:

- Single-encoder systems or
- Dual-encoder systems

For motors without a DRIVE-CLiQ interface, the connection is made using additional Sensor Modules:

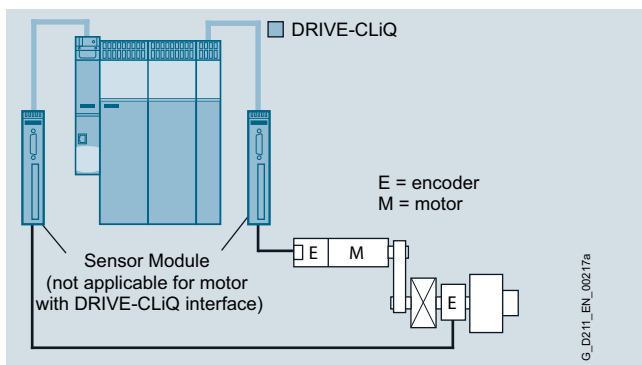
- SMC20
- SME20/SME25
- SME120/SME125

Description and ordering data for the Sensor Modules are provided in the catalog PM 21.



Example: single-encoder system

In a single-encoder system, the motor encoder is used exclusively for safe actual value sensing. An incremental encoder or absolute encoder with photoelectric sampling must be used in this case.



Example: dual-encoder system on a spindle

In the case of the dual-encoder system, the safe actual values for a drive are provided by two separate encoders. The actual values are transferred to the Control Unit over DRIVE-CLiQ. When motors without a DRIVE-CLiQ connection are used, a Sensor Module (SMC20/SMC30/SME20/25/120/125) must be implemented. Each measuring system requires a separate DRIVE-CLiQ connection.

For this configuration, either two HTL/TTL encoders, one dual-HTL/TTL encoder or one HTL/TTL encoder and one sin/cos encoder can be used.

More information

Absolute encoders (e.g. ECI, EQI) that offer an EnDat interface with additional sin/cos tracks, but operate according to an inductive measuring principle internally, are not permitted.

Introduction

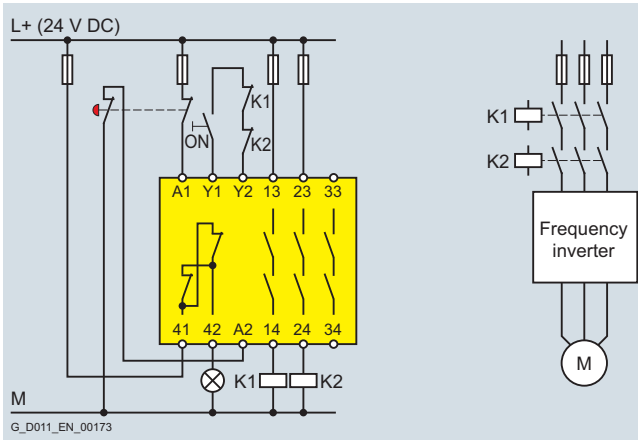
Safety Integrated

Comparison between conventional and integrated safety systems

The safety functions integrated into the drive can greatly reduce the effort required to implement safety concepts.

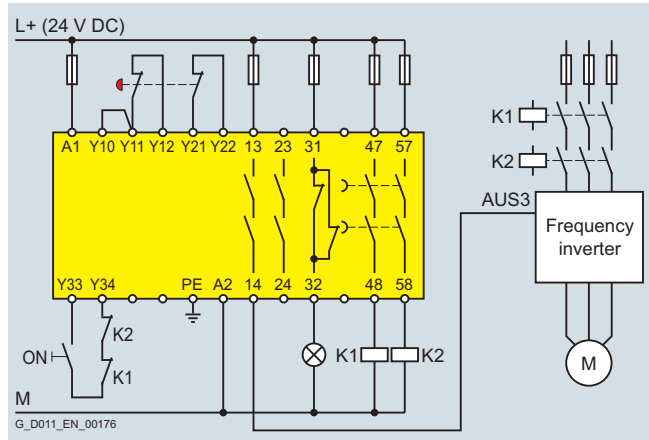
The integrated safety functions provide support when setting up tailored safety concepts. Configurations of safety concepts are given below based on the example of the SINAMICS G120.

Safe Torque Off (STO)



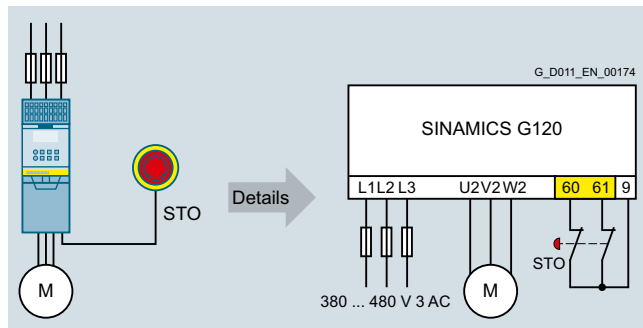
Conventional wiring

Safe Stop 1 (SS1)

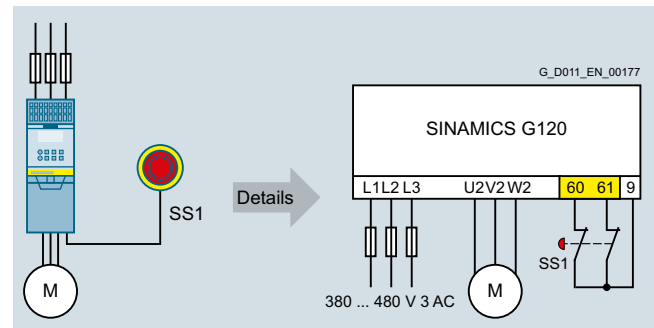


Conventional wiring

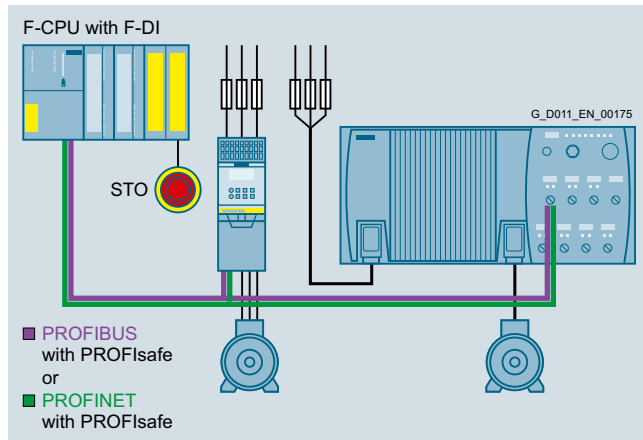
4



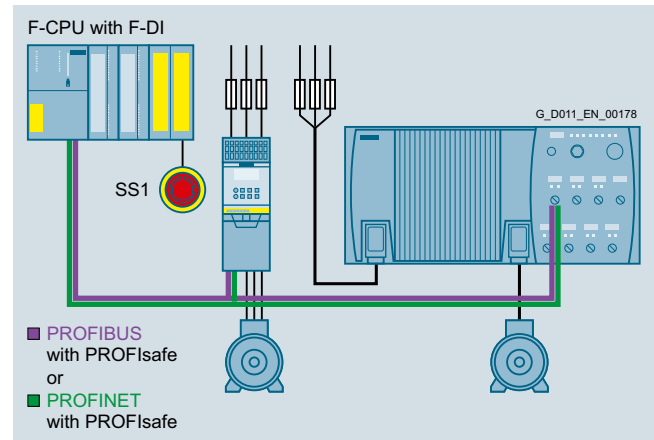
Integrated safety via fail-safe inputs



Integrated safety via fail-safe inputs

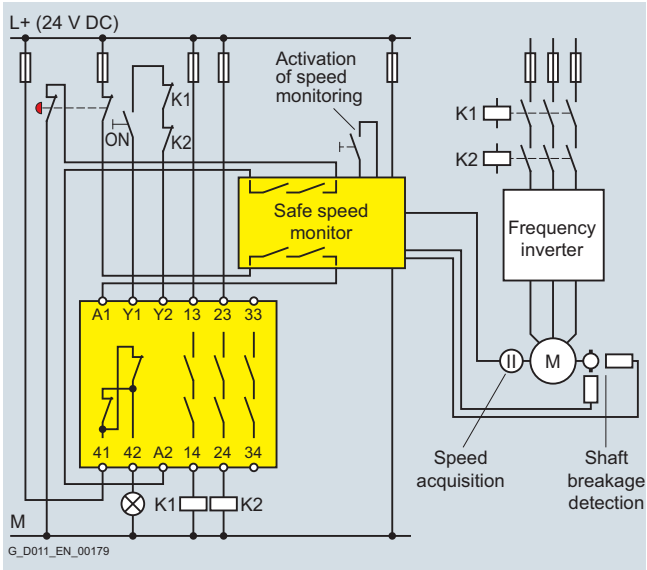


Integrated safety via PROFIsafe

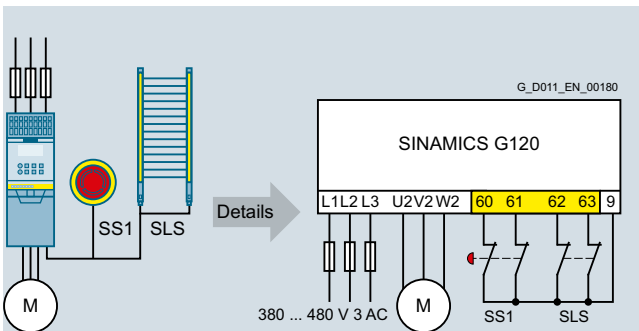


Integrated safety via PROFIsafe

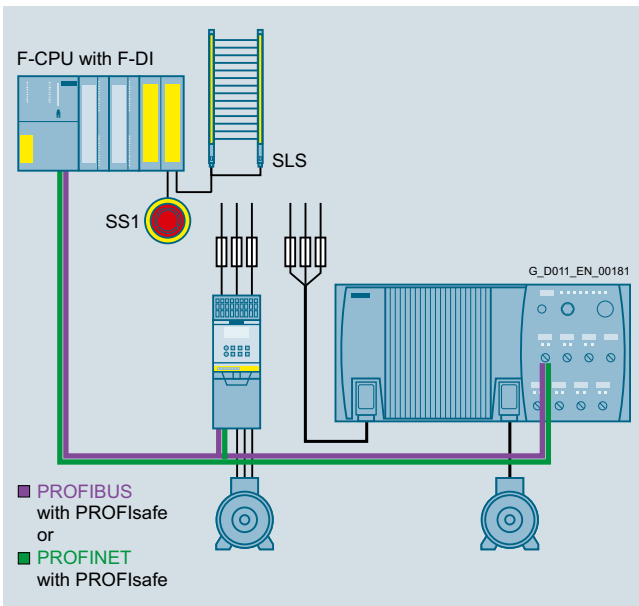
Safely Limited Speed (SLS)



Conventional wiring



Integrated safety via fail-safe inputs



Integrated safety via PROFIsafe

SINAMICS

SINAMICS G120C compact inverters

Safety Integrated with SINAMICS G120C

Function



SINAMICS G120C compact inverters offer a well-balanced combination of features to address a wide range of applications.

SINAMICS G120C inverters are compact, rugged devices that are easy to operate and can be optionally equipped with a basic or advanced operator panel.

SINAMICS G120C compact inverters continuously control the speed of three-phase asynchronous (induction) motors and can be used in a wide range of industrial areas.

SINAMICS G120C can be integrated into the widest range of applications, either using the integrated digital and analog inputs or via the integrated fieldbus interface (available in the USS/Modbus RTU, PROFIBUS DP, PROFINET, CANopen versions). Especially the product versions with integrated PROFIBUS DP or PROFINET interface make full integration into the Siemens TIA family possible, therefore allowing the advantages of the seamless TIA product family to be fully utilized.

SINAMICS G120C devices are preset in the factory so that they can be immediately connected to PROFIBUS DP, PROFINET and CANopen fieldbuses and used without parameterization.

They are generally suitable for applications involving conveyor belts, mixers, extruders, pumps, fans, compressors and basic handling machines.

SINAMICS G120C inverters are especially suitable when it comes to meeting the requirements of system integrators, OEMs and distributors regarding high productivity and tailored performance.

The compact mechanical design and the high power density allow these devices to be installed in machine control enclosures and control cabinets for maximum space utilization.

SINAMICS G120C is available in the power range from 0.55 kW to 18.5 kW.

Supplementary system components

Comprehensive system components are offered for the SINAMICS G120C

Intelligent Operator Panel IOP

Graphics-based, user-friendly and powerful operator panel for commissioning and diagnostics as well as local operator control and monitoring of SINAMICS G120C.

Basic Operator Panel BOP-2

A 2-line display to provide support when commissioning and troubleshooting the drive. The drive can be locally controlled.

Memory cards

The parameter settings for an inverter can be stored on the SINAMICS micro memory Card (MMC) or SINAMICS memory card (SD card). When service is required, e.g. after the converter has been replaced and the data has been downloaded from the memory card, the drive system is immediately ready for use again. The associated memory card holder is integrated in the inverter.

PC inverter connection kit 2

For controlling and commissioning an inverter directly from a PC if the STARTER commissioning tool has been installed on the PC.

For detailed information, see catalog D 31.

Safety Integrated

The SINAMICS G120C frequency inverter offers the safety function "Safe Torque Off" (STO) as protection against unintentional start-up of the motor.

The Safety Integrated function is completely integrated into the drive system. It can be activated via fail-safe digital inputs on the inverter via PROFINET or PROFIBUS with PROFIsafe.

The Safety Integrated function is implemented electronically and therefore offers short response times in comparison to solutions with externally implemented monitoring functions.

Overview of SINAMICS G120C Safety Integrated functions and associated boundary conditions

Function	Activation	Underlying function	Reaction to limit overshoot	External setpoint input effective	Encoder required	License required
STO	<ul style="list-style-type: none"> F-DI PROFIsafe 	—	—	No	No	No

Selection and ordering data

SINAMICS G120C compact inverters

The article number is selected corresponding to

- the required motor power or the motor current required and the overload requirements of the application,
- the necessary EMC classification and
- the required integrated fieldbus interface

Rated power ¹⁾		Frame size	Version	SINAMICS G120C <u>without</u> filter	SINAMICS G120C <u>with</u> integrated filter class A
kW	hp			Article No.	Article No.
Line voltage 380 ... 480 V 3 AC					
0.55	0.75	FSA	USS/Modbus RTU	6SL3210-1KE11-8UB1	6SL3210-1KE11-8AB1
			PROFIBUS DP	6SL3210-1KE11-8UP1	6SL3210-1KE11-8AP1
			PROFINET	6SL3210-1KE11-8UF1	6SL3210-1KE11-8AF1
			CANopen	6SL3210-1KE11-8UC1	6SL3210-1KE11-8AC1
0.75	1.0	FSA	USS/Modbus RTU	6SL3210-1KE12-3UB1	6SL3210-1KE12-3AB1
			PROFIBUS DP	6SL3210-1KE12-3UP1	6SL3210-1KE12-3AP1
			PROFINET	6SL3210-1KE12-3UF1	6SL3210-1KE12-3AF1
			CANopen	6SL3210-1KE12-3UC1	6SL3210-1KE12-3AC1
1.1	1.5	FSA	USS/Modbus RTU	6SL3210-1KE13-2UB1	6SL3210-1KE13-2AB1
			PROFIBUS DP	6SL3210-1KE13-2UP1	6SL3210-1KE13-2AP1
			PROFINET	6SL3210-1KE13-2UF1	6SL3210-1KE13-2AF1
			CANopen	6SL3210-1KE13-2UC1	6SL3210-1KE13-2AC1
1.5	2.0	FSA	USS/Modbus RTU	6SL3210-1KE14-3UB1	6SL3210-1KE14-3AB1
			PROFIBUS DP	6SL3210-1KE14-3UP1	6SL3210-1KE14-3AP1
			PROFINET	6SL3210-1KE14-3UF1	6SL3210-1KE14-3AF1
			CANopen	6SL3210-1KE14-3UC1	6SL3210-1KE14-3AC1
2.2	3.0	FSA	USS/Modbus RTU	6SL3210-1KE15-8UB1	6SL3210-1KE15-8AB1
			PROFIBUS DP	6SL3210-1KE15-8UP1	6SL3210-1KE15-8AP1
			PROFINET	6SL3210-1KE15-8UF1	6SL3210-1KE15-8AF1
			CANopen	6SL3210-1KE15-8UC1	6SL3210-1KE15-8AC1
3.0	4.0	FSA	USS/Modbus RTU	6SL3210-1KE17-5UB1	6SL3210-1KE17-5AB1
			PROFIBUS DP	6SL3210-1KE17-5UP1	6SL3210-1KE17-5AP1
			PROFINET	6SL3210-1KE17-5UF1	6SL3210-1KE17-5AF1
			CANopen	6SL3210-1KE17-5UC1	6SL3210-1KE17-5AC1
4.0	5.0	FSA	USS/Modbus RTU	6SL3210-1KE18-8UB1	6SL3210-1KE18-8AB1
			PROFIBUS DP	6SL3210-1KE18-8UP1	6SL3210-1KE18-8AP1
			PROFINET	6SL3210-1KE18-8UF1	6SL3210-1KE18-8AF1
			CANopen	6SL3210-1KE18-8UC1	6SL3210-1KE18-8AC1
5.5	7.5	FSB	USS/Modbus RTU	6SL3210-1KE21-3UB1	6SL3210-1KE21-3AB1
			PROFIBUS DP	6SL3210-1KE21-3UP1	6SL3210-1KE21-3AP1
			PROFINET	6SL3210-1KE21-3UF1	6SL3210-1KE21-3AF1
			CANopen	6SL3210-1KE21-3UC1	6SL3210-1KE21-3AC1
7.5	10	FSB	USS/Modbus RTU	6SL3210-1KE21-7UB1	6SL3210-1KE21-7AB1
			PROFIBUS DP	6SL3210-1KE21-7UP1	6SL3210-1KE21-7AP1
			PROFINET	6SL3210-1KE21-7UF1	6SL3210-1KE21-7AF1
			CANopen	6SL3210-1KE21-7UC1	6SL3210-1KE21-7AC1

¹⁾ The rated power of the device based on the rated output current I_L and a rated input voltage of 400 V 3 AC.

The rated power is specified on the device rating plate.

²⁾ The base load current I_L is based on the duty cycle for low overload (LO). The current value is specified on the device rating plate.

³⁾ The base load current I_H is based on the duty cycle for high overload (HO). The current value is not specified on the device rating plate.

SINAMICS

SINAMICS G120C compact inverters

SINAMICS G120C compact inverter Line-side components

Selection and ordering data

Rated power ¹⁾		Frame size	Version	SINAMICS G120C <u>without</u> filter	SINAMICS G120C <u>with</u> integrated filter class A
kW	hp			Article No.	Article No.
Line voltage 380 ... 480 V 3 AC					
11	15	FSC	USS/Modbus RTU	6SL3210-1KE22-6UB1	6SL3210-1KE22-6AB1
			PROFIBUS DP	6SL3210-1KE22-6UP1	6SL3210-1KE22-6AP1
			PROFINET	6SL3210-1KE22-6UF1	6SL3210-1KE22-6AF1
			CANopen	6SL3210-1KE22-6UC1	6SL3210-1KE22-6AC1
15	20	FSC	USS/Modbus RTU	6SL3210-1KE23-2UB1	6SL3210-1KE23-2AB1
			PROFIBUS DP	6SL3210-1KE23-2UP1	6SL3210-1KE23-2AP1
			PROFINET	6SL3210-1KE23-2UF1	6SL3210-1KE23-2AF1
			CANopen	6SL3210-1KE23-2UC1	6SL3210-1KE23-2AC1
18.5	25	FSC	USS/Modbus RTU	6SL3210-1KE23-8UB1	6SL3210-1KE23-8AB1
			PROFIBUS DP	6SL3210-1KE23-8UP1	6SL3210-1KE23-8AP1
			PROFINET	6SL3210-1KE23-8UF1	6SL3210-1KE23-8AF1
			CANopen	6SL3210-1KE23-8UC1	6SL3210-1KE23-8AC1

Line-side components

Line reactors are used to smooth voltage peaks or to bridge commutating dips. Line reactors also reduce the effects of harmonics on the inverter and the line supply.

If the ratio of the rated inverter power to the line supply short-circuit power is less than 1%, then it is recommended to use a line reactor to reduce the current peaks.

Rated power		SINAMICS G120C		Line reactor
kW	hp	Type	Frame size	Article No.
Line voltage 380 ... 480 V 3 AC				
0.55	0.75	6SL3210-1KE11-8..1	FSA	6SL3203-0CE13-2AA0
0.75	1	6SL3210-1KE12-3..1		
1.1	1.5	6SL3210-1KE13-2..1		
1.5	2	6SL3210-1KE14-3..1	FSA	6SL3203-0CE21-0AA0
2.2	3	6SL3210-1KE15-8..1		
3	4	6SL3210-1KE17-5..1		
4	5	6SL3210-1KE18-8..1		
5.5	7.5	6SL3210-1KE21-3..1	FSB	6SL3203-0CE21-8AA0
7.5	10	6SL3210-1KE21-7..1		
11	15	6SL3210-1KE22-6..1	FSC	6SL3203-0CE23-8AA0
15	20	6SL3210-1KE23-2..1		
18.5	25	6SL3210-1KE23-8..1		

¹⁾ The rated power of the device based on the rated output current I_{LO} and a rated input voltage of 400 V 3 AC.

The rated power is specified on the device rating plate.

²⁾ The base load current I_L is based on the duty cycle for low overload (LO). The current value is specified on the device rating plate.

³⁾ The base load current I_H is based on the duty cycle for high overload (HO). The current value is not specified on the device rating plate.

SINAMICS

SINAMICS G120C compact inverters

Line-side components
Recommended line-side power components

Selection and ordering data

Recommended line-side power components

The following table lists recommendations for additional line-side components, such as fuses and circuit breakers.

Note for use in compliance with IEC standards:

3NA3 fuses are recommended for European countries. The values in the table take into account the overload capability of the inverter.

Note for use in compliance with UL regulations:

Fuses for use in North America must be UL-certified (e.g. the Class NON fuse series from Bussmann) or approved SIRIUS 3RV circuit breakers and 3VL molded case circuit breakers according to UL 489 (category control number CCN: Div Q). The specified circuit breakers are UL-certified.

An overvoltage protection device is required for installation in conformance with UL corresponding to the UL certification of SINAMICS G120C. The overvoltage protection device must be marked with the Listed test symbol and category code VZCA. The detailed UL installation guidelines are included in the equipment manual.

[Additional information about the listed fuses and circuit breakers can be found in catalogs LV 10, IC 10 and IC 10 AO.](#)

Rated power		SINAMICS G120C	Corresponding to the IEC standard			Corresponding to the UL/cUL standard
			Standard fuse		Circuit breaker	Circuit breaker
kW	hp	Type 6SL3210-...	Current in A	Article No.	Article No.	Article No.
Line voltage 380 ... 480 V 3 AC						
0.55	0.75	1KE11-8..1	6	3NA3801	3RV1021-1DA10	3RV1021-1DA10
0.75	1	1KE12-3..1			3RV1021-1EA10	3RV1021-1EA10
1.1	1.5	1KE13-2..1			3RV1021-1FA10	3RV1021-1FA10
1.5	2	1KE14-3..1	10	3NA3803	3RV1021-1HA10	3RV1021-1HA10
2.2	3	1KE15-8..1			3RV1021-1JA10	3RV1021-1JA10
3.0	4	1KE17-5..1	16	3NA3805	3RV1021-1KA10	3RV1021-1KA10
4.0	5	1KE18-8..1			3RV1021-4AA10	3RV1021-4AA10
5.5	7.5	1KE21-3..1	20	3NA3807	3RV1021-4BA10	3RV1021-4BA10
7.5	10	1KE21-7..1	25	3NA3810	3RV1021-4DA10	3RV1021-4DA10
11	15	1KE22-6..1	40	3NA3817	3RV1031-4FA10	3RV1031-4FA10
15	20	1KE23-2..1	50	3NA3820	3RV1031-4GA10	3RV1031-4GA10
18.5	25	1KE23-8..1	63	3NA3822	3RV1031-4HA10	3RV1031-4HA10

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SINAMICS G120C compact inverters

DC link components Supplementary system components

Selection and ordering data

DC link components

The excess energy of the DC link is dissipated using the braking resistor. The braking resistors are designed for use with the SINAMICS G120C. SINAMICS G120C has an integrated braking chopper and cannot feed back regenerative energy to the line supply. For regenerative operation, e.g. the braking of a rotating mass with high moment of inertia, a braking resistor must be connected to convert the resulting energy into heat.

The braking resistors are designed for mounting horizontally or vertically onto a heat-resistant sheet steel panel.

The resistors should be mounted such as to ensure that the air can flow in and out and heat cannot build up. The heat dissipated by the braking resistor must not diminish the inverter cooling.

Every braking resistor is equipped with a temperature switch. The temperature switch can be evaluated to prevent consequential damage if the braking resistor overheats.

Rated power		SINAMICS G120C		Braking resistor
kW	hp	Type	Frame size	Article No.
Line voltage 380 ... 480 V 3 AC				
0.55	0.75	6SL3210-1KE11-8..1	FSA	6SL3201-0BE14-3AA0
0.75	1	6SL3210-1KE12-3..1		
1.1	1.5	6SL3210-1KE13-2..1		
1.5	2	6SL3210-1KE14-3..1		
2.2	3	6SL3210-1KE15-8..1	FSA	6SL3201-0BE21-0AA0
3	4	6SL3210-1KE17-5..1		
4	5	6SL3210-1KE18-8..1		
5.5	7.5	6SL3210-1KE21-3..1	FSB	6SL3201-0BE21-8AA0
7.5	10	6SL3210-1KE21-7..1		
11	15	6SL3210-1KE22-6..1	FSC	6SL3201-0BE23-8AA0
15	20	6SL3210-1KE23-2..1		
18.5	25	6SL3210-1KE23-8..1		

Supplementary system components

The following supplementary system components are available for SINAMICS G120C inverters:

Description	Article No.
Intelligent Operator Panel IOP	6SL3255-0AA00-4JA1
IOP Handheld For use with SINAMICS G120, SINAMICS G120C, SINAMICS G110D or SINAMICS G120D Included in the scope of delivery: IOP, handheld housing, rechargeable batteries (4 × AA), charging unit (international), RS232 connecting cable (3 m/9.84 ft long), for use with SINAMICS G120 only), USB cable (1 m/3.28 ft long)	6SL3255-0AA00-4HA0
Basic Operator Panel BOP-2	6SL3255-0AA00-4CA1
Accessories	
Door mounting kit (for IOP and BOP-2) For mounting an operator panel in control cabinet doors with sheet steel thicknesses of 1 ... 3 mm (0.04 ... 0.12 in) IP54 degree of protection for IOP IP55 degree of protection for BOP-2 Included in the scope of delivery: Seal, mounting material, connecting cable (5 m/16.4 ft long, also supplies voltage to the IOP directly via the SINAMICS G120C compact inverter)	6SL3256-0AP00-0JA0
SINAMICS micro memory card (MMC) 64 MB	6SL3254-0AM00-0AA0
SINAMICS memory card (SD card) 512 Mbyte	6SL3054-4AG00-2AA0
PC inverter connection kit 2 For SINAMICS G120C and SINAMICS G120 Control Units CU240E-2 and CU250S-2 including USB cable (3 m in length) and STARTER commissioning tool ¹⁾ on DVD-ROM	6SL3255-0AA00-2CA0

¹⁾ STARTER commissioning tool is also available on the Internet at <http://support.automation.siemens.com/WW/view/en/10804985/133100>

Selection and ordering data

Spare parts

The following spare parts are available for SINAMICS G120C for service and maintenance work:

Description	Article No.
SINAMICS G120C shield plate	
• Frame size FSA	6SL3266-1EA00-0KA0
• Frame size FSB	6SL3266-1EB00-0KA0
• Frame size FSC	6SL3266-1EC00-0KA0
SINAMICS G120C Spare Parts Kit	6SL3200-0SK41-0AA0
SINAMICS G120C connectors	
• Frame size FSA	6SL3200-0ST05-0AA0
• Frame size FSB	6SL3200-0ST06-0AA0
• Frame size FSC	6SL3200-0ST07-0AA0
SINAMICS G120C roof-mounted fan	
• Frame size FSA	6SL3200-0SF40-0AA0
• Frame size FSB	6SL3200-0SF41-0AA0
• Frame size FSC	6SL3200-0SF42-0AA0
SINAMICS G120C fan unit	
• Frame size FSA	6SL3200-0SF12-0AA0
• Frame size FSB	6SL3200-0SF13-0AA0
• Frame size FSC	6SL3200-0SF14-0AA0

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SINAMICS G120 standard inverters

Safety Integrated with SINAMICS G120

Function



SINAMICS G120 is a modular inverter system that essentially comprises two function units.

- Control Unit (CU)
- Power Module (PM)

The Control Unit controls and monitors the Power Module and the connected motor in several different selectable modes. The digital inputs and digital outputs on the device support the simple wiring of sensors and actuators directly at the drive. The input signals can either be directly linked within the Control Unit and initiate local responses independently or they can be transferred to the central control via PROFIBUS or PROFINET for further processing within the context of the overall plant.

The Power Module supplies the motor in a power range from 0.37 kW to 250 kW.

In addition to scalable functions, it is also possible to select the Control Unit and Power Module to obtain the required safety functions.

The **CU240E-2** Control Units with V/f control and sensorless vector control are suitable for a wide range of applications in general machine construction, such as conveyor belts, mixers and extruders. The CU240E-2 is available as a standard variant with STO and as a fail-safe variant with comprehensive safety functions.

The **CU250S-2** Control Unit also offers vector control with sensor evaluation and supports the operation of single-axis applications with asynchronous and synchronous motors, as well as applications with basic positioning tasks or with high demands for the I/O configuration. The CU250S-2 offers the Safety Basic Functions as standard. The Safety Extended Functions can only be enabled via a SW license.

PM240 and **PM340** Power Modules have a braking chopper (four-quadrant applications) and are suitable for a large number of applications in general machinery construction.

PM250 Power Modules are suitable for the same applications as the PM240. Any braking energy is directly fed back into the line supply (four-quadrant applications – a braking chopper is not required).

PM260 Power Modules are designed for applications from 500 V to 690 V, are capable of energy recovery and include a sine-wave filter to reduce the stress on the motor and for long cable lengths.

The standard SINAMICS G120 inverter is especially well-suited

- as a universal drive in all industrial and commercial applications
- e.g. in the automotive, textile, printing and chemical industries
- for higher-level applications, e.g. in conveyor systems

Supplementary system components

Comprehensive system components are offered for the SINAMICS G120

Intelligent Operator Panel IOP

Graphic display with bar-type diagrams, e.g. for status values such as pressure or flowrate.

User-friendly commissioning, diagnostics and local operator control using a large plain text display, clear menu navigation and integrated application wizards.

Intelligent Operator Panel IOP Handheld

A handheld version of the IOP can be ordered for mobile use. In addition to the IOP, this includes a housing with rechargeable batteries, charging unit and RS232 connecting cable.

Basic Operator Panel BOP-2

Menu navigation and 2-line display permit fast and user-friendly commissioning of the inverter. Simple basic commissioning by simultaneously displaying parameter and parameter value, as well as the option of filtering parameters.

Door mounting kit for IOP/BOP-2

Using the optionally available door mounting kit, the IOP/BOP-2 can be mounted in a control cabinet door with just a few manual operations (IP54/UL Type 12 degree of protection is achieved).

Memory cards

The parameter settings for an inverter can be stored on the SINAMICS micro memory card (MMC) or SINAMICS memory card (SD card). When service is required, e.g. after the inverter has been replaced, the drive system is immediately ready for use again.

Adapter for mounting on DIN rails

The adapter for DIN rail mounting can be used to mount inverters, frame sizes FSA and FSB, on DIN mounting rails (2 units with a center-to-center distance of 100 mm).

PC inverter connection kit 2

For controlling and commissioning an inverter directly from a PC if the STARTER commissioning tool has been installed on the PC. The STARTER commissioning tool on DVD-ROM is included in the PC inverter connection kit -2.

Shield connection kit for Power Modules

The shield connection kit makes it easier to connect the shields of supply and control cables, provides mechanical strain relief and thus ensures optimum EMC performance.

Shield connection kits for Control Units

The Shield Connection Kit offers optimum shield connection and strain relief for all signal and communication cables. It includes a matching shield bonding plate and all of the necessary connecting and retaining elements for mounting.

For detailed information, see catalog D 31.

Safety Integrated

The standard SINAMICS G120 inverters are available in a number of different versions for safety-related applications. The PM240, PM250 and PM260 Power Modules are prepared for Safety Integrated. In conjunction with a fail-safe Control Unit, the drive can be turned into a Safety Integrated Drive with comprehensive safety functions. In conjunction with a standard Control Unit, the drive provides the safety function STO.

The fail-safe frequency inverter SINAMICS G120 offers the following safety functions (terms as defined in IEC 61800-5-2):

- **Safe Torque Off (STO)**
This function ensures that no torque-generating energy can continue to affect a motor and prevents unintentional start-ups.
- **Safe Stop 1 (SS1)**
The SS1 function causes a motor to stop rapidly and safely and switches the motor to torque-free mode after the standstill by activating STO.
- **Safe Brake Control (SBC)**
The SBC function permits the safe control of a holding brake. SBC is always activated in parallel with STO. The Safe Brake Relay is used for SBC.
- **Safe-Limited Speed (SLS)**
The SLS function ensures that the drive does not exceed a preset speed or velocity limit.
- **Safe Direction (SDI)**
This function ensures that the drive can only rotate in the selected direction.
- **Safe Speed Monitor (SSM)**
This function signals if a drive operates below a specific speed/feed velocity.

The Safety Integrated Function Manual contains additional information about the safety functions.

The Safety Integrated functions are completely integrated into the drive system. They can be activated via fail-safe digital inputs on the Control Unit or via PROFINET or PROFIBUS with PROFIsafe.

The Safety Integrated functions are implemented electronically and therefore offer short response times in comparison to solutions with externally implemented monitoring functions.

Safety Integrated encoderless

The safety functions do not require a motor encoder; the implementation effort is minimal. Existing plants in particular can be updated with integrated safety technology without the need to change the motor or mechanical system.

The STO function can be used without restriction for all applications.

The SS1, SLS, SSM and SDI functions are permissible for applications in conjunction with asynchronous and SIEMOSYN motors where the load can never cause acceleration. An encoder that is used for the purposes of motor control has no significance for the safety functions here.

Safety Integrated overview

The availability of Safety Integrated functions depends on the type of Control Unit, i.e. whether it is a standard Control Unit or a fail-safe Control Unit.

All standard Control Units have STO.

The fail-safe Control Units offer Extended Functions (SLS, SDI, SSM) in addition to the Basic Functions (STO, SS1).

The SBC function is currently supported for CU250S-2.

A license is required for operation of the Extended Functions on the CU250S-2 Control Unit. It is of no consequence here which safety functions are used and how many.

The license can be ordered as an option with the memory card. Alternatively, a single license can also be purchased.

Safe Brake Relay

The Safe Brake Control (SBC) function requires a Safe Brake Relay. The Safe Brake Relay allows safe control of electro-mechanical motor brakes.



The Safe Brake Relay controls a 24 V brake. When the STO function is active, the Safe Brake Relay safely closes the connected brake. The SBC function monitors the control of the brake, however, not its mechanical functioning.

The inverter controls the connected brake using the "motor holding brake" function.

The 24 V DC solenoid of the motor brake is directly connected to the Safe Brake Relay. External overvoltage limiters are not required. The cable harnesses for connection to the Power Module are included in the scope of supply.

In the case of the Safe Brake Relay, the brake is controlled in accordance with ISO 13849-1 to Performance Level PL d or Category 3 and in accordance with IEC 61508 to SIL2.

Detailed information is provided in catalog D 31.

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SINAMICS G120 standard inverters

Safety Integrated with SINAMICS G120

An overview of the Safety Integrated functions of SINAMICS G120 plus their boundary conditions is shown in the following table:

Overview of SINAMICS G120 Safety Integrated functions and associated boundary conditions

Function	Activation	Underlying function	Reaction to limit over-shoot	External setpoint input effective	Encoder required	License required	Available in
Basic Functions							
STO	<ul style="list-style-type: none"> F-DI PROFIsafe 	SBC (if activated)	–	No	No	No	<ul style="list-style-type: none"> CU240E-2 CU240E-2 DP CU240E-2 PN CU240E-2 F CU240E-2 DP-F CU240E-2 PN-F CU250S-2 CU250S-2 CAN CU250S-2 DP CU250S-2 PN
SS1 with SBR	<ul style="list-style-type: none"> F-DI PROFIsafe 	Safe Brake Ramp (SBR) monitoring during braking. STO and SBC (if activated) following expiry of the parameterized delay time or if the speed falls below the minimum speed limit	STO	No	No	No	<ul style="list-style-type: none"> CU240E-2 F CU240E-2 DP-F CU240E-2 PN-F CU250S-2 CU250S-2 CAN CU250S-2 DP CU250S-2 PN
SBC	<ul style="list-style-type: none"> With STO (directly or following expiry of the delay time) 	–	–	–	No	No	<ul style="list-style-type: none"> CU250S-2 CU250S-2 CAN CU250S-2 DP CU250S-2 PN
Extended Functions							
SLS	<ul style="list-style-type: none"> F-DI PROFIsafe 	–	STO, SS1 (can be parameterized)	Yes	No	No	<ul style="list-style-type: none"> CU240E-2 F CU240E-2 DP-F CU240E-2 PN-F
						Yes	<ul style="list-style-type: none"> CU250S-2 CU250S-2 CAN CU250S-2 DP CU250S-2 PN
SDI	<ul style="list-style-type: none"> F-DI PROFIsafe 	–	STO, SS1 (can be parameterized)	Yes	No	No	<ul style="list-style-type: none"> CU240E-2 F CU240E-2 DP-F CU240E-2 PN-F
						Yes	<ul style="list-style-type: none"> CU250S-2 CU250S-2 CAN CU250S-2 DP CU250S-2 PN
SSM	<ul style="list-style-type: none"> Always active, if configured 	–	Signals that the speed has fallen below a specified value	Yes	No	No	<ul style="list-style-type: none"> CU240E-2 F CU240E-2 DP-F CU240E-2 PN-F
						Yes	<ul style="list-style-type: none"> CU250S-2 CU250S-2 CAN CU250S-2 DP CU250S-2 PN

SINAMICS

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Control Units

Selection and ordering data

Control Units

Inputs	Outputs	Integrated safety technology	Fail-safe digital inputs	Communication	Designation	Control unit Article No.
CU240E-2 series						
6 digital 2 analog	3 digital 2 analog	STO	1 F-DI (opt. each 2 DI)	RS485/USS / Modbus RTU	CU240E-2	6SL3244-0BB12-1BA1
				PROFIBUS DP PROFIdrive PROFIsafe	CU240E-2 DP	6SL3244-0BB12-1PA1
				PROFINET PROFIdrive PROFIsafe PROFInergy	CU240E-2 PN	6SL3244-0BB12-1FA0
		STO, SS1, SLS, SSM, SDI	3 F-DI (opt. each 2 DI)	RS485/USS / Modbus RTU	CU240E-2 F	6SL3244-0BB13-1BA1
				PROFIBUS DP PROFIdrive PROFIsafe	CU240E-2 DP-F	6SL3244-0BB13-1PA1
				PROFINET PROFIdrive PROFIsafe PROFInergy	CU240E-2 PN-F	6SL3244-0BB13-1FA0
CU250S-2 series						
11 digital 2 analog	4 digital 2 analog	STO, SBC, SS1	3 F-DI (opt. each 2 DI) 1 F-DO (opt. each 3 DO)	RS485/USS / Modbus RTU	CU250S-2	6SL3246-0BA22-1BA0
				PROFIBUS DP PROFIdrive PROFIsafe	CU250S-2 DP	6SL3246-0BA22-1PA0
				PROFINET PROFIdrive PROFIsafe PROFInergy	CU250S-2 PN	6SL3246-0BA22-1FA0
				CANopen	CU250S-2 CAN	6SL3246-0BA22-1CA0

Optional licenses for CU250S-2 Control Units

Extended safety technology	Extended technology functions	Designation	Article No.
Optional licenses for CU250S-2 Control Units			
Extended Safety License: SLS, SSM, SDI	–	SINAMICS SD card 512 MB	6SL3054-4AG00-2AA0-Z F01
		Post-licensing	6SL3074-0AA10-0AA0
–	Extended Functions License: basic positioning (EPos)	SINAMICS SD card 512 MB	6SL3054-4AG00-2AA0-Z E01
		Post-licensing	6SL3074-7AA04-0AA0
Extended Safety License: SLS, SSM, SDI	Extended Functions License: basic positioning (EPos)	SINAMICS SD card 512 MB	6SL3054-4AG00-2AA0-Z F01+E01

The Control Units can be operated with the following Power Modules:

Control Units	Power Modules				
	PM240-2	PM240	PM250	PM260	PM340 blocksize format 200 to 240 V 1 AC
CU240E-2	4	4	4	4	4
CU250S-2	4	4	4	4	4

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SINAMICS G120 standard inverters

Power Modules

Selection and ordering data

PM240 to PM260 Power Modules

To ensure that a suitable Power Module is selected, the following currents should be used for applications:

- Rated output current for applications with low overload (LO);
- Base load current for applications with high overload (HO).

With reference to the rated output current, the modules support at least 2-pole to 6-pole low-voltage motors, e.g. the new 1LE1 motor series. The rated power is merely a guide value. For a description of the overload performance, please refer to the general technical specifications of the Power Modules.

PM240-2 Power Modules standard variant

Rated power ¹⁾		Rated output current I_{rated} ²⁾	Power based on the base load current ³⁾		Base load current I_H ³⁾	Frame size	PM240-2 Power Module standard variant without integrated line filter	PM240-2 Power Module standard variant with integrated line filter-class <u>A</u>
kW	hp	A	kW	hp	A		Article No.	Article No.
380 ... 480 V 3 AC								
0.55	0.75	1.7	0.37	0.50	1.3	FSA	6SL3210-1PE11-8UL0	6SL3210-1PE11-8AL0
0.75	1.0	2.2	0.55	0.75	1.7		6SL3210-1PE12-3UL0	6SL3210-1PE12-3AL0
1.1	1.5	3.1	0.75	1.0	2.2		6SL3210-1PE13-2UL0	6SL3210-1PE13-2AL0
1.5	2.0	4.1	1.1	1.5	3.1		6SL3210-1PE14-3UL0	6SL3210-1PE14-3AL0
2.2	3.0	5.9	1.5	2.0	4.1		6SL3210-1PE16-1UL0	6SL3210-1PE16-1AL0
3.0	4.0	7.7	2.2	3.0	5.9		6SL3210-1PE18-0UL0	—

PM240-2 Power Modules push-through variant

Rated power ¹⁾		Rated output current I_{rated} ²⁾	Power based on the base load current ³⁾		Base load current I_H ³⁾	Frame size	PM240-2 Power Module push-through variant without integrated line filter	PM240-2 Power Module push-through variant with integrated line filter-class <u>A</u>
kW	hp	A	kW	hp	A		Article No.	Article No.
380 ... 480 V 3 AC								
2.2	3.0	5.9	1.5	3.0	4.1	FSA	—	6SL3211-1PE16-1AL0
3.0	4.0	7.7	2.2	7.5	5.9		6SL3211-1PE18-0UL0	—

¹⁾ Rated power based on the rated output current I_{rated} . The rated output current I_{rated} is based on the duty cycle for low overload (LO).

²⁾ The rated output current I_{rated} is based on the duty cycle for low overload (LO). These current values are valid for 400 V and are stamped on the rating plate of the Power Module.

³⁾ The base load current I_H is based on the duty cycle for high overload (HO).

Selection and ordering data

PM240 Power Modules

Rated power ¹⁾		Rated output current I_{rated} ²⁾	Power based on the base load current ³⁾		Base load current I_H ³⁾	Frame size	PM240 Power Module without integrated line filter	PM240 Power Module with integrated line filter class A
kW	hp	A	kW	hp	A		Article No.	Article No.
380 ... 480 V 3 AC								
0.37	0.50	1.3	0.37	0.50	1.3	FSA	6SL3224-0BE13-7UA0	–
0.55	0.75	1.7	0.55	0.75	1.7		6SL3224-0BE15-5UA0	–
0.75	1.0	2.2	0.75	1.0	2.2		6SL3224-0BE17-5UA0	–
1.1	1.5	3.1	1.1	1.5	3.1		6SL3224-0BE21-1UA0	–
1.5	2.0	4.1	1.5	2.0	4.1		6SL3224-0BE21-5UA0	–
2.2	3.0	5.9	2.2	3.0	5.9	FSB	6SL3224-0BE22-2UA0	6SL3224-0BE22-2AA0
3.0	4.0	7.7	3.0	4.0	7.7		6SL3224-0BE23-0UA0	6SL3224-0BE23-0AA0
4.0	5.0	10.2	4.0	5.0	10.2		6SL3224-0BE24-0UA0	6SL3224-0BE24-0AA0
7.5	10	18	5.5	7.5	13.2	FSC	6SL3224-0BE25-5UA0	6SL3224-0BE25-5AA0
11.0	15	25	7.5	10	19		6SL3224-0BE27-5UA0	6SL3224-0BE27-5AA0
15.0	20	32	11.0	15	26		6SL3224-0BE31-1UA0	6SL3224-0BE31-1AA0
18.5	25	38	15.0	20	32	FSD	6SL3224-0BE31-5UA0	6SL3224-0BE31-5AA0
22	30	45	18.5	25	38		6SL3224-0BE31-8UA0	6SL3224-0BE31-8AA0
30	40	60	22	30	45		6SL3224-0BE32-2UA0	6SL3224-0BE32-2AA0
37	50	75	30	40	60	FSE	6SL3224-0BE33-0UA0	6SL3224-0BE33-0AA0
45	60	90	37	50	75		6SL3224-0BE33-7UA0	6SL3224-0BE33-7AA0
55	75	110	45	60	90	FSF	6SL3224-0BE34-5UA0	6SL3224-0BE34-5AA0
75	100	145	55	75	110		6SL3224-0BE35-5UA0	6SL3224-0BE35-5AA0
90	125	178	75	100	145		6SL3224-0BE37-5UA0	6SL3224-0BE37-5AA0
110	150	205	90	125	178	FSGX ⁴⁾	6SL3224-0BE38-8UA0	–
132	200	250	110	150	205		6SL3224-0BE41-1UA0	–
160	250	302	132	200	250		6SL3224-0XE41-3UA0	–
200	300	370	160	250	302		6SL3224-0XE41-6UA0	–
250	400	477	200	300	370		6SL3224-0XE42-0UA0	–

¹⁾ Rated power based on the rated output current I_{rated} . The rated output current I_{rated} is based on the duty cycle for low overload (LO).

²⁾ The rated output current I_{rated} is based on the duty cycle for low overload (LO). These current values are valid for 400 V and are stamped on the rating plate of the Power Module.

³⁾ The base load current I_H is based on the duty cycle for high overload (HO).

⁴⁾ The FSGX frame size does not support Extended Safety functions.

SINAMICS

SINAMICS G120 standard inverters

Power Modules

Selection and ordering data

PM250 Power Modules

Rated power ¹⁾		Rated output current I_{rated} ²⁾	Power based on the base load current ³⁾		Base load current I_H ³⁾	Frame size	PM250 Power Module without integrated line filter	PM250 Power Module with integrated line filter class A
kW	hp	A	kW	hp	A		Article No.	Article No.
380 ... 480 V 3 AC								
7.5	10	18	5.5	7.5	13.2	FSC	–	6SL3225-0BE25-5AA1
11.0	15	25	7.5	10	19		–	6SL3225-0BE27-5AA1
15.0	20	32	11.0	15	26		–	6SL3225-0BE31-1AA1
18.5	25	38	15.0	20	32	FSD	6SL3225-0BE31-5UA0	6SL3225-0BE31-5AA0
22	30	45	18.5	25	38		6SL3225-0BE31-8UA0	6SL3225-0BE31-8AA0
30	40	60	22	30	45		6SL3225-0BE32-2UA0	6SL3225-0BE32-2AA0
37	50	75	30	40	60	FSE	6SL3225-0BE33-0UA0	6SL3225-0BE33-0AA0
45	60	90	37	50	75		6SL3225-0BE33-7UA0	6SL3225-0BE33-7AA0
55	75	110	45	60	90	FSF	6SL3225-0BE34-5UA0	6SL3225-0BE34-5AA0
75	100	145	55	75	110		6SL3225-0BE35-5UA0	6SL3225-0BE35-5AA0
90	125	178	75	100	145		6SL3225-0BE37-5UA0	6SL3225-0BE37-5AA0

PM260 Power Modules

Rated power ¹⁾		Rated output current ⁴⁾	Power based on the base load current ³⁾		Base load current I_H ³⁾	Frame size	PM260 Power Module without integrated line filter	PM260 Power Module with integrated line filter class A
kW	hp	A	kW	hp	A		Article No.	Article No.
500 ... 690 V 3 AC								
11.0	15	14	7.5	10	10	FSD	6SL3225-0BH27-5UA1	6SL3225-0BH27-5AA1
15.0	20	19	11	15	14		6SL3225-0BH31-1UA1	6SL3225-0BH31-1AA1
18.5	25	23	15	20	19		6SL3225-0BH31-5UA1	6SL3225-0BH31-5AA1
30	40	35	22	30	26	FSF	6SL3225-0BH32-2UA1	6SL3225-0BH32-2AA1
37	50	42	30	40	35		6SL3225-0BH33-0UA1	6SL3225-0BH33-0AA1
55	75	62	37	50	42		6SL3225-0BH33-7UA1	6SL3225-0BH33-7AA1

PM340 Power Modules

Selection and ordering data, see page 4/141.

¹⁾ Rated power based on the rated output current I_{rated} . The rated output current I_{rated} is based on the duty cycle for low overload (LO).

²⁾ The rated output current I_{rated} is based on the duty cycle for low overload (LO). These current values are valid for 400 V and are stamped on the rating plate of the Power Module.

³⁾ The base load current I_H is based on the duty cycle for high overload (HO).

⁴⁾ The rated output current I_{rated} is based on the duty cycle for low overload (LO). These current values are valid for 690 V and are stamped on the rating plate of the Power Module.

SINAMICS

SINAMICS G120 standard inverters

Line-side components
Line filters

Selection and ordering data

Line-side components

Line filters

With an additional line filter, the Power Module reaches a higher radio interference class.

Line filter class A

Rated power		SINAMICS G120 PM240 Power Module		Line filter class A according to EN 55011
kW	A	Type	Frame size	Article No.
380 ... 480 V 3 AC				
0.37	0.50	6SL3224-0BE13-7UA0	FSA	6SE6400-2FA00-6AD0
0.55	0.75	6SL3224-0BE15-5UA0		
0.75	1.0	6SL3224-0BE17-5UA0		
1.1	1.5	6SL3224-0BE21-1UA0		
1.5	2.0	6SL3224-0BE21-5UA0		
110	150	6SL3224-0BE38-8UA0	FSF	6SL3203-0BE32-5AA0
132	200	6SL3224-0BE41-1UA0		
160	250	6SL3224-0XE41-3UA0	FSGX	6SL3000-0BE34-4AA0
200	300	6SL3224-0XE41-6UA0		
250	400	6SL3224-0XE42-0UA0	FSGX	6SL3000-0BE36-0AA0

Line filter class B

Rated power		SINAMICS G120 PM240 Power Module		Line filter class B according to EN 55011
kW	A	Type	Frame size	Article No.
380 ... 480 V 3 AC				
0.37	0.50	6SL3224-0BE13-7UA0	FSA	6SE6400-2FB00-6AD0
0.55	0.75	6SL3224-0BE15-5UA0		
0.75	1.0	6SL3224-0BE17-5UA0		
1.1	1.5	6SL3224-0BE21-1UA0		
1.5	2.0	6SL3224-0BE21-5UA0		
2.2	3.0	6SL3224-0BE22-2AA0	FSB	6SL3203-0BE21-6SA0
3.0	4.0	6SL3224-0BE23-0AA0		
4.0	5.0	6SL3224-0BE24-0AA0		
7.5	10	6SL3224-0BE25-5AA0	FSC	6SL3203-0BD23-8SA0
11	15	6SL3224-0BE27-5AA0		
15	20	6SL3224-0BE31-1AA0		

Rated power		SINAMICS G120 PM250 Power Module		Line filter class B according to EN 55011
kW	A	Type	Frame size	Article No.
380 ... 480 V 3 AC				
7.5	10	6SL3225-0BE25-5AA1	FSC	6SL3203-0BD23-8SA0
11	15	6SL3225-0BE27-5AA1		
15	20	6SL3225-0BE31-1AA1		

SINAMICS

SINAMICS G120 standard inverters

Line-side components Line reactors

Selection and ordering data

Line-side components (continued)

Line reactors

Line reactors are used to smooth voltage peaks or to bridge commutating dips. Line reactors also reduce the effects of harmonics on the inverter and the line supply.

Note:

A line reactor must not be used in combination with a PM250 or PM260 Power Module.

Rated power		SINAMICS G120 PM240-2 Power Module standard variant	Line reactor	
kW	A	Type	Frame size	Article No.
380 ... 480 V 3 AC				
0.55	0.75	6SL3210-1PE11-8 . . 0	FSA	6SL3203-0CE13-2AA0
0.75	1.0	6SL3210-1PE12-3 . . 0		
1.1	1.5	6SL3210-1PE13-2 . . 0		
1.5	2.0	6SL3210-1PE14-3 . . 0		
2.2	3.0	6SL3210-1PE16-1 . . 0		6SL3203-0CE21-0AA0
3.0	4.0	6SL3210-1PE18-0 . . 0		

Rated power		SINAMICS G120 PM240-2 Power Module push-through variant	Line reactor	
kW	A	Type	Frame size	Article No.
380 ... 480 V 3 AC				
2.2	3.0	6SL3211-1PE16-1AL0	FSA	6SL3203-0CE21-0AA0
3.0	4.0	6SL3211-1PE18-0AL0		

Rated power		SINAMICS G120 PM240 Power Module	Line reactor	
kW	A	Type	Frame size	Article No.
380 ... 480 V 3 AC				
0.37	0.50	6SL3224-0BE13-7UA0	FSA	6SE6400-3CC00-2AD3
0.55	0.75	6SL3224-0BE15-5UA0		6SE6400-3CC00-4AD3
0.75	1.0	6SL3224-0BE17-5UA0		
1.1	1.5	6SL3224-0BE21-1UA0	FSB	6SE6400-3CC00-6AD3
1.5	2.0	6SL3224-0BE21-5UA0		6SL3203-0CD21-0AA0
2.2	3.0	6SL3224-0BE22-2 . A0		
3.0	4.0	6SL3224-0BE23-0 . A0	FSC	6SL3203-0CD21-4AA0
4.0	5.0	6SL3224-0BE24-0 . A0		6SL3203-0CD22-2AA0
7.5	10	6SL3224-0BE25-5 . A0	FSD	
11	15	6SL3224-0BE27-5 . A0		6SL3203-0CJ24-5AA0
15	20	6SL3224-0BE31-1 . A0		
18.5	25	6SL3224-0BE31-5 . A0	FSE	6SL3203-0CD25-3AA0
22	30	6SL3224-0BE31-8 . A0		FSF
30	40	6SL3224-0BE32-2 . A0	6SE6400-3CC11-2FD0	
37	50	6SL3224-0BE33-0 . A0		
45	60	6SL3224-0BE33-7 . A0	6SL3000-0CE32-3AA0	
55	75	6SL3224-0BE34-5 . A0		6SL3000-0CE32-8AA0
75	100	6SL3224-0BE35-5 . A0	FSGX	
90	125	6SL3224-0BE37-5 . A0		6SL3000-0CE35-1AA0
110	150	6SL3224-0BE38-8UA0		
132	200	6SL3224-0BE41-1UA0		
160	250	6SL3224-0XE41-3UA0		
200	300	6SL3224-0XE41-6UA0		
250	400	6SL3224-0XE42-0UA0		

Selection and ordering data**Line-side components** (continued)Recommended line-side power components

The following table lists recommendations for additional line-side components, such as fuses and circuit breakers. The values in the table take into account the overload capability of the inverter.

Notes for use in compliance with IEC standards:
3NA3 or 3NE1 fuses and 3RV10 or 3VL circuit breakers are recommended for European countries.

Notes for use in compliance with UL regulations:
Fuses and circuit breakers for use in North America must be UL-certified.

- Examples of fuses:
 - Type 3NE1 fuses are UL-compliant (corresponds to **3NA**).
 - Class J fuses, fuse series Class NOS supplied by Bussmann

- Examples of circuit breakers:
 - In accordance with UL 489 (category control number CCN: DiV Q), approved SIRIUS 3RV circuit breakers and 3VL molded case circuit breakers

An overvoltage protection device is required for installation in conformance with UL corresponding to the UL certification of SINAMICS G120 PM240-2 Power Modules. The overvoltage protection device must be marked with the Listed test symbol and category code VZCA. The detailed UL installation guidelines are included in the equipment manual.

[Additional information about the listed fuses and circuit breakers can be found in catalogs LV 10, IC 10 and IC 10 AO.](#)

Rated power ¹⁾		SINAMICS G120 PM240-2 Power Module <u>standard variant</u>	Corresponding to the IEC standard			Corresponding to the UL/cUL standard	
			Standard fuse type		Circuit breaker	Standard fuse type	
kW	hp		Type	Current in A	Article No.	Article No.	Current in A
380 ... 480 V 3 AC							
0.55	0.75	6SL3210-1PE11-8 . L0	6	3NA3801	3RV1021-1DA10	10	J
0.75	1.0	6SL3210-1PE12-3 . L0	6	3NA3801	3RV1021-1EA10	10	J
1.1	1.5	6SL3210-1PE13-2 . L0	6	3NA3801	3RV1021-1FA10	10	J
1.5	2.0	6SL3210-1PE14-3 . L0	10	3NA3803	3RV1021-1HA10	10	J
2.2	3.0	6SL3210-1PE16-1 . L0	10	3NA3803	3RV1021-1JA10	10	J
3.0	4.0	6SL3210-1PE18-0 . L0	16	3NA3805	3RV1021-1KA10	15	J

Rated power ¹⁾		SINAMICS G120 PM240-2 Power Module <u>push-through variant</u>	Corresponding to the IEC standard			Corresponding to the UL/cUL standard	
			Standard fuse type		Circuit breaker	Standard fuse type	
kW	hp		Type	Current in A	Article No.	Article No.	Current in A
380 ... 480 V 3 AC							
2.2	3.0	6SL3211-1PE16-1AL0	10	3NA3803	3RV1021-1JA10	10	J
3.0	4.0	6SL3211-1PE18-0ULO	16	3NA3805	3RV1021-1KA10	15	J

¹⁾ Rated power based on the rated output current I_{rated} . The rated output current I_{rated} is based on the duty cycle for low overload (LO).

SINAMICS G120 standard inverters

Line-side components
Recommended line-side power components

Selection and ordering data

Line-side components (continued)

Recommended line-side power components (continued)

Rated power ¹⁾		SINAMICS G120 PM240 Power Module	Fuse Metal factor for metal surcharges <i>(MS)</i>		Circuit breaker Metal factor for metal surcharges <i>(MS)</i>	
			Type 3NA3	Type 3NE1 (VA)		
kW	hp	Type 6SL3224-...	Frame size	Article No.	Article No.	
380 ... 480 V 3 AC						
0.37	0.50	OBE13-7UA0	FSA	3NA3803	UL-listed fuses such as the Class NON fuse series from Bussmann are required for North America.	3RV1021-1CA10
0.55	0.75	OBE15-5UA0				3RV1021-1DA10
0.75	1.0	OBE17-5UA0				3RV1021-1FA10
1.1	1.5	OBE21-1UA0				3RV1021-1GA10
1.5	2	OBE21-5UA0				3RV1021-1JA10
2.2	3	OBE22-2 . A0	FSB	3NA3805		3RV1021-1KA10
3.0	4	OBE23-0 . A0		3NA3807		3RV1021-4AA10
4.0	5	OBE24-0 . A0				3RV1021-4BA10
7.5	10	OBE25-5 . A0	FSC			3RV1031-4EA10
11.0	15	OBE27-5 . A0				3RV1031-4FA10
15.0	20	OBE31-1 . A0				3RV1031-4HA10
18.5	25	OBE31-5 . A0	FSD	3NA3820	3NE1817-0	3RV1042-4KA10
22	30	OBE31-8 . A0		3NA3822	3NE1818-0	3RV1042-4MA10
30	40	OBE32-2 . A0		3NA3824	3NE1820-0	
37	50	OBE33-0 . A0	FSE	3NA3830	3NE1021-0	3VL1712-1DD33-0AA0
45	60	OBE33-7 . A0		3NA3832	3NE1022-0	3VL1712-2DD33-0AA0
						3VL1716-1DD33-0AA0
						3VL1716-2DD33-0AA0
55	75	OBE34-5 . A0	FSF	3NA3836	3NE1224-0	3VL3720-1DC36-0AA0
75	100	OBE35-5 . A0		3NA3140	3NE1225-0	3VL3720-2DC36-0AA0
						3VL3720-3DC36-0AA0
						3VL3725-1DC36-0AA0
						3VL3725-2DC36-0AA0
90	125	OBE37-5 . A0		3NA3144	3NE1227-0	3VL3725-3DC36-0AA0
110	150	OBE38-8UA0		—	3NE1230-0	3VL4731-1DC36-0AA0
132	200	OBE41-1UA0		—		3VL4731-2DC36-0AA0
160	250	OXE41-3UA0	FSGX	3NA3254	3NE1333-2	3VL4731-3DC36-0AA0
200	300	OBE41-6UA0		3NA3260		3VL4740-1DC36-0AA0
						3VL4740-2DC36-0AA0
						3VL4740-3DC36-0AA0
250	400	OBE42-0UA0		3NA3372	3NE1436-2	3VL5750-1DC36-0AA0
						3VL5750-2DC36-0AA0
						3VL5750-3DC36-0AA0

Note: For 3VL molded case circuit breakers, only the basic design without auxiliary switch and shunt release (3VL.....-0AA0) is listed here. For further details, see catalog LV 10, IC 10 and IC 10 AO.

¹⁾ Rated power based on the rated output current I_{rated} . The rated output current I_{rated} is based on the duty cycle for low overload (LO).

SINAMICS

SINAMICS G120 standard inverters

Line-side components
Recommended line-side power components

Selection and ordering data

Line-side components (continued)

Recommended line-side power components (continued)

Rated power ¹⁾		SINAMICS G120 PM250 Power Module		Fuse Metal factor for metal surcharges (MS)		Circuit breaker Metal factor for metal surcharges (MS)
kW	hp	Type 6SL3225-...	Frame size	Type 3NA3 Article No.	Type 3NE1 (VA) Article No.	Article No.
380 ... 480 V 3 AC						
7.5	10	OBE25-5AA1	FSC	3NA3807	UL-listed fuses such as the Class NON fuse series from Bussmann are required for North America.	3RV1031-4EA10
11.0	15	OBE27-5AA1		3NA3812		3RV1031-4FA10
15.0	20	OBE31-1AA1		3NA3814		3RV1031-4HA10
18.5	25	OBE31-5 . A0	FSD	3NA3820	3NE1817-0	3RV1042-4KA10
22	30	OBE31-8 . A0		3NA3822	3NE1818-0	
30	40	OBE32-2 . A0		3NA3824	3NE1820-0	3RV1042-4MA10
37	50	OBE33-0 . A0	FSE	3NA3830	3NE1021-0	3VL1712-1DD33-0AA0
						3VL1712-2DD33-0AA0
45	60	OBE33-7 . A0		3NA3832	3NE1022-0	3VL1716-1DD33-0AA0
						3VL1716-2DD33-0AA0
55	75	OBE34-5 . A0	FSF	3NA3836	3NE1224-0	3VL3720-1DC36-0AA0
						3VL3720-2DC36-0AA0
						3VL3720-3DC36-0AA0
75	100	OBE35-5 . A0		3NA3140	3NE1225-0	3VL3725-1DC36-0AA0
						3VL3725-2DC36-0AA0
						3VL3725-3DC36-0AA0
90	125	OBE37-5 . A0		3NA3144	3NE1227-0	3VL4731-1DC36-0AA0
						3VL4731-2DC36-0AA0
						3VL4731-3DC36-0AA0

Note: For 3VL molded case circuit breakers, only the basic design without auxiliary switch and shunt release (3VL.....-.....0AA0) is listed here. For further details, see catalog LV 10, IC 10 and IC 10 AO.

Rated power ¹⁾		SINAMICS G120 PM260 Power Module		Fuse Metal factor for metal surcharges (MS)		Circuit breaker Metal factor for metal surcharges (MS)
kW	hp	Type 6SL3225-...	Frame size	Type 3NA3 Article No.	Type 3NE1 (VA) Article No.	Article No.
500 ... 690 V 3 AC						
11.0	15	OBH27-5 . A1	FSD	3NA3120-6		3RV1041-4FA10
15.0	20	OBH31-1 . A1				
18.5	25	OBH31-5 . A1				
30	40	OBH32-2 . A1	FSF	3NA3122-6		3RV1041-4JA10
37	50	OBH33-0 . A1				3RV1041-4KA10
55	75	OBH33-7 . A1		3NA3130-6		3RV1041-4MA10

¹⁾ Rated power based on the rated output current I_{rated} . The rated output current I_{rated} is based on the duty cycle for low overload (LO).

SINAMICS G120 standard inverters

DC link components
Braking resistors, Braking Modules

Selection and ordering data

DC link components

Braking resistors

Rated power		SINAMICS G120 PM240-2 Power Module Standard variant	Braking resistor	
kW	hp	Type	Frame size	Article No.
380 ... 480 V 3 AC				
0.55	0.75	6SL3210-1PE11-8 . . 0	FSA	6SL3201-0BE14-3AA0
0.75	1.0	6SL3210-1PE12-3 . . 0		
1.1	1.5	6SL3210-1PE13-2 . . 0		
1.5	2	6SL3210-1PE14-3 . . 0		
2.2	3	6SL3210-1PE16-1 . . 0		6SL3201-0BE21-0AA0
3.0	4	6SL3210-1PE18-0 . . 0		

Rated power		SINAMICS G120 PM240-2 Power Module Push-through variant	Braking resistor	
kW	hp	Type	Frame size	Article No.
380 ... 480 V 3 AC				
2.2	3	6SL3211-1PE16-1AL0	FSA	6SL3201-0BE21-0AA0
3.0	4	6SL3211-1PE18-0UL0		

Rated power		SINAMICS G120 <u>PM240</u> Power Module	Braking resistor	
kW	hp	Type	Frame size	Article No.
380 ... 480 V 3 AC				
0.37	0.50	6SL3224-0BE13-7UA0	FSA	6SE6400-4BD11-0AA0
0.55	0.75	6SL3224-0BE15-5UA0		
0.75	1.0	6SL3224-0BE17-5UA0		
1.1	1.5	6SL3224-0BE21-1UA0		
1.5	2	6SL3224-0BE21-5UA0	FSB	6SL3201-0BE12-0AA0
2.2	3	6SL3224-0BE22-2 . A0		
3.0	4	6SL3224-0BE23-0 . A0		
4.0	5	6SL3224-0BE24-0 . A0		
7.5	10	6SL3224-0BE25-5 . A0	FSC	6SE6400-4BD16-5CA0
11.0	15	6SL3224-0BE27-5 . A0		
15.0	20	6SL3224-0BE31-1 . A0		
18.5	25	6SL3224-0BE31-5 . A0	FSD	6SE6400-4BD21-2DA0
22	30	6SL3224-0BE31-8 . A0		
30	40	6SL3224-0BE32-2 . A0		
37	50	6SL3224-0BE33-0 . A0	FSE	6SE6400-4BD22-2EA1
45	60	6SL3224-0BE33-7 . A0		
55	75	6SL3224-0BE34-5 . A0	FSF	6SE6400-4BD24-0FA0
75	100	6SL3224-0BE35-5 . A0		
90	125	6SL3224-0BE37-5 . A0	FSF	6SE6400-4BD26-0FA0
110	150	6SL3224-0BE38-8UA0		
132	200	6SL3224-0BE41-1UA0	FSGX ¹⁾	6SL3000-1BE31-3AA0 6SL3000-1BE32-5AA0
160	250	6SL3224-0XE41-3UA0		
200	300	6SL3224-0XE41-6UA0		
250	400	6SL3224-0XE42-0UA0		

Braking Module

Braking Module	
Article No.	
DC link voltage 510 ... 720 V DC	
Braking Module 50 kW/250 kW	6SL3300-1AE32-5AA0

¹⁾ A Braking Module must be additionally ordered for connection.

SINAMICS

SINAMICS G120 standard inverters

Load-side power components
Output reactors

Selection and ordering data

Load-side power components

Output reactors

Rated power		SINAMICS G120 <u>PM240</u> Power Module		Output reactor
kW	hp	Type	Frame size	Article No.
380 ... 480 V 3 AC				
0.37	0.50	6SL3224-0BE13-7UA0	FSA	6SE6400-3TC00-4AD2
0.55	0.75	6SL3224-0BE15-5UA0		
0.75	1.0	6SL3224-0BE17-5UA0		
1.1	1.5	6SL3224-0BE21-1UA0		
1.5	2	6SL3224-0BE21-5UA0		
2.2	3	6SL3224-0BE22-2 . A0	FSB	6SL3202-0AE21-0CA0
3.0	4	6SL3224-0BE23-0 . A0		
4.0	5	6SL3224-0BE24-0 . A0		
7.5	10	6SL3224-0BE25-5 . A0	FSC	6SL3202-0AJ23-2CA0
11.0	15	6SL3224-0BE27-5 . A0		
15.0	20	6SL3224-0BE31-1 . A0		
18.5	25	6SL3224-0BE31-5 . A0	FSD	6SE6400-3TC05-4DD0
22	30	6SL3224-0BE31-8 . A0		6SE6400-3TC03-8DD0
30	40	6SL3224-0BE32-2 . A0		6SE6400-3TC05-4DD0
37	50	6SL3224-0BE33-0 . A0	FSE	6SE6400-3TC08-0ED0
45	60	6SL3224-0BE33-7 . A0		6SE6400-3TC07-5ED0
55	75	6SL3224-0BE34-5 . A0	FSF	6SE6400-3TC14-5FD0
75	100	6SL3224-0BE35-5 . A0		6SE6400-3TC15-4FD0
90	125	6SL3224-0BE37-5 . A0		6SE6400-3TC14-5FD0
110	150	6SL3224-0BE38-8UA0		6SL3000-2BE32-1AA0
132	200	6SL3224-0BE41-1UA0	FSGX	6SL3000-2BE32-6AA0
160	250	6SL3224-0XE41-3UA0		6SL3000-2BE33-2AA0
200	300	6SL3224-0XE41-6UA0		6SL3000-2BE33-8AA0
250	400	6SL3224-0XE42-0UA0		6SL3000-2BE35-0AA0

SINAMICS G120 standard inverters

Load-side power components
Output reactors, sine-wave filters

Selection and ordering data

Load-side power components (continued)

Output reactors (continued)

Rated power		SINAMICS G120 <u>PM250</u> Power Module		Output reactor
kW	hp	Type	Frame size	Article No.
380 ... 480 V 3 AC				
7.5	10	6SL3225-0BE25-5AA1	FSC	6SL3202-0AJ23-2CA0
11.0	15	6SL3225-0BE27-5AA1		
15.0	20	6SL3225-0BE31-1AA1		
18.5	25	6SL3225-0BE31-5 . A0	FSD	6SE6400-3TC05-4DD0
22	30	6SL3225-0BE31-8 . A0		6SE6400-3TC03-8DD0
30	40	6SL3225-0BE32-2 . A0		6SE6400-3TC05-4DD0
37	50	6SL3225-0BE33-0 . A0	FSE	6SE6400-3TC08-0ED0
45	60	6SL3225-0BE33-7 . A0		6SE6400-3TC07-5ED0
55	75	6SL3225-0BE34-5 . A0	FSF	6SE6400-3TC14-5FD0
75	100	6SL3225-0BE35-5 . A0		6SE6400-3TC15-4FD0
90	125	6SL3225-0BE37-5 . A0		6SE6400-3TC14-5FD0

SINAMICS

SINAMICS G120 standard inverters

Load-side power components
Sine-wave filters

Selection and ordering data

Load-side power components (continued)

Sine-wave filters (continued)

Rated power		SINAMICS G120 <u>PM240</u> Power Module		Sine-wave filter
kW	hp	Type	Frame size	Article No.
380 ... 480 V 3 AC				
0.37	0.50	6SL3224-0BE13-7UA0	FSA	6SL3202-0AE20-3SA0
0.55	0.75	6SL3224-0BE15-5UA0		
0.75	1.0	6SL3224-0BE17-5UA0		
1.1	1.5	6SL3224-0BE21-1UA0		
1.5	2	6SL3224-0BE21-5UA0	FSB	6SL3202-0AE20-6SA0
2.2	3	6SL3224-0BE22-2 . A0		
3.0	4	6SL3224-0BE23-0 . A0		
4.0	5	6SL3224-0BE24-0 . A0		
7.5	10	6SL3224-0BE25-5 . A0	FSC	6SL3202-0AE21-1SA0
11.0	15	6SL3224-0BE27-5 . A0		
15.0	20	6SL3224-0BE27-5 . A0		
18.5	25	6SL3224-0BE31-1 . A0		
22	30	6SL3224-0BE31-5 . A0	FSD	6SL3202-0AE21-4SA0
30	40	6SL3224-0BE31-8 . A0		
37	50	6SL3224-0BE32-2 . A0		
45	60	6SL3224-0BE33-0 . A0		
55	75	6SL3224-0BE33-7 . A0	FSE	6SL3202-0AE22-0SA0
75	100	6SL3224-0BE34-5 . A0		
90	125	6SL3224-0BE34-5 . A0		
110	150	6SL3224-0BE37-5 . A0		
132	200	6SL3224-0BE38-8UA0	FSF	6SL3202-0AE23-3SA0
160	250	6SL3224-0BE41-1UA0		
200	300	6SL3224-0BE41-1UA0		
250	400	6SL3224-0BE41-1UA0		
160	250	6SL3224-0BE31-1 . A0	FSGX	6SL3202-0AE23-3SA0
200	300	6SL3224-0BE31-5 . A0		
250	400	6SL3224-0BE31-8 . A0		
300	500	6SL3224-0BE32-2 . A0		
375	500	6SL3224-0BE32-2 . A0	FSGX	6SL3202-0AE26-2SA0
500	630	6SL3224-0BE33-0 . A0		
630	800	6SL3224-0BE33-7 . A0		
800	1000	6SL3224-0BE34-5 . A0		
1000	1250	6SL3224-0BE35-5 . A0	FSE	6SL3202-0AE28-8SA0
1250	1600	6SL3224-0BE37-5 . A0		
1600	2000	6SL3224-0BE38-8UA0		
2000	2500	6SL3224-0BE41-1UA0		
2500	3150	6SL3224-0BE41-1UA0	FSGX	6SL3202-0AE31-5SA0
3150	4000	6SL3224-0XE41-3UA0		
4000	5000	6SL3224-0XE41-6UA0		
5000	6300	6SL3224-0XE42-0UA0		
6300	8000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
8000	10000	6SL3224-0XE42-0UA0		
10000	12500	6SL3224-0XE42-0UA0		
12500	16000	6SL3224-0XE42-0UA0		
16000	20000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
20000	25000	6SL3224-0XE42-0UA0		
25000	31500	6SL3224-0XE42-0UA0		
31500	40000	6SL3224-0XE42-0UA0		
40000	50000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
50000	63000	6SL3224-0XE42-0UA0		
63000	80000	6SL3224-0XE42-0UA0		
80000	100000	6SL3224-0XE42-0UA0		
100000	125000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
125000	160000	6SL3224-0XE42-0UA0		
160000	200000	6SL3224-0XE42-0UA0		
200000	250000	6SL3224-0XE42-0UA0		
250000	315000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
315000	400000	6SL3224-0XE42-0UA0		
400000	500000	6SL3224-0XE42-0UA0		
500000	630000	6SL3224-0XE42-0UA0		
630000	800000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
800000	1000000	6SL3224-0XE42-0UA0		
1000000	1250000	6SL3224-0XE42-0UA0		
1250000	1600000	6SL3224-0XE42-0UA0		
1600000	2000000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
2000000	2500000	6SL3224-0XE42-0UA0		
2500000	3150000	6SL3224-0XE42-0UA0		
3150000	4000000	6SL3224-0XE42-0UA0		
4000000	5000000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
5000000	6300000	6SL3224-0XE42-0UA0		
6300000	8000000	6SL3224-0XE42-0UA0		
8000000	10000000	6SL3224-0XE42-0UA0		
10000000	12500000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
12500000	16000000	6SL3224-0XE42-0UA0		
16000000	20000000	6SL3224-0XE42-0UA0		
20000000	25000000	6SL3224-0XE42-0UA0		
25000000	31500000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
31500000	40000000	6SL3224-0XE42-0UA0		
40000000	50000000	6SL3224-0XE42-0UA0		
50000000	63000000	6SL3224-0XE42-0UA0		
63000000	80000000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
80000000	100000000	6SL3224-0XE42-0UA0		
100000000	125000000	6SL3224-0XE42-0UA0		
125000000	160000000	6SL3224-0XE42-0UA0		
160000000	200000000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
200000000	250000000	6SL3224-0XE42-0UA0		
250000000	315000000	6SL3224-0XE42-0UA0		
315000000	400000000	6SL3224-0XE42-0UA0		
400000000	500000000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
500000000	630000000	6SL3224-0XE42-0UA0		
630000000	800000000	6SL3224-0XE42-0UA0		
800000000	1000000000	6SL3224-0XE42-0UA0		
1000000000	1250000000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
1250000000	1600000000	6SL3224-0XE42-0UA0		
1600000000	2000000000	6SL3224-0XE42-0UA0		
2000000000	2500000000	6SL3224-0XE42-0UA0		
2500000000	3150000000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
3150000000	4000000000	6SL3224-0XE42-0UA0		
4000000000	5000000000	6SL3224-0XE42-0UA0		
5000000000	6300000000	6SL3224-0XE42-0UA0		
6300000000	8000000000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
8000000000	10000000000	6SL3224-0XE42-0UA0		
10000000000	12500000000	6SL3224-0XE42-0UA0		
12500000000	16000000000	6SL3224-0XE42-0UA0		
16000000000	20000000000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
20000000000	25000000000	6SL3224-0XE42-0UA0		
25000000000	31500000000	6SL3224-0XE42-0UA0		
31500000000	40000000000	6SL3224-0XE42-0UA0		
40000000000	50000000000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
50000000000	63000000000	6SL3224-0XE42-0UA0		
63000000000	80000000000	6SL3224-0XE42-0UA0		
80000000000	100000000000	6SL3224-0XE42-0UA0		
100000000000	125000000000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
125000000000	160000000000	6SL3224-0XE42-0UA0		
160000000000	200000000000	6SL3224-0XE42-0UA0		
200000000000	250000000000	6SL3224-0XE42-0UA0		
250000000000	315000000000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
315000000000	400000000000	6SL3224-0XE42-0UA0		
400000000000	500000000000	6SL3224-0XE42-0UA0		
500000000000	630000000000	6SL3224-0XE42-0UA0		
630000000000	800000000000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
800000000000	1000000000000	6SL3224-0XE42-0UA0		
1000000000000	1250000000000	6SL3224-0XE42-0UA0		
1250000000000	1600000000000	6SL3224-0XE42-0UA0		
1600000000000	2000000000000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
2000000000000	2500000000000	6SL3224-0XE42-0UA0		
2500000000000	3150000000000	6SL3224-0XE42-0UA0		
3150000000000	4000000000000	6SL3224-0XE42-0UA0		
4000000000000	5000000000000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
5000000000000	6300000000000	6SL3224-0XE42-0UA0		
6300000000000	8000000000000	6SL3224-0XE42-0UA0		
8000000000000	10000000000000	6SL3224-0XE42-0UA0		
10000000000000	12500000000000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
12500000000000	16000000000000	6SL3224-0XE42-0UA0		
16000000000000	20000000000000	6SL3224-0XE42-0UA0		
20000000000000	25000000000000	6SL3224-0XE42-0UA0		
25000000000000	31500000000000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
31500000000000	40000000000000	6SL3224-0XE42-0UA0		
40000000000000	50000000000000	6SL3224-0XE42-0UA0		
50000000000000	63000000000000	6SL3224-0XE42-0UA0		
63000000000000	80000000000000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
80000000000000	100000000000000	6SL3224-0XE42-0UA0		
100000000000000	125000000000000	6SL3224-0XE42-0UA0		
125000000000000	160000000000000	6SL3224-0XE42-0UA0		
160000000000000	200000000000000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
200000000000000	250000000000000	6SL3224-0XE42-0UA0		
250000000000000	315000000000000	6SL3224-0XE42-0UA0		
315000000000000	400000000000000	6SL3224-0XE42-0UA0		
400000000000000	500000000000000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
500000000000000	630000000000000	6SL3224-0XE42-0UA0		
630000000000000	800000000000000	6SL3224-0XE42-0UA0		
800000000000000	1000000000000000	6SL3224-0XE42-0UA0		
1000000000000000	1250000000000000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
1250000000000000	1600000000000000	6SL3224-0XE42-0UA0		
1600000000000000	2000000000000000	6SL3224-0XE42-0UA0		
2000000000000000	2500000000000000	6SL3224-0XE42-0UA0		
2500000000000000	3150000000000000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
3150000000000000	4000000000000000	6SL3224-0XE42-0UA0		
4000000000000000	5000000000000000	6SL3224-0XE42-0UA0		
5000000000000000	6300000000000000	6SL3224-0XE42-0UA0		
6300000000000000	8000000000000000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
8000000000000000	10000000000000000	6SL3224-0XE42-0UA0		
10000000000000000	12500000000000000	6SL3224-0XE42-0UA0		
12500000000000000	16000000000000000	6SL3224-0XE42-0UA0		
16000000000000000	20000000000000000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
20000000000000000	25000000000000000	6SL3224-0XE42-0UA0		
25000000000000000	31500000000000000	6SL3224-0XE42-0UA0		
31500000000000000	40000000000000000	6SL3224-0XE42-0UA0		
40000000000000000	50000000000000000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
50000000000000000	63000000000000000	6SL3224-0XE42-0UA0		
63000000000000000	80000000000000000	6SL3224-0XE42-0UA0		
80000000000000000	100000000000000000	6SL3224-0XE42-0UA0		
100000000000000000	125000000000000000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
125000000000000000	160000000000000000	6SL3224-0XE42-0UA0		
160000000000000000	200000000000000000	6SL3224-0XE42-0UA0		
200000000000000000	250000000000000000	6SL3224-0XE42-0UA0		
250000000000000000	315000000000000000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
315000000000000000	400000000000000000	6SL3224-0XE42-0UA0		
400000000000000000	500000000000000000	6SL3224-0XE42-0UA0		
500000000000000000	630000000000000000	6SL3224-0XE42-0UA0		
630000000000000000	800000000000000000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
800000000000000000	1000000000000000000	6SL3224-0XE42-0UA0		
1000000000000000000	1250000000000000000	6SL3224-0XE42-0UA0		
1250000000000000000	1600000000000000000	6SL3224-0XE42-0UA0		
1600000000000000000	2000000000000000000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
2000000000000000000	2500000000000000000	6SL3224-0XE42-0UA0		
2500000000000000000	3150000000000000000	6SL3224-0XE42-0UA0		
3150000000000000000	4000000000000000000	6SL3224-0XE42-0UA0		
4000000000000000000	5000000000000000000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
5000000000000000000	6300000000000000000	6SL3224-0XE42-0UA0		
6300000000000000000	8000000000000000000	6SL3224-0XE42-0UA0		
8000000000000000000	10000000000000000000	6SL3224-0XE42-0UA0		
10000000000000000000	12500000000000000000	6SL3224-0XE42-0UA0	FSGX	6SL3202-0AE31-8SA0
12500000000000000000	16000000000000000000	6SL3224-0XE42-0UA0		
16000000000000000000	20000000000			

Rated power		SINAMICS G120 <u>PM250</u> Power Module		Sine-wave filter
kW	hp	Type	Frame size	Article No.
380 ... 480 V 3 AC				
7.5	10	6SL3225-0BE25-5AA1	FSC	6SL3202-0AE22-0SA0
11.0	15	6SL3225-0BE27-5AA1		6SL3202-0AE23-3SA0
15.0	20	6SL3225-0BE31-1AA1		
18.5	25	6SL3225-0BE31-5 . A0	FSD	6SL3202-0AE24-6SA0
22	30	6SL3225-0BE31-8 . A0		
30	40	6SL3225-0BE32-2 . A0		6SL3202-0AE26-2SA0
37	50	6SL3225-0BE33-0 . A0	FSE	6SL3202-0AE28-8SA0
45	60	6SL3225-0BE33-7 . A0		
55	75	6SL3225-0BE34-5 . A0	FSF	6SL3202-0AE31-5SA0
75	100	6SL3225-0BE35-5 . A0		
90	125	6SL3225-0BE37-5 . A0		6SL3202-0AE31-8SA0

SINAMICS

SINAMICS G120 standard inverters

Supplementary system components

Selection and ordering data

Supplementary system components

The following supplementary system components are available for the G120 standard inverters:

Description	Article No.
Intelligent Operator Panel IOP	6SL3255-0AA00-4JA1
IOP Handheld For use with SINAMICS G120, SINAMICS G110D or SINAMICS G120D Included in the scope of delivery: IOP, handheld housing, rechargeable batteries (4 × AA), charging unit (international), RS232 connecting cable (3 m/9.84 ft long), for use with SINAMICS G120 only), USB cable (1 m/3.28 ft long)	6SL3255-0AA00-4HA0
Basic Operator Panel BOP-2	6SL3255-0AA00-4CA1
Accessories	
Door mounting kit (for IOP and BOP-2) For mounting an operator panel in control cabinet doors with sheet steel thicknesses of 1 ... 3 mm (0.04 ... 0.12 in) IP54 degree of protection for IOP IP55 degree of protection for BOP-2 Included in the scope of delivery: seal, mounting material, connecting cable (5 m/16.41 ft long, also supplies voltage to the IOP or BOP-2 directly via the Control Unit)	6SL3256-0AP00-0JA0
Push-through mounting frame For PM240-2 Power Modules, degree of protection IP20, push-through variants • Frame size FSA	6SL3260-6AA00-0DA0
SINAMICS micro memory card (MMC) 64 Mbyte	6SL3254-0AM00-0AA0
SINAMICS memory card (SD card) 512 Mbyte	6SL3054-4AG00-2AA0
Brake Relay Including cable harness for connection with the Power Module	6SL3252-0BB00-0AA0
Safe Brake Relay Including cable harness for connection with the Power Module	6SL3252-0BB01-0AA0
Adapter for mounting on DIN rails • For Power Module frame size FSA • For Power Module frame size FSB	6SL3262-1BA00-0BA0 6SL3262-1BB00-0BA0
PC inverter connection kit 2 For CU240E-2 and CU250S-2 Control Units including USB cable (3 m/9.84 ft) and STARTER commissioning tool ¹⁾ on DVD-ROM.	6SL3255-0AA00-2CA0
Shield connection kit 2 For CU240E-2 Control Units	6SL3264-1EA00-0HA0
Shield connection kit 3 For CU240E-2 PN and CU240E-2 PN-F Control Units	6SL3264-1EA00-0HB0
Shield connection kit 4 For CU250S-2 Control Units	6SL3264-1EA00-0LA0

¹⁾ STARTER commissioning tool is also available on the Internet at <http://support.automation.siemens.com/WW/view/en/10804985/133100>

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SINAMICS G120 standard inverters

Supplementary system components Spare parts

Selection and ordering data

Supplementary system components (continued)

Description	Article No.
Shield connection kit for PM240 and PM250 Power Modules	
• Frame size FSA	6SL3262-1AA00-0BA0
• Frame size FSB	6SL3262-1AB00-0DA0
• Frame size FSC	6SL3262-1AC00-0DA0
• Frame sizes FSD and FSE	6SL3262-1AD00-0DA0
• Frame size FSF	6SL3262-1AF00-0DA0
Shield connection kit for PM260 Power Modules	
• Frame size FSD	6SL3262-1FD00-0CA0
• Frame size FSF	6SL3262-1FF00-0CA0

Spare parts

The following spare parts are available for the G120 standard inverters:

Description	Article No.
Spare part kit for Control Units CU240E-2 and CU240E-2 F	6SL3200-0SK01-0AA0
Replacement door For PM240 Power Modules, frame size FSGX	6SL3200-0SM10-0AA0
Terminal Cover Kit For frame sizes FSD and FSE	6SL3200-0SM11-0AA0
Terminal Cover Kit For frame sizes FSF	6SL3200-0SM12-0AA0
Replacement connector	
• For SINAMICS G120 PM240-2 and SINAMICS G120C frame size FSA	6SL3200-0ST05-0AA0
• For PM260 Power Module, frame size FSD	6SL3200-0ST04-0AA1

Fan units

Description	Article No.
Fan unit For SINAMICS G120 <u>PM240-2</u> Power Module (and SINAMICS G120C)	
• Frame size FSA	6SL3200-0SF12-0AA0

SINAMICS G120 standard inverters

Supplementary system components
Spare parts

Selection and ordering data

Spare parts (continued)

Replacement fan

Rated power		SINAMICS G120 <u>PM240</u> Power Module		Replacement fan
kW	hp	Type	Frame size and number of fans	Article No.
380 ... 480 V 3 AC				
0.37	0.50	6SL3224-0BE13-7UA0	FSA, 1 fan	6SL3200-0SF01-0AA0 (includes 1 replacement fan)
0.55	0.75	6SL3224-0BE15-5UA0		
0.75	1.0	6SL3224-0BE17-5UA0		
1.1	1.5	6SL3224-0BE21-1UA0		
1.5	2	6SL3224-0BE21-5UA0		
2.2	3	6SL3224-0BE22-2 . A0	FSB, 2 fans ¹⁾	
3.0	4	6SL3224-0BE23-0 . A0		
4.0	5	6SL3224-0BE24-0 . A0		6SL3200-0SF03-0AA0 (includes 1 replacement fan)
7.5	10	6SL3224-0BE25-5 . A0	FSC, 2 fans ¹⁾	
11.0	15	6SL3224-0BE27-5 . A0		
15.0	20	6SL3224-0BE31-1 . A0		
18.5	25	6SL3224-0BE31-5 . A0	FSD, 2 fans	6SL3200-0SF04-0AA0 (includes 2 replacement fans)
22	30	6SL3224-0BE31-8 . A0		6SL3200-0SF05-0AA0 (includes 2 replacement fans)
30	40	6SL3224-0BE32-2 . A0		
37	50	6SL3224-0BE33-0 . A0	FSE, 2 fans	6SL3200-0SF04-0AA0 (includes 2 replacement fans)
45	60	6SL3224-0BE33-7 . A0		6SL3200-0SF05-0AA0 (includes 2 replacement fans)
55	75	6SL3224-0BE34-5 . A0	FSF, 2 fans	6SL3200-0SF06-0AA0 (includes 2 replacement fans)
75	100	6SL3224-0BE35-5 . A0		
90	125	6SL3224-0BE37-5 . A0		6SL3200-0SF07-0AA0 (includes 2 replacement fans)
110	150	6SL3224-0BE38-8UA0		6SL3200-0SF08-0AA0 (includes 2 replacement fans)
132	200	6SL3224-0BE41-1UA0		
160	250	6SL3224-0XE41-3UA0	FSGX, 2 fans	6SL3362-0AG00-0AA1 (includes 2 replacement fans)
200	300	6SL3224-0XE41-6UA0		
250	400	6SL3224-0XE42-0UA0		

¹⁾ Recommendation: Even if only one fan on the Power Module is defective, it is advisable to replace both.
In this case, the order quantity must be doubled.

SINAMICS

SINAMICS G120 standard inverters

Supplementary system components Spare parts

Selection and ordering data

Spare parts (continued)

Replacement fans (continued)

Rated power		SINAMICS G120 <u>PM250</u> Power Module		Replacement fan
kW	hp	Type	Frame size and number of fans	Article No.
380 ... 480 V 3 AC				
7.5	10	6SL3225-0BE25-5AA1	FSC, 2 fans ¹⁾	6SL3200-0SF03-0AA0 (includes 1 replacement fan)
11.0	15	6SL3225-0BE27-5AA1		
15.0	20	6SL3225-0BE31-1AA1		
18.5	25	6SL3225-0BE31-5 . A0	FSD, 2 fans	6SL3200-0SF04-0AA0 (includes 2 replacement fans)
22	30	6SL3225-0BE31-8 . A0		
30	40	6SL3225-0BE32-2 . A0		6SL3200-0SF05-0AA0 (includes 2 replacement fans)
37	50	6SL3225-0BE33-0 . A0	FSE, 2 fans	6SL3200-0SF04-0AA0 (includes 2 replacement fans)
45	60	6SL3225-0BE33-7 . A0		6SL3200-0SF05-0AA0 (includes 2 replacement fans)
55	75	6SL3225-0BE34-5 . A0	FSF, 2 fans	6SL3200-0SF06-0AA0 (includes 2 replacement fans)
75	100	6SL3225-0BE35-5 . A0		
90	125	6SL3225-0BE37-5 . A0		6SL3200-0SF08-0AA0 (includes 2 replacement fans)

Rated power		SINAMICS G120 <u>PM260</u> Power Module		Replacement fan
kW	hp	Type	Frame size and number of fans	Article No.
660 ... 690 V 3 AC				
11.0	15	6SL3225-0BH27-5 . A1	FSD, 2 fans	6SL3200-0SF11-0AA0 (includes 2 replacement fans)
15.0	20	6SL3225-0BH31-1 . A1		
18.5	25	6SL3225-0BH31-5 . A1		
30	40	6SL3225-0BH32-2 . A1	FSF, 2 fans	6SL3200-0SF07-0AA0 (includes 2 replacement fans)
37	50	6SL3225-0BH33-0 . A1		
55	75	6SL3225-0BH33-7 . A1		

¹⁾ Recommendation: Even if only one fan on the Power Module is defective, it is advisable to replace both.
In this case, the order quantity must be doubled.

SINAMICS

SINAMICS G110D distributed inverters

Safety Integrated with SINAMICS G110D

Function



The SINAMICS G110D distributed frequency inverter series is the solution for basic drive tasks, especially in the field of conveyor systems. The inverter allows the speed of three-phase asynchronous (induction) motors to be continually controlled and fulfills the requirements of conveyor-related applications with open-loop frequency control. It can be optimally integrated into the system thanks to its compact and low-profile design in an IP65 degree of protection. It can be optimally integrated into the Siemens TIA world of automation via AS-Interface.

SINAMICS G110D is a compact inverter in IP65 degree of protection where the Control Unit (CU) and Power Module (PM) function units are combined in one device.

With its wide power range from 0.75 kW to 7.5 kW, it is suitable for a wide range of distributed drive solutions.

SINAMICS G110D is ideally suited for basic conveyor system applications in the industrial environment for which a distributed drive with communications capability is required. This is especially true for distribution logistics and for airports.

Further, SINAMICS G110D is suitable for many additional low-performance applications in various industries, e.g. in the automotive industry, in the food and beverage industry (without surfactants) and in the packaging industry.

Supplementary system components

Comprehensive system components are offered for the SINAMICS G110D

Intelligent Operator Panel IOP Handheld

A handheld version of the IOP can be ordered for mobile use. In addition to the IOP, this includes a housing with rechargeable batteries, charging unit and RS232 connecting cable.

Manual-local control with keyswitch

Master control can be toggled between the automatic mode (PLC) and manual-local mode using the manual-local control.

This can also be used to switch off the inverter. Additional functions include switching over between the continuous and jog mode, starting the motor including direction of rotation and deactivating the quick stop in the manual mode.

Memory cards

The parameter settings for an inverter can be stored on the SINAMICS micro memory card (MMC). When service is required, e.g. after the converter has been replaced and the data has been downloaded from the memory card, the drive system is immediately ready for use again. The associated memory card holder is not included in the scope of supply of the inverter and must be ordered separately.

Card holder for memory cards

To use the SINAMICS micro memory card (MMC), a card holder is required that is inserted under the blanking cover or under the manual-automatic operator panel on the inverter.

RS232 interface cable for communication with a PC

For controlling and commissioning an inverter directly from a PC if the STARTER commissioning tool has been installed on the PC.

USB interface cable for communication with a PC

For controlling and commissioning an inverter directly from a PC if the STARTER commissioning tool has been installed on the PC.

Adapter for mounting the SINAMICS G110D instead of a SIRIUS M200D motor starter

Connection Board Kit to mount a SINAMICS G110D inverter on the connection holes of the SIRIUS M200D motor starter (assuming that there is enough space).

Connector kit for braking resistor

Connector kit for using or connecting different braking resistors.

UL connector kit

Special UL connector kit for UL-compatible applications.

Protection bar

Protection bar for protecting the connector against shearing due to mechanical stress

Connecting cable

Connector sets to connect to the line supply and the outgoing motor feeder are available as accessories as well as pre-fabricated motor cables for connection to the motor.

Flexible plug-in cables to transfer data between AS-Interface participants as well as to supply the Control Unit and the Power Module with power.

Spare Parts Kit

A Spare Parts Kit is available which comprises small parts such as seals, caps and screws.

Replacement fan

A replacement fan is available, which comprises a pre-mounted unit with cover, fan and screws.

[For detailed information, see catalog D 31.](#)

Safety Integrated

The SINAMICS G110D frequency inverter offers the safety function "Safe Torque Off" (STO) as protection against unintentional start-up of the motor.

Overview of SINAMICS G110D Safety Integrated functions and associated boundary conditions

Function	Activation	External setpoint input effective	Encoder required	License required
STO	<ul style="list-style-type: none"> Through safety-related deactivation of the AS-Interface 	No	No	No

SINAMICS G110D distributed inverters

SINAMICS G110D distributed inverters
Recommended line-side components

Selection and ordering data

SINAMICS G110D distributed inverters

Rated power ¹⁾		Rated output current ²⁾	Input current	Frame size	SINAMICS G110D with integrated line filter class A	SINAMICS G110D with integrated line filter class A and integrated maintenance switch
kW	hp	A	A		Article No.	Article No.
380 ... 500 V 3 AC ³⁾						
0.75	1.0	2.3	2.0	FSA	6SL3511-0PE17-5AM0	6SL3511-1PE17-5AM0
1.5	1.5 ⁴⁾	4.3	3.8		6SL3511-0PE21-5AM0	6SL3511-1PE21-5AM0
3.0	4.0	7.7	7.0		6SL3511-0PE23-0AM0	6SL3511-1PE23-0AM0
4.0	5.0	10.2	9.1	FSB	6SL3511-0PE24-0AM0	6SL3511-1PE24-0AM0
5.5	7.5	13.2	12.2	FSC	6SL3511-0PE25-5AM0	6SL3511-1PE25-5AM0
7.5	10	19.0	17.9		6SL3511-0PE27-5AM0	6SL3511-1PE27-5AM0

Recommended line-side power components

The following table lists recommendations for additional line-side components, such as fuses and circuit breakers (line-side components dimensioned in accordance with IEC standards). The specified circuit breakers are UL-certified.

3NA3 fuses are recommended for European countries. The values in the table take into account the overload capability of the inverter.

Fuses for use in North America must be UL-certified (e.g. the Class NON fuse series from Bussmann) or approved SIR-IUS 3RV circuit breakers and 3VL molded case circuit breakers according to UL 489 (category control number CCN: DiV Q).

[Additional information about the listed fuses and circuit breakers can be found in catalogs LV 10, IC 10 and IC 10 AO.](#)

Individual protection

Rated power		SINAMICS G110D	Protection		Fuse	Circuit breaker
kW	hp	Type 6SL3511-...	Frame size		Article No.	Article No.
380 ... 500 V 3 AC						
0.75	1.0	. PE17-5AM0	FSA	10	3NA3803	3RV1021-1FA10
1.5	1.5 ⁴⁾	. PE21-5AM0	FSA	10		3RV1021-1JA10
3.0	4.0	. PE23-0AM0	FSA	16	3NA3805	3RV1021-4AA10
4.0	5.0	. PE24-0AM0	FSB	20	3NA3807	3RV1021-4BA10
5.5	7.5	. PE25-5AM0	FSC	20		3RV1031-4EA10
7.5	10	. PE27-5AM0	FSC	32	3NA3812	3RV1031-4FA10

¹⁾ Rated power based on the rated output current I_{rated} . The rated output current I_{rated} is based on the duty cycle for high overload (HO).

²⁾ The rated output current I_{rated} is based on the duty cycle for high overload (HO). These current values apply at 400 V and are specified on the rating plate.

³⁾ With the exception of UL operation, 500 V + 10 % is possible.

⁴⁾ It is not possible to make any assignment to a particular standard.

SINAMICS G110D distributed inverters

DC link components

Supplementary system components

Selection and ordering data

DC link components

Excess energy in the DC link is dissipated in the braking resistors. The braking resistors are intended for use with the SINAMICS G110D distributed inverters, which have an integrated

braking chopper, but cannot regenerate energy to the line supply.

Rated power		SINAMICS G110D		Braking resistor
kW	hp	Type	Frame size	Article No.
380 ... 500 V 3 AC				
0.75	1.0	6SL3511- . PE17-5AM0	FSA	6SL3501-0BE08-6AA0
1.5	1.5 ¹⁾	6SL3511- . PE21-5AM0	FSA	
3.0	10	6SL3511- . PE23-0AM0	FSA	6SL3501-0BE12-1AA0
4.0	4.0	6SL3511- . PE24-0AM0	FSB	
5.5	10	6SL3511- . PE25-5AM0	FSC	6SL3501-0BE14-1AA0
7.5	15	6SL3511- . PE27-5AM0	FSC	

Supplementary system components

The following supplementary system components are available for SINAMICS G110D distributed inverters:

Description	Article No.
Intelligent Operator Panel IOP Handheld For use with SINAMICS G120, SINAMICS G120C, SINAMICS G110D or SINAMICS G120D Included in the scope of delivery: Intelligent Operator Panel IOP, handheld housing, rechargeable batteries (4 × AA), charging unit (international), RS232 connecting cable (3 m/9.84 ft long), for SINAMICS G120 only), USB cable (1 m/3.28 ft long)	6SL3255-0AA00-4HA0
RS232 connecting cable with optical interface to connect the SINAMICS G110D or SINAMICS G120D inverters to the IOP Handheld (2.5 m/8.2 ft long).	3RK1922-2BP00
Manual-local control with keyswitch	6SL3555-0PL00-2AA0
SINAMICS micro memory card (MMC) 64 Mbyte	6SL3254-0AM00-0AA0
Card holder for memory card	6SL3555-0PM00-0AA0
RS232 interface cable for communication with a PC	3RK1922-2BP00
USB interface cable for communication with a PC (2.5 m/8.2 ft long)	6SL3555-0PA00-2AA0
Adapter for mounting SINAMICS G110D instead of SIRIUS M200D motor starter	6SL3263-1GA20-0GA0
STARTER commissioning tool ²⁾ on DVD-ROM	6SL3072-0AA00-0AG0
Connector kit for braking resistor	6SL3563-4RA00-0GA0
UL connector kit for power and motor	6SL3563-4UA00-0GA0
Protection bar • For frame sizes FSA and FSB • For frame size FSC	6SL3263-1HA20-0GA0 6SL3263-1HC20-0GA0

Connecting cable and socket for AS-Interface

AS-Interface M12 branch to connect the AS-Interface and the U_{Aux} cable to an M12 socket, UL • Length: 1.0 m • Length: 2.0 m	3RK1901-1NR21 3RK1901-1NR22
M12 socket for screw mounting, 4-pole screw-type connection max. 0.75 mm ² , A-coded, max. 4 A, UL • Angled	3RK1902-4CA00-4AA0

¹⁾ It is not possible to make any assignment to a particular standard.

²⁾ STARTER commissioning tool is also available on the Internet at <http://support.automation.siemens.com/WW/view/en/10804985/133100>

Selection and ordering data

Supplementary system components (continued)

Description		Article No.	
Connecting cables and connectors for digital inputs			
M12 plug-in cable with PUR sheath, to connect digital sensors and actuators, pre-assembled at one end, angled, plug connector, 5-pole, 5 x 0.34 mm ² , UL <ul style="list-style-type: none">Length: 1.5 mLength: 5 mLength: 10 m		3RK1902-4HB15-5AA0	
		3RK1902-4HB50-5AA0	
		3RK1902-4HC01-5AA0	
M12 connector for screw mounting, 5-pole, screw-type connection max. 0.75 mm ² , A-coded, max. 4 A, UL, plug connector <ul style="list-style-type: none">StraightAngled			
		3RK1902-4BA00-5AA0	
		3RK1902-4DA00-5AA0	
Connecting cables pre-assembled at one end and connector sets to connect to the line supply			
Connecting cable pre-assembled at one end Power supply cable, open at one end, for HAN Q4/2, angled, 4 × 4 mm ² <ul style="list-style-type: none">Length: 1.5 mLength: 5 m		3RK1911-0DB13	
		3RK1911-0DB33	
Connector set for power supply, HAN Q4/2 <ul style="list-style-type: none">2.5 mm²4 mm²6 mm²			
		3RK1911-2BE50	
		3RK1911-2BE10	
		3RK1911-2BE30	
Motor cables pre-assembled at one end and connector sets to connect the inverter to the motor			
Motor cables pre-assembled at one end For motors with brake and temperature sensor with HAN Q8 connector, shielded	Article No. (HTG: supplied by Harting) (ZKT: supplied by KnorrTec)		
	Cross-section	4 × 1.5 mm ²	4 × 2.5 mm ²
• Length: 1.5 m	HTG: 61 88 201 0288	HTG: 61 88 201 0291	HTG: 61 88 201 0303
	ZKT: 70020501000150	ZKT: 70009601000150	ZKT: 70017001000150
• Length: 3 m	HTG: 61 88 201 0289	HTG: 61 88 201 0292	HTG: 61 88 201 0304
	ZKT: 70020501000300	ZKT: 70009601000300	ZKT: 70017001000300
• Length: 5 m	HTG: 61 88 201 0290	HTG: 61 88 201 0293	HTG: 61 88 201 0305
	ZKT: 70020501000500	ZKT: 70009601000500	ZKT: 70017001000500
• Length: 10 m	HTG: 61 88 201 0299	HTG: 61 88 201 0301	HTG: 61 88 201 0306
	ZKT: 70020501001000	ZKT: 70009601001000	ZKT: 70017001001000
Connector set for motor cable HAN Q8, shielded			
	HTG: 61 83 401 0131	HTG: 61 83 401 0132	HTG: 61 83 401 0133
	ZKT: 10032001	ZKT: 10032011	ZKT: 10032021

For further information about the connecting cables and plug-in connectors mentioned above, please refer to catalog IK PI.

Further selected accessories are available from Siemens Solution Partners. Please go to the "Solution Partner Finder" and select technology "Distributed Field Installation System".
www.siemens.com/automation/partnerfinder

SINAMICS

SINAMICS G110D distributed inverters

Spare parts

Selection and ordering data

Spare parts

The following spare parts are available for SINAMICS G110D distributed inverters:

Description					Spare Parts Kit for SINAMICS G110D
					Article No.
Spare Parts Kit for SINAMICS G110D comprising replacement seals, caps and screws					6SL3500-0TK01-0AA0
Replacement fan					
Rated power		SINAMICS G110D			Replacement fan (pre-mounted unit with cover, fan and screws)
kW	hp	Type	Frame size		Article No.
380 ... 500 V 3 AC					
4.0	5.0	6SL3511- . PE24-0AM0	FSB		6SL3500-0TF01-0AA0
5.5	7.5	6SL3511- . PE25-5AM0	FSC		
7.5	10	6SL3511- . PE27-5AM0			

Function



The SINAMICS G120D distributed frequency inverter series is the solution for demanding drive tasks especially in the field of conveyor systems. SINAMICS G120D inverters continuously control the speed of three-phase asynchronous (induction) motors and fulfill all the requirements of conveyor system applications from simple frequency control through to demanding vector control. With its intelligent modular design with IP65 degree of protection, it can be seamlessly integrated into the plant or system and supports a high plant availability and low stocks of spare parts. The innovative power unit concept capable of energy recovery helps to save energy. The patented implementation concept of integrated safety functions is unique worldwide, permitting improved plant and system designs with a higher productivity. This drive can be optimally integrated into the Siemens TIA world of automation via PROFIBUS or PROFINET.

With different device versions (frame sizes FSA to FSC) in a power range from 0.75 kW to 7.5 kW, it is suitable for a wide variety of drive solutions.

SINAMICS G120D is a modular inverter system with IP65 degree of protection comprising various function units. The main ones are:

- Control Unit (CU)
- Power Module (PM)

The Control Unit controls and monitors the Power Module and the connected motor in several different selectable modes. The digital inputs and digital outputs on the device support the simple wiring of sensors and actuators directly at the drive. The input signals can either be directly linked within the Control Unit and initiate local responses independently or they can be transferred to the central control via PROFIBUS or PROFINET for further processing within the context of the overall plant.

The Power Module supplies the motor in a power range from 0.75 kW to 7.5 kW.

In addition to scalable functions, it is also possible to select the Control Unit and Power Module to obtain the required safety functions.

The **CU240D-2** Control Units with V/f control and vector control (sensorless and with sensor evaluation), are suitable for a wide range of conveyor applications. The CU240D-2 is available as a standard variant with STO and as a fail-safe variant with comprehensive safety functions.

The **CU250D-2** Control Units offer additional positioning functions. The positioning functionality provides a simple way of solving positioning tasks. The CU250D-2 is available as a fail-safe variant with comprehensive safety functions.

PM250D Power Modules use an innovative circuit design which allows line-commutated energy recovery to the supply. This innovative circuit permits regenerative energy to be fed back into the supply system and therefore saves energy.

SINAMICS G120D is ideally suited to demanding conveyor system applications in the industrial environment for which a distributed drive with communications capability is required. This applies in particular to the automotive industry, e.g. for assembly lines.

SINAMICS G120D is also suitable for many additional high-performance applications, e.g. in the airport sector, the food and beverage industry (without surfactants) and in distribution logistics (e.g. electric monorail systems).

Supplementary system components

Comprehensive system components are offered for SINAMICS G120D.

Intelligent Operator Panel IOP Handheld

The IOP supports both entry-level personnel and drive experts. Thanks to the large plain text display, menu prompting and application wizard, it is easy to commission, diagnose and locally control standard drives.

Memory cards

The parameter settings for an inverter can be stored on the SINAMICS micro memory card (MMC) and SINAMICS SD card. When service is required, e.g. after the converter has been replaced and the data has been downloaded from the memory card, the drive system is immediately ready for use again. The associated slot is located on the rear of the Control Unit.

RS232 interface cable for communication with a PC

For controlling and commissioning an inverter directly from a PC if the STARTER commissioning tool has been installed on the PC.

USB interface cable for communication with a PC

For controlling and commissioning an inverter directly from a PC if the STARTER commissioning tool has been installed on the PC.

Connecting cable for the Control Units

Flexible plug-in cables to transfer data between the Industrial Ethernet participants or PROFIBUS participants, as well as to supply power to the Control Unit.

Connecting cable for the Power Modules

Connector sets to connect to the line supply and the outgoing motor feeder are available as accessories as well as pre-fabricated motor cables for connection to the motor.

Spare Parts Kit

A Spare Parts Kit is available which comprises small parts such as seals, caps, PROFIBUS address windows and screws.

Replacement fan

A replacement fan is available, which comprises a pre-mounted unit with cover, fan and screws

For detailed information, see catalog D 31.

SINAMICS G120D distributed inverters

Safety Integrated with SINAMICS G120D

Safety Integrated

The SINAMICS G120D distributed inverters include versions for safety-related applications. The PM250D Power Modules are already designed for Safety Integrated. In conjunction with a fail-safe Control Unit, the drive can be turned into a Safety Integrated Drive with comprehensive safety functions. In conjunction with a standard Control Unit, the drive provides the safety function STO.

The fail-safe frequency inverter SINAMICS G120 offers the following safety functions (terms as defined in IEC 61800-5-2):

- **Safe Torque Off (STO)**
This function ensures that no torque-generating energy can continue to affect a motor and prevents unintentional start-ups.
- **Safe Stop 1 (SS1)**
The SS1 function causes a motor to stop rapidly and safely and switches the motor to torque-free mode after the standstill by activating STO.
- **Safe Brake Control (SBC)**
The SBC function permits the safe control of a holding brake. SBC is always activated in parallel with STO.
- **Safely-Limited Speed (SLS)**
The SLS function ensures that the drive does not exceed a preset speed or velocity limit.
- **Safe Direction (SDI)**
This function ensures that the drive can only rotate in the selected direction.
- **Safe Speed Monitor (SSM)**
This function signals if a drive operates below a specific speed/feed velocity.

The Safety Integrated functions are completely integrated into the drive system. They can be activated via fail-safe digital inputs on the Control Unit or via PROFINET or PROFIBUS with PROFIsafe.

The Safety Integrated functions are implemented electronically and therefore offer short response times in comparison to solutions with externally implemented monitoring functions.

Safety Integrated encoderless

The safety functions do not require a motor encoder; the implementation effort is minimal. Existing plants in particular can be updated with safety technology without the need to change the motor or mechanical system.

The STO function can be used without restriction for all applications.

The SS1, SLS, SSM and SDI functions are permissible for applications in conjunction with asynchronous and SIEMOSYN motors where the load can never cause acceleration. An encoder that is used for the purposes of motor control has no significance for the safety functions here.

Control Units

The availability of Safety Integrated functions depends on the type of Control Unit, i.e. whether it is a standard Control Unit or a fail-safe Control Unit. All standard Control Units have STO.

The fail-safe Control Units offer Extended Functions (SLS, SDI, SSM) in addition to the Basic Functions (STO, SS1).

Safety Integrated overview

An overview of the Safety Integrated functions of SINAMICS G120D plus their boundary conditions is shown in the following table (see next page):

SINAMICS

SINAMICS G120D distributed inverters

Safety Integrated with SINAMICS G120D

Overview of SINAMICS G120D Safety Integrated functions and associated boundary conditions

Function	Activation	Underlying function	Reaction to limit overshoot	External setpoint input effective	Encoder required	License required	Available in
Basic Functions							
STO	<ul style="list-style-type: none"> • F-DI • PROFIsafe 		–	No	No	No	<ul style="list-style-type: none"> • CU240D-2 DP • CU240D-2 PN • CU240D-2 DP-F • CU240D-2 PN-F • CU250D-2 DP-F • CU250D-2 PN-F
SS1 with SBR	<ul style="list-style-type: none"> • F-DI • PROFIsafe 	Safe Brake Ramp (SBR) monitoring during braking. Following expiry of the parameterized delay time or if the speed falls below the minimum speed limit STO	STO	No	No	No	<ul style="list-style-type: none"> • CU240D-2 DP-F • CU240D-2 PN-F • CU250D-2 DP-F • CU250D-2 PN-F
Extended Functions							
SLS	<ul style="list-style-type: none"> • F-DI • PROFIsafe 	–	STO, SS1 (can be parameterized)	Yes	No	No	<ul style="list-style-type: none"> • CU240D-2 DP-F • CU240D-2 PN-F • CU250D-2 DP-F • CU250D-2 PN-F
SDI	<ul style="list-style-type: none"> • F-DI • PROFIsafe 	–	STO, SS1 (can be parameterized)	Yes	No	No	<ul style="list-style-type: none"> • CU240D-2 DP-F • CU240D-2 PN-F • CU250D-2 DP-F • CU250D-2 PN-F
SSM	<ul style="list-style-type: none"> • Always active 	–	Signals that the speed has fallen below a specified value	Yes	No	No	<ul style="list-style-type: none"> • CU240D-2 DP-F • CU240D-2 PN-F • CU250D-2 DP-F • CU250D-2 PN-F

SINAMICS G120D distributed inverters

CU240D-2 and CU250D-2 Control Units
PM250D Power Modules

Selection and ordering data

CU240D-2 and CU250D-2 Control Units

The Control Unit performs closed-loop control functions for the inverter. In addition to closed-loop control, the Control Unit has additional functions that can be adapted to the relevant application by parameterization. The CU240D-2 Control Units supersede the CU240D Control Units, whereby both versions can be operated with PM250D Power Modules.

CU250D-2 Control Units can be used to implement applications with positioning requirements in the drive. This expansion opens up their use in lifting, swiveling, traversing or rotating applications. The positioning functionality is comparable with SINAMICS S110 servo drives.

Two points must be noted here:

- Vector control (VC) and sensorless vector control (SLVC) are possible (but not servo control)
- Positioning using one encoder (HTL/SSI) or using two encoders simultaneously (HTL and SSI)

Control Units are available in different versions:

- CU240D-2 DP
- CU240D-2 DP-F
- CU240D-2 PN
- CU240D-2 PN-F
- CU240D-2 PN-F PP (Push Pull)
- CU250D-2 DP-F
- CU250D-2 PN-F
- CU250D-2 PN-F PP (Push Pull)

The Push Pull version comprises an alternative connection method for the 24 V supply voltage and the PN communication.

Communication	Digital inputs (number which can be parameterized as fail-safe given below)	Analog inputs	Digital outputs (number which can be parameterized as fail-safe given below)	Encoder interfaces HTL/SSI	Safety Integrated functions	Designation	Control Unit Article No.
CU240D-2 series – Standard							
PROFIBUS DP	6 (1)	2	2	1/-	STO	CU240D-2 DP	6SL3544-0FB20-1PA0
PROFINET	6 (1)	2	2	1/-	STO	CU240D-2 PN	6SL3544-0FB20-1FA0
CU240D-2 series – Fail-safe for Safety Integrated							
PROFIBUS DP	6 (3)	2	2 (1)	1/-	STO, SLS, SS1, SSM, SDI	CU240D-2 DP-F	6SL3544-0FB21-1PA0
PROFINET	6 (3)	2	2 (1)	1/-	STO, SLS, SS1, SSM, SDI	CU240D-2 PN-F	6SL3544-0FB21-1FA0
PROFINET	6 (3)	2	2 (1)	1/-	STO, SLS, SS1, SSM, SDI	CU240D-2 PN-F PP	6SL3544-0FB21-1FB0
CU250D-2 series – Basic positioner (EPos) and fail-safe for Safety Integrated							
PROFIBUS DP	6 (3)	-	2 (1)	1/1	STO, SLS, SS1, SSM, SDI	CU250D-2 DP-F	6SL3546-0FB21-1PA0
PROFINET	6 (3)	-	2 (1)	1/1	STO, SLS, SS1, SSM, SDI	CU250D-2 PN-F	6SL3546-0FB21-1FA0
PROFINET	6 (3)	-	2 (1)	1/1	STO, SLS, SS1, SSM, SDI	CU250D-2 PN-F PP	6SL3546-0FB21-1FB0

PM250D Power Modules

The regenerative feedback capability of the PM250D Power Module in generating mode (electronic braking) means that energy is returned to the supply system and not wasted in a braking resistor.

This saves space, time-consuming dimensioning of the braking resistor as well as its wiring. Generated heat is also reduced.

Rated power ¹⁾		Rated output current ²⁾	Input current	Frame size	PM250D Power Module with integrated line filter class A Article No.
kW	hp	A	A		
380 ... 500 V 3 AC					
0.75	1	2.2	2.1	FSA	6SL3525-0PE17-5AA1
1.5	1.5 ³⁾	4.1	3.8	FSA	6SL3525-0PE21-5AA1
3	4	7.7	7.2	FSB	6SL3525-0PE23-0AA1
4	5	10.2	9.5	FSC	6SL3525-0PE24-0AA1
5.5	7.5	13.2	12.2	FSC	6SL3525-0PE25-5AA1
7.5	10	19.0	17.7	FSC	6SL3525-0PE27-5AA1

¹⁾ Rated power based on the rated output current I_{rated} . The rated output current I_{rated} is based on the duty cycle for high overload (HO).

²⁾ The rated output current I_{rated} is based on the duty cycle for high overload (HO). These current values are valid for 400 V and are stamped on the rating plate of the Power Module.

³⁾ It is not possible to make any assignment to a particular standard.

SINAMICS G120D distributed inverters

Recommended line-side power components
Supplementary system components

Selection and ordering data

Recommended line-side power components

The following table lists recommendations for additional line-side components, such as fuses and circuit breakers (line-side components dimensioned in accordance with IEC standards). The specified circuit breakers are UL-certified. 3NA3 fuses are recommended for European countries.

Furthermore, only contactors complying with the utilization category AC-3 (according to IEC 60947-4-1) may be used. The val-

ues in the table take into account the overload capability of the inverter.

Fuses for use in North America must be UL-certified (e.g. the Class NON fuse series from Bussmann) or approved SIR-IUS 3RV circuit breakers and 3VL molded-case circuit breakers according to UL 489 (category control number CCN: DiV Q).

Additional information about the listed fuses and circuit breakers can be found in catalogs LV 10, IC 10 and IC 10 AO.

Individual protection

Rated power		SINAMICS G120D PM250D Power Module		Protection	Fuse	Circuit breaker
kW	hp	Type 6SL3525-...	Frame size	A	Article No.	Article No.
380 ... 500 V 3 AC						
0.75	1	OPE17-5AA1	FSA	10	3NA3803	3RV2011-1JA10
1.5	1.5 ¹⁾	OPE21-5AA1	FSA	10		3RV2011-1JA10
3	4	OPE23-0AA1	FSB	16	3NA3805	3RV2011-4AA10
4	5	OPE24-0AA1	FSC	20	3NA3807	3RV2021-4BA10
5.5	7.5	OPE25-5AA1	FSC	20		3RV2021-4BA10
7.5	10	OPE27-5AA1	FSC	32	3NA3812	3RV2021-4PA10

Group fusing (installation on power bus)

For installations with several inverters, the inverters are normally supplied from a 400 V power bus.

Further information can be found in the operating instructions at:
www.siemens.com/sinamics-g120d/documentation

Supplementary system components

The following supplementary system components are available for SINAMICS G120D distributed inverters:

Description	Article No.
IOP Handheld For use with SINAMICS G120D, SINAMICS G120C, SINAMICS G110D or SINAMICS G120. Included in the scope of delivery: IOP, handheld housing, rechargeable batteries (4 × AA), charging unit (international), RS232 connecting cable (3 m/9.84 ft long), for use with SINAMICS G120 only), USB cable (1 m/3.28 ft long).	6SL3255-0AA00-4HA0
RS232 connecting cable with optical interface to connect the SINAMICS G110D or SINAMICS G120D inverters to the IOP Handheld (2.5 m/8.2 ft long).	3RK1922-2BP00
SINAMICS micro memory card (MMC) 64 Mbyte	6SL3254-0AM00-0AA0
SINAMICS memory card (SD card) 512 Mbyte	6SL3054-4AG00-2AA0
STARTER commissioning tool ²⁾ on DVD-ROM	6SL3072-0AA00-0AG0

¹⁾ It is not possible to make any assignment to a particular standard.

²⁾ STARTER commissioning tool is also available on the Internet at <http://support.automation.siemens.com/WW/view/en/10804985/133100>

SINAMICS

SINAMICS G120D distributed inverters

Supplementary system components

Selection and ordering data

Supplementary system components (continued)

The following supplementary system components are available for SINAMICS G120D distributed inverters:

Description	Article No.
Connecting cables for the Control Unit	
PROFINET connecting cables	
IE connecting cable M12-180/M12 180 Pre-assembled IE FC TP trailing cable GP 2 × 2 PROFINET type C with two 4-pole M12 plugs (4-pole, D-coded), IP65/IP67 degree of protection, UL, plug connector/plug connector (IN/OUT) Length: <ul style="list-style-type: none"> • 0.3 m • 0.5 m • 1.0 m • 1.5 m • 2.0 m • 3.0 m • 5.0 m • 10 m • 15 m 	6XV1870-8AE30 6XV1870-8AE50 6XV1870-8AH10 6XV1870-8AH15 6XV1870-8AH20 6XV1870-8AH30 6XV1870-8AH50 6XV1870-8AN10 6XV1870-8AN15
IE M12 Plug PRO For assembly in the field, M12 plug-in connector (D-coded), metal enclosure, UL, fast connection method, plug connector <ul style="list-style-type: none"> • 1 unit • 8 units • 1 unit (angled) 	6GK1901-0DB20-6AA0 6GK1901-0DB20-6AA8 3RK1902-2DA00
RJ45 PLUG PRO connector for on-site assembly for CU240D-2 PN-F PP or CU250D-2 PN-F PP Control Unit, UL, 1 package = 1 unit <ul style="list-style-type: none"> • 1 unit 	6GK1901-1BB10-6AA0
PROFIBUS connecting cables	
PROFIBUS M12 plug-in cable Pre-assembled with two 5-pole M12 plug/socket connectors, UL Length: <ul style="list-style-type: none"> • 0.3 m • 0.5 m • 1.0 m • 1.5 m • 2.0 m • 3.0 m • 5.0 m • 10 m • 15 m 	6XV1830-3DE30 6XV1830-3DE50 6XV1830-3DH10 6XV1830-3DH15 6XV1830-3DH20 6XV1830-3DH30 6XV1830-3DH50 6XV1830-3DN10 6XV1830-3DN15
PROFIBUS M12 connection plug 5-pole, B-coded, metal enclosure, 1 package = 5 units <ul style="list-style-type: none"> • Pin insert • Female contact insert 	6GK1905-0EA00 6GK1905-0EB00

Selection and ordering data

Supplementary system components (continued)

Description	Article No.
Connecting cables/plug-in connectors for supplying the Control Unit with power	
7/8" plug-in cable For power supply, pre-assembled with two 5-pole 7/8" plug/socket connectors, UL, $5 \times 1.5 \text{ mm}^2$ Length: <ul style="list-style-type: none"> • 0.3 m • 0.5 m • 1.0 m • 1.5 m • 2.0 m • 3.0 m • 5.0 m • 10 m • 15 m 	6XV1822-5BE30 6XV1822-5BE50 6XV1822-5BH10 6XV1822-5BH15 6XV1822-5BH20 6XV1822-5BH30 6XV1822-5BH50 6XV1822-5BN10 6XV1822-5BN15
7/8" connector 5-pole, B-coded, plastic enclosure, 1 package = 5 units <ul style="list-style-type: none"> • Pin insert (IN) • Female contact insert (OUT) 	6GK1905-0FA00 6GK1905-0FB00
POWER PLUG PRO plug-in connector For the CU240D-2 PN-F PP or CU250D-2 PN-F PP 5-pole push-pull power connector for on-site assembly, 1 package = 1 unit <ul style="list-style-type: none"> • 1 unit 	6GK1907-0AB10-6AA0
Connecting cables and connectors for digital inputs and outputs	
M12 plug-in cable with PUR sheath, to connect digital sensors and actuators, pre-assembled at one end, angled, plug connector, 5-pole, $5 \times 0.34 \text{ mm}^2$, UL Length: <ul style="list-style-type: none"> • 1.5 m • 5 m • 10 m 	3RK1902-4HB15-5AA0 3RK1902-4HB50-5AA0 3RK1902-4HC01-5AA0
M12 connector for screw mounting, 5-pole, screw-type connection max. 0.75 mm^2 , A-coded, max. 4 A, UL, plug connector <ul style="list-style-type: none"> • Straight • Angled 	3RK1902-4BA00-5AA0 3RK1902-4DA00-5AA0
Connecting cables for Power Modules	
Connecting cables pre-assembled at one end and connector sets to connect to the line supply	
Connecting cable pre-assembled at one end Power supply cable, open at one end, for HAN Q4/2, angled, $4 \times 4 \text{ mm}^2$ <ul style="list-style-type: none"> • Length: 1.5 m • Length: 5 m 	3RK1911-0DB13 3RK1911-0DB33
Connector set for the power supply HAN Q4/2 <ul style="list-style-type: none"> • 2.5 mm^2 • 4 mm^2 • 6 mm^2 	3RK1911-2BE50 3RK1911-2BE10 3RK1911-2BE30

SINAMICS G120D distributed inverters

Supplementary system components
Spare parts

Selection and ordering data

Supplementary system components (continued)

Motor cables pre-assembled at one end and connector sets to connect the Power Module to the motor

Motor cables pre-assembled at one end For motors with brake and temperature sensor with HAN Q8 connector, shielded	Article No. (HTG: supplied by Harting) (ZKT: supplied by KnorrTec)		
Cross-section	4 × 1.5 mm ²	4 × 2.5 mm ²	4 × 4 mm ²
• Length: 1.5 m	HTG: 61 88 201 0288 ZKT: 70020501000150	HTG: 61 88 201 0291 ZKT: 70009601000150	HTG: 61 88 201 0303 ZKT: 70017001000150
• Length: 3 m	HTG: 61 88 201 0289 ZKT: 70020501000300	HTG: 61 88 201 0292 ZKT: 70009601000300	HTG: 61 88 201 0304 ZKT: 70017001000300
• Length: 5 m	HTG: 61 88 201 0290 ZKT: 70020501000500	HTG: 61 88 201 0293 ZKT: 70009601000500	HTG: 61 88 201 0305 ZKT: 70017001000500
• Length: 10 m	HTG: 61 88 201 0299 ZKT: 70020501001000	HTG: 61 88 201 0301 ZKT: 70009601001000	HTG: 61 88 201 0306 ZKT: 70017001001000
Connector set for motor cable HAN Q8, shielded			
	HTG: 61 83 401 0131 ZKT: 10032001	HTG: 61 83 401 0132 ZKT: 10032011	HTG: 61 83 401 0133 ZKT: 10032021

For further information about the connecting cables and plug-in connectors mentioned above, please refer to catalog IK PI.

Further selected accessories are available from Siemens Solution Partners. Please go to the "Solution Partner Finder" and select technology "Distributed Field Installation System".
www.siemens.com/automation/partnerfinder

Spare parts

Spare Parts Kit

Description	Article No.
Spare Parts Kit for SINAMICS G120D comprising replacement seals, caps, PROFIBUS address windows and screws	6SL3500-0SK01-0AA0
Replacement caps for CU240D PN-F PP and CU240D PN-F PP	
24 V push-pull PLUG PRO caps 1 package = 5 units	6ES7194-4JA50-0AA0
RJ45 PLUG PRO caps 1 package = 5 units	6ES7194-4JD50-0AA0

Replacement fan

Rated power		SINAMICS G120D PM250D Power Module	Replacement fan (pre-mounted unit with cover, fan and screws)	
kW	hp	Type	Frame size	Article No.
380 ... 500 V 3 AC				
4.0	5.0	6SL3525-OPE24-0AA1	FSC	6SL3500-0SF01-0AA0
5.5	7.5	6SL3525-OPE25-5AA1		
7.5	10	6SL3525-OPE27-5AA1		

SINAMICS G130 drive converter chassis units

Safety Integrated with SINAMICS G130

Overview



SINAMICS G130 drive converter chassis units in frame sizes FX + HX



CU320-2 Control Unit

The SINAMICS G130 is a converter that can be combined very flexibly with the associated system components and integrated into customer-specific control cabinets or directly into machines.

The SINAMICS G130 drive converter chassis units are available for the following voltages and power ratings:

Line voltage	Power
380 ... 480 V 3 AC	110 ... 560 kW
500 ... 600 V 3 AC	110 ... 560 kW
660 ... 690 V 3 AC	75 ... 800 kW

A wide range of add-on electrical components allow the drive system to be optimized for specific requirements. Configuration and commissioning are greatly simplified by predefined interfaces.

The control accuracy of the sensorless vector control is suitable for most applications, and additional actual speed value encoders are therefore superfluous.

However, encoder evaluation units are available for the SINAMICS G130 converters so that they can address applications that require an encoder for plant-specific reasons.

Communication between the Control Unit, the Power Module and other active SINAMICS components takes place via DRIVE-CLiQ, the drive's internal interface.

The DRIVE-CLiQ connections, which are available as pre-assembled cables of different lengths, allow a complete converter system to be put together quickly.

For communication with the process control system, with the CU320-2 either a PROFIBUS or a PROFINET interface is available as standard. There is also the option to expand the interface using digital and analog inputs and outputs. The TM31 Terminal Module and TB30 Terminal Board are provided for this purpose. Additional expansion cards can also be installed to allow communication via PROFINET and the CAN protocol.

SINAMICS G130 drive converter chassis units

Safety Integrated with SINAMICS G130

Benefits

- Particularly quiet and compact converters due to the use of state-of-the-art IGBT power semiconductors and an innovative cooling concept.
- Individual modules and power components can be replaced quickly and easily, which ensures a higher level of plant availability. The design of replaceable components is based on the principle that they must be quick and easy to change. In addition, the "SparesOnWeb" Internet tool makes it easy to view the spare parts that are available for the system components ordered.
- Can be easily integrated in automation solutions by means of a standard communications interface as well as a range of analog and digital interfaces.
- Easy commissioning and parameterization using interactive menus on the AOP30 Advanced Operator Panel with graphic LCD and plain-text display, or PC-supported using the STARTER commissioning tool.
- Preset software functions make it easier to tailor the converter to the individual plant.
- All components, from individual parts to the ready-to-connect cabinet, undergo rigorous testing throughout the entire production process. This guarantees a high level of functional reliability during installation and commissioning, as well as in operation.

Application

Variable-speed drives are ideal for all applications that involve moving, conveying, pumping or compressing solids, liquids or gases.

This means the following applications in particular:

- Pumps and fans
- Compressors
- Extruders and mixers
- Mills

Documentation

The documentation for the various drive units consists of the following parts:

- Operating Instructions
- Spare parts list
- Unit-specific dimension drawings, layout diagrams, circuit and terminal diagrams

The documentation is supplied as standard with the CU Kit on CD-ROM. The documentation is available in English, French, German, Italian and Spanish.

Design

The SINAMICS G130 drive converter chassis unit provides machine builders and plant constructors with a modular drive system that can be tailored to specific applications.

SINAMICS G130 drive converter chassis units consist of two modular, stand-alone components:

- Power Module and
- Control unit

They may be located separately from one another or combined in a single unit. The Power Module contains a slot for the Control Unit.

The Power Modules are supplied with a DRIVE-CLiQ cable for communication and a cable for the 24 V supply to the Control Unit. These cables are pre-assembled for installing the Control Unit in the Power Module. If the two units are installed in separate locations, the cables must be ordered in the appropriate lengths.

The AOP30 Advanced Operator Panel and the BOP20 Basic Operator Panel can be used for commissioning and local operation.

Predefined interfaces, via terminal block or the CU320-2 Control Unit with either PROFIBUS or PROFINET, make commissioning and control of the drive much easier. The interfaces of the CU320-2 Control Unit can be supplemented with add-on modules, such as the plug-in TB30 Terminal Module or the TM31 Terminal Module.

If further customer interfaces are needed to communicate with the drive, an external 24 V supply must be provided.

Varnished PCBs

The following converter components are equipped as standard with coated PCBs:

- Power Modules
- Control Units
- Sensor Modules
- Terminal Modules
- Advanced Operator Panel (AOP30)

The coating on the modules protects the sensitive SMD components against corrosive gases, chemically active dust and moisture.

Nickel-plated busbars

All of the copper busbars of the Power Modules are nickel-plated in order to achieve the best possible immunity to environmental effects. Further, the bare copper connections do not have to be cleaned for customer connections.

[Detailed information is provided in catalog D 11.](#)

SINAMICS G130 drive converter chassis units

Safety Integrated with SINAMICS G130

Safety Integrated with SINAMICS G130

The standard SINAMICS G130 converters are available in numerous different versions for safety-related applications.

The Safety Integrated functions are completely integrated into the drive system

The following Safety Integrated Basic Functions are included as standard (terms in accordance with IEC 61800-5-2):

- **Safe Torque Off (STO)**
This function ensures that no torque-generating energy can continue to affect a motor and prevents unintentional start-ups.
 - **Safe Stop 1 (SS1)**
The SS1 function causes a motor to stop rapidly and safely and switches the motor to torque-free mode after the standstill by activating STO.
 - **Safe Brake Control (SBC)**
The SBC function permits the safe control of a holding brake. SBC is always activated in parallel with STO. The Safe Brake Adapter is used for SBC.
- Optionally, the following Safety Integrated Extended Functions are available; these are enabled via a license:
- **Safe Stop 2 (SS2)**
The SS2 function brings the motor to a standstill quickly and safely and then monitors the standstill position.
 - **Safe Operating Stop (SOS)**
With the SOS function, the stopped drive is kept in position and monitored by drive control.
 - **Safely-Limited Speed (SLS)**
The SLS function ensures that the drive does not exceed a preset speed or velocity limit.
 - **Safe Direction (SDI)**
This function ensures that the drive can only rotate in the selected direction.
 - **Safe Speed Monitor (SSM)**
This function signals if a drive operates below a specific speed/velocity limit.

Safety Integrated functions can be activated by the following methods:

- Via terminals on the Control Unit and on the Power Module (STO, SS1 only)
- Via terminals on the TM54F Terminal Module
- Via PROFIBUS or PROFINET with the PROFIsafe profile

The Safety Integrated functions are implemented electronically and therefore offer short response times in comparison to solutions with externally implemented monitoring functions.

As an alternative to controlling via terminals and/or PROFIsafe, there is also the option to parameterize several safety functions without selection. For this mode, after parameterization and a POWER ON, these functions are permanently selected.

Example

"SLS without selection" can be used, for example, to monitor the maximum velocity to prevent the drive from exceeding a mechanical speed limit. For this purpose, using the "without selection" function, an F-DI does not have to be used.

Safety Integrated with and without encoder

The Safety Integrated Basic Functions STO, SBC and SS1 can be operated without encoder: two safety-capable incremental encoders (HTL or TTL) are required for utilization of the Safety Integrated Extended Functions SLS, SDI, SOS, SS2 and SSM. These are connected to the relevant Sensor Module Cabinet SMC30 (first SMC30, option K50, second SMC30, option K52). The lowest possible velocity resolution for an HTL/TTL encoder system must be observed.

Further information is described in the [Safety Integrated Function Manual SINAMICS G130 / G150 / S120 Chassis / S120 Cabinet Modules / S150](#).

Licensing

The Safety Integrated Basic Functions do not require a license.

However, the Safety Integrated Extended Functions do require a license. It is of no consequence here which safety functions are used and how many.

Safety Integrated overview

An overview of the Safety Integrated functions of SINAMICS G130 plus their boundary conditions is shown in the following table (see next page):

SINAMICS G130 drive converter chassis units

Safety Integrated with SINAMICS G130

Overview of SINAMICS G130 Safety Integrated functions and associated boundary conditions

Function	Activation	Underlying function	Reaction to limit overshoot	External setpoint input effective	License required
Basic Functions					
STO	<ul style="list-style-type: none"> • EP terminals on the power unit • F-DI on TM54F • PROFIsafe 	SBC (if activated)	–	No	No ¹⁾
SBC	<ul style="list-style-type: none"> • With STO (directly or following expiry of the delay time with SS1) 	–	–	–	No
SS1	<ul style="list-style-type: none"> • EP terminals on the power unit • PROFIsafe 	STO following expiry of the parameterized delay time, SBC (if activated)	STO	Parameterizable	No
Extended Functions					
SS1 with SBR/SAM	<ul style="list-style-type: none"> • F-DI on TM54F • PROFIsafe 	Safe Acceleration Monitor (SAM) or Safe Brake Ramp (SBR) during braking. STO and SBC (if activated) following expiry of the parameterized delay time or if the speed falls below the minimum speed limit	STO	Parameterizable	Yes
SS2	<ul style="list-style-type: none"> • F-DI on TM54F • PROFIsafe 	Safe Acceleration Monitor (SAM) during braking. Following expiry of the parameterized delay time SOS	SS1→ STO	No	Yes
SLS	<ul style="list-style-type: none"> • F-DI on TM54F • PROFIsafe • Continuously activated 	–	STO, SS1, SS2 or SOS (can be parameterized)	Yes	Yes
SOS	<ul style="list-style-type: none"> • F-DI on TM54F • PROFIsafe 	–	SS1→ STO	Yes	Yes
SSM	<ul style="list-style-type: none"> • Always active, if configured 	–	Signals that the speed has fallen below a specified value	Yes	Yes
SDI	<ul style="list-style-type: none"> • F-DI on TM54F • F-DI on CU310-2 or D410-2 • PROFIsafe • Continuously activated 	–	STO, SS1, SS2 or SOS (can be parameterized)	Yes	Yes

¹⁾ The activation option using terminals on TM54F currently requires a license.

SINAMICS G130 drive converter chassis units

Safety Integrated with SINAMICS G130

Selection and ordering data

SINAMICS G130 drive converter chassis units consist of two modular, stand-alone components:

- Power Module and
- Control unit

They may be located separately from one another or combined in a single unit. The Power Module contains a slot for the Control Unit.

The Power Modules are supplied with a DRIVE-CLiQ cable for communication and a cable for the 24 V supply to the Control Unit. These cables are pre-assembled for installing the Control Unit in the Power Module. If the two units are installed in separate locations, the cables must be ordered in the appropriate lengths.

Control Unit Kit

The communication, open-loop and closed-loop control functions for the chassis units are executed in the CU320-2 Control Unit. The Control Unit Kit, which consists of the CU320-2 Control Unit and the drive software installed on the CompactFlash card, provides predefined interfaces that simplify configuring and commissioning. The CompactFlash card is plugged into the CU320-2, and can be quickly replaced in order to upgrade the software.

Description	Article No.
Control Unit Kit PROFIBUS DP consisting of: <ul style="list-style-type: none"> • CU320-2 DP Control Unit • CompactFlash card with the latest firmware • DRIVE-CLiQ cable • 24 V cable to the power supply • Equipment documentation on CD • STARTER commissioning tool on DVD 	6SL3040-1GA00-1AA0
Control Unit Kit PROFINET PN consisting of: <ul style="list-style-type: none"> • CU320-2 PN Control Unit • CompactFlash card with the latest firmware • DRIVE-CLiQ cable • 24 V cable to the power supply • Equipment documentation on CD • STARTER commissioning tool on DVD 	6SL3040-1GA01-1AA0

The SINAMICS Low Voltage Engineering Manual contains additional information about the CU320-2 Control Unit, which is available as a PDF file on the CD-ROM included with catalog D 11.

Further components that are relevant for Safety Integrated	Article No.
Firmware license for Safety Integrated Functions Including Certificate of License for one axis	6SL3074-0AA10-0AA0
SMC30 Sensor Module Cabinet-Mounted (without DRIVE-CLiQ cable)	6SL3055-0AA00-5CA2
TM54F Terminal Module (without DRIVE-CLiQ cable)	6SL3055-0AA00-3BA0
Safe Brake Adapter 230 V AC / 2 A	6SL3355-2DX00-1AA0
Pre-assembled interface cables to connect the SBA to the electronics module	6SL3060-4DX04-0AA0

Power Modules

The following Power Modules are available for the G130:

Type rating		Rated output current	Power Module
For 400 V, 500 V or 690 V	For 60 Hz, 460 V or 575 V	A	Article No.
380 ... 480 V 3 AC			
110	150	210	6SL3310-1GE32-1AA3
132	200	260	6SL3310-1GE32-6AA3
160	250	310	6SL3310-1GE33-1AA3
200	300	380	6SL3310-1GE33-8AA3
250	400	490	6SL3310-1GE35-0AA3
315	500	605	6SL3310-1GE36-1AA3
400	600	745	6SL3310-1GE37-5AA3
450	700	840	6SL3310-1GE38-4AA3
560	800	985	6SL3310-1GE41-0AA3
500 ... 600 V 3 AC			
110	150	175	6SL3310-1GF31-8AA3
132	200	215	6SL3310-1GF32-2AA3
160	250	260	6SL3310-1GF32-6AA3
200	300	330	6SL3310-1GF33-3AA3
250	400	410	6SL3310-1GF34-1AA3
315	450	465	6SL3310-1GF34-7AA3
400	600	575	6SL3310-1GF35-8AA3
500	700	735	6SL3310-1GF37-4AA3
560	800	810	6SL3310-1GF38-1AA3
660 ... 690 V 3 AC			
75		85	6SL3310-1GH28-5AA3
90		100	6SL3310-1GH31-0AA3
110		120	6SL3310-1GH31-2AA3
132		150	6SL3310-1GH31-5AA3
160		175	6SL3310-1GH31-8AA3
200		215	6SL3310-1GH32-2AA3
250		260	6SL3310-1GH32-6AA3
315		330	6SL3310-1GH33-3AA3
400		410	6SL3310-1GH34-1AA3
450		465	6SL3310-1GH34-7AA3
560		575	6SL3310-1GH35-8AA3
710		735	6SL3310-1GH37-4AA3
800		810	6SL3310-1GH38-1AA3

A complete configuration also includes the line-side power components, such as line reactors, fuse switch disconnectors or circuit breakers. In addition, the accessories components, such as interface extensions, motor output filters, operator panel and braking chopper round off the offer.

For further information about the ordering data and technical specifications, please refer to catalog D 11.

SINAMICS

SINAMICS G150 drive converter cabinet units

Safety Integrated with SINAMICS G150

Overview



SINAMICS G150 drive converter cabinet units, versions A and C

With its SINAMICS G150 drive converter cabinet units, Siemens is offering a drive system on which all line-side and motor-side components as well as the Power Module are integrated extremely compactly into a specially designed cabinet enclosure. This approach minimizes the effort and expense required to configure and install them.

SINAMICS G150 has been specially tailored to meet the requirements of drives with quadratic and constant load characteristics, with medium performance requirements, and without regenerative feedback capability.

The control accuracy of the sensorless vector control is suitable for most applications, and additional actual speed value encoders are therefore superfluous.

SINAMICS G150 converters are optionally available with an encoder evaluation function in order to handle applications that require an encoder for plant-specific reasons.

SINAMICS G150 drive converter cabinet units offer an economic drive solution that can be matched to customer-specific requirements as a result of the wide range of available components and options.

There are two versions of the drive converter cabinet units:

■ Version A

All optionally available line connection components, such as the main switch, circuit breakers, line contactor, line fuses, line filter, motor-side components and additional monitoring devices, can be installed as required. This version is also available with power units connected in parallel.

■ Version C

This offers an extremely space-optimized structure without line-side components. This particularly narrow design can be used, for example, when line connection components are accommodated in a central low-voltage distribution panel (MCC) in the customer's plant or system.

The SINAMICS G150 drive converter cabinet units are available for the following voltages and outputs:

Line voltage	Output range for single circuit (versions A and C)	Output range for parallel circuit (version A)
380 ... 480 V 3 AC	110 ... 560 kW	630 ... 900 kW
500 ... 600 V 3 AC	110 ... 560 kW	630 ... 1000 kW
660 ... 690 V 3 AC	75 ... 800 kW	1000 ... 2700 kW

Degrees of protection are IP20 (standard), and as an option IP21, IP23, IP43 and IP54.

Global use

SINAMICS G150 drive converter cabinet units are manufactured in compliance with relevant international standards and regulations, and are therefore suitable for global use (→ [Technical specifications in catalog D 11](#)).

SINAMICS G150 drive converter cabinet units

Safety Integrated with SINAMICS G150

Benefits

- Particularly quiet and compact converters due to the use of state-of-the-art IGBT power semiconductors and an innovative cooling concept.
- Individual modules and power components can be replaced quickly and easily, which ensures a higher level of plant availability. The design of replaceable components is based on the principle that they must be quick and easy to change. In addition, the "SparesOnWeb" Internet tool makes it easy to view the spare parts that are available for the system components ordered.
- Can be easily integrated in automation solutions by means of a standard communications interface as well as a range of analog and digital interfaces.
- Easy commissioning and parameterization using interactive menus on the AOP30 Advanced Operator Panel with graphic LCD and plain-text display, or PC-supported using the STARTER commissioning tool.
- Preset software functions make it easier to tailor the converter to the individual plant. For example, the key functions for controlling pumps are stored as a preprogrammed macro in the drive.
- Regarding EMC, the units are sub-divided into various zones, and as a consequence, they are extremely insensitive to disturbances and are very reliable in operation. With the help of simulated conditions, partitions have been designed to act as air guides and to help dissipate heat.
- Special measures used in the construction of the cabinets ensure that they remain mechanically durable over their entire life cycle. All components, from individual parts to the ready-to-connect cabinet, undergo rigorous testing throughout the entire production process. This guarantees a high level of functional reliability during installation and commissioning, as well as in operation.

Application

Variable-speed drives are ideal for all applications that involve moving, conveying, pumping or compressing solids, liquids or gases.

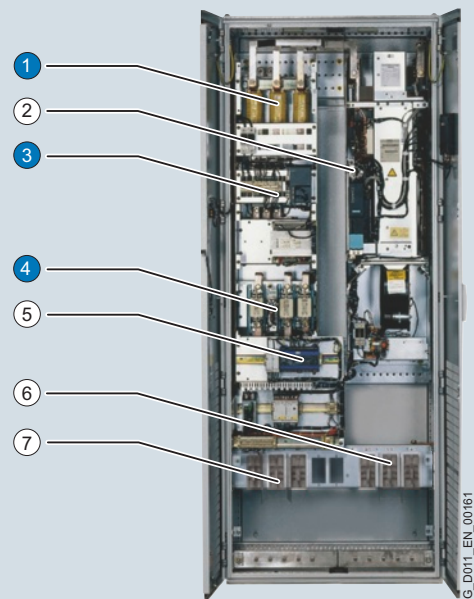
This means the following applications in particular:

- Pumps and fans
- Compressors
- Extruders and mixers
- Mills

Design

SINAMICS G150 drive converter cabinet units are characterized by their compact, modular, and service-friendly design.

A wide range of options is available depending on the cabinet version which permit optimum adaptation of the drive system to the respective requirements.



- ① Line reactor (≤ 500 kW standard) (Option L23)
- ② PROFIBUS connection
- ③ Line contactor (Option L13)
- ④ Main control switch with fuses (Option L26)
- ⑤ Customer Terminal Module
- ⑥ Motor connection
- ⑦ Line connection

- Standard version
- Options

Example of design of a SINAMICS G150 drive converter cabinet unit, version A with a CU320-2 DP Control Unit

Detailed information is provided in catalog D 11.

SINAMICS G150 drive converter cabinet units

Safety Integrated with SINAMICS G150

Safety Integrated with SINAMICS G150

The standard SINAMICS G150 converters are available in numerous different versions for safety-related applications.

The Safety Integrated functions are completely integrated into the drive system

The following Safety Integrated Basic Functions are included as standard (terms in accordance with IEC 61800-5-2):

- **Safe Torque Off (STO)**

This function ensures that no torque-generating energy can continue to affect a motor and prevents unintentional start-ups.

- **Safe Stop 1 (SS1)**

The SS1 function causes a motor to stop rapidly and safely and switches the motor to torque-free mode after the standstill by activating STO.

- **Safe Brake Control (SBC)**

The SBC function permits the safe control of a holding brake. SBC is always activated in parallel with STO. The Safe Brake Adapter (for G150, option K88) is used for SBC.

Optionally, the following Safety Integrated Extended Functions are available; these are enabled via a license (for G150, option K01):

- **Safe Stop 2 (SS2)**

The SS2 function brings the motor to a standstill quickly and safely and then monitors the standstill position.

- **Safe Operating Stop (SOS)**

With the SOS function, the stopped drive is kept in position and monitored by drive control.

- **Safely-Limited Speed (SLS)**

The SLS function ensures that the drive does not exceed a preset speed or velocity limit.

- **Safe Direction (SDI)**

This function ensures that the drive can only rotate in the selected direction.

- **Safe Speed Monitor (SSM)**

This function signals if a drive operates below a specific speed/velocity limit.

Safety Integrated functions can be activated by the following methods:

- Via terminals on the Control Unit and on the terminal module, for G150 option K82 (STO, SS1 only)
- Via terminals on the TM54F Terminal Module (for G150, option K87)
- Via PROFIBUS or PROFINET with the PROFIsafe profile

The Safety Integrated functions are implemented electronically and therefore offer short response times in comparison to solutions with externally implemented monitoring functions.

As an alternative to controlling via terminals and/or PROFIsafe, there is also the option to parameterize several safety functions without selection. For this mode, after parameterization and a POWER ON, these functions are permanently selected.

Example

"SLS without selection" can be used, for example, to monitor the maximum velocity to prevent the drive from exceeding a mechanical speed limit. For this purpose, using the "without selection" function, an F-DI does not have to be used.

Safety Integrated with and without encoder

The Safety Integrated Basic Functions STO, SBC and SS1 can be operated without encoder: two safety-capable incremental encoders (HTL or TTL) are required for utilization of the Safety Integrated Extended Functions SLS, SDI, SOS, SS2 and SSM. These are connected to the relevant Sensor Module Cabinet SMC30 (first SMC30, option K50, second SMC30, option K52). The lowest possible velocity resolution for an HTL/TTL encoder system must be observed.

Further information is described in the [Safety Integrated Function Manual SINAMICS G130 / G150 / S120 Chassis / S120 Cabinet Modules / S150](#).

Licensing

The Safety Integrated Basic Functions do not require a license.

However, the Safety Integrated Extended Functions do require a license. (For G150, option K01). It is of no consequence here which safety functions are used and how many.

Safety Integrated overview

An overview of the Safety Integrated functions of SINAMICS G150 plus their boundary conditions is shown in the following table (see next page):

SINAMICS G150 drive converter cabinet units

Safety Integrated with SINAMICS G150

Overview of SINAMICS G150 Safety Integrated functions and associated boundary conditions

Function	Activation	Underlying function	Reaction to limit overshoot	External setpoint input effective	License required
Basic Functions					
STO	<ul style="list-style-type: none"> • EP terminals on the power unit; access for G150 via terminal module (option K82) and on the Control Unit • F-DI on TM54F • PROFIsafe 	SBC (if activated)	–	No	No ¹⁾
SBC	<ul style="list-style-type: none"> • With STO (directly or following expiry of the delay time with SS1) 	–	–	–	No
SS1	<ul style="list-style-type: none"> • EP terminals on the power unit; access for G150 via terminal module (option K82) and on the Control Unit • PROFIsafe 	STO following expiry of the parameterized delay time, SBC (if activated)	STO	Parameterizable	No
Extended Functions					
SS1 with SBR/SAM	<ul style="list-style-type: none"> • F-DI on TM54F • PROFIsafe 	Safe Acceleration Monitor (SAM) or Safe Brake Ramp (SBR) during braking. STO and SBC (if activated) following expiry of the parameterized delay time or if the speed falls below the minimum speed limit	STO	Parameterizable	Yes
SS2	<ul style="list-style-type: none"> • F-DI on TM54F • PROFIsafe 	Safe Acceleration Monitor (SAM) during braking. Following expiry of the parameterized delay time SOS	SS1→ STO	No	Yes
SLS	<ul style="list-style-type: none"> • F-DI on TM54F • PROFIsafe • Continuously activated 	–	STO, SS1, SS2 or SOS (can be parameterized)	Yes	Yes
SOS	<ul style="list-style-type: none"> • F-DI on TM54F • PROFIsafe 	–	SS1→ STO	Yes	Yes
SSM	<ul style="list-style-type: none"> • Always active, if configured 	–	Signals that the speed has fallen below a specified value	Yes	Yes
SDI	<ul style="list-style-type: none"> • F-DI on TM54F • F-DI on CU310-2 or D410-2 • PROFIsafe • Continuously activated 	–	STO, SS1, SS2 or SOS (can be parameterized)	Yes	Yes

¹⁾ The activation option using terminals on TM54F currently requires a license.

SINAMICS G150 drive converter cabinet units

Safety Integrated with SINAMICS G150

Safe Brake Adapter (G150, option K88)

The Safe Brake Control (SBC) function requires a Safe Brake Adapter. This can be ordered via option K88 for SINAMICS G150 drive cabinet units.

The Safe Brake Adapter allows safe control of electro-mechanical motor brakes.

The Safe Brake Adapter controls 230 V AC brakes. When the STO function is active, the Safe Brake Adapter safely closes the connected brake. The SBC function monitors the control of the brake, however, not its mechanical functioning.

The converter controls the connected brake using the "motor holding brake" function.

External overvoltage limiters are not required.

In the case of the Safe Brake Adapter, the brake is controlled in accordance with ISO 13849-1 to Performance Level PL d or Category 3 and in accordance with IEC 61508 SIL2.



Safe Brake Adapter

Overview of cabinet options

The SINAMICS G150 is a drive cabinet unit that is ready for connection and can be configured individually using cabinet options. Additional components are easy to select.

Overview of safety-relevant options:

Option K01: Safety license for 1 axis

Option K82: Terminal module for controlling the Safe Torque Off and Safe Stop 1 safety functions

Option K87: TM54F Terminal Module

Option K50: SMC30 Sensor Module Cabinet-Mounted

Option K52: Second SMC30 Sensor Module Cabinet-Mounted

Option K88: Safe Brake Adapter SBA, 230 V AC

[Detailed information is provided in catalog D 11.](#)

SINAMICS G150 drive converter cabinet units

Safety Integrated with SINAMICS G150

Selection and ordering data

Single circuit

Type rating		Rated output current I_{rated}	SINAMICS G150 drive converter cabinet units
For 400 V, 500 V or 690 V	For 60 Hz 460 V or 575 V		(Article No. supplement, see below)
kW	hp	A	Article No.
380 ... 480 V 3 AC			
110	150	210	6SL3710-1GE32-1 A3
132	200	260	6SL3710-1GE32-6 A3
160	250	310	6SL3710-1GE33-1 A3
200	300	380	6SL3710-1GE33-8 A3
250	400	490	6SL3710-1GE35-0 A3
315	500	605	6SL3710-1GE36-1 A3
400	600	745	6SL3710-1GE37-5 A3
450	700	840	6SL3710-1GE38-4 A3
560	800	985	6SL3710-1GE41-0 A3
500 ... 600 V 3 AC			
110	150	175	6SL3710-1GF31-8 A3
132	200	215	6SL3710-1GF32-2 A3
160	250	260	6SL3710-1GF32-6 A3
200	300	330	6SL3710-1GF33-3 A3
250	400	410	6SL3710-1GF34-1 A3
315	450	465	6SL3710-1GF34-7 A3
400	600	575	6SL3710-1GF35-8 A3
500	700	735	6SL3710-1GF37-4 A3
560	800	810	6SL3710-1GF38-1 A3
660 ... 690 V 3 AC			
75		85	6SL3710-1GH28-5 A3
90		100	6SL3710-1GH31-0 A3
110		120	6SL3710-1GH31-2 A3
132		150	6SL3710-1GH31-5 A3
160		175	6SL3710-1GH31-8 A3
200		215	6SL3710-1GH32-2 A3
250		260	6SL3710-1GH32-6 A3
315		330	6SL3710-1GH33-3 A3
400		410	6SL3710-1GH34-1 A3
450		465	6SL3710-1GH34-7 A3
560		575	6SL3710-1GH35-8 A3
710		735	6SL3710-1GH37-4 A3
800		810	6SL3710-1GH38-1 A3

Article No. supplement

Version A

All available line connection components can be installed

Version C

Especially space-saving design

A

C

Parallel circuit

Type rating		Rated output current I_{rated}	SINAMICS G150 drive converter cabinet units, version A
For 400 V, 500 V or 690 V	For 60 Hz 460 V or 575 V		Article No.
kW	hp	A	
380 ... 480 V 3 AC			
630	900	1120	6SL3710-2GE41-1AA3
710	1000	1380	6SL3710-2GE41-4AA3
900	1250	1560	6SL3710-2GE41-6AA3
500 ... 600 V 3 AC			
630	900	860	6SL3710-2GF38-6AA3
710	1000	1070	6SL3710-2GF41-1AA3
1000	1250	1360	6SL3710-2GF41-4AA3
660 ... 690 V 3 AC			
1000		1070	6SL3710-2GH41-1AA3
1350		1360	6SL3710-2GH41-4AA3
1500		1500	6SL3710-2GH41-5AA3
1750		1740	6SL3710-2GH41-8EA3
1950		1940	6SL3710-2GH42-0EA3
2150		2150	6SL3710-2GH42-2EA3
2400		2390	6SL3710-2GH42-4EA3
2700		2685	6SL3710-2GH42-7EA3

For further information about the ordering data and technical specifications, please refer to catalog D 11.

Note: The power data in hp units are based on the NEC/CEC standards for the North American market.

SINAMICS

SINAMICS S110 servo drives

Safety Integrated with SINAMICS S110

Overview



Many applications in mechanical engineering and plant construction require machine axes to be positioned quickly and precisely by the simplest possible method. It is often simply a case of moving a machine axis from position X to position Y reliably and with the required level of performance. The SINAMICS S110 drive converter is ideally suited to this type of application. It is specially designed to position single axes accurately and effectively.

SINAMICS S110 is the perfect solution for many applications. Typical examples are:

- Handling equipment
- Feed and withdrawal devices
- Stacking units
- Automatic assembly machines
- Laboratory automation
- Metalworking
- Woodworking, glass and ceramic industries
- Printing machines
- Plastics processing machines

The SINAMICS S110 servo drive is designed for connection to both synchronous servo motors and asynchronous (induction) motors, and is available in a large output range from 0.12 kW to 90 kW.

It supports all the most popular types of encoder. A variety of fieldbus interfaces is provided for linking the unit to a higher-level control system. Alternatively, it can be controlled via 10 V and a pulse direction interface.

The so-called basic positioner (EPos) is an integral component of SINAMICS S110. It provides a simple method of solving positioning tasks.

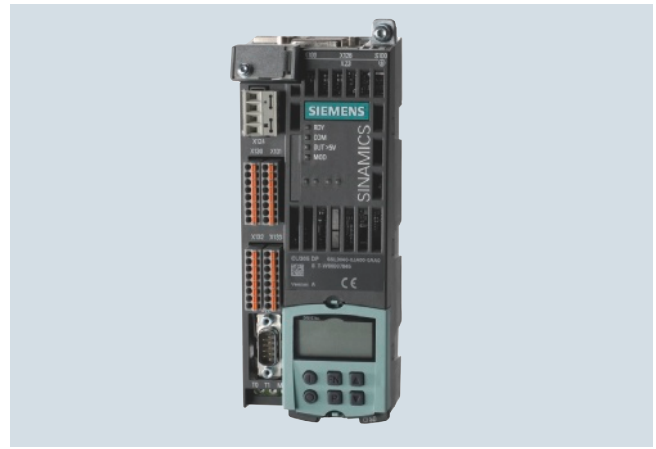
Supplementary system components

Comprehensive system components are offered for the SINAMICS S110

BOP20 Basic Operator Panel

The BOP20 Basic Operator Panel can be snapped onto any CU305 Control Unit and may be used to acknowledge faults, set parameters and read diagnostic information (e.g. alarm and fault messages).

The BOP20 has a backlit two-line display area and 6 keys. The integrated plug connector on the rear of the BOP20 provides its power and establishes communication with the Control Unit.



CU305 Control Unit with attached BOP20 Basic Operator Panel

Intelligent Operator Panel IOP

The Intelligent Operator Panel IOP is an extremely user-friendly and powerful operator panel for SINAMICS S110.

The IOP supports both entry-level personnel and drive experts. Thanks to the large plain text display, menu prompting and application wizards, it is easy to commission the drive. A drive can be essentially commissioned without having to use a printed parameter list – as the parameters are displayed in plain text, and explanatory help texts and a parameter filtering function are provided.

The drives are easily controlled manually using directly assigned buttons and the navigation wheel. The IOP has a dedicated switchover button to switch from automatic to manual mode.



Detailed information is provided in catalog D 31.

Safety Integrated

The integrated safety functions of SINAMICS S110 provide highly effective application-oriented protection for personnel and machinery (terms as defined in IEC 61800-5-2).

The following Safety Integrated Basic Functions are included as standard:

- **Safe Torque Off (STO)**
This function ensures that no torque-generating energy can continue to affect a motor and prevents unintentional start-ups.
- **Safe Stop 1 (SS1)**
The SS1 function causes a motor to stop rapidly and safely and switches the motor to torque-free mode after the standstill by activating STO.
- **Safe Brake Control (SBC)**
The SBC function permits the safe control of a holding brake. SBC is always activated in parallel with STO. The Safe Brake Relay is used for SBC.

Optionally, the following Safety Integrated Extended Functions are available; these are enabled via a license:

- **Safe Stop 2 (SS2)**
The SS2 function brings the motor to a standstill quickly and safely and then monitors the standstill position.
- **Safe Operating Stop (SOS)**
With the SOS function, the stopped drive is kept in position and monitored by drive control.
- **Safely-Limited Speed (SLS)**
The SLS function ensures that the drive does not exceed a preset speed or velocity limit.
- **Safe Direction (SDI)**
This function ensures that the drive can only rotate in the selected direction.
- **Safe Speed Monitor (SSM)**
This function signals if a drive operates below a specific speed/velocity limit.

The Safety Integrated functions are implemented electronically and therefore offer short response times in comparison to solutions with externally implemented monitoring functions.

The Safety Integrated functions are completely integrated into the drive system. They can be activated via fail-safe digital inputs on the CU305 Control Unit or via PROFINET or PROFIBUS with PROFIsafe.

As an alternative to controlling via terminals and/or PROFIsafe, there is also the option to parameterize several safety functions without selection. For this mode, after parameterization and a POWER ON, these functions are permanently selected.

Example

"SLS without selection" can be used, for example, to monitor the maximum velocity to prevent the drive from exceeding a mechanical speed limit. For this purpose, using the "without selection" function, an F-DI does not have to be used; an F-CPU is also not required.

Safe speed/position sensing

Incremental encoders or absolute encoders can be used for safe sensing of the position values on a drive. Safe actual value sensing relies on redundant evaluation of the incremental tracks A/B that supply sin/cos signals with 1 Vpp. Only encoders of the type whose A/B track signals are created and processed using purely analog techniques can be used.

The encoder signals can be input via the Sensor Modules. As an alternative, motors with an integrated DRIVE-CLiQ interface can be used. The speed or position actual values are generated directly in the motor as safe values and are transferred to the Control Unit over safe communication via DRIVE-CLiQ.

The encoder must be mechanically attached in such a manner that the encoder shaft is unable to unplug or slide off. For notes on this, see IEC 61800-5-2: 2007, Table D.16.

A list of Siemens motors that fulfill the electrical and mechanical requirements is available at:

<http://support.automation.siemens.com/WW/view/en/33512621>

Motors with DRIVE-CLiQ interface are connected directly to the CU305 Control Unit. A SINAMICS Sensor Module is required to evaluate the encoder signals of motors without a DRIVE-CLiQ interface.

Safe actual value acquisition without encoder

Some safety functions can also be operated without safety-capable encoders; implementation effort is minimal. Existing plants in particular can be updated with safety technology without the need to change the motor or mechanical system.

The STO function can be used without restriction for all applications.

The SS1, SLS, SSM and SDI functions are permissible for applications in conjunction with asynchronous and SIEMOSYN motors where the load can never cause acceleration. An encoder that is used for the purposes of motor control has no significance for the safety functions here.

SINAMICS

SINAMICS S110 servo drives

Safety Integrated with SINAMICS S110

Licensing

The Safety Integrated Basic Functions do not require a license. However, the Safety Integrated Extended Functions do require a license. It is of no consequence here which safety functions are used and how many. The license can be ordered as an option with the memory card. Alternatively, a single license can also be purchased.

Safety Integrated overview

An overview of the Safety Integrated functions of SINAMICS S110 plus their boundary conditions is shown in the following table:

Overview of SINAMICS S110 Safety Integrated functions and associated boundary conditions

Function	Activation	Underlying function	Reaction to limit overshoot	External setpoint input effective	Encoder required	License required
Basic Functions						
STO	<ul style="list-style-type: none"> F-DI PROFIsafe 	SBC (if activated)	–	No	No	No
SBC	<ul style="list-style-type: none"> With STO (directly or following expiry of the delay time) 	–	–	–	No	No
SS1	<ul style="list-style-type: none"> F-DI PROFIsafe 	STO following expiry of the parameterized delay time, followed by SBC (if activated)	STO	No	No	No
Extended Functions						
SS1 with SBR	<ul style="list-style-type: none"> F-DI PROFIsafe 	Safe Acceleration Monitoring (SBR - Safe Brake Ramp) during braking. STO and SBC (if activated) following expiry of the parameterized delay time or if the speed falls below the minimum speed limit	STO	No	No	Yes
SS2	<ul style="list-style-type: none"> F-DI PROFIsafe 	Safe Acceleration Monitoring (SBR - Safe Brake Ramp) during braking. Following expiry of the parameterized delay time SOS	SS1 → STO	No	Yes	Yes
SOS	<ul style="list-style-type: none"> F-DI PROFIsafe 	–	SS1 → STO	Yes	Yes	Yes
SLS	<ul style="list-style-type: none"> F-DI PROFIsafe 	–	STO, SS1, SS2 or SOS (can be parameterized)	Yes	Yes	Yes
SLS encoderless	<ul style="list-style-type: none"> F-DI PROFIsafe 	–	STO, SS1 (can be parameterized)	Yes	No	Yes
SDI	<ul style="list-style-type: none"> F-DI PROFIsafe 	–	STO, SS1, SS2 or SOS (can be parameterized)	Yes	No	Yes
SSM	<ul style="list-style-type: none"> Always active, if configured 	–	Signals that the speed has fallen below a specified value	Yes	No	Yes

Safe Brake Relay

The Safe Brake Control (SBC) function requires a Safe Brake Relay. The Safe Brake Relay allows safe control of electro-mechanical motor brakes.

The 24 V DC solenoid of the motor brake is directly connected to the Safe Brake Relay. External overvoltage limiters are not required. The cable harnesses for connection to the Power Module are included in the scope of supply.

In the case of the Safe Brake Relay, the brake is controlled in accordance with ISO 13849-1 to Performance Level PL d or Category 3 and in accordance with IEC 61508 to SIL2.

Detailed information is provided in catalog D 31.



Safe Brake Relay

Selection and ordering data

CU305 Control Units

Description	Article No.
CU305 PN Control Unit Without a memory card	6SL3040-0JA01-0AA0
CU305 DP Control Unit Without a memory card	6SL3040-0JA00-0AA0
Control Unit CU305 CAN Without a memory card	6SL3040-0JA02-0AA0

Accessories

Memory card for Control Units CU305 PN / CU305 DP / CU305 CAN	
• Empty	6SL3054-4AG00-0AA0
• With firmware version V4.1	6SL3054-4EB00-0AA0
• With firmware version V4.3	6SL3054-4ED00-0AA0
• With firmware version V4.4	6SL3054-4EE00-0AA0
• With firmware version V4.4 and safety license (Extended Functions)	6SL3054-4EE00-0AA0-Z F01
Safety license (Extended Functions)	6SL3074-0AA10-0AA0
STARTER commissioning tool ¹⁾ on DVD-ROM	6SL3072-0AA00-0AG0

PM340 Power Modules in blocksize format

Rated output current	Type rating	Frame size	Air-cooled PM340 Power Module in blocksize format <u>without</u> line filter	Air-cooled PM340 Power Module in blocksize format <u>with</u> integrated line filter
A	kW		Article No.	Article No.
Line voltage 200 ... 240 V 1 AC				
0.9	0.12	FSA	6SL3210-1SB11-0UA0	6SL3210-1SB11-0AA0
2.3	0.37		6SL3210-1SB12-3UA0	6SL3210-1SB12-3AA0
3.9	0.75		6SL3210-1SB14-0UA0	6SL3210-1SB14-0AA0
Line voltage 380 ... 480 V 3 AC				
1.3	0.37	FSA	6SL3210-1SE11-3UA0	–
1.7	0.55		6SL3210-1SE11-7UA0	–
2.2	0.75		6SL3210-1SE12-2UA0	–
3.1	1.1		6SL3210-1SE13-1UA0	–
4.1	1.5		6SL3210-1SE14-1UA0	–
5.9	2.2	FSB	6SL3210-1SE16-0UA0	6SL3210-1SE16-0AA0
7.7	3		6SL3210-1SE17-7UA0	6SL3210-1SE17-7AA0
10.2	4		6SL3210-1SE21-0UA0	6SL3210-1SE21-0AA0
18	7.5	FSC	6SL3210-1SE21-8UA0	6SL3210-1SE21-8AA0
25	11		6SL3210-1SE22-5UA0	6SL3210-1SE22-5AA0
32	15		6SL3210-1SE23-2UA0	6SL3210-1SE23-2AA0
38	18.5	FSD	6SL3210-1SE23-8UA0	6SL3210-1SE23-8AA0
45	22		6SL3210-1SE24-5UA0	6SL3210-1SE24-5AA0
60	30		6SL3210-1SE26-0UA0	6SL3210-1SE26-0AA0
75	37	FSE	6SL3210-1SE27-5UA0	6SL3210-1SE27-5AA0
90	45		6SL3210-1SE31-0UA0	6SL3210-1SE31-0AA0
110	55	FSF	6SL3210-1SE31-1UA0	6SL3210-1SE31-1AA0
145	75		6SL3210-1SE31-5UA0	6SL3210-1SE31-5AA0
178	90		6SL3210-1SE31-8UA0	6SL3210-1SE31-8AA0

¹⁾ STARTER commissioning tool is also available on the Internet at <http://support.automation.siemens.com/WW/view/en/10804985/133100>

SINAMICS

SINAMICS S110 servo drives

PM340 Power Modules in blocksize format Line-side components

Selection and ordering data

PM340 Power Modules in blocksize format (continued)

Accessories

Description	Article No.
Shield connection kit for PM340 Power Modules	
• Frame size FSA	6SL3262-1AA00-0BA0
• Frame size FSB	6SL3262-1AB00-0DA0
• Frame size FSC	6SL3262-1AC00-0DA0
• Frame sizes FSD and FSE	6SL3262-1AD00-0DA0
• Frame size FSF	6SL3262-1AF00-0DA0

Line-side components

Line reactors

Rated output current A	Type rating kW	Power Modules in blocksize format Type	Frame size	Line reactor Article No.
Line voltage 200 ... 240 V 1 AC				
0.9	0.12	6SL3210-1SB11-0...	FSA	6SE6400-3CC00-4AB3
2.3	0.37	6SL3210-1SB12-3...		
3.9	0.75	6SL3210-1SB14-0...	FSA	6SE6400-3CC01-0AB3
Line voltage 380 ... 480 V 3 AC				
1.3	0.37	6SL3210-1SE11-3UA0	FSA	6SE6400-3CC00-2AD3
1.7	0.55	6SL3210-1SE11-7UA0		
2.2	0.75	6SL3210-1SE12-2UA0	FSA	6SE6400-3CC00-4AD3
3.1	1.1	6SL3210-1SE13-1UA0		
4.1	1.5	6SL3210-1SE14-1UA0	FSA	6SE6400-3CC00-6AD3
5.9	2.2	6SL3210-1SE16-0...	FSB	6SL3203-0CD21-0AA0
7.7	3	6SL3210-1SE17-7...		
10	4	6SL3210-1SE21-0...	FSB	6SL3203-0CD21-4AA0
18	7.5	6SL3210-1SE21-8...	FSC	6SL3203-0CD22-2AA0
25	11	6SL3210-1SE22-5...		
32	15	6SL3210-1SE23-2...	FSC	6SL3203-0CD23-5AA0
38	18.5	6SL3210-1SE23-8...	FSD	6SL3203-0CJ24-5AA0
45	22	6SL3210-1SE24-5...		
60	30	6SL3210-1SE26-0...	FSD	6SL3203-0CD25-3AA0
75	37	6SL3210-1SE27-5...	FSE	6SL3203-0CJ28-6AA0
90	45	6SL3210-1SE31-0...		
110	55	6SL3210-1SE31-1...	FSF	6SE6400-3CC11-2FD0
145	75	6SL3210-1SE31-5...		
178	90	6SL3210-1SE31-8...	FSF	6SE6400-3CC11-7FD0

Line filters

Power Modules in blocksize format Type	Line filters Article No.
Line voltage 380 ... 480 V 3 AC	
6SL3210-1SE11-....	6SE6400-2FA00-6AD0
6SL3210-1SE12-....	
6SL3210-1SE13-....	
6SL3210-1SE14-....	

SINAMICS

SINAMICS S110 servo drives

Line-side components
Recommended line-side power components

Selection and ordering data

Line-side components (continued)

Recommended line-side power components

Rated output current	Type rating	Power Modules in blocksize format	Circuit breaker IEC 60947 and UL489/CSA C22.2 No. 5-0
A	kW	Type	Article No.
Line voltage 200 ... 240 V 1 AC			
0.9	0.12	6SL3210-1SB11-0...	5SJ4206-7HG41
2.3	0.37	6SL3210-1SB12-3...	5SJ4210-7HG41
3.9	0.75	6SL3210-1SB14-0...	5SJ4216-7HG41

Rated output current	Type rating	Power Modules in blocksize format	Circuit breaker IEC 60947	Main switch
A	kW	Type 6SL3210-...	Article No.	Article No.
Line voltage 380 ... 480 V 3 AC				
1.3	0.37	1SE11-3UA0	3RV1021-1DA10	3LD2003-1TP51
1.7	0.55	1SE11-7UA0		
2.2	0.75	1SE12-2UA0	3RV1021-1FA10	
3.1	1.1	1SE13-1UA0	3RV1021-1GA10	
4.1	1.5	1SE14-1UA0	3RV1021-1HA10	
5.9	2.2	1SE16-0...	3RV1021-1KA10	
7.7	3	1SE17-7...	3RV1021-4AA10	
10	4	1SE21-0...	3RV1021-4BA10	3LD2103-1TP51
18	7.5	1SE21-8...	3RV1031-4EA10	3LD2203-0TK51
25	11	1SE22-5...	3RV1031-4FA10	3LD2504-0TK51
32	15	1SE23-2...	3RV1031-4HA10	
38	18.5	1SE23-8...	3RV1042-4JA10	
45	22	1SE24-5...	3RV1042-4KA10	
60	30	1SE26-0...	3RV1042-4MA10	3LD2704-0TK51
75	37	1SE27-5...	3VL1712-1DD33-0AA0	
90	45	1SE31-0...	3VL1716-1DD33-0AA0	3LD2804-0TK51
110	55	1SE31-1...	3VL3720-1DC36-0AA0	3KA5330-1GE01
145	75	1SE31-5...		3KA5530-1GE01
178	90	1SE31-8...	3VL4725-1DC36-0AA0	

Note: For 3VL molded case circuit breakers, only the basic design without auxiliary switch and shunt release (3VL.....-0AA0) is listed here. For further details, see catalog LV 10, IC 10 and IC 10 AO.

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SINAMICS S110 servo drives

Line-side components DC link components

Selection and ordering data

Line-side components (continued)

Recommended line-side power components (continued)

Rated output current	Type rating	Power Modules in blocksize format	Fuse switch disconnecter	Switch disconnecter with fuse holders	Fuse ¹⁾
A	kW	Type 6SL3210-...	Article No.	Article No.	Article No.
Line voltage 380 ... 480 V 3 AC					
1.3	0.37	1SE11-3UA0	3NP1123-1CA20	3KL5030-1GB01	3NA3804
1.7	0.55	1SE11-7UA0			
2.2	0.75	1SE12-2UA0			3NA3801
3.1	1.1	1SE13-1UA0			3NA3803
4.1	1.5	1SE14-1UA0			
5.9	2.2	1SE16-0...			
7.7	3	1SE17-7...			3NA3805
10	4	1SE21-0...			
18	7.5	1SE21-8...			3NA3810
25	11	1SE22-5...			3NA3814
32	15	1SE23-2...			3NA3817
38	18.5	1SE23-8...			3NA3820
45	22	1SE24-5...			3NA3822
60	30	1SE26-0...		3KL5230-1GB01	3NA3824
75	37	1SE27-5...			3NA3830
90	45	1SE31-0...	3NP1133-1CA20		3NA3832
110	55	1SE31-1...		3KL5330-1GB01	3NA3836
145	75	1SE31-5...	3NP1143-1DA10	3KL5530-1GB01	3NA3140
178	90	1SE31-8...			3NA3144

DC link components

Description	Power Modules in blocksize format	Braking resistor
		Article No.
DC link voltage 240 ... 360 V DC (line voltage 200 ... 240 V 1 AC)		
180 Ω	Frame size FSA	6SE6400-4BC05-0AA0
DC link voltage 510 ... 720 V DC (line voltage 380 ... 480 V 3 AC)		
390 Ω	Frame size FSA	6SE6400-4BD11-0AA0
160 Ω	Frame size FSB	6SL3201-0BE12-0AA0
56 Ω	Frame size FSC	6SE6400-4BD16-5CA0
27 Ω	Frame size FSD	6SE6400-4BD21-2DA0
15 Ω	Frame size FSE	6SE6400-4BD22-2EA1
8.2 Ω	Frame size FSF	6SE6400-4BD24-0FA0

¹⁾ Can also be protected by semiconductor protection or device protection fuses of type 3NE, and the switch disconnecter appropriate for the fuse.

Selection and ordering data

Load-side power components

Rated output current	Type rating of the Power Module	Power Modules in blocksize format		Motor reactor
A	kW	Type	Frame size	Article No.
Line voltage 380 ... 480 V 3 AC				
1.3	0.37	6SL3210-1SE11-3UA0	FSA	6SE6400-3TC00-4AD2
1.7	0.55	6SL3210-1SE11-7UA0		
2.2	0.75	6SL3210-1SE12-2UA0		
3.1	1.1	6SL3210-1SE13-1UA0		
4.1	1.5	6SL3210-1SE14-1UA0		
5.9	2.2	6SL3210-1SE16-0...	FSB	6SL3202-0AE21-0CA0
7.7	3	6SL3210-1SE17-7...		
10	4	6SL3210-1SE21-0...		
18	7.5	6SL3210-1SE21-8...	FSC	6SL3202-0AJ23-2CA0
25	11	6SL3210-1SE22-5...		
32	15	6SL3210-1SE23-2...		
38	18.5	6SL3210-1SE23-8...	FCD	6SE6400-3TC05-4DD0
45	22	6SL3210-1SE24-5...		6SE6400-3TC03-8DD0
60	30	6SL3210-1SE26-0...		6SE6400-3TC05-4DD0
75	37	6SL3210-1SE27-5...	FSE	6SE6400-3TC08-0ED0
90	45	6SL3210-1SE31-0...		6SE6400-3TC07-5ED0
110	55	6SL3210-1SE31-1...	FSF	6SE6400-3TC14-5FD0
145	75	6SL3210-1SE31-5...		6SE6400-3TC15-4FD0
178	90	6SL3210-1SE31-8...		6SE6400-3TC14-5FD0

Supplementary system components

Description	Article No.
BOP20 Basic Operator Panel	6SL3055-0AA00-4BA0
Intelligent Operator Panel IOP	6SL3255-0AA00-4JA1
IOP Handheld for use with SINAMICS S110, SINAMICS G120, SINAMICS G110D or SINAMICS G120D. Included in the scope of delivery: IOP, handheld housing, rechargeable batteries (4 × AA), charging unit (international), RS232 connecting cable (3 m/9.84 ft long), for SINAMICS G120 only), USB cable (1 m/3.28 ft long).	6SL3255-0AA00-4HA0
Safe Brake Relay Including cable harness for connection with the Power Module	6SL3252-0BB01-0AA0
Accessories	
Door mounting kit (for IOP) IP54 degree of protection for mounting an operator panel in control cabinet doors with sheet steel thicknesses of 1 ... 3 mm (0.04 ... 0.12 in) Included in the scope of delivery: Seal, mounting material, connecting cable (5 m/16.41 ft long, also supplies voltage to the IOP directly via the Control Unit)	6SL3256-0AP00-0JA0

Encoder system connection

Description	Article No.
SMC10 Sensor Module Cabinet-Mounted Without DRIVE-CLiQ cable	6SL3055-0AA00-5AA3
SMC20 Sensor Module Cabinet-Mounted Without DRIVE-CLiQ cable	6SL3055-0AA00-5BA3
SMC30 Sensor Module Cabinet-Mounted Without DRIVE-CLiQ cable	6SL3055-0AA00-5CA2
Sensor Module External SME 20 Without DRIVE-CLiQ cable	6SL3055-0AA00-5EA3
Sensor Module External SME 25 Without DRIVE-CLiQ cable	6SL3055-0AA00-5HA3
Sensor Module External SME 120 Without DRIVE-CLiQ cable	6SL3055-0AA00-5JA3
Sensor Module External SME 120 Without DRIVE-CLiQ cable	6SL3055-0AA00-5KA3

SINAMICS

SINAMICS S120 modular drive system

Safety Integrated with SINAMICS S120

Overview



Flexibility for successful machine concepts

As part of the SINAMICS drive family, the SINAMICS S120 drive system is a modular system for high-performance applications in machine and plant engineering. SINAMICS S120 offers high-performance single-axis and multi-axis drives for a very broad range of industrial applications. By virtue of its scalability and flexibility, SINAMICS S120 is the ideal system for satisfying the ever increasing demand for more axes and better performance. SINAMICS S120 supports flexible machine designs and speedy implementation of customized drive solutions.

The response to ever increasing demands

Modern machines must be built at ever lower cost, but deliver ever greater productivity. The SINAMICS S120 drive concept meets both these challenges! It is easy to configure and thus helps to reduce project completion times. Its excellent dynamic response and accuracy permit higher cycle rates for maximum productivity.

Applications in machine and plant engineering

Regardless of whether the application involves continuous material webs or cyclic, highly dynamic processes – SINAMICS S120 means increased machine performance in many industries:

- Packaging machines
- Plastics processing machines
- Textile machines
- Printing machines
- Paper machines
- Hoisting gear
- Handling and assembly systems
- Machine tools
- Rolling mills
- Test stands
- Renewable energy

Modularity for mechanical engineering

SINAMICS S120 is designed to allow free combination of power and control performance. Multi-axis drives with higher-level motion control can be implemented with the SINAMICS S120 modular system as easily as single-drive solutions.

Greater flexibility with central control intelligence

On the SINAMICS S120, the drive intelligence is combined with closed-loop control functions into Control Units.

These units are capable of controlling drives in Vector, Servo and V/f modes. They also perform the speed and torque control functions plus other intelligent drive functions for all axes on the drive.

Free performance selection for Vector and Servo control modes

The use of a SINAMICS S120 Vector control is recommended for drive solutions with continuous material webs, for example, wire-drawing machines, film and paper machines, as well as for hoisting gear, centrifuges and marine drives with harmonic, circular motion.

Servo control with SINAMICS S120 is employed for cyclic processes with precise, highly dynamic position control and servo motors, e.g. in textile, packaging, printing machines and machine tools.

SINAMICS S120 – Functions for better efficiency

- Basic functions: Speed control, torque control, positioning functions
- Intelligent starting functions for independent restart after power supply interruption
- BICO technology with interconnection of drive-related I/Os for easy adaptation of the drive system to its operating environment
- Integrated safety functions for rational implementation of safety concepts
- Regulated infeed/regenerative feedback functions for preventing undesirable reactions on the supply, allowing recovery of braking energy and ensuring greater stability against line fluctuations.

DRIVE-CLiQ – The digital interface between all components

All SINAMICS S120 components, including the motors and encoders, are interconnected by a shared serial interface called DRIVE-CLiQ. The standardized cables and connectors reduce the variety of different parts and cut storage costs. Converter boards (Sensor Modules) for converting standard encoder signals to DRIVE-CLiQ are available for third-party motors or retrofit applications.

Swift and automatic: The electronic rating plate

An important digital linkage element of the SINAMICS S120 drive system are the electronic rating plates integrated in every component. They allow all drive components to be detected automatically via a DRIVE-CLiQ link. As a result, data do not need to be entered manually during commissioning or component replacement – helping to ensure that drives are commissioned successfully! The electronic rating plates of the motors contain, for example, the parameters of the electrical equivalent circuit diagram and the characteristic data of the built-in motor encoder in addition to information such as order and identification numbers.

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SINAMICS S120 modular drive system

Safety Integrated with SINAMICS S120







Modular design ensures flexibility and scalability

DC/AC units (= Motor Modules) – available in compact booksize, booksize and chassis formats – are characterized by their modular design. All the drive intelligence is organized into Control Units. The Control Units perform all the closed-loop control functions for the drive line-up. They also handle all other drive functions such as the interconnection of drive-related I/Os, positioning functions, and feature PROFIBUS DP or PROFINET as the central interface for linking to higher-level automation systems.

Line Modules function as the central energy supply to the voltage-source DC link. Line Modules are optionally available with regulated infeed/regenerative feedback to provide a constant DC link voltage and high level of supply compatibility. Motor Modules supply the motors with energy from the DC link.

On AC/AC units, the infeed and motor power supply functions are combined in one device, the Power Module – available in blocksize and chassis formats. For single-axis applications, drive control functions are performed by a special Control Unit (CU310-2) mounted on the Power Module and for multi-axis applications, by a Control Unit (e.g. CU320-2) connected by a DRIVE-CLiQ link. In this case, a Control Unit Adapter is mounted on the Power Module in place of the Control Unit.

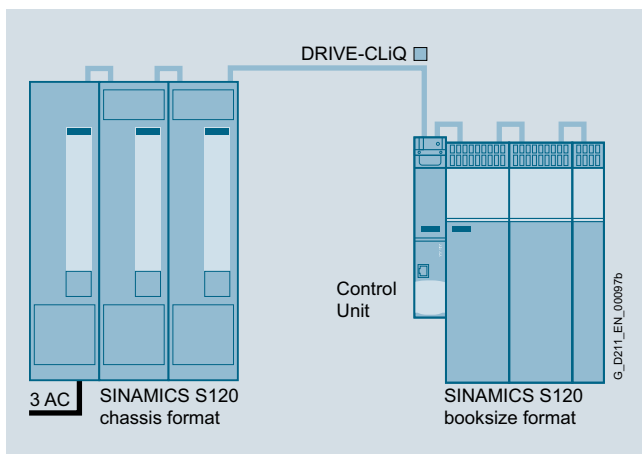
SINAMICS S120 – Formats

Modular drive system for demanding single/multi-axis applications					
Units for single-axis applications		Units for multi-axis applications			
Blocksize	Chassis	Booksize Compact	Booksize	Chassis	Cabinet Modules
					
0.12 – 90 kW	110 – 250 kW	0.9 – 9.7 kW	1.6 – 107 kW	75 – 4500 kW	1.6 – 4500 kW

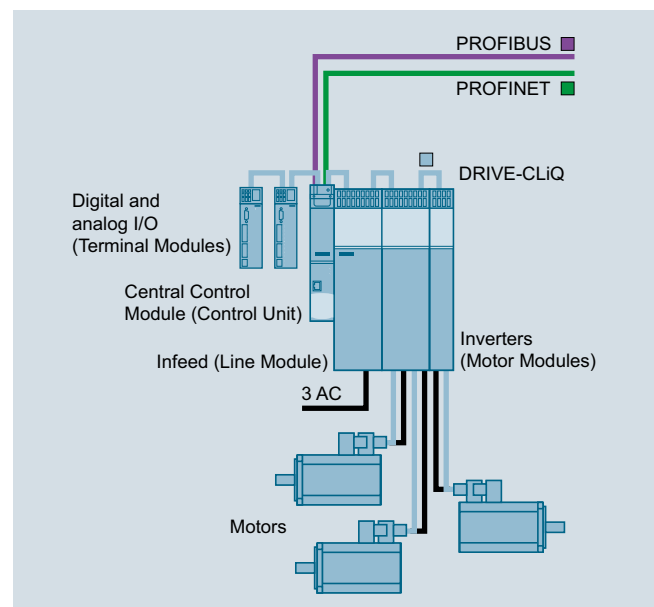
SINAMICS S120 – The various formats with their respective output ranges

All formats can be combined as required

The different SINAMICS S120 formats can be combined freely thanks to their DRIVE-CLiQ interfaces, e.g. Line Modules in chassis format can be freely combined with Motor Modules in booksize format for multi-axis applications with high total output.



SINAMICS S120 Control Units in booksize and chassis formats

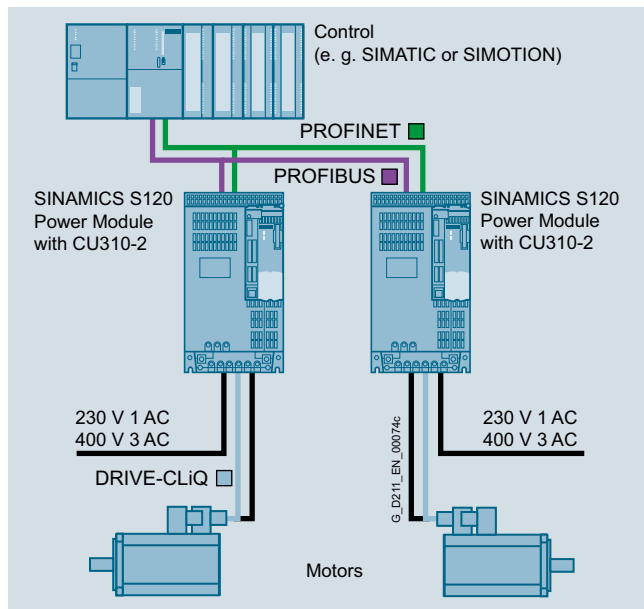


Example configuration of SINAMICS S120 booksize format

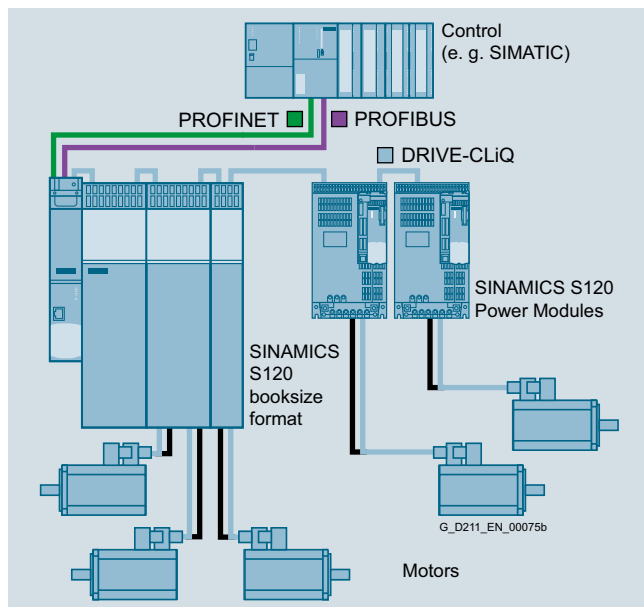
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SINAMICS S120 modular drive system

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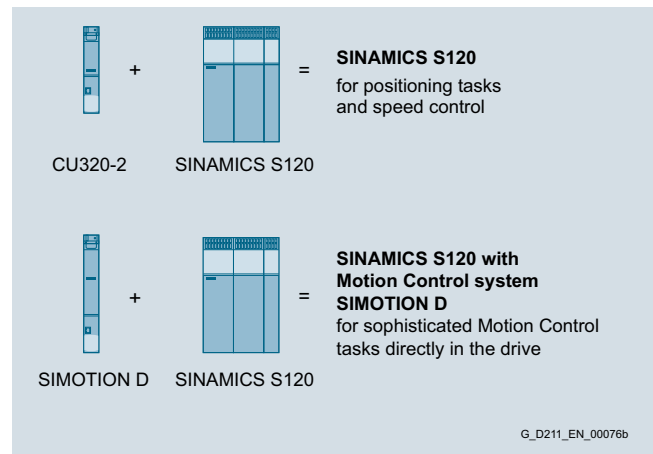
Example configuration of SINAMICS S120 blocksize format



Example configuration of SINAMICS S120 booksize and blocksize formats

SINAMICS S120 and SIMOTION – The perfect team

Modern machines must be capable of handling ever more complex Motion Control tasks and performing them with increasing accuracy and speed. With regard to this requirement, the SIMOTION Motion Control System and high-performance SINAMICS S120 drive system form a perfect team. The SIMOTION D variant, which is physically integrated in the SINAMICS S120 drive, is the ideal solution for machines with a large number of axes and stringent precision requirements. This distributed automation structure allows the machine to be segmented into various axis groupings, with each grouping controlled by a separate SIMOTION Motion Control System. The SIMOTION systems communicate either via PROFIBUS DP or PROFINET. Another important aspect: The compact machine design thanks to the distributed automation structure and a Control Unit directly in the drive.



Scalable MOTION CONTROL functionality

Totally Integrated Automation – The unique automation platform

With Totally Integrated Automation (TIA), Siemens is the only single-source provider to offer an integrated spectrum of products and systems for all industries. Tailored to meet individual customer requirements, industry-specific automation solutions can be implemented efficiently on the basis of TIA. Lower life-cycle costs for plant operation and a significant reduction in the time to market result in a marked improvement in productivity and greater investment security.

Easy – Totally Integrated Automation with SINAMICS S120

Apart from SIMATIC, SIMOTION and SINUMERIK, SINAMICS is also one of the core components of TIA. The STARTER commissioning tool is therefore an integral element of the TIA platform. It is thus possible to parameterize, program and commission all components in the automation system using a standardized engineering platform and without any gaps. The system-wide data management functions ensure consistent data and simplify archiving of the entire plant project.

PROFIBUS

PROFIBUS DP, the standard fieldbus of the TIA system, is supported by all SINAMICS S120 variants. It provides a high-performance, system-wide communication network which links all automation components: HMI, controls, drives and I/O devices.

PROFINET – For enhanced performance and open IT communication

SINAMICS S120 is also available with a PROFINET interface. This Ethernet-based bus enables control data to be exchanged at high speed via PROFINET IO with IRT or RT and makes SINAMICS S120 a suitable choice for integration in top-performance multi-axis applications.

At the same time, PROFINET also uses standard IT mechanisms (TCP/IP) to transport information, e.g. operating and diagnostic data, to higher-level systems. A SINAMICS S120 with this interface can thus easily be integrated into factory IT networks.

Safety Integrated

The integrated safety functions of SINAMICS S120 provide highly effective application-oriented protection for personnel and machinery. They are suitable for machines and systems that require flexible safety functions and support the setup of tailored safety concepts.

The following Safety Integrated Basic Functions are included as standard (terms in accordance with IEC 61800-5-2):

- **Safe Torque Off (STO)**
This function ensures that no torque-generating energy can continue to affect a motor and prevents unintentional start-ups.
- **Safe Stop 1 (SS1)**
The SS1 function causes a motor to stop rapidly and safely and switches the motor to torque-free mode after the standstill by activating STO.
- **Safe Brake Control (SBC)**
The SBC function permits the safe control of a holding brake. SBC is always activated in parallel with STO. The Safe Brake Relay is used for SBC.

Optionally, the following Safety Integrated Extended Functions are available; these are enabled via a license:

- **Safe Stop 2 (SS2)**
The SS2 function brings the motor to a standstill quickly and safely and then monitors the standstill position.
- **Safe Operating Stop (SOS)**
With the SOS function, the stopped drive is kept in position and monitored by drive control.
- **Safely-Limited Speed (SLS)**
The SLS function ensures that the drive does not exceed a preset speed or velocity limit.
- **Safe Direction (SDI)**
This function ensures that the drive can only rotate in the selected direction.
- **Safe Speed Monitor (SSM)**
This function signals if a drive operates below a specific speed/velocity limit.
- **Safely-Limited Position (SLP)**
The SLP function monitors the axis to ensure that it remains within the permissible traversing range.
- **Safe Brake Test (SBT)**
The SBT function performs a test of the braking function.
- **Safe Position (SP)**
The SP function transfers the actual position values determined safely in the drive over safe PROFIsafe communication to a safety control.

The SP and SBT functions go beyond the functional scope according to IEC 61800-5-2.

The Safety Integrated functions are completely integrated into the drive system. They can be activated as follows:

- Via terminals on the Control Unit and on the power unit (STO, SBC, SS1 only)
- Via safety-related inputs on the CU310-2 Control Unit
- Via safety-related inputs on the TM54F Terminal Module
- Via PROFIBUS or PROFINET with the PROFIsafe profile

The Safety Integrated functions are implemented electronically and therefore offer short response times in comparison to solutions with externally implemented monitoring functions.

As an alternative to controlling via terminals and/or PROFIsafe, there is also the option to parameterize several safety functions without selection. For this mode, after parameterization and a POWER ON, these functions are permanently selected.

Example

"SLS without selection" can be used, for example, to monitor the maximum velocity to prevent the drive from exceeding a mechanical speed limit. For this purpose, using the "without selection" function, an F-DI does not have to be used; an F-CPU is also not required.

The SIMOTION Motion Control System provides support for SINAMICS drives that can execute safety-related monitoring functions (SOS, SLS, SDI) or stop reactions (STO, SS1, SS2). This support ensures that limit violations are prevented at the drive end in that SIMOTION controls (with SLS) the drive through the application, for example, within the permissible velocity (e.g. with SLS) or brings it to a standstill (e.g. with SOS).

The safety functions are activated and deactivated and their status is displayed with specific technological alarms and system variables on the axis.

SINAMICS

SINAMICS S120 modular drive system

Safety Integrated with SINAMICS S120

Safe speed/position sensing

Incremental encoders or absolute encoders can be used for safe sensing of the position values on a drive. Safe actual value sensing relies on redundant evaluation of the incremental tracks A/B that supply sin/cos signals with 1 Vpp. Only encoders of the type whose A/B track signals are created and processed using purely analog techniques can be used. The encoder signals can be input via the Sensor Modules SMC20, SME20/25 or SME120/125.

HTL/TTL encoders can be used in a dual-encoder system to achieve safe actual value sensing for chassis format units. The minimum possible speed resolution must also be taken into account. The encoder signals are input via the SMC30 Sensor Module.

As an alternative, motors with an integrated DRIVE-CLiQ interface can be used. The speed or position actual values are generated directly in the motor as safe values and are transferred to the Control Unit over safe communication via DRIVE-CLiQ.

The encoder must be mechanically attached in such a manner that the encoder shaft is unable to unplug or slide off.

For notes on this, see IEC 61800-5-2: 2007, Table D.16.

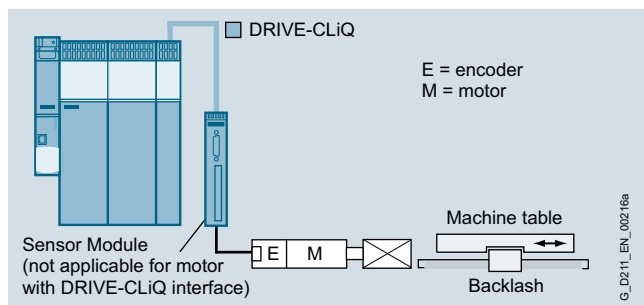
A list of Siemens motors that fulfill the electrical and mechanical requirements is available at:

<http://support.automation.siemens.com/WW/view/en/33512621>

The following can be used for safe speed/position sensing:

- Single-encoder systems or
- Dual-encoder systems

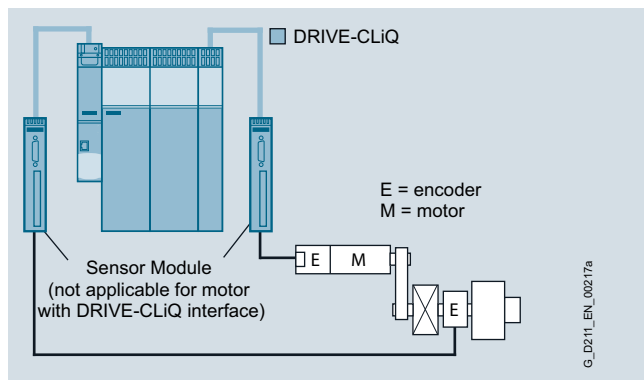
Single-encoder system



Example: Single-encoder system

In a single-encoder system, the motor encoder is used exclusively for safe actual value sensing.

Dual-encoder system



Example: Dual-encoder system on a spindle

The safe actual values for a drive are provided by two separate encoders. The actual values are transferred to the Control Unit over DRIVE-CLiQ. When motors without a DRIVE-CLiQ connection are used, a Sensor Module (SMC20/SME20/25/120/125) must be implemented. Each measuring system requires a separate DRIVE-CLiQ connection.

Safe actual value acquisition without encoder

The Extended Functions Safe Stop 1 (SS1) with SAM/SBR, Safely Limited Speed (SLS), Safe Speed Monitor (SSM) and Safe Direction (SDI) are also available for use without encoders (in combination with asynchronous (induction) motors and SIEMOSYN motors). An encoder that is used for the purposes of motor control has no significance for the safety function here. The encoderless safety functions can be implemented on request for chassis format units.

[The Safety Integrated Function Manual contains additional information about the encoderless safety functions.](#)

The Extended Functions Safe Stop 2 (SS2), Safe Operating Stop (SOS), Safely Limited Position (SLP) and Safe Position (SP) and Safe Brake Test (SBT) always require a safe encoder system.

Licensing

The Safety Integrated Basic Functions do not require a license.

However, on the other hand, for Safety Integrated Extended Functions, a license is required for each axis equipped with safety functions. It is of no consequence here which safety functions are used and how many.

The required licenses can be optionally ordered with the CompactFlash card:

[For the article numbers of the CompactFlash cards, see Section SINAMICS S120 drive system and SIMOTION D of catalog PM 21.](#)

Notes

Up to 6 safety axes with Extended Functions are possible in vector or servo control on a CU320-2, D4x5-2 or CX32-2. Up to 11 axes with Safety Integrated Extended Functions are possible in V/f control mode.

The CU310-2 and D410-2 Control Units have been designed to control only single axes. Only one license is therefore required for the Safety Integrated Extended Functions (short code F01).

Safety Integrated overview

An overview of the Safety Integrated functions of SINAMICS S120 plus their boundary conditions is shown in the following table (see next page):

SINAMICS

SINAMICS S120 modular drive system

Safety Integrated with SINAMICS S120

Overview of SINAMICS S120 Safety Integrated functions and associated boundary conditions

Function	Activation	Underlying function	Reaction to limit overshoot	External set-point input effective	Encoder required ¹⁾	License required
Basic Functions						
STO	<ul style="list-style-type: none"> • EP terminals on the power unit or CUA31/CUA32 and on the Control Unit • F-DI on TM54F • F-DI on CU310-2 or D410-2 • PROFIsafe 	SBC (if activated)	–	No	No ²⁾	No ³⁾
SBC	<ul style="list-style-type: none"> • With STO (directly or following expiry of the delay time with SS1) 	–	–	–	No	No
SS1	<ul style="list-style-type: none"> • EP terminals on the power unit or CUA31/CUA32 and on the Control Unit • PROFIsafe 	STO following expiry of the parameterized delay time, SBC (if activated)	STO	Parameterizable	No	No
Extended Functions						
SS1 with SBR/SAM	<ul style="list-style-type: none"> • F-DI on TM54F • F-DI on CU310-2 or D410-2 • PROFIsafe 	Safe Acceleration Monitor (SAM) or Safe Brake Ramp (SBR) during braking. STO and SBC (if activated) following expiry of the parameterized delay time or if the speed falls below the minimum speed limit	STO	Parameterizable	No	Yes (each safety axis)
SS2	<ul style="list-style-type: none"> • F-DI on TM54F • F-DI on CU310-2 or D410-2 • PROFIsafe 	Safe Acceleration Monitor (SAM) during braking. Following expiry of the parameterized delay time SOS	SS1 → STO	No	Yes	Yes (each safety axis)
SLS encoderless	<ul style="list-style-type: none"> • F-DI on TM54F • F-DI on CU310-2 or D410-2 • PROFIsafe • Continuously activated 	–	STO, SS1 (can be parameterized)	Yes	No	Yes (each safety axis)
SLS	<ul style="list-style-type: none"> • F-DI on TM54F • F-DI on CU310-2 or D410-2 • PROFIsafe • Continuously activated 	–	STO, SS1, SS2 or SOS (can be parameterized)	Yes	Yes	Yes (each safety axis)
SOS	<ul style="list-style-type: none"> • F-DI on TM54F • F-DI on CU310-2 or D410-2 • PROFIsafe 	–	SS1 → STO	Yes	Yes	Yes (each safety axis)
SSM	<ul style="list-style-type: none"> • Always active, if configured 	–	Signals that the speed has fallen below a specified value	Yes	No	Yes (each safety axis)
SDI	<ul style="list-style-type: none"> • F-DI on TM54F • F-DI on CU310-2 or D410-2 • PROFIsafe • Continuously activated 	–	STO, SS1, SS2 or SOS (can be parameterized)	Yes	No	Yes (each safety axis)
SLP	<ul style="list-style-type: none"> • F-DI on TM54F • F-DI on CU310-2 • PROFIsafe 	–	STO, SS1, SS2 or SOS (can be parameterized)	Yes	Yes	Yes (each safety axis)
SP	<ul style="list-style-type: none"> • Always active, if configured 	–	–	Yes	Yes	Yes (each safety axis)
SBT	<ul style="list-style-type: none"> • F-DI on TM54F • F-DI on CU310-2 or D410-2 • PROFIsafe 	–	Signals test result. Warning if test fails	Yes	Yes	Yes (each safety axis)

¹⁾ The encoderless Safety Extended Functions can be implemented only on request for S120 converters in chassis format and cabinet units.

²⁾ The activation option using terminals on TM54F currently requires an encoder

³⁾ The activation option using terminals on TM54F currently requires a license.

SINAMICS

SINAMICS S120 modular drive system

Safety Integrated with SINAMICS S120

Safe Brake Relay, Safe Brake Adapter

For Safe Brake Control (SBC)

- a Safe Brake Relay is required for power units in blocksize format;
- a Safe Brake Adapter is required for power units in chassis format.

The Safe Brake Control is integrated in power units in booksize format.

The Safe Brake Relay/Safe Brake Adapter and the brake control that is integrated in the booksize format allows safe control of electro-mechanical motor brakes.

The Safe Brake Relay controls a 24 V DC brake; the Safe Brake Adapter controls 230 V AC brakes.

When the STO function is active, the Safe Brake Relay safely closes the connected brake. The SBC function monitors the control of the brake, however, not its mechanical functioning.

The converter controls the connected brake using the "motor holding brake" function.

External overvoltage limiters are not required. The cable harnesses for connection to the Power Module are included in the scope of supply.

In the case of the Safe Brake Relay/Safe Brake Adapter, the brake is controlled in accordance with ISO 13849-1 to Performance Level PL d or Category 3 and in accordance with IEC 61508 to SIL2.

Overview of cabinet options

Additional components are available as cabinet options for the S120 Cabinet Modules modular cabinet system. Overview of safety-relevant options:

Option K01 - 05: Safety license for 1 to 5 axes

Option K82: Terminal module for controlling the Safe Torque Off and Safe Stop 1 safety functions

Option K87: TM54F Terminal Module

Option K50: SMC30 Sensor Module Cabinet-Mounted

Option K52: Second SMC30 Sensor Module Cabinet-Mounted

Option K48 SMC20 Sensor Module Cabinet-Mounted

Option K88: Safe Brake Adapter SBA, 230 V AC

[Detailed information is provided in catalog D21.3.](#)



Safe Brake Relay



Safe Brake Adapter

[Detailed information is provided in catalogs PM 21 and D 21.3.](#)

SINAMICS S150 drive converter cabinet units

Safety Integrated with SINAMICS S150

Overview



SINAMICS S150 drive converter cabinet units are particularly suitable for all variable-speed single-axis drives with high performance requirements, i.e., drives with:

- high dynamic requirements
- frequent braking cycles and high braking energy levels
- Four-quadrant operation

SINAMICS S150 offers high-performance speed control with excellent accuracy and a high dynamic response.

Line voltage	Power
380 ... 480 V 3 AC	110 ... 800 kW
500 ... 600 V 3 AC	75... 1200 kW

Degrees of protection are IP20 (standard), and as an option IP21, IP23, IP43 and IP54.

Line and motor-side components as well as additional monitoring devices can be installed in the converter cabinet units.

A wide range of electrical and mechanical components enable the drive system to be optimized individually to suit customer requirements.

Benefits

The self-commutating, pulsed infeed/regenerative unit uses IGBT technology and is equipped with a Clean Power Filter. This combination guarantees extremely line-friendly behavior which is characterized by the following:

- Negligible line harmonics as a result of the innovative Clean Power Filter ($< 1\%$)
- The stringent limit values of IEEE 519-1992 are complied with, without any exceptions.
- Regenerative feedback (four-quadrant operation)
- Tolerant to fluctuations in the line voltage
- Operation on weak line supplies
- Reactive power compensation is possible (inductive or capacitive)
- High drive dynamic performance

Simple drive handling from engineering to operation thanks to:

- Compact, modular design with an optimum degree of service friendliness
- Straightforward engineering
- Simple installation, as it is ready to be connected up
- Fast, menu-prompted commissioning without complex parameterization
- Clear and convenient operation using a user-friendly graphical operator panel with measured values displayed in plain text or in a quasi-analog bar display

Application

- Test stands
- Centrifuges
- Elevators and cranes
- Cross cutters and shears
- Conveyor belts with a high power demand and energy recovery
- Presses
- Cable winches

Detailed information is provided in catalog D 21.3.

SINAMICS S150 drive converter cabinet units

Safety Integrated with SINAMICS S150

Safety Integrated

The integrated safety functions of SINAMICS S150 provide highly effective application-oriented protection for personnel and machinery. They are suitable for machines and systems that require flexible safety functions and support the setup of tailored safety concepts.

The following Safety Integrated Basic Functions are included as standard (terms in accordance with IEC 61800-5-2):

- **Safe Torque Off (STO)**
This function ensures that no torque-generating energy can continue to affect a motor and prevents unintentional start-ups.
- **Safe Stop 1 (SS1)**
The SS1 function causes a motor to stop rapidly and safely and switches the motor to torque-free mode after the standstill by activating STO.
- **Safe Brake Control (SBC)**
The SBC function permits the safe control of a holding brake. SBC is always activated in parallel with STO. The Safe Brake Adapter (option K88) is used for SBC.

Optionally, the following Safety Integrated Extended Functions are available; these are enabled via a license (option K01):

- **Safe Stop 2 (SS2)**
The SS2 function brings the motor to a standstill quickly and safely and then monitors the standstill position.
- **Safe Operating Stop (SOS)**
With the SOS function, the stopped drive is kept in position and monitored by drive control.
- **Safely-Limited Speed (SLS)**
The SLS function ensures that the drive does not exceed a preset speed or velocity limit.
- **Safe Direction (SDI)**
This function ensures that the drive can only rotate in the selected direction.
- **Safe Speed Monitor (SSM)**
This function signals if a drive operates below a specific speed/velocity limit.
- **Safely-Limited Position (SLP)**
The SLP function monitors the axis to ensure that it remains within the permissible traversing range.
- **Safe Brake Test (SBT)**
The SBT function performs a test of the braking function.
- **Safe Position (SP)**
The SP function transfers the actual position values determined safely in the drive over safe PROFIsafe communication to a safety control.

The SP and SBT functions go beyond the functional scope according to IEC 61800-5-2.

The Safety Integrated functions are completely integrated into the drive system. They can be activated as follows:

- Via terminals on the Control Unit and on the terminal module, option K82 (STO, SS1 only)
- Via terminals on the TM54F Terminal Module (option K87)
- Via PROFIBUS or PROFINET with the PROFIsafe profile

The Safety Integrated functions are implemented electronically and therefore offer short response times in comparison to solutions with externally implemented monitoring functions.

As an alternative to controlling via terminals and/or PROFIsafe, there is also the option to parameterize several safety functions without selection. For this mode, after parameterization and a POWER ON, these functions are permanently selected.

Example

"SLS without selection" can be used, for example, to monitor the maximum velocity to prevent the drive from exceeding a mechanical speed limit. For this purpose, using the "without selection" function, an F-DI does not have to be used.

Safe speed/position sensing

Incremental encoders or absolute encoders can be used for safe sensing of the position values on a drive. Safe actual value sensing relies on redundant evaluation of the incremental tracks A/B that supply sin/cos signals with 1 Vpp. Only encoders of the type whose A/B track signals are created and processed using purely analog techniques can be used. The encoder signals can be input via the SMC20 Sensor Modules (option K48).

HTL/TTL encoders can be used in a dual-encoder system to achieve safe actual value sensing for chassis format units. The minimum possible speed resolution must also be taken into account. The encoder signals are input via the Sensor Module SMC30 (first SMC30, option K50, second SMC30, option K52).

The encoder must be mechanically attached in such a manner that the encoder shaft is unable to unplug or slide off.

For notes on this, see IEC 61800-5-2: 2007, Table D.16.

A list of Siemens motors that fulfill the electrical and mechanical requirements is available at:

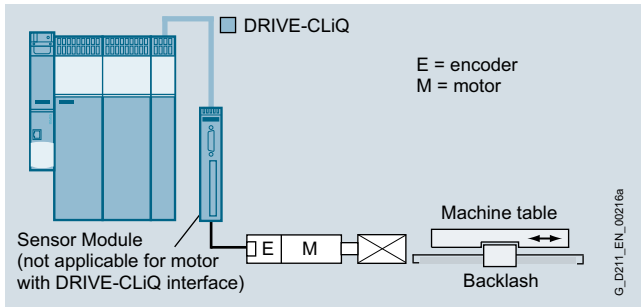
<http://support.automation.siemens.com/WW/view/en/33512621>

The following can be used for safe speed/position sensing:

- Single-encoder systems or
- Dual-encoder systems.

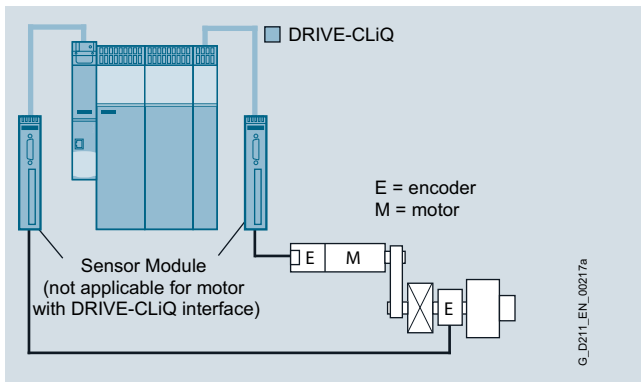
SINAMICS S150 drive converter cabinet units

Safety Integrated with SINAMICS S150

Single-encoder system

Example: Single-encoder system

In a single-encoder system, the motor encoder is used exclusively for safe actual value sensing.

Dual-encoder system

Example: Dual-encoder system on a spindle

The safe actual values for a drive are provided by two separate encoders. The actual values are transferred to the Control Unit over DRIVE-CLiQ. When motors without a DRIVE-CLiQ connection are used, a Sensor Module (SMC20/SME20/25/120/125) must be implemented. Each measuring system requires a separate DRIVE-CLiQ connection.

Safe actual value acquisition without encoder

The safety functions can also be operated without motor encoder on request; the boundary conditions to be taken into account must also be observed during configuration.

Further information is described in the [Function Manual SINAMICS G130 / G150 / S120 Chassis / S120 Cabinet Modules / SINAMICS S150](#).

Licensing

The Safety Integrated Basic Functions do not require a license. However, the Safety Integrated Extended Functions do require a license. (Option K01). It is of no consequence here which safety functions are used and how many.

Safety Integrated overview

An overview of the Safety Integrated functions of SINAMICS S150 plus their boundary conditions is shown in the following table (see next page):

SINAMICS S150 drive converter cabinet units

Safety Integrated with SINAMICS S150

Overview of SINAMICS S150 Safety Integrated functions and associated boundary conditions

Function	Activation	Underlying function	Reaction to limit overshoot	External setpoint input effective	Encoder required ¹⁾	License required
Basic Functions						
STO	<ul style="list-style-type: none"> • EP terminals on the power unit, access via terminal module (option K82) and on the Control Unit • F-DI on TM54F • PROFIsafe 	SBC (if activated)	–	No	No ²⁾	No ³⁾
SBC	<ul style="list-style-type: none"> • With STO (directly or following expiry of the delay time with SS1) 	–	–	–	No	No
SS1	<ul style="list-style-type: none"> • EP terminals on the power unit, access via terminal module (option K82) and on the Control Unit • PROFIsafe 	STO following expiry of the parameterized delay time, SBC (if activated)	STO	Parameterizable	No	No
Extended Functions						
SS1 with SBR/SAM	<ul style="list-style-type: none"> • F-DI on TM54F • PROFIsafe 	Safe Acceleration Monitor (SAM) or Safe Brake Ramp (SBR) during braking. STO and SBC (if activated) following expiry of the parameterized delay time or if the speed falls below the minimum speed limit	STO	Parameterizable	Yes, encoderless on request only	Yes
SS2	<ul style="list-style-type: none"> • F-DI on TM54F • PROFIsafe 	Safe Acceleration Monitor (SAM) during braking. Following expiry of the parameterized delay time SOS	SS1 → STO	No	Yes	Yes
SLS encoderless	<ul style="list-style-type: none"> • F-DI on TM54F • PROFIsafe • Continuously activated 	–	STO, SS1 (can be parameterized)	Yes	Yes, encoderless on request only	Yes
SLS	<ul style="list-style-type: none"> • F-DI on TM54F • PROFIsafe • Continuously activated 	–	STO, SS1, SS2 or SOS (can be parameterized)	Yes	Yes	Yes
SOS	<ul style="list-style-type: none"> • F-DI on TM54F • PROFIsafe 	–	SS1 → STO	Yes	Yes	Yes
SSM	<ul style="list-style-type: none"> • Always active, if configured 	–	Signals that the speed has fallen below a specified value	Yes	Yes	Yes
SDI	<ul style="list-style-type: none"> • F-DI on TM54F • PROFIsafe • Continuously activated 	–	STO, SS1, SS2 or SOS (can be parameterized)	Yes	Yes, encoderless on request only	Yes
SLP	<ul style="list-style-type: none"> • F-DI on TM54F • PROFIsafe 	–	STO, SS1, SS2 or SOS (can be parameterized)	Yes	Yes	Yes
SP	<ul style="list-style-type: none"> • Always active, if configured 	–	–	Yes	Yes	Yes
SBT	<ul style="list-style-type: none"> • F-DI on TM54F • PROFIsafe 	–	Signals test result	Yes	Yes	Yes

¹⁾ The encoderless Safety Extended Functions can be implemented only on request for S150 converters in chassis format and cabinet units.

²⁾ The activation option using terminals on TM54F currently requires an encoder.

³⁾ The activation option using terminals on TM54F currently requires a license.

SINAMICS S150 drive converter cabinet units

Safety Integrated with SINAMICS S150

Safe Brake Adapter (option K88)

The Safe Brake Control (SBC) function requires a Safe Brake Adapter for S150 drive cabinet units.

The Safe Brake Adapter allows safe control of electro-mechanical motor brakes.

The Safe Brake Adapter controls 230 V AC brakes. When the STO function is active, the Safe Brake Adapter safely closes the connected brake. The SBC function monitors the control of the brake, however, not its mechanical functioning.

The converter controls the connected brake using the "motor holding brake" function.

External overvoltage limiters are not required.

In the case of the Safe Brake Adapter, the brake is controlled in accordance with ISO 13849-1 to Performance Level PL d or Cat-egory 3 and in accordance with IEC 61508 SIL2.



Safe Brake Adapter

Overview of cabinet options

The S150 is a drive cabinet unit that is ready for connection and can be configured individually using cabinet options. Additional components are easy to select. Overview of safety-relevant options:

Option K01: Safety license for 1 axis

Option K82: Terminal module for controlling the Safe Torque Off and Safe Stop 1 safety functions

Option K87: TM54F Terminal Module

Option K48 SMC20 Sensor Module Cabinet-Mounted

Option K50: SMC30 Sensor Module Cabinet-Mounted

Option K52: Second SMC30 Sensor Module Cabinet-Mounted

Option K88: Safe Brake Adapter SBA, 230 V AC

Detailed information is provided in catalog D 21.3.

Selection and ordering data

Type rating	Rated output current I_{rated}	SINAMICS S150 drive converter cabinet units
For 400 V or 690 V kW	A	Article No.
Line voltage 380 ... 480 V 3 AC		
110	210	6SL3710-7LE32-1AA3
132	260	6SL3710-7LE32-6AA3
160	310	6SL3710-7LE33-1AA3
200	380	6SL3710-7LE33-8AA3
250	490	6SL3710-7LE35-0AA3
315	605	6SL3710-7LE36-1AA3
400	745	6SL3710-7LE37-5AA3
450	840	6SL3710-7LE38-4AA3
560	985	6SL3710-7LE41-0AA3
710	1260	6SL3710-7LE41-2AA3
800	1405	6SL3710-7LE41-4AA3
Line voltage 500 ... 690 V 3 AC		
75	85	6SL3710-7LG28-5AA3
90	100	6SL3710-7LG31-0AA3
110	120	6SL3710-7LG31-2AA3
132	150	6SL3710-7LG31-5AA3
160	175	6SL3710-7LG31-8AA3
200	215	6SL3710-7LG32-2AA3
250	260	6SL3710-7LG32-6AA3
315	330	6SL3710-7LG33-3AA3
400	410	6SL3710-7LG34-1AA3
450	465	6SL3710-7LG34-7AA3
560	575	6SL3710-7LG35-8AA3
710	735	6SL3710-7LG37-4AA3
800	810	6SL3710-7LG38-1AA3
900	910	6SL3710-7LG38-8AA3
1000	1025	6SL3710-7LG41-0AA3
1200	1270	6SL3710-7LG41-3AA3

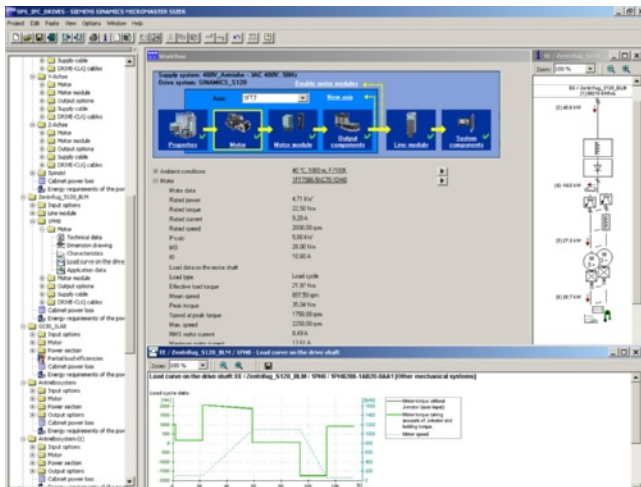
For further information about the order data and technical specifications, please refer to catalog D 21.3.

SINAMICS

Engineering software

SIZER for Siemens Drives engineering tool

Overview



The SIZER for Siemens Drives engineering tool is available for the user-friendly engineering of the following drives and controls:

- SINAMICS low voltage and MICROMASTER 4 drive systems
- SINUMERIK CNC control
- SIMOTION motion control system
- SIMATIC Technology

It provides support when setting up the technologies involved in the hardware and firmware components required for a drive task. SIZER for Siemens Drives covers the full range of operations required to configure a complete drive system, from basic single drives to complex multi-axis applications.

SIZER for Siemens Drives supports all of the engineering steps in a workflow:

- Configuring the power supply
- Selecting and dimensioning motors and gear units, including calculation of the mechanical transmission elements
- Configuring the drive components
- Compiling the required accessories
- Selecting the line-side and motor-side power options, e.g. cables, filters, and reactors

Configuring of Safety Integrated

SIZER for Siemens Drives support the configuring of Safety Integrated functions.

By selecting the safety functions (drive-based Safety Integrated and SINUMERIK-based Safety Integrated), the appropriate systems and drive devices are offered.

The selection of safety-capable encoders is taken into account.

The configuration of the DRIVE-CLiQ topology for SINAMICS S120 is oriented towards the configured safety functions.

When SIZER for Siemens Drives was being designed, particular importance was placed on a high degree of usability and a universal, function-based approach to the drive application. The extensive user guidance makes using the tool easy. Status information keeps you continually informed about the progress of the configuration process.

The SIZER for Siemens Drives user interface is available in German, English, French and Italian.

The drive configuration is saved in a project. In the project, the components and functions used are displayed in a hierarchical tree structure.

The project view permits the configuration of drive systems and the copying/inserting/modifying of drives already configured.

The configuration process produces the following results:

- A parts list of the required components (export to Excel, use of the Excel data sheet for import to SAP)
- Technical specifications of the system
- Characteristic curves
- Comments on system reactions
- Mounting arrangement of drive and control components and dimension drawings of motors
- Energy requirements of the configured application

Technological online help is available:

- Detailed technical specifications
- Information about the drive systems and their components
- Decision-making criteria for the selection of components
- Online help in German, English, French, Italian, Chinese and Japanese

Minimum system requirements

- PG or PC with Pentium III min. 800 MHz (recommended > 1 GHz)
- 512 MB RAM (1 GB RAM recommended)
- At least 4.1 GB of free hard disk space
- An additional 100 MB of free hard disk space on the Windows system drive
- Screen resolution 1024 × 768 pixels recommended 1280 × 1024 pixels
- Operating system:
 - Windows XP Home Edition SP2
 - Windows XP Professional 32 bit SP2
 - Windows XP Professional 64 bit SP2
 - Windows Vista Business
 - Windows 7 Ultimate 32 bit
 - Windows 7 Professional 32 bit
- Microsoft Internet Explorer 5.5 SP2

Selection and ordering data

	Article No.
SIZER for Siemens Drives engineering tool	6SL3070-0AA00-0AG0
DVD-ROM	
German, English, French, Italian.	

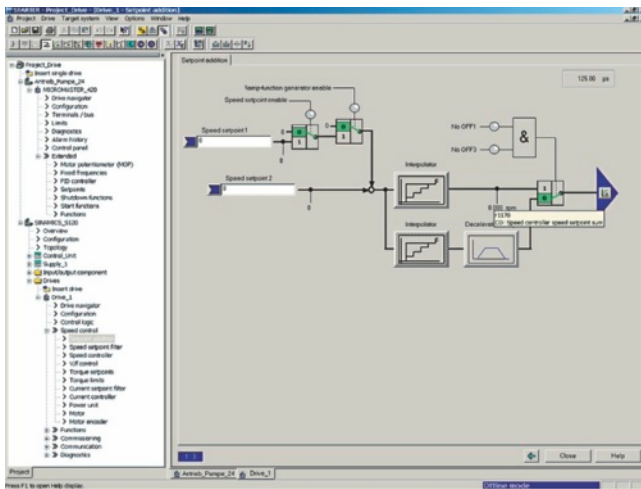
More information

The SIZER for Siemens Drives engineering tool is available free on the Internet at:

www.siemens.com/sizer

STARTER commissioning tool

Overview



The user-friendly STARTER commissioning tool can be used for

- Commissioning,
- Optimizing and
- Diagnostics

This software can be operated either as a standalone PC application, integrated in SIMATIC STEP 7 with TIA compatibility via Drive ES Basic, or it can be integrated into the SCOUT engineering system (for SIMOTION). The basic functions and handling are the same in both cases.

In addition to the SINAMICS drives, STARTER also supports MICROMASTER 4 devices.

The project wizards can be used to create the drives within the structure of the project tree.

Beginners are supported by solution-based dialog guidance, whereby a standard graphics-based display maximizes clarity when setting the drive parameters.

First commissioning is guided by a wizard which makes all the basic settings in the drive. Therefore, getting a motor up and running is merely a question of setting a few of the drive parameters as part of the drive configuration process.

The individual settings required are made using graphics-based parameterization screens, which also precisely visualize the principle of operation.

Examples of individual settings that can be made include:

- How terminals are used
- Bus interface
- Setpoint channel (e.g. fixed setpoints)
- Closed-loop speed control (e.g. ramp-function generator, limits)
- BICO interconnections
- Diagnostics

For experts, the expert list can be used to specifically and quickly access individual parameters at any time.

An individual compilation of frequently used parameters can be saved in dedicated user lists.

Configuring of Safety Integrated

STARTER supports the configuration of the Safety Integrated functions. Safety functions are configured and commissioned using graphic screens.

Controls for the safety functions via terminals or PROFI-safe are easy to implement with graphic support.

In addition, the following functions are available for optimization purposes:

- Self-optimization of the controller settings (depending on drive unit)
- Trace (depending on the drive unit, this is not supported for
 - MICROMASTER 4
 - SINAMICS G110
 - SINAMICS G120 < FW V4.4
 - SINAMICS G110D
 - SINAMICS G120D)

Diagnostics functions provide information about:

- Control/status words
- Parameter status
- Conditions of use
- Communication states

Performance features

- User-friendly: Only a small number of settings need to be made for successful first commissioning: Axis rotates
- Solution-oriented dialog-based user guidance simplifies commissioning
- Self-optimization functions reduce manual effort for optimization.

Minimum system requirements

The following minimum requirements must be complied with:

- Hardware
 - PG or PC with Pentium III min. 1 GHz (recommended >1 GHz)
 - Work memory 1 GB (recommended: 2 GB).
 - Screen resolution 1024×768 pixels, 16-bit color depth
 - Free hard disk memory: min. 3 GB
- Software
 - Microsoft Internet Explorer V6.0 or higher
 - 32-bit operating systems:
 - Microsoft Windows Server 2003 SP2
 - Microsoft Windows Server 2008
 - Microsoft Windows XP Professional SP3
 - Microsoft Windows 7 Professional incl. SP1
 - Microsoft Windows 7 Ultimate incl. SP1
 - Microsoft Windows 7 Enterprise incl. SP1 (standard installation)
 - 64-bit operating systems:
 - Microsoft Windows 7 Professional SP1
 - Microsoft Windows 7 Ultimate SP1
 - Microsoft Windows 7 Enterprise SP1 (standard installation)
 - Microsoft Windows Server 2008 R2

Selection and ordering data

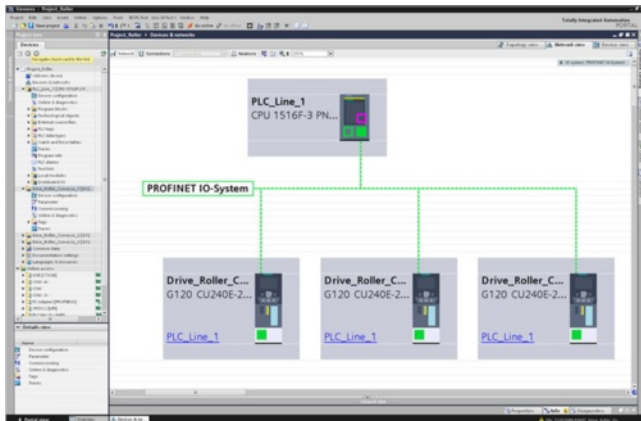
	Article No.
STARTER commissioning tool	6SL3072-0AA00-0AG0
for SINAMICS and MICROMASTER	
German, English, French, Italian, Spanish	

SINAMICS

Engineering software

Startdrive commissioning tool

Overview



Startdrive provides a TIA portal-integrated tool for

- Configuration
- Commissioning and
- Diagnostics

of the SINAMICS drive family. SINAMICS Startdrive V12 can be used to implement drive tasks with SINAMICS G120, G120C, G120D and G120P frequency inverters. The engineering tool has been optimized with regard to user friendliness and consistent use of the TIA Portal benefits of a common working environment for PLC, HMI and drives.

Installation variants

SINAMICS Startdrive can be installed both as

- an optional package for SIMATIC STEP 7 V12 and as
- a stand-alone version (without STEP 7).

The STARTER commissioning tool ([see page 4/159](#)) is still available and is offered in parallel. SINAMICS Startdrive can be installed on a PC in parallel with STARTER.

Startdrive supports the languages:

- German
- English
- French
- Spanish
- Italian and
- Chinese (simplified)

System requirements

SINAMICS Startdrive V12 is released for use with the following operating systems (32-bit, Windows 7, also 64-Bit):

- Microsoft Windows 7 Professional SP1
- Microsoft Windows 7 Enterprise SP1
- Microsoft Windows 7 Ultimate SP1
- Microsoft Windows XP Professional SP3
- Microsoft Server 2003 R2 Std. SP2
- Microsoft Server 2008 Std. SP2

Operating system	Processor	RAM	Graphic
Windows 7, 32 bit	Core i5, 2.4 GHz or comparable	3 GB	1280 x 1024
Windows 7, 64 bit	Core i5, 2.4 GHz or comparable	8 GB	1280 x 1024

Benefits

Efficient commissioning with easy configuration and powerful tools:

- High usability due to task-based navigation along the engineering workflow (hardware configuration, parameterization, commissioning, diagnostics)
- Time-saving and guided step-by-step commissioning
- User-friendly graphic function view for all drive functions
- List of drive parameters structured according to functions
- Easy integration of SIMOTICS motors
- Integrated control panel for direct operation of the inverter from the TIA Portal
- Powerful realtime trace for commissioning and drive diagnostics
- Intuitive and efficient inverter diagnostics through automatic display of messages
- Context-sensitive online help, e.g. for drive messages
- Integrated detailed diagnostics for the inverter (control/status words, parameter status, operating conditions, communication states)
- Simple configuration for drive-end Safety Integrated and the drive-internal basic positioning function (EPOS)
- Graphic configuration of drive-internal free function modules
- Online work on the inverter
 - Without previous creation of an offline project.
 - With new SINAMICS FW version (e.g. FW V4.6), without having to perform a tool update.
 - Available online functions without project: Commissioning with wizard and control panel, full parameter access with graphic function view and structured parameter list with complete inverter diagnostics

Integration

Integration of SINAMICS drives with SIMATIC in the TIA Portal

The software packages based on the TIA Portal are harmonized with each other and offer the user essential benefits: The TIA Portal enables simple integration of SINAMICS frequency inverters in your automation solution:

- Reduction in the familiarization overhead thanks to cross-tool uniformity of the operator inputs
- Device configuration and network connection of the inverters in the TIA Portal-wide configuration/network editor
- Device access to the inverters via the PLC across network boundaries (dataset routing)
- Automatic frame comparison between inverters and SIMATIC S7 PLC
- Reduction of standstill times through the integration of inverter messages in the S7 system diagnostics:
 - The drive messages are part of the S7 system diagnostics without previous configuration.
 - The drive messages are therefore automatically available as plain text in the TIA Portal, the web server of the S7 PLC and in the HMI.
- Time saving due to simple and guided configuration of the inverters for operation with SIMATIC S7 Motion Control.
- Short familiarization time for SIMATIC STEP 7 users due to common use of editors. The realtime trace and the drive control panel are identical to the editors in STEP 7.
- Reuse of drive configuration and parameter assignment with the aid of the TIA Portal library or standard TIA Portal functions for inverters, e.g. Undo, Redo.
- Block library supplied for easy integration of SINAMICS inverters into the user programs of the SIMATIC S7-300/400 and S7-1200/1500.
- Shared project storage for all devices in the project

Supported frequency inverters

Integration of the SINAMICS drives into the TIA Portal is carried out in steps. In SINAMICS Startdrive V12 the following SINAMICS

- SINAMICS G120
- SINAMICS G120C
- SINAMICS G120D and
- SINAMICS G120P

can be configured. All available Control Units (incl. PROFINET, PROFIBUS, Safety Integrated) are supported for these units, from SINAMICS firmware version 4.4 in each case. All combinable Power Modules can be configured (up to 250 kW).

Selection and ordering data

Article No.	
Startdrive commissioning tool for SINAMICS	6SL3072-4CA02-1XG0 Free Internet download at https://support.automation.siemens.com and then enter "Startdrive" in the search screen.
Supported languages: English, French, German, Italian, Spanish, Chinese (simplified)	
<ul style="list-style-type: none"> • Delivery on DVD incl. Single License and Certificate of License • Delivery as Internet download incl. Single License and Certificate of License 	

SIMOTION motion control system

SIMOTION D - Drive-based

Overview of SIMOTION D

Overview



SIMOTION D Control Units: D410-2, D4x5-2 (4 performance classes)

SIMOTION D is the compact, drive-based version of SIMOTION based on the SINAMICS S120 drives family.

The SIMOTION D Control Units are available in the following variants:

- SIMOTION D410-2 are compact Control Units for single-axis applications with multi-axis option. The Control Units are available in variants D410-2 DP and D410-2 DP/PN and are snapped onto the SINAMICS S120 PM340 Power Modules in blocksize format.
- SIMOTION D4x5-2 are Control Units for multi-axis applications in the SINAMICS S120 booksize format and are available in the following performance variants:
 - SIMOTION D425-2 DP and D425-2 DP/PN Control Units (BASIC Performance) for up to 16 axes
 - SIMOTION D435-2 DP and D435-2 DP/PN Control Units (STANDARD Performance) for up to 32 axes
 - SIMOTION D445-2 DP/PN (HIGH Performance) Control Unit for up to 64 axes
 - SIMOTION D455-2 DP/PN Control Unit (ULTRA-HIGH Performance) for up to 128 axes or applications with very short control cycle clocks

This fine scalability ensures a quick response to changing requirements in automation without having to change the system.

Device concept

With SIMOTION D, the PLC and motion control functionalities as well as the SINAMICS S120 drive software run on a shared control hardware. The IEC 61131-3-compliant PLC integrated in SIMOTION D means that the system is not just capable of controlling motion sequences, but that the entire machine can also be controlled with a single compact unit.

Depending on the SIMOTION D platform, HMI devices can be operated on the onboard PROFIBUS, Ethernet or PROFINET interface for operator control and monitoring. Functions such as remote maintenance, diagnostics and teleservice can also be used via these interfaces.

Benefits

- Cost-effective thanks to the integration of PLC, motion control and technology functions direct in the drive
- Employs the innovative SINAMICS S120 design
- Compact form-factor reduces control cabinet size
- Ideally suited to modular and distributed machine concepts
- User-friendly operation
- Variable networking via a wide range of communication interfaces:
 - D410-2 DP, D4x5-2 DP: Industrial Ethernet and PROFIBUS DP onboard
 - D410-2 DP/PN, D4x5-2 DP/PN: Industrial Ethernet, PROFIBUS DP and PROFINET IO onboard
- Powerful thanks to a range of technology functions
- Very simple engineering, from drive commissioning to open-loop control and Motion Control applications
- Easy to service thanks to the CompactFlash card, which can be easily replaced and contains all data (programs, data, drive parameters, and licenses)
- Very dynamic because the interfaces between PLC and Motion Control are no longer required

Application

SIMOTION D can be used optimally wherever

- the SINAMICS S120 drive family is used
- the motion control and PLC functionality are directly executed in the drive (SINAMICS S120)
- compact, space-saving construction is required
- high performance is required for motion control and high-speed I/O
- high electromagnetic compatibility and a high resistance to shock and vibration are required due to harsh ambient conditions
- modular machine concepts with high-speed isochronous coupling is required

The flexible solution for modular machine concepts

SIMOTION D optimally supports the implementation of modular machine concepts in which single-axis drives and high-performance multi-axis drives have to be combined:

- SIMOTION D410-2 (blocksize format) is the most cost-effective solution for the design of compact drives, ranging from single units to small-scale multi-axis solutions with typically 2 to 3 axes.
- SIMOTION D4x5-2 (booksize format) performs the open-loop and closed-loop control functions for multi-axis groups with up to 128 axes.

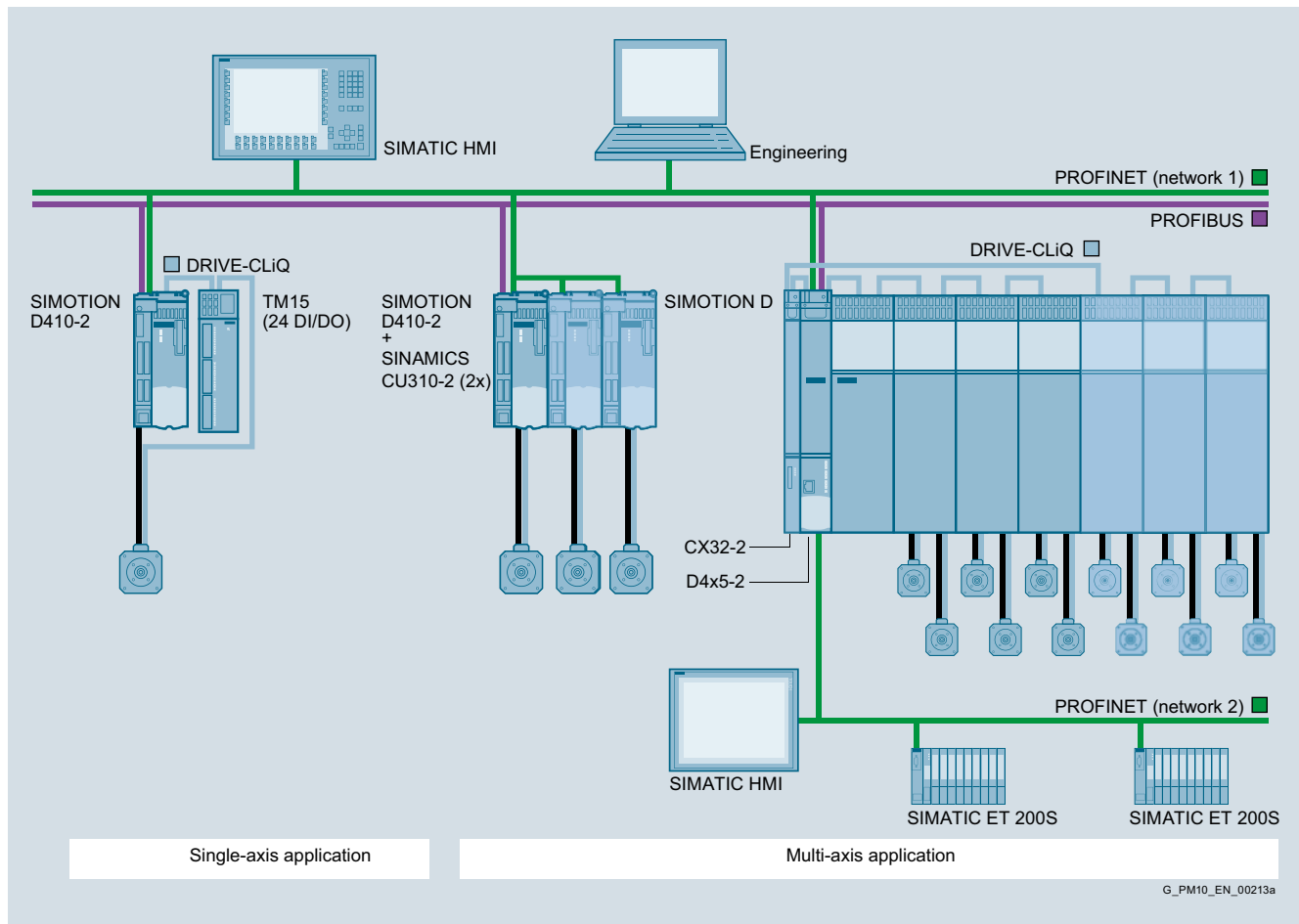
Important applications include:

Packaging machines

- Plastic and rubber processing machines
- Presses, wire-drawing machines
- Textile machines
- Printing machines
- Wood, glass, ceramics and stone working machines
- Converting
- Handling devices

Due to the increasing use of servo and vector drives, these machines require a high degree of integration of PLC, motion control and technology functions.

Design



Typical design of an automation solution using SIMOTION D

SIMOTION D components and interfaces

- Various status/error displays
- Onboard digital inputs and outputs
- Option slot (receptacle, only for D4x5-2), e.g. for expansion with additional I/Os with the TB30 Terminal Board
- Integrated communications interfaces for linking:
 - SINAMICS S120 drive modules
 - Distributed I/Os
 - HMI systems
 - PG/PC
 - Other motion control and automation systems
 - Other SINAMICS S110/S120 drives with digital setpoint interface
- Slot for CompactFlash card for data backup

Construction of a single axis with SIMOTION D410-2

The following components make up a SIMOTION D410-2 single axis system:

- A SIMOTION D410-2 Control Unit, designed for open and closed-loop control of a single drive
- A SINAMICS S120 PM340 Power Module, blocksize format (combined infeed and power module)
- Other drive components, such as
 - Power supply
 - Filter
 - Choke, etc.

The connection between SIMOTION D410-2 and the SINAMICS S120 PM340 Power Module is made via the integra-

ted PM-IF interface or, when the CUA31/CUA32 Control Unit Adapter is used, via DRIVE-CLiQ.

Structure of an axis grouping with SIMOTION D410-2

In order to create a multi-axis grouping with SIMOTION D410-2, additional SINAMICS S110/S120 Control Units are connected to the SIMOTION D410-2 by means of PROFIBUS or PROFINET.

Motion control is performed centrally by the SIMOTION D410-2 using the SIMOTION technology objects.

Structure of an axis grouping with SIMOTION D4x5-2

The following components comprise a SIMOTION D4x5-2 axis grouping:

- A SIMOTION D4x5-2 Control Unit, designed for open and closed-loop control of a multiple axis grouping
- A SINAMICS S120 Line Module (infeed module)
- One or more SINAMICS S120 Motor Modules (power modules)
- Other drive components, such as
 - Power supply
 - Filter
 - Choke, etc.

The connection between the SIMOTION D Control Unit and the SINAMICS S120 drive modules is made via DRIVE-CLiQ.

Note:

SINAMICS S120 PM340 Power Modules in blocksize format can be operated on a SIMOTION D4x5-2/CX32-2 with the Control Unit Adapters CUA31/CUA32.

SIMOTION motion control system

SIMOTION D - Drive-based

Overview of SIMOTION D

Design (continue)

Expansion using I/O

SIMOTION D can be expanded with the following I/O:

- Distributed I/O systems (e.g. SIMATIC ET 200S)
- Drive-based control cabinet I/O (e.g. TM15, TM31 Terminal Modules, etc.)
- I/Os in booksize compact format (e.g. TMC1080 PN, ...)

Function

Basic functionality

The SIMOTION D basic functionality is supplied with the CompactFlash card (CF) and is loaded when the voltage is switched on. The basic functionality includes:

- SIMOTION runtime system
 - User-programmable with several languages conforming to IEC 61131
 - Various methods of program execution (cyclic, sequential, event-driven)
 - PLC and arithmetic functionality
 - Communication and management functions
 - Motion control functions (Motion Control Basic)
- SINAMICS S120 drive control
 - SIMOTION D410-2: Current/speed control (based on CU310-2, firmware version V4.x) for up to 1 servo axis, 1 vector axis or 1 V/f axis
 - SIMOTION D4x5-2: Current/speed control (based on CU320-2, firmware version V4.x) for up to 6 servo axes, 6 vector axes or 12 V/f axes, closed-loop control for infeed (Active Line Module)
- Testing and diagnostic tools

This basic functionality can be expanded with loadable technology packages, if required.

Position-controlled motion control for drives

- Integrated drives (SINAMICS Integrated):
The power units are connected over DRIVE-CLiQ or over the integrated PM-IF interface optionally for the SIMOTION D410-2.
- Drives with digital setpoint interface:
SIMOTION D enables position-controlled motion control for drives with digital setpoint interfaces via PROFIBUS DP/PROFINET IO with PROFIdrive.
- Drives with analog setpoint interface, e.g. for retrofit or hydraulic applications:
The ADI 4 (Analog Drive Interface for 4 Axes) or IM 174 (Interface Module for 4 Axes) module can be used to connect drives with analog ± 10 V setpoint interfaces. The IM 174 also makes it possible to connect stepper drives with a pulse direction interface.
Both modules are connected over PROFIBUS DP. The following can be connected to one ADI 4 or IM 174 module:
 - 4 drives
 - 4 encoders
 - Digital inputs and outputs

SIMOTION technology packages

A special feature of SIMOTION is that the basic functionality can be expanded by loading technology packages, such as:

- Motion Control with the technology functions:
 - POS – Positioning
 - GEAR – Synchronous operation/electronic gear
 - CAM – Cam
 - PATH – Path interpolation (not D410-2)
- TControl – Temperature controller
- MIIF – Multipurpose Information Interface

Since the technology functions have modular licenses, you only pay for what you will actually use.

Performance

Hardware-supported floating-point arithmetic enables complex arithmetic functions to be used effectively.

Fast instruction execution opens up completely new application possibilities in the mid-performance to high-performance range.

Configuring/parameterizing/programming

SIMOTION SCOUT is a powerful and user-friendly engineering tool. It is an integrated system for all engineering steps, from configuring and parameterization, through programming, to testing and diagnostics. Graphical operator prompting, using dialog boxes and wizards, as well as text-based and graphical languages for programming, considerably reduce the familiarization and training periods.

Operator control and monitoring (HMI)

Communication services which support user-friendly data exchange with HMI devices are integrated in the basic functionality of SIMOTION D.

Operator control and monitoring can be implemented using SIMATIC HMI devices, such as TPs (Touch Panels), OPs (Operator Panels) or MPs (Multi Panels).

These devices can be connected to SIMOTION D over PROFIBUS, Industrial Ethernet or PROFINET and they are configured using WinCC flexible.

Version V7.0 and higher of the SCADA system WinCC features a SIMOTION channel which is included as standard on the WinCC DVD.

With the SIMATIC NET communications software, an open, standardized OPC interface is available for accessing SIMOTION from other Windows-based HMI systems..

SIMOTION IT service and diagnostic functions

SIMOTION IT provides SIMOTION D with an integrated Web server on which, for example, user-specific Web pages can be stored.

Read and write access can be made to the Control Unit variables. Java scripts or applets also allow the implementation of active operation and display functions in the Web pages that can be executed on a client PC with an Internet browser.

Process and data communication

Thanks to its integrated interfaces, SIMOTION D supports both process and data communication.

PROFINET IO with IRT is available for exacting motion control applications. In addition to cycle clock synchronization, cycle times of minimum 250 is and safety-related communication (PROFIsafe), the PROFINET interfaces on the SIMOTION D4x5-2 Control Units also support media redundancy (MRP/MRPD).

The SIMOTION SCOUT engineering system is provided for user-friendly communication configuration and diagnostics.

Function

Safety Integrated functions

The integrated safety functions of SINAMICS S120 allow SIMOTION D to provide practical, highly-effective protection for personnel and machinery.

The following Safety Integrated functions are currently available for the integrated SINAMICS S120 drive system:
(Terms in accordance with IEC 61800-5-2)

- Safe Torque Off (STO)
- Safe Brake Control (SBC)
- Safe Stop1 (SS1)
- Safe Stop2 (SS2)
- Safe Operating Stop (SOS)
- Safely Limited Speed (SLS)
- Safe Speed Monitor (SSM)
- Safe Direction (SDI)
- Safely Limited Position (SLP), (as of firmware V4.4)
- Safe Position (SP), (as of firmware V4.4)
- Safe Brake Test (SBT), (as of firmware V4.4)

Activation of Safety Integrated functions

Safety Integrated functions can be activated by the following methods:

- Via terminals on the D4x5-2/CX32-2 and on the power unit (STO, SBC, SS1 only)
- Via fail-safe inputs on the TM54F Terminal Module
- Via fail-safe Inputs on the D410-2
- Via PROFINET/PROFIBUS with PROFIsafe.

The Safety Integrated functions are implemented electronically and therefore offer short response times in comparison to solutions with externally implemented monitoring functions.

Safety Integrated functions via PROFIsafe

Safety Integrated functions are activated via "PROFINET with PROFIsafe" or "PROFIBUS with PROFIsafe" safe communication. The control (F logic) is implemented using an F-CPU connected via PROFINET or PROFIBUS, for example, a SIMATIC S7-300 F-CPU.

Safety Integrated functions are routed through from the SIMOTION D410-2 and D4x5-2 Control Units to the following drives:

- Integrated SINAMICS S120 drives on SIMOTION D410-2 and D4x5-2
- Drives on the SIMOTION CX32-2 Controller Extension
- Drives on SINAMICS Control Units connected via PROFIBUS to SIMOTION D.
- Drives on SINAMICS Control Units connected to SIMOTION D via PROFINET (F-CPU must be connected via PROFINET in this case).

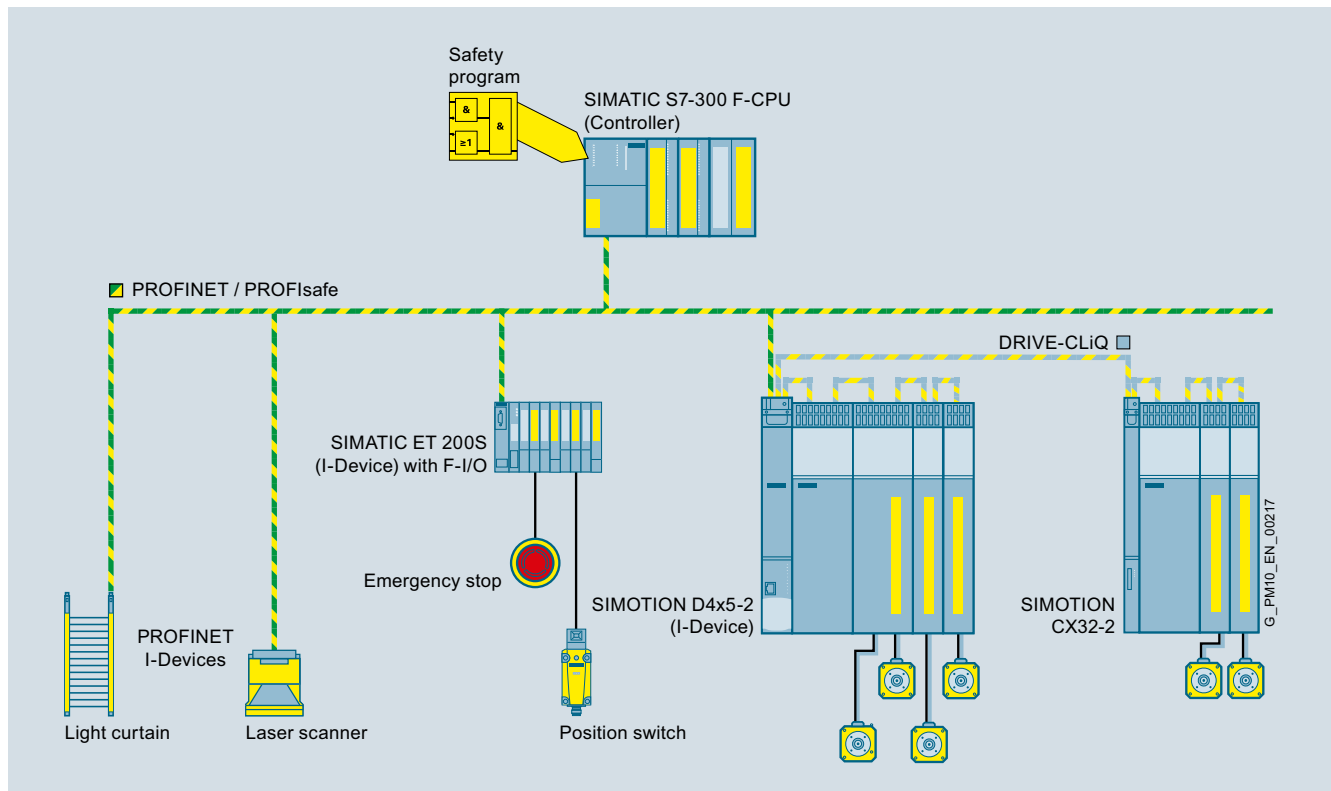
Note

For more information about possible topologies, axis quantity structures and suitable components, please contact your local Siemens sales office.

Detailed information can be found in the SIMOTION D Commissioning Manuals as well as in the SINAMICS documentation.

Industry Mall: www.siemens.com/industrymall

Internet: www.siemens.com/simotion



Safety Integrated solution using a SIMOTION D4x5-2 as an example: Control of the safety functions via PROFINET with PROFIsafe

SINUMERIK CNC automation systems

Safety Integrated with SINUMERIK

SINUMERIK 840D sl

Overview



- SINUMERIK Safety Integrated provides integrated safety functions that support the implementation of highly effective personnel and machine protection. The safety functions comply with the requirements of Category 3 as well as Performance Level PL d according to EN ISO 13849-1 and safety integrity level SIL 2 according to EN 61508. Consequently, important functional safety requirements can be implemented easily and economically. Available functions include, among others:
 - Functions for safety monitoring of velocity and standstill
 - Functions for establishing safe boundaries in work spaces and protected spaces, and for range recognition
 - Direct connection of all safety-related signals and their internal logical linkage

Benefits

- High level of safety:
Complete implementation of the safety functions in Category 3/SIL 2/PL d
- High level of flexibility:
Supports the implementation of practically sound safety and operating concepts
- Extremely cost-effective:
Reduced hardware and installation costs
- Enhanced availability:
Absence of interference-susceptible electromechanical switching elements

Function

The safety functions are available in all modes and can communicate with the process using safety-related input/output signals. They can be implemented for each individual axis and spindle:

Safety Integrated system-integrated (option)

- Safe shutdown
Ensures safe transition of the drive from motion to rest when a monitoring device or a sensor (e.g. a light barrier) is triggered.
- Safe braking ramp (SBR)
Monitoring of the speed curve. The speed must be reduced after a stop request has been issued
- Safe operating stop (SBH)
Monitors drives for standstill. The drives remain fully functional in position control
- Safe standstill (SH)
Suppression of drive pulses, providing safe electronic interruption of the power supply
- Safely limited speed (SLS)
Monitoring of configurable speed limits
- Safety-related output $n < nx$
Safe speed recognition of a drive
- Safe software limit switch (SE)
Variable travel limitations
- Safe software cams (SN)
Range recognition
- Safety-related input/output signals (SGE/SGA)
Interface with process
- Safe programmable logic (SPL)
Direct connection of all safety-related signals and their internal logical linkage
- Safe brake management (SBM)
 - 2-channel braking signal (integrated in the Motor Module) (SBC)
 - Cyclic brake test (SBT)
- Safety-related communication via standard bus
 - Connection of distributed I/O for process and safety signals via PROFIBUS/PROFINET using the PROFIsafe protocol
 - Safety-related CPU - CPU communication via PROFIBUS or PROFINET
- Integrated acceptance test
Partially automated acceptance test for all safety-relevant functions. Simple operation of the test process, automatic configuration of Trace functions and automatic generation of an acceptance record

Safety Integrated drive-based (basic version)

- Safe Torque Off (STO)
Suppression of drive pulses, providing safe electronic interruption of the power supply
- "Safe Brake Control (SBC)
Safe (two-channel) control of a holding brake (integrated in the Motor Module)
- "Safe Stop 1 (SS1)
Safe stopping of the drive followed by STO

SINUMERIK CNC automation systems

Safety Integrated with SINUMERIK

SINUMERIK 840D sl

Integration

Preconditions:

- SINUMERIK 840D sl
- SINAMICS S120 in booksize format
- The encoder systems used must meet the requirements of SINUMERIK Safety Integrated
- "The measuring circuit cables must comply with the SINAMICS S120 specification.
- "Sensor/actuator integration with PROFIsafe I/Os
- "Fail-safe modules
 - SIMATIC ET 200M
 - SIMATIC ET 200S
 - SIMATIC ET 200SP
 - SIMATIC ET 200eco
 - SIMATIC ET 200pro
 - DP/AS-i F-Link
- SIMATIC S7 F Configuration Pack available as a download at: <http://support.automation.siemens.com/WW/view/en/15208817>
- For the integrated acceptance test SinuCom NC software tool (can run on PC/PG)

Selection and ordering data

Article-No.

SINUMERIK Safety Integrated for SINUMERIK 840D sl

SINUMERIK SI-Basic

incl. 1 axis/spindle up to 4 inputs and up to 4 outputs can be used for the safe programmable logic

6FC5800-0AM63-0YB0

SINUMERIK SI-Comfort

for up to 1 axis/spindle up to 64 inputs and up to 64 outputs can be used for the safe programmable logic

6FC5800-0AM64-0YB0

SINUMERIK SI-High Feature

for up to 1 axis/spindle up to 192 inputs and up to 192 outputs can be used for the safe programmable logic Requirement: NCU 720.x/NCU 730.x

6FC5800-0AS68-0YB0

SINUMERIK SI axis/spindle package

extra for each additional axis/spindle

6FC5800-0AC70-0YB0

SINUMERIK SI axis/spindle package

further additional 15 axes/spindles

6FC5800-0AC60-0YB0

Only one SI Basic and one SI Comfort option can be ordered for each SINUMERIK 840D sl NCU. If a machine with Safety Integrated requires up to 4 safe inputs and 4 safe outputs, the SI Basic option can be ordered. If 5 or more safe inputs/outputs are required, the SI Comfort option should be ordered.

Ordering example 1:

The machine has 2 axes and 1 spindle, which are to be monitored by Safety Integrated. 4 safe inputs and 3 safe outputs are required. The following options must be ordered:

Quantity	Order item	Remark
1	6FC5800-0AM63-0YB0	SI-Basic
2	6FC5800-0AC70-0YB0	SI axis/spindle package

Ordering example 2:

The machine has 5 axes and 1 spindle, which are to be monitored by Safety Integrated. 9 safe inputs and 5 safe outputs are required. The following options must be ordered:

Quantity	Order item	Remark
1	6FC5800-0AM64-0YB0	SI-Comfort
5	6FC5800-0AC70-0YB0	SI axis/spindle package

More information

The Safety Integrated functions of the SINUMERIK are generally certified by independent institutes. An up-to-date list of certified components is available on request from your local Siemens office. If you have any questions relating to certifications that have not been completed, please ask your Siemens contact.

Encoder systems

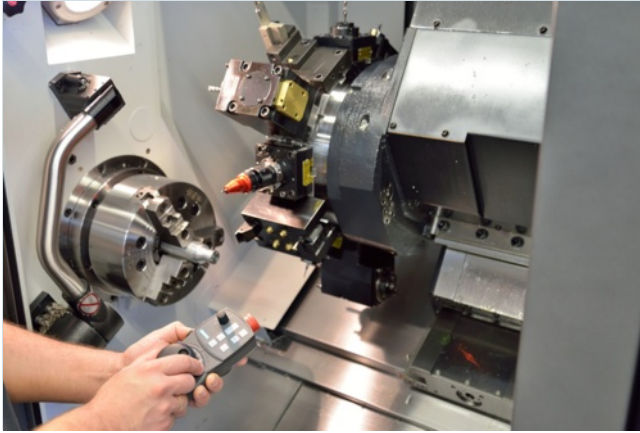
If you require information about the use of suitable encoder systems with SINUMERIK Safety Integrated, please contact your local Siemens office.

SINUMERIK CNC automation systems

Safety Integrated with SINUMERIK

SINUMERIK 828D

Overview



Drive Based Safety Integrated provides integrated safety functions that support the implementation of highly effective personnel and machine protection. The safety functions comply with the requirements of Category 3 as well as Performance Level PL d according to DIN EN ISO 13849-1 and safety integrity level SIL 2 according to DIN EN 61508. Consequently, important functional safety requirements can be implemented easily and economically.

Included in the functional scope:

- Functions for safe monitoring of standstill
- Functions for safe monitoring of speed

Benefits

- High level of safety:
Full implementation of the safety functions in Category 3/SIL 2/PL d
- High level of flexibility:
Practical safety and operating concepts can be implemented
- Faster commissioning due to integrated safety functions

Function

The safety functions are available in all modes and can communicate with the process using safety-related input/output signals. These can be implemented individually for each axis and spindle. The following Safety Integrated functions are available (terms in accordance with IEC 61800-5-2):

Safety Integrated basic functions

- **Safe Torque Off (STO)**
Prevention of unexpected startup by internal cancellation of the drive pulses.
- **Safe Brake Control (SBC)**
Safe brake control of holding brakes which are active in the de-energized state, e.g. motor holding brakes.
- **Safe Stop 1 (SS1)**
Safe stopping of the drive with subsequent prevention of unexpected startup (STO).

Extended Safety Integrated functions

- **Safe Operating Stop (SOS)**
Monitors drives for standstill. The drives remain fully functional for position control.
- **Safe Stop 2 (SS2)**
Safe stopping of the drive with subsequent monitoring for standstill (SOS).
- **Safely Limited Speed (SLS)**
Monitoring of configurable velocity limit values, e.g. during setup.

- **Safe Speed Monitor (SSM)**

Safe checkback signal when a value falls below a settable speed limit, e.g. for enabling a protective door.

- **Safe Acceleration Monitor (SAM)**

Fastest possible detection of resumed acceleration of the axis during braking (SS1 and SS2).

- **Safe Direction (SDI)**

Safe monitoring of the direction of motion

The Safety Integrated basic functions are license-free. The Extended Safety Integrated functions require a software license in the form of a CNC option per axis with safety functions.

The basic functions of Safety Integrated are activated via the terminals of the SINAMICS S120 Combi Power Modules or the SINAMICS S120 Motor Modules in booksize compact format and SINUMERIK 828.

A TM54F Terminal Module is required for controlling the Extended Safety Integrated functions.

For the formation of the safe control logic, fail-safe safety relays are recommended.

See chapter 3 or Siemens Industry Mall:

www.siemens.com/industrymall

Integration

- SINUMERIK 828D BASIC T
- SINUMERIK 828D BASIC M
- SINUMERIK 828D
- SINAMICS S120 Combi Power Module or SINAMICS S120Booksize Compact Motor Module
- Motors with encoders that comply with the Safety Integrated specification: 1PH8 or 1FK7 motors
- Encoder system: If you require information about the use of suitable encoder systems with SINUMERIK Safety Integrated, please contact your local Siemens office.
- Signal cables that comply with the SINAMICS S120 specification: MOTION-CONNECT
- Control of the Extended Safety Integrated functions: TM54F Terminal Module
- CNC software license is required per axis with the Extended Safety Integrated functions (see SINUMERIK 828D BASIC)
- 3TK28, 3RK3 or 3SK1 safety relays

Selection and ordering data

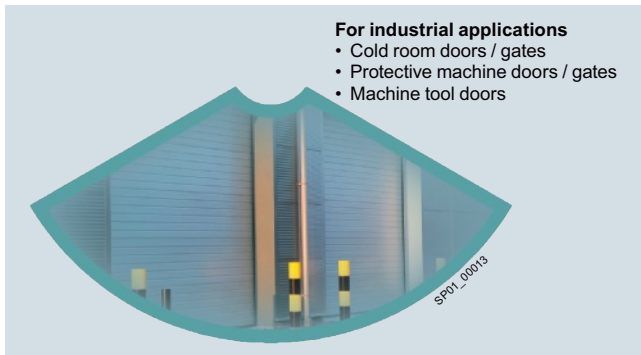
	Article-No.
SINUMERIK Safety Integrated for SINUMERIK 828D	6FC5800-0AC50-0YB0
Safety Integrated functions for a CNC axis	

SIDOOR automatic door controls

For industrial applications

SIDOOR ATD400W machine tool door drive

Overview



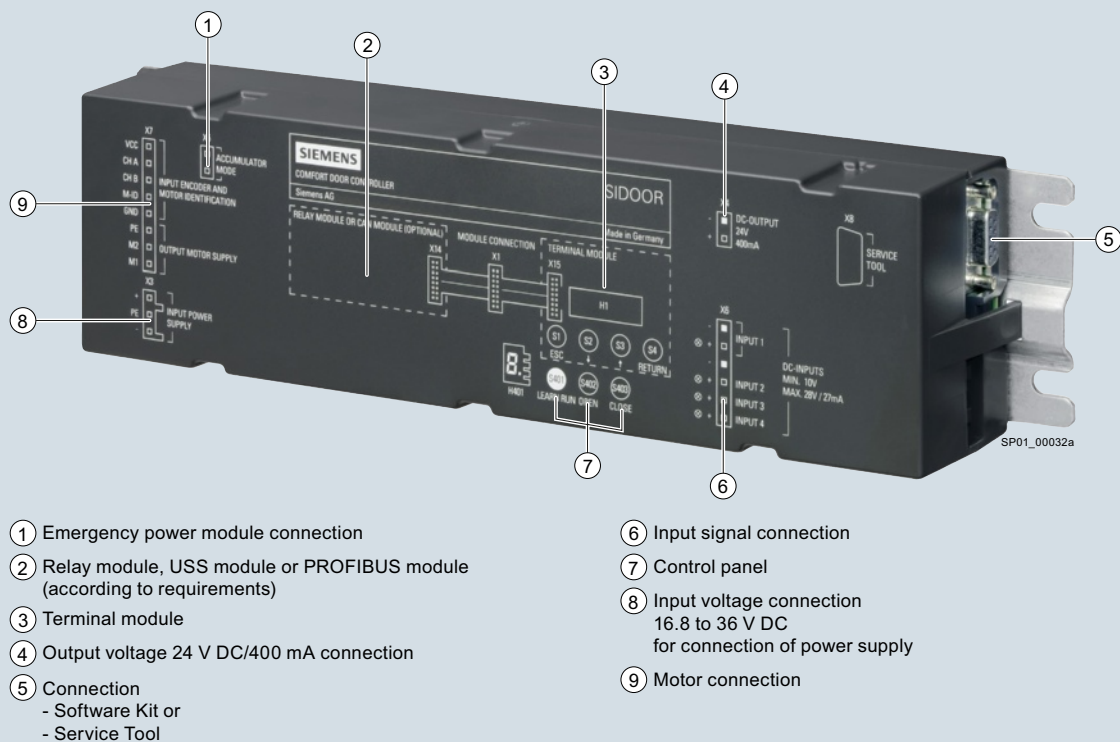
Automatic door controllers for industrial applications

SIDOOR door control systems permit the control of motors for moving doors with masses of up to 400 kg. They are generally connected to the higher-level application via digital or serial interfaces and can be configured via a user interface.

The SIDOOR ATD400W controller is an intelligent door control system for operating machine tool doors. A relay module is integrated.

The product-specific application/requirement lies in complying with the special industrial requirements regarding functional safety and the door closing mechanisms. Protective machine doors and power-actuated doors and gates comply with the safety standard ISO 13849-1 (Safety of Machinery and Machinery Directive).

Overview



- ① Emergency power module connection
- ② Relay module, USS module or PROFIBUS module (according to requirements)
- ③ Terminal module
- ④ Output voltage 24 V DC/400 mA connection
- ⑤ Connection
 - Software Kit or
 - Service Tool
- ⑥ Input signal connection
- ⑦ Control panel
- ⑧ Input voltage connection
16.8 to 36 V DC
for connection of power supply
- ⑨ Motor connection

SIDOOR ATD400W machine tool door drive

The SIDOOR ATD400W machine tool door drive enables the quick, easy and flexible movement, installation and configuration of a wide range of industrial door drive systems.

- Relay module version
- For dynamic door weights up to 400 kg
- Automatic door weight detection
- Operating temperature -20 to +50 °C
- Flexible motor management (three different motor types), automatic detection
- Opening width 0.3 to 4 m
- Emergency power input via special emergency power module 24 V DC \pm 15 %
- Auxiliary voltage output 24 V DC \pm 15 %; 0.4 A (short-circuit-proof)
- Output stage short-circuit-proof
- Vandal-proof
- Degree of protection IP54 for 180 to 400 kg motor versions, gear unit IP40

SIDOOR automatic door controls

For industrial applications

SIDOOR ATD400W machine tool door drive

Application

The SIDOOR ATD400W machine tool door drive is an intelligent door control system which enables protective doors for machine tools to be opened and closed at adjustable speeds and accelerations.

The maintenance-free, variable speed drive unit comprises a DC motor with non-self-locking gearing.

Three different motors are available:

- SIDOOR M2 geared motor (24 V DC/1.8 A; motor for max. overall door leaf weight of 120 kg)
- SIDOOR M3 geared motor (30 V DC/4.0 A; motor for max. overall door leaf weight of 180 kg)
- SIDOOR M4 geared motor (30 V DC/4.0 A; motor for max. overall door leaf weight of 400 kg)

These must be ordered separately, [see Industry Mall](http://www.siemens.com/sidoor) or www.siemens.com/sidoor

Operation of the door drive does not require a limit switch. The door width and the "OPEN/CLOSED" positions are determined automatically.

The current operating states are indicated by a 7-segment display directly in the SIDOOR ATD400W machine tool door drive. They can also be displayed externally with the aid of the Software Kit or Service Tool, [see Industry Mall](http://www.siemens.com/sidoor) or www.siemens.com/sidoor

Power transmission is via a toothed belt, which passes over a deflector unit and can be fitted with two door clutch holders. These accessories are not included in the scope of supply, [see Industry Mall](http://www.siemens.com/sidoor) or www.siemens.com/sidoor

This enables it to drive both single-sided and centrally opening doors.

Design

The SIDOOR ATD400W machine tool door control drive system is made up of several components:

Version	Type
Control devices	
SIDOOR ATD400W machine tool door drive (incl. terminal module and relay module)	6FB1141-1AT10-3WE2
The following individual components must be ordered separately:	
Power supplies	
• Mains transformer	6FB1112-0AT20-2TR0
• NT40 switch-mode power supply	6FB1112-0AT20-3PS0
Additional units to enable the universal use and maintenance of the door drive system	
• Software Kit	6FB1105-0AT01-6SW0
• Service Tool	6FB1105-0AT01-6ST0
• Emergency power module	6FB1115-0AT10-4CP0
DC geared motors	
• SIDOOR M2 geared motor (max. door weight of 120 kg)	6FB1103-0AT1.-5MA0
• SIDOOR M3 geared motor (max. door weight of 180 kg)	6FB1103-0AT1.-4MB0
• SIDOOR M4 geared motor (max. door weight of 400 kg)	6FB1103-0AT1.-3MC0
Accessories for the complete system	
• Rubber-metal anti-vibration mount for low-noise operation of the door drive system	6FB1104-0AT02-0AD0
- For the SIDOOR M3 geared motor	6FB1104-0AT01-0AD0
- For the SIDOOR M4 geared motor	
• Mounting bracket	6FB1104-0AT01-0AS0
- For the SIDOOR M4 geared motor	
for flexible accommodation of the rubber-bonded metal	6FB1104-0AT02-0AS0
- For the deflector unit	
for the toothed belt to be set to the required belt tension	6FB1104-0AT01-0CP0
• Door clutch holder	
for connecting the respective door leaf by means of a toothed belt	6FB1104-0AT03-0AS0
• Deflector unit	
for the toothed belt STS for attaching on the door system	
• Toothed belt STS	
as connection between the door system and the final positions of the door	6FB1104-0AT01-0AB0
- 4 m long	6FB1104-0AT02-0AB0
- 45 m long	

SIDOOR automatic door controls

For industrial applications

SIDOOR ATD400W machine tool door drive

Technical specifications

Type	6FB1141-1AT10-3WE2	
General data		
Supply voltage at DC	V	36
Relative positive tolerance of the supply voltage	%	3
Input voltage		
• Per DC input	V	10 ... 28
Input current		
• Per DC input	mA	9 ... 27
Product feature		
• Control inputs isolated		Yes
• Control inputs p-switching		Yes
Output current at 24 V DC output, maximum	mA	400
Property of the 24 V DC output		
• Note		CAUTION: Do not supply with external voltage!
• Short-circuit-proof		Yes
Product expansion optional		Emergency power module
Switching capacity current of output relay		
• At 230 V		
- At AC	mA	10 ... 1 000
• At 50 V		
- At DC	mA	10 ... 1 000
Opening width of door	m	0.3 ... 4
Ambient temperature		
• During operation	°C	-20 ... +50
• During storage	°C	-40 ... +50
IP degree of protection		IP20
Relative humidity		
• No condensation	%	10 ... 93
Dimensions		
• Width	mm	320
• Height	mm	60
• Depth	mm	80
Standards		
Type of inspection TÜV prototype tested		Yes
Certificate of suitability CE marking		Yes
Standard		
• For EMC		IEC 61000-6-2/IEC 61000-6-4
• For safety		IEC 60950-1:2006
Performance level (PL) according to ISO 13849-1		d
Category according to ISO 13849-1		2

Selection and ordering data

Product designation	DT	Article No.
---------------------	----	-------------

SIDOOR ATD400W machine tool door drives



6FB1141-1AT10-3WE2

SIDOOR ATD400W control device for machine tool doors with relay module

C 6FB1141-1AT10-3WE2

SIDOOR automatic door controls

For industrial applications

Notes

Appendix



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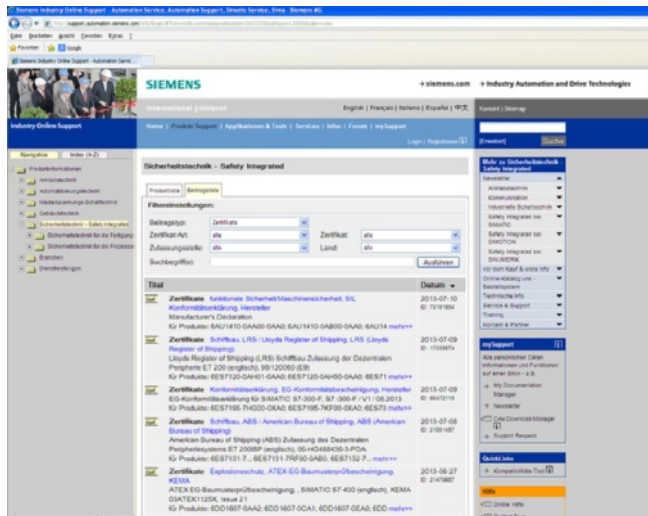
Appendix

Safety characteristics

Approvals, test certificates, characteristic curves

An overview of the certificates and manuals available for Industrial Control products along with more technical documentation can be consulted daily on the Internet under the topic "Product Support" at:

<http://support.automation.siemens.com>



Product Support: Approvals/Certificates

Safety characteristics

- Within the following standards, the so-called B10 values for calculating the safety integrity or safety integrity level (SIL) in functional safety at a high or continuous demand rate are required also for electromechanical switchgear
- IEC 62061 "Safety of machines - Functional safety of safety-related electrical, electronic and programmable electronic control systems",
- ISO 13849-1 "Safety of machines - Safety-related components of controls - Part 1: General principles".

Failure rates of electromechanical components are required for calculating the safety integrity or safety integrity level (SIL) in functional safety:

- in the manufacturing industry at a (high demand) rate
- in the process industry at a (low demand) rate

Further requirements are laid down in IEC 61511-1 "Functional safety - Safety instrumented systems for the process industry sector - Part 1: Framework, definitions, system, hardware and software requirements".

The German versions of the above standards are:

- EN 62061 (VDE 0113-50), October 2005, which since 31.12.2005 has been harmonized as EN 62061 under the Machinery Directive,
- EN ISO 13849-1:2008
- EN 61511-1 (VDE 810-1).

Safety Evaluation Tool

The TÜV-tested Safety Evaluation Tool assists in calculating the safety function as verification for the machine documentation. You can find this free on the Internet at:

www.siemens.com/safety-evaluation-tool.



Free-of-charge tool for evaluating safety functions:
The Safety Evaluation Tool

Neutral data interface

Safety-relevant characteristic values of products from other manufacturers can now be imported into the Safety Evaluation Tool in XML format in accordance with the VDMA 66413 specification– or the characteristic values of Siemens safety products can be exported for other calculation tools.

At www.siemens.com/safety-functional-examples you will also find examples of functions with calculations according to the current standards.

Definitions

$\lambda(t) dt$ is the probability that a unit which has not failed by a certain time t will fail in the following interval $(t; t + dt)$. Failure rates have the dimension 1/time unit, e.g. 1/h. Failure rates for components are often specified in FIT (failures in time unit): 1 FIT equals $10^{-9}/h$.

From the failure rate it is possible to derive a (mathematical) distribution function of the failure probability:

$$F(t) = 1 - \exp(-\lambda t), \text{ with } \lambda \text{ as constant failure rate}$$

- The mean value of this exponential distribution is also referred to as:
 - Mean Time To Failure (MTTF) in the case of irreparable components; 63.2 % of components fail by the MTTF.
 - Mean Operating Time Between Failures (MTBF) in the case of repairable components.
- $MTTF = 1/\lambda$
(MTTF is a statistical mean value but no guarantee for endurance).

Electromechanical components are often irreparable components. In general, the failure rate of monitored units changes with age.

The B10 value for devices subject to wear is expressed in number of operating cycles:

- This is the number of switching cycles at which during a life-time test, 10% of the test objects have failed (or: the number of operating cycles after which 10 % of the devices have failed).

For low demand rates (mainly in the process industry), the failure rate and not the B10 value is used to determine the failure probability.

Standard B10 values at a high demand rate

With the help of the B10 value and a simplified formula (see section 6.7.8.2.1 of EN 62061), the user can then calculate the total failure rate of an electromechanical component:

$$\lambda = 0.1 \times C / B10$$

with C = operating cycles per hour. C is specified by the user.

The failure rate is made up of safe (λ_S) and dangerous (λ_D) failures:

$$\lambda = \lambda_S + \lambda_D$$

or

$$\lambda_D = [\text{share of dangerous failures in \%}] \times \lambda$$

$$\lambda_S = [\text{share of safe failures in \%}] \times \lambda$$

The failure rate of the dangerous failures λ_D of the components used is needed for further calculations.

Listed in the following table are the standard B10 values and the share of dangerous failures for SIRIUS product groups at a high demand rate.

Standard B10 values (at a high demand rate)		
SIRIUS product group (electromechanical components)	Standard B10 value ¹⁾ (operating cycles)	Share of dangerous failures
3SB2/3SB3/3SF5 EMERGENCY-STOP control devices (with positive-opening contacts)	30 000	20 %
- pulled to unlatch - rotated to unlatch (also with lock)	100 000	20 %
3SE7/3SF2 Cable-operated switches for EMERGENCY-STOP function (with positive-opening contacts)	100 000	50 %
3SE5/3SF1 Standard position switches/basic switches (with positive-opening contacts)	10 000 000	20 %
3SE5/3SF1 Position switches with separate actuator (with positive-opening contacts)	1 000 000	20 %
3SE5/3SF1 Position switches with tumbler (with positive-opening contacts)	1 000 000	20 %
3SE5/3SF1 Hinge switches (with positive-opening contacts)	1 000 000	20 %
3SB3 Pushbuttons (non-latching, with positive-opening contacts)	10 000 000	20 %
Contactors/motor starters for switching motors:		
- 3RT/3TF6/3TB	1000 000 ²⁾	73 %
- 3TC	1000 000 ²⁾	73 %
Contactor relays and auxiliary switches (with positive-opening contacts, and at $I < 0.3 \cdot I_e$)	1000 000	73 %

¹⁾ Only applies under the conditions specified in the technical specifications

²⁾ Calculation of the B10 values was based on 66 % of the rated current value I_e .

The B10_d value used in EN ISO 13849-1:2008 is determined as follows:

$$B10_d = \frac{B10}{\text{Share of dangerous failures}}$$

Calculation example

A protective door is monitored by a position switch with a separate actuator.

The protective door is opened 4 times an hour.

The overall failure rate of the position switch is:

$$\lambda = 0.1 \cdot C / B10 \text{ [failures/h]}$$

$$\lambda = 0.1 \cdot 4 / 1000000 = 4 \cdot 10^{-7} \text{ [failures/h]}$$

The dangerous failure rate is calculated with:

$$\lambda_D = 20 \% \text{ von } \lambda = 0.2 \cdot 4 \cdot 10^{-7} \text{ [failures/h]}$$

$$\lambda_D = 8 \cdot 10^{-8} \text{ [failures/h]}$$

Standard failure rates (at a low demand rate)

On the basis of the failure rates it is possible to calculate the average probability of failure on demand (PFD_{avg}) of a PLT protective device.

A so-called low demand rate is assumed, meaning the rate of demand on the safety-related system amounts to no more than once a year and is not greater than double the frequency of the repeat test.

A repeat test once a year is recommended for electromechanical components in order to reveal passive faults.

For special applications it is possible, in agreement with the inspecting institution (e.g. a technical inspectorate, government agency or the like) to extend the test intervals by using suitable solutions (e.g. a multi-channel version etc.).

Listed in the following table are the standard failure rates and the share of dangerous failures for SIRIUS product groups at a low demand rate.

Standard failure rates at a low demand rate		
SIRIUS product group (electromechanical components)	Standard failure rates (in FIT) ¹⁾	Share of dangerous failures ²⁾
3SB2/3SB3/3SF5 EMERGENCY-STOP control devices (with positive-opening contacts)	100	20 %
3SE7/3SF2 Cable-operated switches for EMERGENCY-STOP function (with positive-opening contacts)	100	20 %
3SE5/3SF1 Standard position switches/basic switches (with positive-opening contacts)	100	20 %
3SE5/3SF1 Position switches with separate actuator (with positive-opening contacts)	100	20 %
3SE5/3SF1 Position switches with tumbler (with positive-opening contacts)	100	20 %
3SE5/3SF1 Hinge switches (with positive-opening contacts)	100	20 %
3SB3 Pushbuttons (non-latching) (with positive-opening contacts)	100	20 %
Contactors/motor starters (with positive-opening contacts or mirror contacts)	100	< 40 %

¹⁾ The failure rates specified in the table were limited to 100 FIT.

²⁾ Valid only under the previously mentioned conditions.

Appendix

Siemens Industry Training

Faster and more applicable know-how: Hands-on training from the manufacturer

Siemens Industry Training provides you with comprehensive support in solving your tasks.

Training by the market leader in the industry enables you to make independent decisions with confidence. Especially where the optimum and efficient use of products and plants are concerned. You can eliminate deficiencies in existing plants, and exclude expensive faulty planning right from the beginning.



First-class know-how directly pays for itself: In shorter startup times, high-quality end products, faster troubleshooting and reduced downtimes. In other words, increased profits and lower costs.

Achieve more with Siemens Industry Training

- Shorter times for startup, maintenance and servicing
- Optimized production operations
- Reliable configuration and startup
- Minimization of plant downtimes
- Flexible plant adaptation to market requirements
- Compliance with quality standards in production
- Increased employee satisfaction and motivation
- Shorter familiarization times following changes in technology and staff

Contact

Visit our site on the Internet at:

www.siemens.com/sitrain

or let us advise you personally.

Siemens Industry Training Customer Support Germany:

Phone: +49 (911) 895-7575

Fax: +49 (911) 895-7576

E-Mail: info@sitrain.com

Highlights Siemens Industry Training

Top trainers

Our trainers are skilled teachers with direct practical experience. Course developers have close contact with product development, and directly pass on their knowledge to the trainers.

Practical experience

The practical experience of our trainers enables them to teach theory effectively. But since theory can be pretty drab, we attach great importance to practical exercises which can comprise up to half of the course time. You can therefore immediately implement your new knowledge in practice. We train you on state-of-the-art methodically/didactically designed training equipment. This training approach will give you all the confidence you need.

Wide variety

With a total of about 300 local attendance courses, we train the complete range of Siemens Industry products as well as interaction of the products in systems.

Tailor-made training

We are only a short distance away. You can find us at more than 50 locations in Germany, and in 62 countries worldwide. You wish to have individual training instead of one of our 300 courses? Our solution: We will provide a program tailored exactly to your personal requirements. Training can be carried out in our Training Centers or at your company.

The right mixture: Blended learning

"Blended learning" is a combination of various training media and sequences. For example, a local attendance course in a Training Center can be optimally supplemented by a teach-yourself program as preparation or follow-up. Additional effect: Reduced traveling costs and periods of absence.



SITRAIN training courses

SITRAIN course offer for "Safety Integrated"

	Planning	Implementation	Operation		
Title	Target group	Duration	Short title		
Standards and guidelines					
Safety of machinery – CE marking & standards	✓	✓		2 days	ST-CENORM
Risk Assessment Management - Methodology for the realization of risk assessments according to standards in conformance with EN ISO 12100	✓	✓		1 day	ST-RAM
Process automation					
SIMATIC PCS 7 - Process Safety	✓	✓		3 days	ST-PCS7SAF
IEC 61511 Functional safety in the process industry	✓	✓		2 days	ST-WSFSP
IEC 61511 Practical use	✓	✓		2 days	ST-WSPUP
Drives (AC-Converter)					
SINAMICS S120 Safety Integrated		✓		3 days	DR-SNS-SAF
Industry automation systems SIMATIC (SIMATIC S7 H/F-Safety Integrated)					
Design and programming of safety related SIMATIC S7 controller via Distributed Safety		✓		3 days	ST-PPDS
Projecting and programming of failsafe / fault tolerance SIMATIC S7-400H controller with the software F-Systems		✓		3 days	ST-PPFS
Programming of fail-safe SIMATIC S7 controllers with STEP 7 Safety Advanced based on TIA Portal		✓		3 days	TIA-SAFETY
CNC automation system SINUMERIK					
SINUMERIK 840D sl, Safety Integrated Maintenance Course			✓	3 days	NC-84SLSIS
SINUMERIK 840D sl Safety Integrated Configuring and Start-up	✓	✓		5 days	NC-84SLSIW

For more detailed information on these and other courses on "Safety Integrated" please go to:

www.siemens.com/sitrain-safetyintegrated

Appendix

Siemens Automation Cooperates with Education

Applicable practical know-how

Comprehensive teaching support for educational institutions

Cooperates
with Education

Automation

SIEMENS

Siemens Automation Cooperates with Education (SCE)

offers a global system for sustained support of technical skills. SCE supports educational institutions in their teaching assignment in the industrial automation sector and offers added value in the form of partnerships, technical expertise, and know-how. As the technological leader, our comprehensive range of services can support you in the knowledge transfer for Industry 4.0.

Our services at a glance

- Training curriculums for your lessons
- Trainer packages for hands-on learning
- Courses convey up-to-date, specialist knowledge
- Support for your projects/textbooks
- Complete didactic solutions from our partners
- Personal contact for individual support

Training curriculums for your lessons



Use our profound industrial know-how for practice-oriented and individual design of your course. We offer you more than 100 didactically prepared training curriculums on the topics of automation and drives technology free of charge. These materials are perfectly matched to your curricula and syllabuses, and optimally suited for use with our trainer packages. This takes into account all aspects of a modern industrial solution: installation, configuration, programming, and commissioning. All documents, including projects, can be individually matched to your specific requirements.

Particular highlights:

- With the new SIMATIC PCS 7 curriculums and trainer packages, you can pass on basic, practice-oriented PCS 7 knowledge at universities within about 60 hours (= 1 semester), using plant simulation.

- The new TIA Portal training materials for SIMATIC S7-1200 are available in English, German, French, Italian, Spanish and Chinese for download.

www.siemens.com/sce/documents

Trainer packages for hands-on learning



Our SCE trainer packages offer a specific combination of original industrial components which are perfectly matched to your requirements and can be conveniently used in your course. These price reduced bundles available exclusively to schools include innovative and flexible hardware and software packages. SCE can currently offer more than 90 SCE trainer packages including related equipment. These cover both the factory and process automation sectors. You can use them to impart the complete course contents on industrial automation at a very low cost.

Trainer packages are available for:

- Introduction to automation technology with LOGO! logic module and SIMATIC S7-1200 compact controller
- PLC engineering with SIMATIC S7 hardware and STEP 7 software (S7-300, S7-1500 and TIA Portal)
- Operator control and monitoring with SIMATIC HMI
- Industrial networking over bus systems with SIMATIC NET (PROFINET, PROFIBUS, IO-Link)
- Sensor systems with VISION, RFID and SIWAREX
- Process automation with SIMATIC PCS 7
- Power Monitoring Devices SENTRON PAC 4200
- Motor Management SIMOCODE
- Networked drive and motion technologies with SINAMICS/SIMOTION
- CNC programming with SinuTrain

Important ordering notes:

Only the following institutions are authorized to obtain trainer packages: vocational schools, Colleges and Universities, in-house vocational training departments, non commercial research institutions and non commercial training departments.

To purchase a trainer package, you require a specific end-use certificate, which you can obtain from your regional sales office.

www.siemens.com/sce/tp

Siemens Automation Cooperates with Education

Applicable practical know-how

Comprehensive teaching support for educational institutions (continued)***Courses convey up-to-date specialist knowledge***

Profit from our excellent know-how as the leader in industrial technologies. We offer you specific courses for automation and drive technology worldwide. These support you in the practice-oriented transferring of product and system know-how, are in conformance with curriculums, and derived from the training fields. Compact technical courses especially for use at universities are also available.

Our range of courses comprises a wide variety of training modules based on the principle of Totally Integrated Automation (TIA). The focus is on the same subject areas as with the SCE trainer packages.

Every PLC and drive course is oriented on state-of-the-art technology. Your graduates can thus be prepared optimally for their future professional life.

In some countries we are offering classes based on our training curriculums. Please inquire with your SCE contact partner.

www.siemens.com/sce/contact

Support for your projects/textbooks

Automation and drive technology is characterized by continuous and rapid developments. Service and Support therefore play an important role.

We can provide you with consulting for selected projects and support from your personal SCE contact as well as our web based and regional Customer Support.

As a particular service, SCE supports technical authors with our know-how as well as with intensive technical consulting. Siemens library of special textbooks covering the industrial automation sector provides an additional resource for you and your students. These can be found at the SCE web site.

www.siemens.com/sce/contact
www.siemens.com/sce/books

Complete didactic solutions

Our partners for learning systems offer a wide range of training systems and solutions for use in your courses or laboratory.

These models have been designed based on our trainer packages and thus save you the time and cost of self-construction of individual components. The Partner systems provide you with simple and effective help in the fulfillment of your teaching assignment.

www.siemens.com/sce/partner

Contact for individual support

You can find your personal SCE contact on our Internet site. Your local SCE Promoter will answer all your questions concerning the complete SCE offering, and provide you with timely and competent information about innovations. When you encounter challenges, you can profit from our global team of excellence.

If a direct SCE contact is not listed for your country, please contact your local Siemens office.

www.siemens.com/sce/contact

SCE Support Finder for your Internet request

You are an educator and need support on the topic of industry automation? Send us your request:

www.siemens.com/sce/supportfinder

Scan the QR
code for further
information
(SCE homepage)



Appendix

Partners at Industry Automation and Drive Technologies



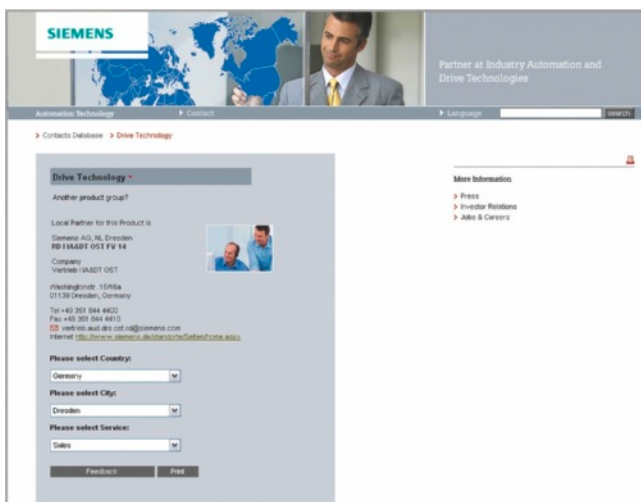
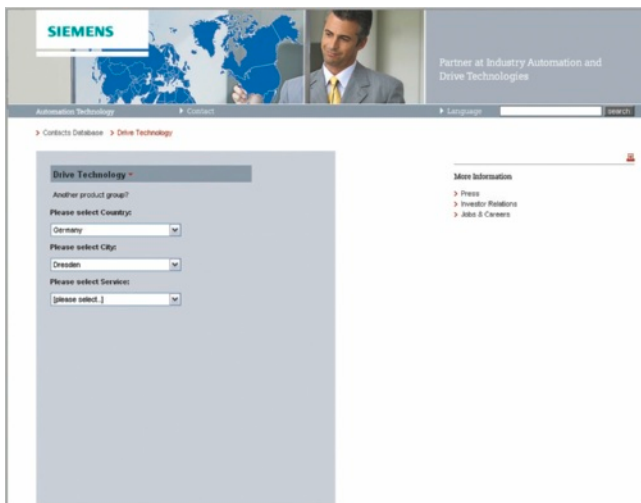
At Siemens Industry Automation and Drive Technologies, more than 85 000 people are resolutely pursuing the same goal: long-term improvement of your competitive ability. We are committed to this goal. Thanks to our commitment, we continue to set new standards in automation and drive technology. In all industries – worldwide.

At your service locally, around the globe for consulting, sales, training, service, support, spare parts ... on the entire Industry Automation and Drive Technologies range.

Your personal contact can be found in our Contacts Database at: www.siemens.com/automation/partner

You start by selecting a

- Product group,
- Country,
- City,
- Service.



Overview

Siemens Solution Partner Automation



Solution Partner: Highest quality - guaranteed

The products and systems from Siemens Industry Automation and Drive Technologies offer the ideal platform for all automation applications.

Under the name of Siemens Solution Partner Automation, selected system integrators around the world act as uniformly qualified solution providers for the Siemens range of products and services in the fields of automation and drives. Day after day, they utilize their qualified product and system know-how as well as their excellent industry expertise to your advantage – for all requirements.

The partner emblem is the guarantee and indicator of proven quality. The basis for this are defined quality features that identify Solution Partners as reliable and competent solution providers:

- Solution quality
Always a good result with tried and tested solutions expertise.
- Expert quality
Certified technical competence ensures maximum efficiency.
- Project quality
With proven project experience straight to the target.
- Portfolio quality
Comprehensive portfolio for state-of-the-art solutions from a single source.

Solution Partner Finder

 The screenshot shows the Siemens Solution Partner Finder web interface. At the top, there's a navigation bar with "Solution Partner", "Language", and "Contact". Below this, the "Partner Finder" section is active. It contains introductory text about finding qualified solution partners. A search form is present with tabs for "Partner search" and "References and Partner search". The "Partner search" tab is selected, showing fields for Technology, Industry, Service, Country, Region, and Company/ZIP code. A "Find" button is at the bottom right. A note on the right side states: "Note: Please note that the search criteria entered are linked with and."

The Siemens Solution Partner Program helps you to find the optimum partner for your specific requirements.

Support is provided by the Solution Partner Finder, a comprehensive online platform that showcases the profiles of all our solution partners. You can convince yourself of the competence of the respective Solution Partner by means of the references provided. Various search criteria are available for this purpose.

Once you have located a partner, you are only one small step away from contacting them.

Find the right partner here for your specific task and convince yourself of the solution competence provided:

www.siemens.com/automation/partnerfinder

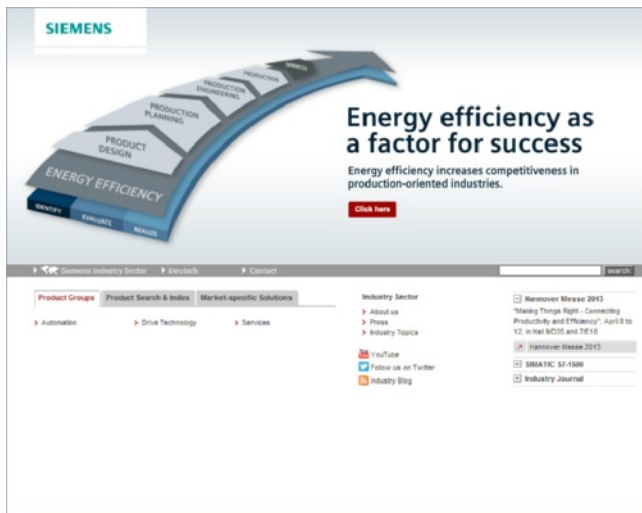
Additional information on the Siemens Solution Partner Program is available online at:

www.siemens.com/automation/solutionpartner

Appendix Online Services

Information and Ordering in the Internet and on DVD

Siemens Industry Automation and Drive Technologies in the WWW



A detailed knowledge of the range of products and services available is essential when planning and configuring automation systems. It goes without saying that this information must always be fully up-to-date.

Siemens Industry Automation and Drive Technologies has therefore built up a comprehensive range of information in the World Wide Web, which offers quick and easy access to all data required.

Under the address

www.siemens.com/industry

you will find everything you need to know about products, systems and services.

Product Selection Using the Interactive Catalog CA 01 of Industry



Detailed information together with convenient interactive functions:

The interactive catalog CA 01 covers more than 80 000 products and thus provides a full summary of the Siemens Industry Automation and Drive Technologies product base.

Here you will find everything that you need to solve tasks in the fields of automation, switchgear, installation and drives. All information is linked into a user interface which is easy to work with and intuitive.

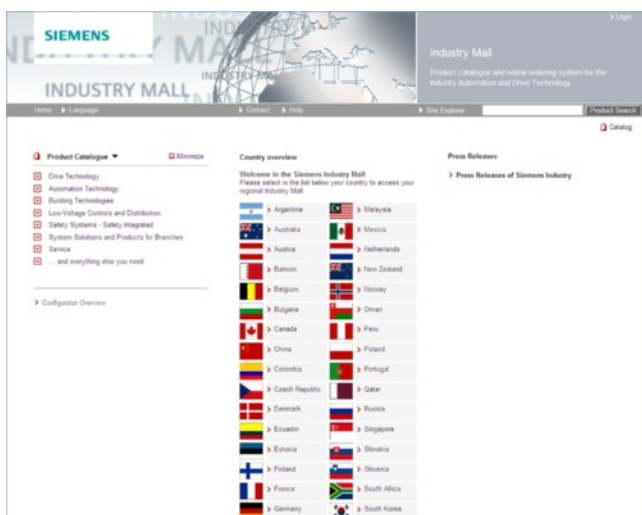
After selecting the product of your choice you can order at the press of a button, by fax or by online link.

Information on the interactive catalog CA 01 can be found in the Internet under

www.siemens.com/automation/ca01

or on DVD.

Easy Shopping with the Industry Mall



The Industry Mall is the virtual department store of Siemens AG on the Internet. Here you have access to a huge range of products presented in electronic catalogs in an informative and attractive way.

Data transfer via EDIFACT allows the whole procedure from selection through ordering to tracking of the order to be carried out online via the Internet.

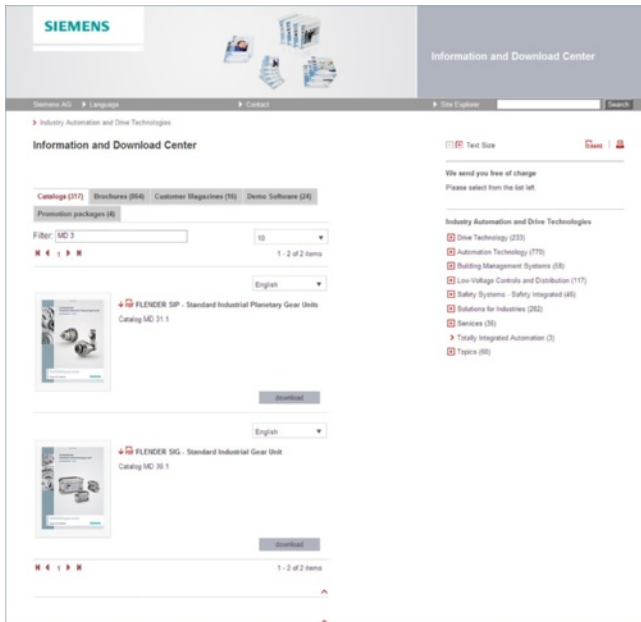
Numerous functions are available to support you.

For example, powerful search functions make it easy to find the required products, which can be immediately checked for availability. Customer-specific discounts and preparation of quotes can be carried out online as well as order tracking and tracing.

Please visit the Industry Mall on the Internet under:

www.siemens.com/industrymall

Downloading Catalogs



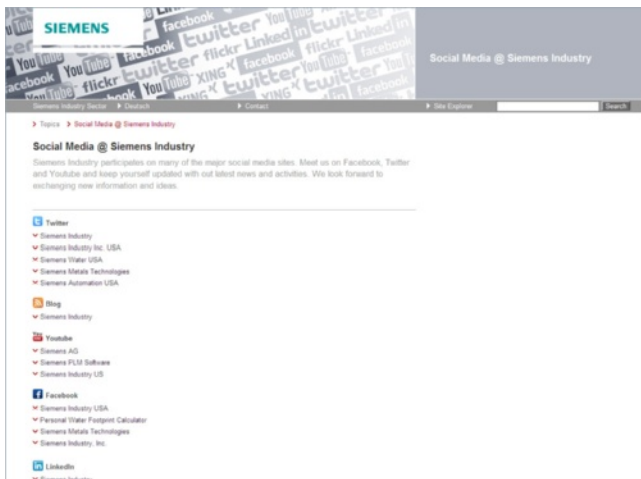
In addition to numerous other useful documents, you can also find the catalogs listed on the back inside cover of this catalog in the Information and Download Center. Without having to register, you can download these catalogs in PDF format or increasingly as digital page-turning e-books.

The filter dialog box above the first catalog displayed makes it possible to carry out targeted searches. If you enter "MD 3" for example, you will find both the MD 30.1 and MD 31.1 catalogs. If you enter "ST 70" both the ST 70 catalog and the associated news or add-ons are displayed.

Visit us on the web at:

www.siemens.com/industry/infocenter

Social Media



Connect with Siemens through social media: visit our social networking sites for a wealth of useful information, demos on products and services, the opportunity to provide feedback, to exchange information and ideas with customers and other Siemens employees, and much, much more. Stay in the know and follow us on the ever-expanding global network of social media.

Connect with Siemens Industry at our central access point:

www.siemens.com/industry/socialmedia

Or via our product pages at:

www.siemens.com/automation

or

www.siemens.com/drives

To find out more about Siemens' current social media activities visit us at:

www.siemens.com/socialmedia

Mobile Media



Discover the world of Siemens.

We are also constantly expanding our offering of cross-platform apps for smartphones and tablets. You will find the current Siemens apps at the app store (iOS) or at Google Play (Android).

The Siemens app, for example, tells you all about the history, latest developments and future plans of the company – with informative pictures, fascinating reports and the most recent press releases.

Appendix

Industry Services

Your machines and plant can do more
– with Industry Services.

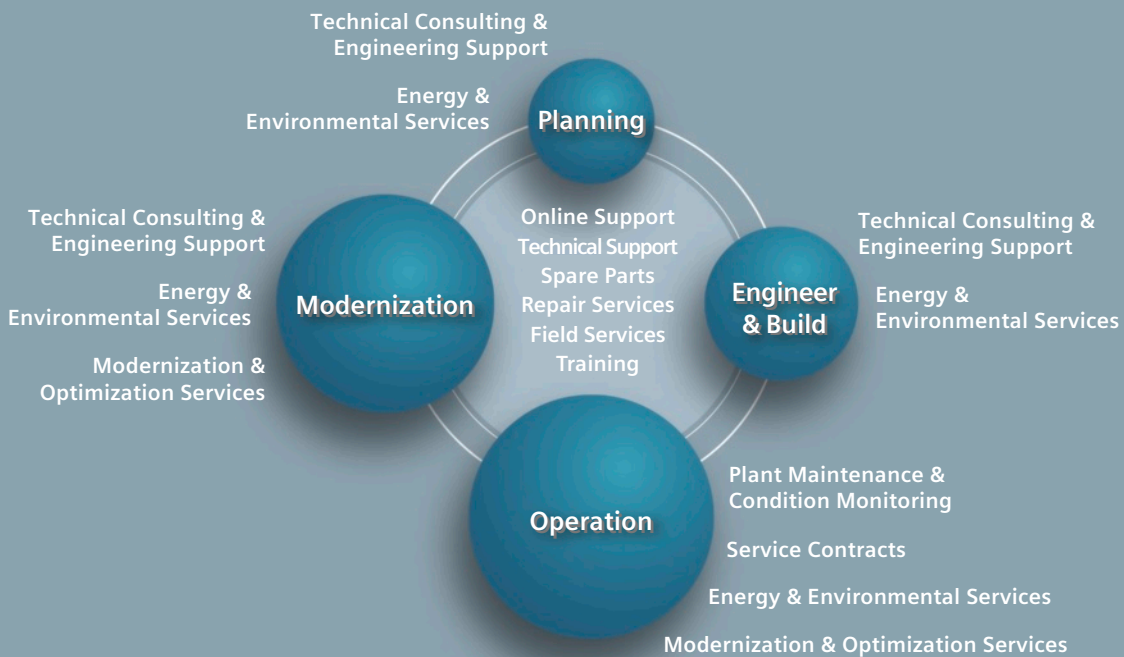


Whether it is production or process industry - in view of rising cost pressure, growing energy costs, and increasingly stringent environmental regulations, services for industry are a crucial competitive factor in manufacturing as well as in process industries.

All over the world Siemens supports its customers with product, system, and application-related services throughout the entire life cycle of a plant. Right from the earliest stages of planning, engineering, and building, all the way to operation and modernization. These services enable customers to benefit from the Siemens experts' unique technological and product knowledge and industry expertise.

Thus downtimes are reduced and the utilization of resources is optimized. The bottom line: increased plant productivity, flexibility, and efficiency, plus reduced overall costs.

Discover all advantages of our service portfolio:
www.siemens.com/industry-services



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Siemens supports its clients with technology based Services across a plants entire life cycle.

Online Support

Online support is a comprehensive information system for all questions relating to products, systems, and solutions that Siemens has developed for industry over time. With more than 300,000 documents, examples and tools, it offers users of automation and drive technology a way to quickly find up-to-date information. The 24-hour service enables direct, central access to detailed product information as well as numerous solution examples for programming, configuration and application.

The content, in six languages, is increasingly multimediated – and now also available as a mobile app. Online support's "Technical Forum" offers users the opportunity to share information with each other. The "Support Request" option can be used to contact Siemens' technical support experts. The latest content, software updates, and news via newsletters and Twitter ensure that industry users are always up to date.



www.siemens.com/industry/online-support

Online Support App



Using the Online Support app, you can access over 300,000 documents covering all Siemens industrial products - anywhere, any time. Regardless of whether you need help implementing your project, fault-finding, expanding your system or are planning a new machine.

You have access to FAQs, manuals, certificates, characteristics curves, application examples, product notices (e.g. announcements of new products) and information on successor products in the event that a product is discontinued.

Just scan the product code printed on the product directly using the camera of your mobile device to immediately see all technical information available on this product at a glance. The graphical CAX information (3D model, circuit diagrams or EPLAN macros) is also displayed. You can forward this information to your workplace using the e-mail function.

The search function retrieves product information and articles and supports you with a personalized suggestion list. You can find your favorite pages – articles you need frequently – under "mySupport". You also receive selected news on new functions, important articles or events in the News section.

Scan the QR code
for information on
our Online Support
app.



The app is available free of charge from the Apple App Store (iOS) or from Google Play (Android).

www.siemens.com/industry/online-support-app

Technical Support

The ability to quickly analyze system and error messages and take appropriate action are key factors in ensuring that plants run safely and efficiently. Questions can arise at any time and in any industry, whether it's an individual product or a complete automation solution. Siemens technical support offers individual technical assistance in matters related to functionality, how to operate, applications, and fault clearance in industrial products and systems – at any time and globally, over the phone, by e-mail, or via remote access. Experienced experts from Siemens answer incoming questions promptly. Depending on the requirements, they first consult specialists in the areas of development, on-site services, and sales. Technical support is also available for discontinued products that are no longer available. Using the support request number, any inquiry can be clearly identified and systematically tracked.



<http://support.automation.siemens.com/WW/view/en/16605032>

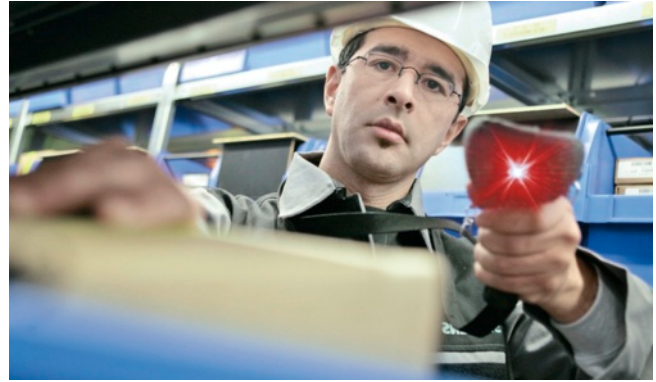
Appendix

Industry Services

Industry Services for the entire life cycle

Spare Parts

Drive and automation systems must be available at all times. Even a single missing spare part can bring the entire plant to a standstill – and result in substantial financial losses for the operator. The spare parts services from Siemens protects against such losses – with the aid of quickly available, original spare parts that ensure smooth interaction with all other system components. Spare parts are kept on hand for up to ten years; defective parts can be returned. For many products and solutions, individual spare parts packages ensure a preventive stock of spare parts on-site. The spare parts services is available around the world and around the clock. Optimum supply chain logistics ensure that replacement components reach their destination as quickly as possible. Siemens' logistics experts take care of planning and management as well as procurement, transportation, customs handling, warehousing, and complete order management for spare parts.



<http://support.automation.siemens.com/WW/view/en/43502238>

Repair Services

Reliable electrical and electronic equipment is crucial for operating continuous processes. That is why it is essential that motors and converters always undergo highly specialized repair and maintenance. Siemens offers complete customer and repair services – on site and in repair centers – as well as technical emergency services worldwide. The repair services include all measures necessary to quickly restore the functionality of defective units. In addition, services such as spare parts logistics, spare parts storage and rapid manufacturing are available to plant operators in all verticals. With a global network of certified repair shops operated by Siemens as well as third parties, Siemens handles the maintenance and overhaul of motors, converters, and other devices as an authorized service partner.



<http://support.automation.siemens.com/WW/view/en/43512848>

Field Services

It's a top priority in all industries: the availability of plants and equipment. Siemens offers specialized maintenance services such as inspection and upkeep as well as rapid fault clearance in industrial plants – worldwide, continuously, and even with emergency services as needed. The services include startup as well as maintenance and fault clearance during operation. The startup service includes checking the installation, function tests, parameterization, integration tests for machines and plants, trial operation, final acceptance, and employee training. All services, including remote maintenance of drives, are also available as elements of customized service contracts.



<http://support.automation.siemens.com/WW/view/en/66012486>

Training

Increasingly, up-to-date knowledge is becoming a determining factor in success. One of the key resources of any company is well-trained staff that can make the right decision at the right moment and take full advantage of the potential. With SITRAIN – Training for Industry, Siemens offers comprehensive advanced training programs. The technical training courses convey expertise and practical knowledge directly from the manufacturer. SITRAIN covers Siemens' entire product and system portfolio in the field of automation and drives. Together with the customer, Siemens determines the company's individual training needs and then develops an advanced training program tailored to the desired requirements. Additional services guarantee that the knowledge of all Siemens partners and their employees is always up-to-date.



<http://support.automation.siemens.com/WW/view/en/43514324>

Technical Consulting & Engineering Support

The efficiency of plants and processes leads to sustainable economic success. Individual services from Siemens help save substantial time and money while also guaranteeing maximum safety. Technical consulting covers the selection of products and systems for efficient industrial plants. The services include planning, consulting, and conceptual design as well as product training, application support, and configuration verification – in all phases of a plant's lifecycle and in all questions related to product safety. Engineering support offers competent assistance throughout the entire project, from developing a precise structure for startup to product-specific preparation for implementation as well as support services in areas such as prototype development, testing and acceptance.



<http://support.automation.siemens.com/WW/view/en/16605680>

Energy & Environmental Services

Efficient energy use and resource conservation – these top sustainability concerns pay off – both for the environment and for companies. Siemens offers integrated solutions that unlock all technical and organizational potential for successful environmental management. Customized consulting services are aimed at sustainably lowering the cost of energy and environmental protection and thus increasing plant efficiency and availability. The experts provide support in the conceptual design and implementation of systematic solutions in energy and environmental management, enabling maximum energy efficiency and optimized water consumption throughout the entire company. Improved data transparency makes it possible to identify savings potential, reduce emissions, optimize production processes, and thereby noticeably cut costs.



<http://support.automation.siemens.com/WW/view/en/42350774>

Appendix

Industry Services

Industry Services for the entire life cycle

Modernization & Optimization Services

High machine availability, expanded functionality and selective energy savings – in all industries, these are decisive factors for increasing productivity and lowering costs. Whether a company wants to modernize individual machines, optimize drive systems, or upgrade entire plants, Siemens' experts support the projects from planning to commissioning.

Expert consulting and project management with solution responsibility lead to security and make it possible to specifically identify savings potential in production. This secures investments over the long term and increases economic efficiency in operation.



<http://support.automation.siemens.com/WW/view/en/66005532>

Plant Maintenance & Condition Monitoring

Modern industrial plants are complex and highly automated. They must operate efficiently in order to ensure the company's competitive strength. In addition, the steadily increasing networking of machines and plants require consistent security concepts. Maintenance and status monitoring as well as the implementation of integrated security concepts by Siemens' experts support optimum plant use and avoid downtime. The services include maintenance management as well as consulting on maintenance concepts, including the complete handling and execution of the necessary measures. Complete solutions also cover remote services, including analysis, remote diagnosis, and remote monitoring. These are based on the Siemens Remote Services platform with certified IT security.



<http://support.automation.siemens.com/WW/view/en/59456862>

Service Contracts

Making maintenance costs calculable, reducing interfaces, speeding up response times, and unburdening the company's resources – the reduced downtimes that these measures achieve increase the productivity of a plant. Service contracts from Siemens make maintenance and repairs more cost-effective and efficient. The service packages include local and remote maintenance for a system or product group in automation and drive technology. Whether you need extended service periods, defined response times, or special maintenance intervals, the services are compiled individually and according to need. They can be adjusted flexibly at any time and used independently of each other. The expertise of Siemens' specialists and the capabilities of remote maintenance thus ensure reliable and fast maintenance processes throughout a plant's entire lifecycle.



<http://support.automation.siemens.com/WW/view/en/65961857>

Overview**Software types**

Software requiring a license is categorized into types. The following software types have been defined:

- Engineering software
- Runtime software

Engineering software

This includes all software products for creating (engineering) user software, e.g. for configuring, programming, parameterizing, testing, commissioning or servicing.

Data generated with engineering software and executable programs can be duplicated for your own use or for use by third parties free-of-charge.

Runtime software

This includes all software products required for plant/machine operation, e.g. operating system, basic system, system expansions, drivers, etc.

The duplication of the runtime software and executable programs created with the runtime software for your own use or for use by third-parties is subject to a charge.

You can find information about license fees according to use in the ordering data (e.g. in the catalog). Examples of categories of use include per CPU, per installation, per channel, per instance, per axis, per control loop, per variable, etc.

Information about extended rights of use for parameterization/configuration tools supplied as integral components of the scope of delivery can be found in the readme file supplied with the relevant product(s).

License types

Siemens Industry Automation & Drive Technologies offers various types of software license:

- Floating license
- Single license
- Rental license
- Rental floating license
- Trial license
- Demo license
- Demo floating license

Floating license

The software may be installed for internal use on any number of devices by the licensee. Only the concurrent user is licensed. The concurrent user is the person using the program. Use begins when the software is started.

A license is required for each concurrent user.

Single license

Unlike the floating license, a single license permits only one installation of the software per license.

The type of use licensed is specified in the ordering data and in the Certificate of License (CoL). Types of use include for example per instance, per axis, per channel, etc.

One single license is required for each type of use defined.

Rental license

A rental license supports the "sporadic use" of engineering software. Once the license key has been installed, the software can be used for a specific period of time (the operating hours do not have to be consecutive).

One license is required for each installation of the software.

Rental floating license

The rental floating license corresponds to the rental license, except that a license is not required for each installation of the software. Rather, one license is required per object (for example, user or device).

Trial license

A trial license supports "short-term use" of the software in a non-productive context, e.g. for testing and evaluation purposes. It can be transferred to another license.

Demo license

The demo license support the "sporadic use" of engineering software in a non-productive context, for example, use for testing and evaluation purposes. It can be transferred to another license. After the installation of the license key, the software can be operated for a specific period of time, whereby usage can be interrupted as often as required.

One license is required per installation of the software.

Demo floating license

The demo floating license corresponds to the demo license, except that a license is not required for each installation of the software. Rather, one license is required per object (for example, user or device).

Certificate of license (CoL)

The CoL is the licensee's proof that the use of the software has been licensed by Siemens. A CoL is required for every type of use and must be kept in a safe place.

Downgrading

The licensee is permitted to use the software or an earlier version/release of the software, provided that the licensee owns such a version/release and its use is technically feasible.

Delivery versions

Software is constantly being updated.

The following delivery versions

- PowerPack
- Upgrade

can be used to access updates.

Existing bug fixes are supplied with the ServicePack version.

PowerPack

PowerPacks can be used to upgrade to more powerful software. The licensee receives a new license agreement and CoL (Certificate of License) with the PowerPack. This CoL, together with the CoL for the original product, proves that the new software is licensed.

A separate PowerPack must be purchased for each original license of the software to be replaced.

Upgrade

An upgrade permits the use of a new version of the software on the condition that a license for a previous version of the product is already held.

The licensee receives a new license agreement and CoL with the upgrade. This CoL, together with the CoL for the previous product, proves that the new version is licensed.

A separate upgrade must be purchased for each original license of the software to be upgraded.

Software Licenses

Overview

ServicePack

ServicePacks are used to debug existing products. ServicePacks may be duplicated for use as prescribed according to the number of existing original licenses.

License key

Siemens Industry Automation & Drive Technologies supplies software products with and without license keys.

The license key serves as an electronic license stamp and is also the "switch" for activating the software (floating license, rental license, etc.).

The complete installation of software products requiring license keys includes the program to be licensed (the software) and the license key (which represents the license).

Software Update Service (SUS)

As part of the SUS contract, all software updates for the respective product are made available to you free of charge for a period of one year from the invoice date. The contract will automatically be extended for one year if it is not canceled three months before it expires.

The possession of the current version of the respective software is a basic condition for entering into an SUS contract.

You can download explanations concerning license conditions from www.siemens.com/automation/salesmaterial-as/catalog/en/terms_of_trade_en.pdf

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Conditions of sale and delivery

1. General Provisions

By using this catalog you can acquire hardware and software products described therein from Siemens AG subject to the following Terms and Conditions of Sale and Delivery (hereinafter referred to as "T&C"). Please note that the scope, the quality and the conditions for supplies and services, including software products, by any Siemens entity having a registered office outside Germany, shall be subject exclusively to the General Terms and Conditions of the respective Siemens entity. The following T&C apply exclusively for orders placed with Siemens Aktiengesellschaft, Germany.

1.1 For customers with a seat or registered office in Germany

For customers with a seat or registered office in Germany, the following applies subordinate to the T&C:

- the "General Terms of Payment"¹⁾ and,
- for software products, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or Registered Office in Germany"¹⁾ and,
- for other supplies and services, the "General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry"¹⁾.

1.2 For customers with a seat or registered office outside Germany

For customers with a seat or registered office outside Germany, the following applies subordinate to the T&C:

- the "General Terms of Payment"¹⁾ and,
- for software products, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or Registered Office outside of Germany"¹⁾ and
- for other supplies and/or services, the "General Conditions for Supplies of Siemens Industry for Customers with a Seat or Registered Office outside of Germany"¹⁾.

2. Prices

The prices are in € (Euro) ex point of delivery, exclusive of packaging.

The sales tax (value added tax) is not included in the prices. It shall be charged separately at the respective rate according to the applicable statutory legal regulations.

Prices are subject to change without prior notice. We will charge the prices valid at the time of delivery.

To compensate for variations in the price of raw materials (e.g. silver, copper, aluminum, lead, gold, dysprosium and neodym), surcharges are calculated on a daily basis using the so-called metal factor for products containing these raw materials. A surcharge for the respective raw material is calculated as a supplement to the price of a product if the basic official price of the raw material in question is exceeded.

The metal factor of a product indicates the basic official price (for those raw materials concerned) as of which the surcharges on the price of the product are applied, and with what method of calculation.

An exact explanation of the metal factor can be downloaded at:

www.siemens.com/automation/salesmaterial-as/catalog/en/terms_of_trade_en.pdf

To calculate the surcharge (except in the cases of dysprosium and neodym), the official price from the day prior to that on which the order was received or the release order was effected is used.

To calculate the surcharge applicable to dysprosium and neodym ("rare earths"), the corresponding three-month basic average price in the quarter prior to that in which the order was received or the release order was effected is used with a one-month buffer (details on the calculation can be found in the explanation of the metal factor).

3. Additional Terms and Conditions

The dimensions are in mm. In Germany, according to the German law on units in measuring technology, data in inches apply only to devices for export.

Illustrations are not binding.

Insofar as there are no remarks on the individual pages of this catalog - especially with regard to data, dimensions and weights given - these are subject to change without prior notice.

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We shall not be obligated to fulfill any agreement if such fulfillment is prevented by any impediments arising out of national or international foreign trade or customs requirements or any embargoes and/or other sanctions.

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If required for the purpose of conducting export control checks, you (upon request by us) shall promptly provide us with all information pertaining to the particular end customer, final disposition and intended use of goods delivered by us respectively works and services provided by us, as well as to any export control restrictions existing in this relation.

The products listed in this catalog may be subject to European/German and/or US export regulations. Any export requiring approval is therefore subject to authorization by the relevant authorities.

Errors excepted and subject to change without prior notice.

1) The text of the Terms and Conditions of Siemens AG can be downloaded at www.siemens.com/automation/salesmaterial-as/catalog/en/terms_of_trade_en.pdf

Appendix

Notes

Industry Automation, Drive Technologies and Low-Voltage Power Distribution

Further information can be obtained from our branch offices listed at www.siemens.com/automation/partner

System Solutions for Industry		<i>Catalog</i>
Interactive Catalog on DVD		
Products for Automation and Drives, Low-Voltage Power Distribution and Electrical Installation Technology	CA 01	
Building Control		
GAMMA Building Control	ET G1	
Drive Systems		
SINAMICS G130 Drive Converter Chassis Units	D 11	
SINAMICS G150 Drive Converter Cabinet Units		
SINAMICS GM150, SINAMICS SM150 Medium-Voltage Converters	D 12	
SINAMICS PERFECT HARMONY GH180 Medium-Voltage Air-Cooled Drives Germany Edition	D 15.1	
SINAMICS G180 Converters – Compact Units, Cabinet Systems, Cabinet Units Air-Cooled and Liquid-Cooled	D 18.1	
SINAMICS S120 Chassis Format Units and Cabinet Modules	D 21.3	
SINAMICS S150 Converter Cabinet Units		
SINAMICS DCM DC Converter, Control Module	D 23.1	
SINAMICS DCM Cabinet	D 23.2	
SINAMICS and Motors for Single-Axis Drives	D 31	
Three-Phase Induction Motors SIMOTICS HV, SIMOTICS TN	D 84.1	
• Series H-compact		
• Series H-compact PLUS		
Asynchronous Motors Standardline	D 86.1	
Synchronous Motors with Permanent-Magnet Technology, HT-direct	D 86.2	
DC Motors	DA 12	
SIMOREG DC MASTER 6RA70 Digital Chassis Converters	DA 21.1	
SIMOREG K 6RA22 Analog Chassis Converters	DA 21.2	
<i>Digital: SIMOREG DC MASTER 6RM70 Digital Converter Cabinet Units</i>	DA 22	
SIMOVERT PM Modular Converter Systems	DA 45	
SIEMOSYN Motors	DA 48	
MICROMASTER 420/430/440 Inverters	DA 51.2	
MICROMASTER 411/COMBIMASTER 411	DA 51.3	
SIMOVERT MASTERDRIVES Vector Control	DA 65.10	
SIMOVERT MASTERDRIVES Motion Control	DA 65.11	
Synchronous and asynchronous servomotors for SIMOVERT MASTERDRIVES	DA 65.3	
SIMODRIVE 611 universal and POSMO	DA 65.4	
<i>Note: Additional catalogs on SIMODRIVE or SINAMICS drive systems and SIMOTICS motors with SINUMERIK and SIMOTION can be found under Motion Control</i>		
Low-Voltage Three-Phase-Motors		
SIMOTICS Low-Voltage Motors	D 81.1	
SIMOTICS FD Flexible Duty Motors	D 81.8	
MOTOX Geared Motors	D 87.1	
SIMOGEAR Geared Motors	MD 50.1	
SIMOGEAR Gearboxes with adapter	MD 50.11	
Mechanical Driving Machines		
FLENDER Standard Couplings	MD 10.1	
FLENDER High Performance Couplings	MD 10.2	
FLENDER SIG Standard industrial gear unit	MD 30.1	
FLENDER SIP Standard industrial planetary gear units	MD 31.1	
Process Instrumentation and Analytics		
Field Instruments for Process Automation	FI 01	
<i>Digital: SIPART Controllers and Software</i>	MP 31	
Products for Weighing Technology	WT 10	
<i>Digital: Process Analytical Instruments</i>	PA 01	
<i>Digital: Process Analytics, Components for the System Integration</i>	PA 11	
<i>Digital: These catalogs are only available as a PDF and/or as an e-book.</i>		
Low-Voltage Power Distribution and Electrical Installation Technology		<i>Catalog</i>
SENTRON · SIVACON · ALPHA Protection, Switching, Measuring and Monitoring Devices, Switchboards and Distribution Systems	LV 10	
Standards-Compliant Components for Photovoltaic Plants	LV 11	
3WT Air Circuit Breakers up to 4000 A	LV 35	
3VT Molded Case Circuit Breakers up to 1600 A	LV 36	
<i>Digital: SIVACON System Cubicles, System Lighting and System Air-Conditioning</i>	LV 50	
<i>Digital: ALPHA Distribution Systems</i>	LV 51	
ALPHA FIX Terminal Blocks	LV 52	
SIVACON S4 Power Distribution Boards	LV 56	
<i>Digital: SIVACON 8PS Busbar Trunking Systems</i>	LV 70	
<i>Digital: DELTA Switches and Socket Outlets</i>	ET D1	
Motion Control		
SINUMERIK & SIMODRIVE Automation Systems for Machine Tools	NC 60	
SINUMERIK & SINAMICS Equipment for Machine Tools	NC 61	
SINUMERIK 840D sl Type 1B Equipment for Machine Tools	NC 62	
SINUMERIK 808 Equipment for Machine Tools	NC 81.1	
SINUMERIK 828 Equipment for Machine Tools	NC 82	
SIMOTION, SINAMICS S120 & SIMOTICS Equipment for Production Machines	PM 21	
Drive and Control Components for Cranes	CR 1	
Power Supply		
Power supply SITOP	KT 10.1	
Safety Integrated		
Safety Technology for Factory Automation	SI 10	
SIMATIC HMI/PC-based Automation		
Human Machine Interface Systems/PC-based Automation	ST 80/ ST PC	
SIMATIC Ident		
Industrial Identification Systems	ID 10	
SIMATIC Industrial Automation Systems		
Products for Totally Integrated Automation	ST 70	
SIMATIC PCS 7 Process Control System	ST PCS 7	
System components		
SIMATIC PCS 7 Process Control System Technology components	ST PCS 7 T	
Add-ons for the SIMATIC PCS 7 Process Control System	ST PCS 7 AO	
SIMATIC NET		
Industrial Communication	IK PI	
SIRIUS Industrial Controls		
SIRIUS Industrial Controls	IC 10	
Information and Download Center		
Digital versions of the catalogs are available on the Internet at: www.siemens.com/industry/infocenter		
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