

Modular and Multifunctional –

# Ideal for Distributed Automation Solutions – SIMATIC ET 200pro



# SIMATIC

Answers for industry.

**SIEMENS**

## Implementing individual solutions – quickly and economically

Your machines and systems must be tailored perfectly to your individual requirements – and offer maximum availability, efficiency and economy, as well as great security of investment. At the same time, competition is getting tougher, making it essential that individual machines and systems be implemented as quickly and economically as possible. In other words: the demand is for modular systems that are readily scalable and expandable, as well as offering maximum flexibility.



### **The easy way to solve complex automation tasks: distributed without control cabinets**

As machines and systems become more and more complex, it is no longer possible to imagine the world of automation without distributed solutions. No wonder, since the advantages speak for themselves: considerably lower installation costs and significantly simpler engineering. This applies particularly to distributed I/O using a degree of protection IP65/67, which does not require control cabinets at all. The devices are mounted on the production line itself. This makes machine concepts significantly clearer and minimizes the expense of assembly, commissioning and troubleshooting. In addition, thanks to the connection to tried-and-tested field buses such as PROFIBUS or PROFINET, the open Industrial Ethernet standard for company-wide automation, you benefit from a high security of investment.

### **The distributed I/O system as all-rounder: SIMATIC ET 200pro**

With SIMATIC® ET 200pro, we offer you a particularly small and powerful distributed I/O system with IP65/67 degree of protection, which offers a unique level of functionality. Its modular design enables customized distributed automation solutions to be implemented with maximum flexibility.

SIMATIC ET 200pro is far more than a simple distributed input and output system. Whatever the application – motor starters, frequency inverters, pneumatics, direct connection to the MOBY identification system, integration of safety technology and connection to PROFIBUS or PROFINET, or simply just digital and analog signals – the system will be able to offer the right solution for every requirement with the highest functionality.

SIMATIC ET 200pro is a component of Totally Integrated Automation (TIA). With TIA, Siemens is the only vendor to offer an integrated basis for implementing customer-specific automation solutions – in all sectors from incoming to outgoing goods.



ET 200pro interface module

ET 200pro expansion module

ET 200pro motor starter

ET 200pro frequency inverter

#### ET 200pro interface module (IM) for PROFIBUS and PROFINET

- PROFIBUS IM for direct connection, ECOFAST or M12, 7/8" connection system
- PROFINET IM with M12, 7/8" connection and push-pull technology
- CPU module: PROFIBUS and PROFINET interface with integrated CPU

#### ET 200pro expansion modules

- I/O modules for the connection of sensors and actuators
- RFID communication modules for the connection of RFID systems
- Pneumatic components for use in standard pneumatic applications

#### ET 200pro motor starters

- Motor starters (direct and reversing starters) as standard and High-Feature versions
- Electromechanical and electronic motor starters
- Isolator modules for the isolation of downstream starters from the mains voltage
- Disconnecting module for the assembly of safety-oriented applications (Safety Motorstarter Solution local and Solution PROFIsafe)

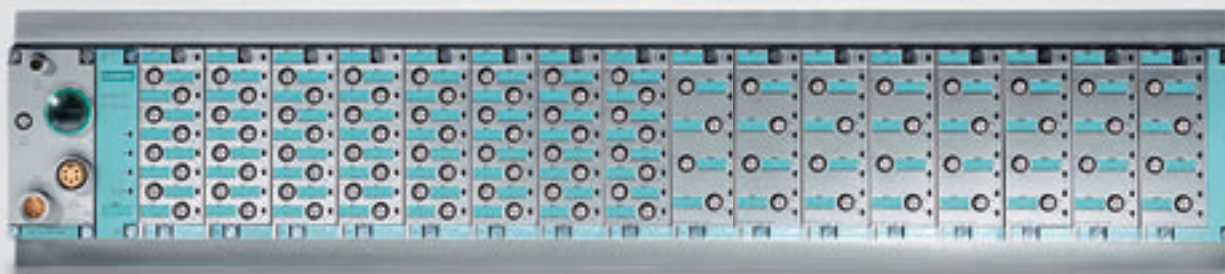
#### ET 200pro frequency inverters

- Standard version and
- Fail-safe version
- Line-commutated power recovery

#### The advantages at a glance

- Cabinet-free application thanks to high degree of protection IP65/67
- Maximum flexibility due to modular structure
- Multifunctional due to numerous integrated functionalities
- Small and particularly robust
- Simple and user-friendly assembly
- Flexible connection options
- Extensive diagnostics concept
- High system availability due to hot swapping and permanent wiring
- Integrated standard and safety-related communication via PROFIBUS and PROFINET
- Easy implementation of load groups
- Power recovery of braking energy into the mains through frequency inverter

Carefully thought out in every detail –  
for maximum flexibility



Maximum configuration

#### Application: directly at machine level

Thanks to its high degree of protection IP65/66/67, the SIMATIC ET 200pro is resistant to dirt and protected against splashing water. You can therefore use it at process level, without the need for control cabinets. The system is specially designed for harsh environmental conditions and is particularly robust in every respect: resistant to vibration loads and also very rugged thanks to the metal design of the connection modules. Smooth surfaces prevent accumulation of dirt. Depending on the module type, operation is possible even at  $-25^{\circ}\text{C}$ .

#### Design: efficient and modular

The expansion modules are divided into bus, electronics and connection modules.

- The **bus module** accommodates the backplane bus for signals and power supply and assembles itself during mounting.
- The **electronics module** determines the function and can be very easily replaced during operation and while energized (hot swapping), maintaining the station's operability in fault cases. A coding prevents the connection of a wrong module.
- The **connection module** featuring permanent wiring is plugged on and fastened with 2 screws. Prefabricated plug lines can be easily and rapidly attached.

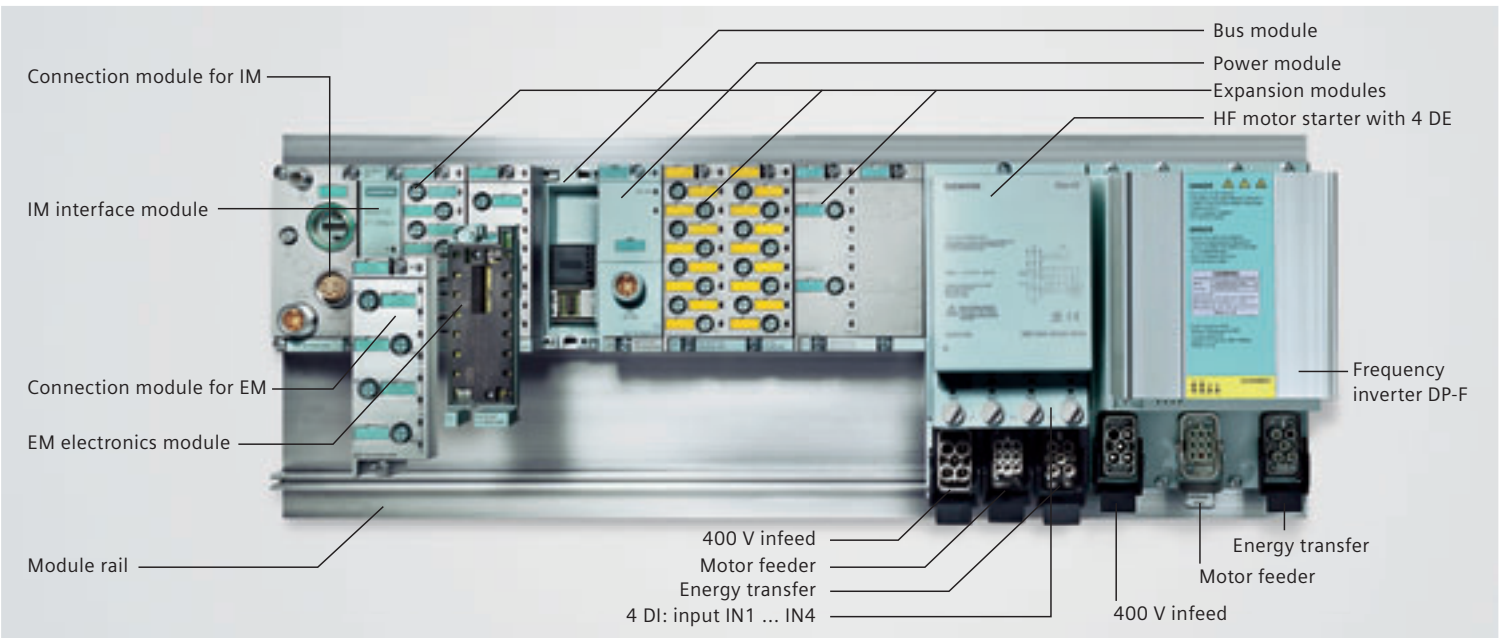
The ET 200pro features a very compact design. Up to 16 modules can be individually combined – over a length of up to one meter.

#### Installation: quick and easy

Different sized module rails ensure extremely flexible installation options: for example, the station with a narrow rail can be preassembled on the workbench and then attached to the machine as a unit. Alternatively, you can secure the compact module rail adapted to the footprint first and assemble the station on it afterwards. In any case, the module rail guarantees stable mounting and vibration resistance.

The station is particularly easy to install, as the modules can be engaged in the rack and pushed together quickly and easily – in the following order: interface module, bus modules and then bus terminating module. For the installation of inputs/outputs, an electronics module is placed on the bus module – and a connection module on top of this. The motor starter or frequency inverter is plugged directly onto the appropriate bus module. The entire station is fitted uniformly with this plug-in concept. Thanks to the convenient installation concept, you only require few screws for each module.





### Wiring: comfortable and space-saving

As you require no on-site control cabinet with SIMATIC ET 200pro, you can save the expense of cable bulkheads. Preassembled connecting cables are used which can be attached quickly and easily considerably reducing wiring expenditures. The backplane bus for signals and supply voltage is integrated in the bus modules and is automatically assembled during station installation. No additional wiring is required between the individual modules. This not only saves time during the wiring process, but also space.

The connection modules of the electronics modules can be removed and thus offer optimum freedom of movement when attaching the connectors.

The 8-channel electronics modules offer special advantages. They can be combined with 8xM12 or 4xM12 connection modules. This gives you the option of single or double assignment of the M12 sockets and enables a wide variety of sensors and actuators to be connected to the

electronics module without the need for additional accessories. This not only simplifies wiring, but also provides considerable savings on accessories and storage.

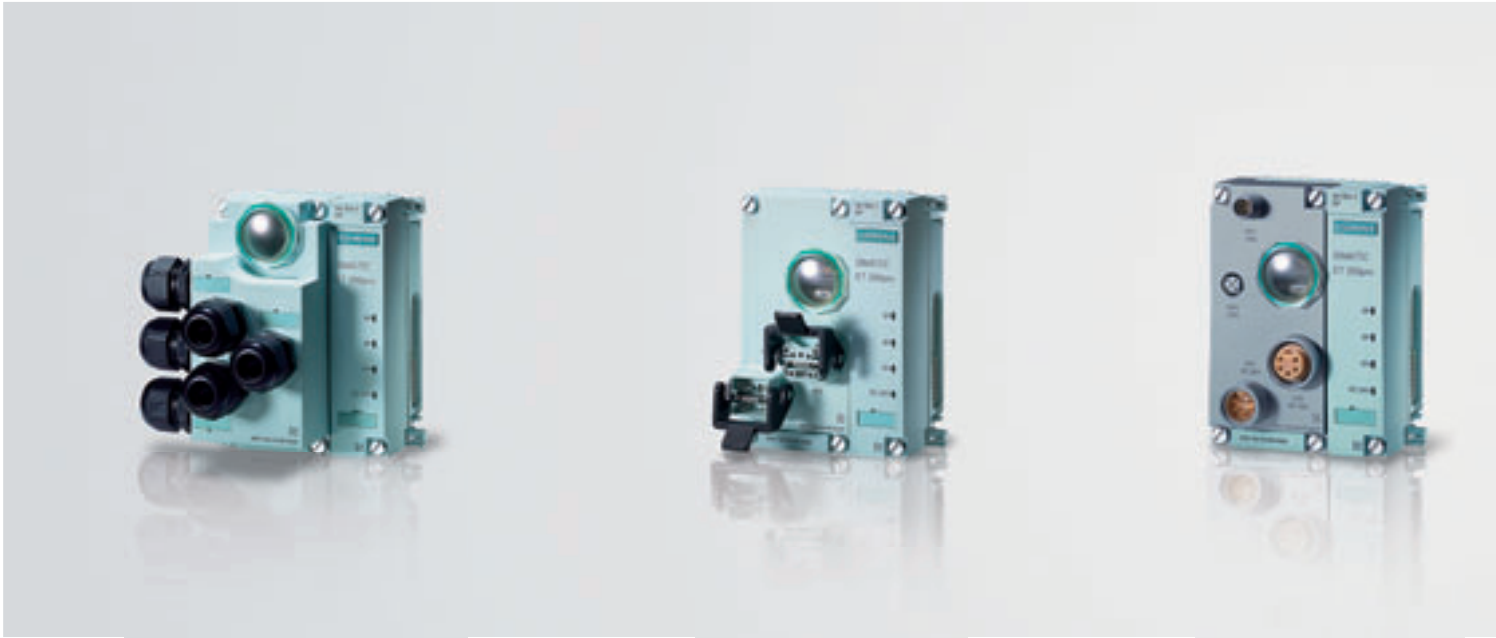
Integrated modular assembly concept with motor starters and frequency inverter



Three-part expansion module: connection, electronics and bus modules



## More possibilities – with PROFIBUS and PROFINET



PROFIBUS interface module  
with direct connection

PROFIBUS interface module with  
ECOFAST connection

PROFIBUS interface module with  
connection system M12, 7/8"

As a standard, SIMATIC ET 200pro relies on field bus communication with PROFIBUS and communication via PROFINET. Based on Industrial Ethernet, many new possibilities open up: integrated communication from the ERP level all the way down to the field level, the operation of even more extensive networks and even faster data transfer.

Safety-oriented communication is no problem with PROFIBUS or PROFINET either. The safety-oriented signals are transmitted by means of PROFIsafe profile. Standard and fail-safe communication run on the same cable.

### Flexible connection: PROFIBUS

SIMATIC ET 200pro is integrated very easily in existing or new communication environments with PROFIBUS. Three connection variants are available. The interface and connection modules can be combined as required:



PROFINET interface module with connection system 2 x RJ45 or 2 x SCRJ FO and 2 x power plug push-pull

PROFINET interface module with connection system 2 x M12, 2 x 7/8"

CPU module with PROFIBUS and PROFINET with integrated CPU

- **Direct connection** with cable screw connection: for an electronic load of up to 16 A and a cable cross section of up to 2.5 mm<sup>2</sup>.
- **ECOFAST** (Energy and Communication Field Installation System): The standardized connection system for cabinet-free distribution according to the ISO standard
- **M12, 7/8"**: the tried-and-tested connection system with a widely used connector standard.

Regardless of which connection system you choose: all connection modules can be removed and have visible address setters, connectable terminating resistor and integrated T-functionality for voltage transfer. This facilitates recognition of the address and permits commissioning of partial segments and uninterrupted bus communication in the event of a service call.

#### Enterprise-wide communication: PROFINET

With SIMATIC ET 200pro, you are prepared for the latest communication solutions based on PROFINET already today. The system can be integrated in PROFINET with the interface module – directly and without detours. The integrated 2-port switch permits easy configuration of a typical PROFIBUS line topology, which is absolutely necessary for applications in conveyor systems, for example. The connection to PROFINET is realized via two M12 plugs and the power supply via the 7/8" screw connection. Furthermore, the push-pull connection system is available. Thanks to PROFINET, more parameters are possible per station – and thus more highly functional modules can be used.

In case of service, the interface module can be replaced without a programming device: device designation and parameters are saved onto the removable Micro Memory Card.

#### Very comfortable: engineering with SIMATIC STEP 7

As is the case with all distributed ET 200 I/O devices, SIMATIC ET 200pro is fully integrated in SIMATIC STEP 7. This both applies to PROFIBUS and PROFINET stations. In both cases, it is extremely easy to configure and parameterize the SIMATIC ET 200pro. The procedure is almost identical for PROFIBUS and PROFINET. Only addressing is implemented differently. You will thus benefit from all advantages of Totally Integrated Automation.

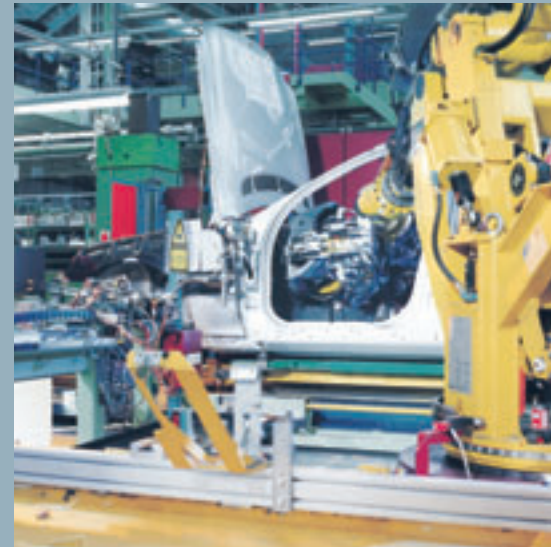
The SIMATIC ET 200pro, however, can also be operated in non-Siemens automation systems. In this case, integration is implemented using device master files (GSD files).

The ideal solution –

## also for safety-relevant automation and drives



Safety Solution PROFIsafe



For automation tasks that place the highest demands on safety, we offer fail-safe expansion modules and High-Feature interface modules. The expansion modules can be used individually in a station or in hybrid configurations with standard modules.

Together with the fail-safe SIMATIC S7-300F and S7-400F controllers, automation tasks with safety requirements up to SIL 3 (EN 61508) or up to Category 4 (EN 954-1) can be solved – efficiently and without control cabinet.

The fail-safe communication between the ET 200pro and the associated fail-safe CPU is transmitted by means of PROFIsafe profile – both via PROFIBUS and PROFINET.

Whether address errors, delays or loss of data: PROFIsafe prevents possible errors thanks to

- consecutive numbering of PROFIsafe data
- time monitoring or
- additional authenticity checks with passwords.

The integration of safety technology in standard automation systems has clear advantages:

- Existing network structures can also be used for fail-safe communication.
- Many components, such as fail-safe controllers (F-CPU), interface modules (IM) and power modules (PM) can be used in standard and safety systems.
- Uniform engineering as well as consistent configuration and diagnostics for the overall automation solution.

For the safety-oriented disconnection of motors and frequency inverters, the two safety concepts Safety Solution PROFIsafe and Safety Solution local are available.

The Safety Solution PROFIsafe is optimally suited for safety applications on the control level. This solution can be easily realized with an F Switch. This electronics module is equipped with two failsafe inputs and outputs for safe switching of the 24 V supply via backplane bus rails. This facilitates safe disconnection of the frequency inverters up to category 3 / SIL 2 and of the motor starters – in combination with a 400 V disconnecting module – up to category 4 / SIL 3.

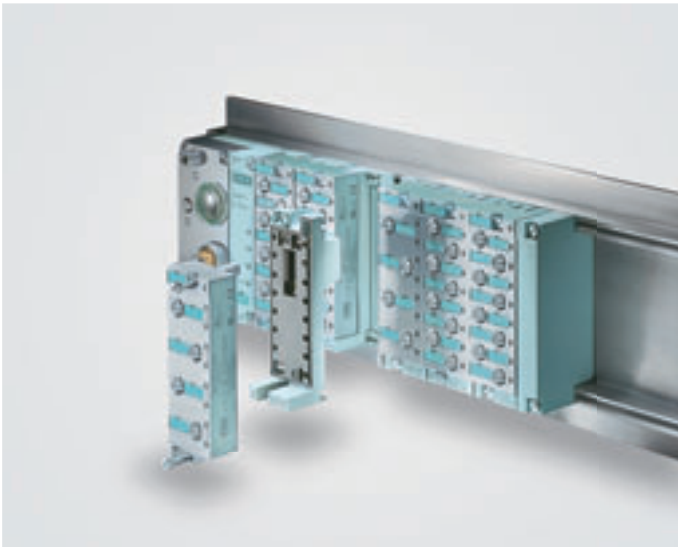
For locally restricted safety applications, the Safety Solution local is the right choice. Application of a Safety local isolator module supports operation of frequency inverters up to category 3 / SIL 2 and of motor starters – in connection with a 400 V disconnecting module – up to category 4 / SIL 3.

The ET 200pro FC frequency inverters additionally facilitate the recovery of braking energy into the mains – and thus ensure a high energy efficiency.



Greater system availability –

## innovative service and diagnostic options



Hot swapping



Load group formation with power modules

### Hot swapping – no downtime during servicing

“Hot swapping” enables you to replace the electronics modules or motor starters quickly during operation in a non-reactive manner. The rest of the station and thus the entire system remain available as the bus module maintains the backplane bus for signals and the supply voltage. A genuine highlight is the permanent wiring of the electronics modules. This means that in the event of a fault or when replacing the I/O modules, you do not have to disconnect the individual wiring of the channels.

This saves time and minimizes potential sources of fault. Coding of the modules rules out the possibility of reinserting them incorrectly.

### Selective load group formation: individual and targeted disconnection of load groups

With SIMATIC ET 200pro power modules, formation of different load groups and supply to downstream loads is possible. This ensures greater flexibility when connecting different loads. The same connection systems are available for power modules as for the voltage supply of the entire station: direction connection, 7/8" or ECOFAST. Several load segments can be integrated in one single station.

Replaceable fuses in the power and interface modules ensure that in case of a fault, only the affected load group is deactivated. Any other load groups within the station continue to be available. The fuse in the interface module also prevents any electrical damage beyond the station.

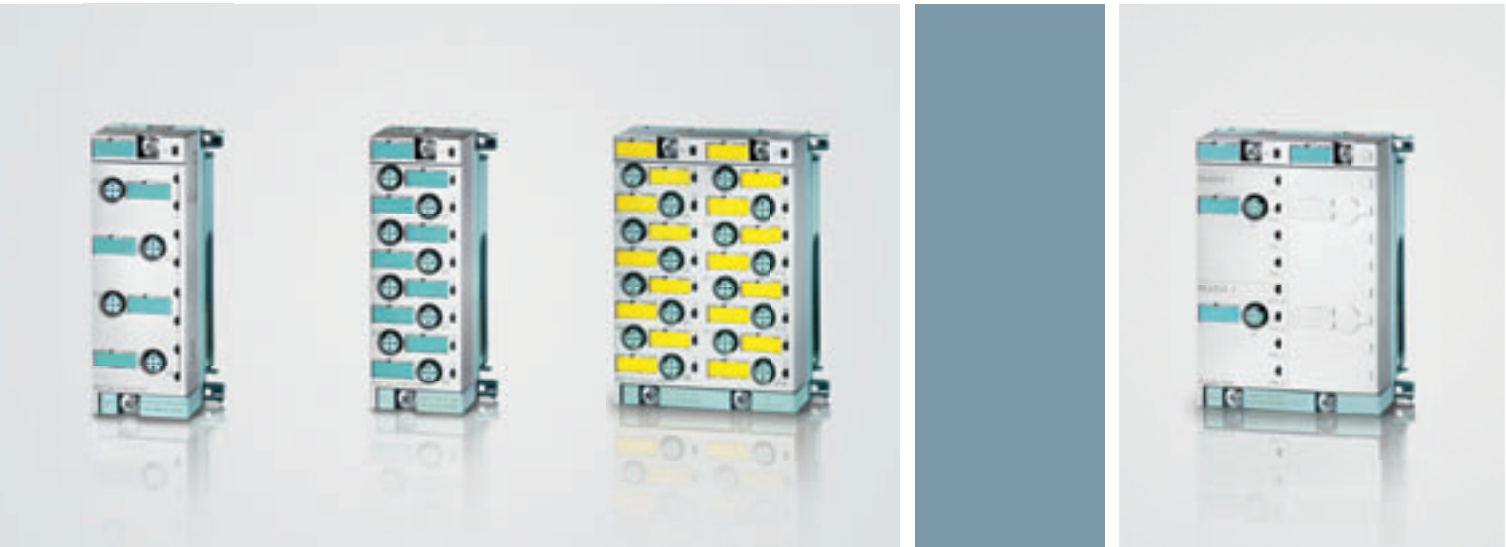
### Diagnostics: graded and made to measure

SIMATIC ET 200 pro has an extensive diagnostics concept: you can choose between module diagnostics or channel-specific diagnostic information. These are automatically signaled as plain text via PROFIBUS or PROFINET to the higher-level control. Remote diagnostics via the Internet is also possible.

Already the standard modules offer module diagnostics for short circuits in the sensor supply or the outputs. Status and error information is displayed via LEDs and reported via the field bus. Even more precise diagnostic options are available with the High-Feature modules: channel-specific for short circuit and wire break – indicated by means of one LED per channel. The diagnostic settings can be parameterized for each channel. With digital inputs, additional process alarms can be used for six channels.

This diagnostic concept can be tailored to suit your specific requirements to trace and clear errors quickly! This in turn optimizes the availability of your system or machine.

Connection of sensors and actuators –  
quick and application-specific



Expansion module  
EM 4DO

Expansion module  
EM 8DI

Fail-safe module

RFID communication module

Electronics module

Up to 16 expansion modules or maximally 128 channels can be connected to every ET 200pro station. Various expansion modules are offered: analog, digital as well as fail-safe variants. The analog expansion modules permit four-channel assignment. With the digital input/output modules, you can choose between four and eight channels, while the double-width fail-safe modules even offer a 12- or 16-channel connection.

Thanks to their robust design, the I/O modules are resistant to vibration loads of up to 5 g and shock loads up to 25 g. The metal casing gives the connection modules a very high level of resistance.

RFID communication module RF 170C

Via the RF 170C communication module, Siemens RFID systems can be connected to ET 200pro. It consists of an electronics module and connection block and facilitates the operation of write/read devices of all RFID systems.

The integration of RF 170C in SIMATIC STEP 7 is realized via the object manager (OM). For integration in external systems, the GSD file of the ET 200pro can be used. This way, the RF 170C can be configured via the HW-Config software tool of the SIMATIC Manager or a different PROFIBUS/PROFINET tool.

The connected readers are supplied via the two reader interfaces of the RF 170C. All components can be easily and quickly connected via the 8-pole M12 connectors.

Two parallel MOBY channels ensure real-time operation on dynamic read points. In addition, the powerful hardware facilitates rapid data exchange with the SLG (reader). The application data are thus available even faster. Furthermore, the adjustable and parameterizable RFDI-specific diagnostics ease commissioning and troubleshooting.

RFID module RF 170C	
Components	• Electronics module and connection block
Software integration	• STEP 7 or GSD file
Interfaces	• 2 x MOBY
Connection	• M12 (8-pole)
Dimensions W x H x D (mm)	90 x 130 x 35



Pneumatic components

CPU module

### Pneumatic components

The PM 148-P pneumatic module facilitates the employment of ET 200pro in pneumatic standard applications. Up to 7 pneumatic modules can be connected per ET 200pro station.

- Via the pneumatic module, two single- or double-acting cylinders can be controlled. The integration of electronics and pneumatics in one module makes its application particularly economical.
- A CPV 10 or CPV 14 valve island by FESTO can be installed in the pneumatic module, through which ET 200pro can also be used for applications which require flexible pneumatics. The various valve functions of the FESTO standard portfolio and manifold flow rates open up a wide application area.

#### Pneumatic module PM 148-P

##### Digital outputs

- 16, for valve control

##### FESTO valve islands

- CPV 10, CPV 14 (orderable via FESTO)

##### Dimensions W x H x D (mm)

- 90 x 130 x 47

### CPU module

The interface module IM 154-8 CPU with CPU functionality is based on the CPU 315-2 PN/DP and offers the same quantity structures and functions. The IM 154-8 CPU is equipped with two communication interfaces:

- combined MPI/PROFIBUS DP interface and
  - PROFINET interface with three ports.
- The IM 154-8 CPU supports PROFINET IO (up to 128 I/O devices connectable), PROFINET CBA as well as PROFIBUS DP (as master for up to 124 slaves).

The IM 154-8 CPU is program-compatible with the S7-300 CPUs and furthermore offers a high data remanence (zero voltage safety). A separate LED indicates maintenance alarms. Thanks to the Micro Memory Card, modules can be effortlessly replaced. Firmware updates can be carried out online. Further advantages: web server functionality for information, status, diagnostics and time synchronization via Ethernet (NTP), open Ethernet communication (TCP/IP, UDP, ISOon-TCP) for reliable and fast data exchange as well as possible pulse synchronism at the PROFIBUS.

The central control is relieved as individual system components can be configured, commissioned, diagnosed and operated independently.

#### CPU module IM 154-8 CPU

##### Connection block PN/DP

- CM IM PN DP M12 7/8"

##### Degree of protection

- IP65 / 67

##### Memory

- 256 kB/85 k instructions

##### Interfaces

- X1: MPI/DP interface (2x M12)
- X2: PN interface (2x M12, 1x RJ45)

##### Dimensions CPU W x H x D (mm)

- 135 x 130 x 59.3

##### Dimensions connection block W x H x D (mm)

- 90 x 130 x 50.8

Compact and intelligent –

## SIMATIC ET 200pro Motor Starters

The ET 200pro motor starters start and protect motors and loads up to 5.5 kW. They are available as electromechanical standard and high feature motor starters and as electronic high-feature motor starters – both as direct or reversing starters. The High-Feature motor starter stands out from the standard motor starter with a greater number of parameters and four parameterizable digital inputs. Parameterization is easily and comfortably realized with the SIMATIC Manager. The motor starters are characterized by high functionality with a small footprint, simple and quick configuration and installation – and by the fact that they increase the availability of production systems.

### Installation: a real step forward

The compact ET 200pro motor starters can be installed in the ET 200pro station with only few flicks of the wrist. The integrated plug-in connection system significantly reduces the wiring expenditures. The motor connection cables can be directly plugged into the motor starter module. In the field, the compact assembly design offers the possibility of integrating as many as eight motor starters over a station width of one meter.

### Current measuring: electronic and precise

With the ET 200pro motor starters, the actual current flow is measured electronically. The evaluation of defined current limit values of the parameterized electronic overload protection increases the availability of the drive systems. The ET 200pro reports any deviation from the limit to the higher-level control, which ensures a high system availability. The motor starter recognizes asymmetrical load currents and switches them off directly. All motor protection functions can be defined by simple parameterization. The partially required on-site control station for a drive is addressed via the four integrated digital inputs (high-feature motor starter) and thus easily integrated in the control.

### Special modules: even greater functionality

If required, an isolator module can be optionally employed, e.g. to disconnect downstream starters from the supply voltage.

### Safety modules

For safety-oriented applications, the Safety Motorstarter Solution local and Solution PROFIsafe are used. For local safety applications, the Safety local isolator module is combined with the 400 V disconnecting module. These two components facilitate safe disconnection of the downstream motor starters' 400 V supply.

When safety technology on the control level is called for, PROFIsafe solutions are the perfect choice. They can be rapidly and easily realized with an F-Switch module. With downstream electronic motor starters, an additional 400 V disconnecting module is installed. Moreover, the combination of these two modules additionally attains a higher safety category (category 4 / SIL 3).

All 400 V components are equipped with plug connectors according to the ISO23570 connection system.



SIMATIC ET 200pro with isolator module and motor starters (standard and high-feature)



## Two devices in one –

# Electronic Motor Starter with Soft Starter Function

The portfolio of electromechanical ET 200pro motor starters in the standard and high-feature versions was expanded by the intelligent electronic high-feature motor starters.

This innovation both acts as an electronic motor starter for high switching frequencies and as a fully fledged soft starter for soft start-up and ramp-down procedures. The switch-over from motor to soft starter is simply realized via re-parameterization in the SIMATIC Manager.

### Absolutely convincing: technical features

In addition to the tried-and-tested characteristics of electromechanical motor starters switching with conventional contactors, the electronic motor starters offer numerous further advantages. As they are equipped with semiconductor elements, they are particularly suitable for applications with high switching frequencies – for example lock-in procedures, conveyor system switches, etc. In other words: wherever a high service is to be guaranteed through wear-free switching.

### Clever alternative: in numerous applications

The High-Feature devices offer more than the direct switch-on and switch-off of motors with high switching frequencies. They can additionally be used as fully fledged soft starters to facilitate soft start-up and ramp-down procedures. They thus present a real alternative to star-delta starters and frequency inverters – given no speed adjustment or a high and constant starting torque is required. Soft start-up and ramp-down is, amongst others, required for applications with pumps, agitators, mixers or fans, where the soft starter reduces the starting current.

This conserves the motor and protects the mechanical components against impact and shock. This gentle operation results

in an increased service life of the entire system and its components.

### Thought out into the detail: integrated functionalities

Thanks to an integrated solid-state overload relay and thermistor motor protection relay, the electronic motor starters offer full motor protection. Both protective functions can be parameterized independently.

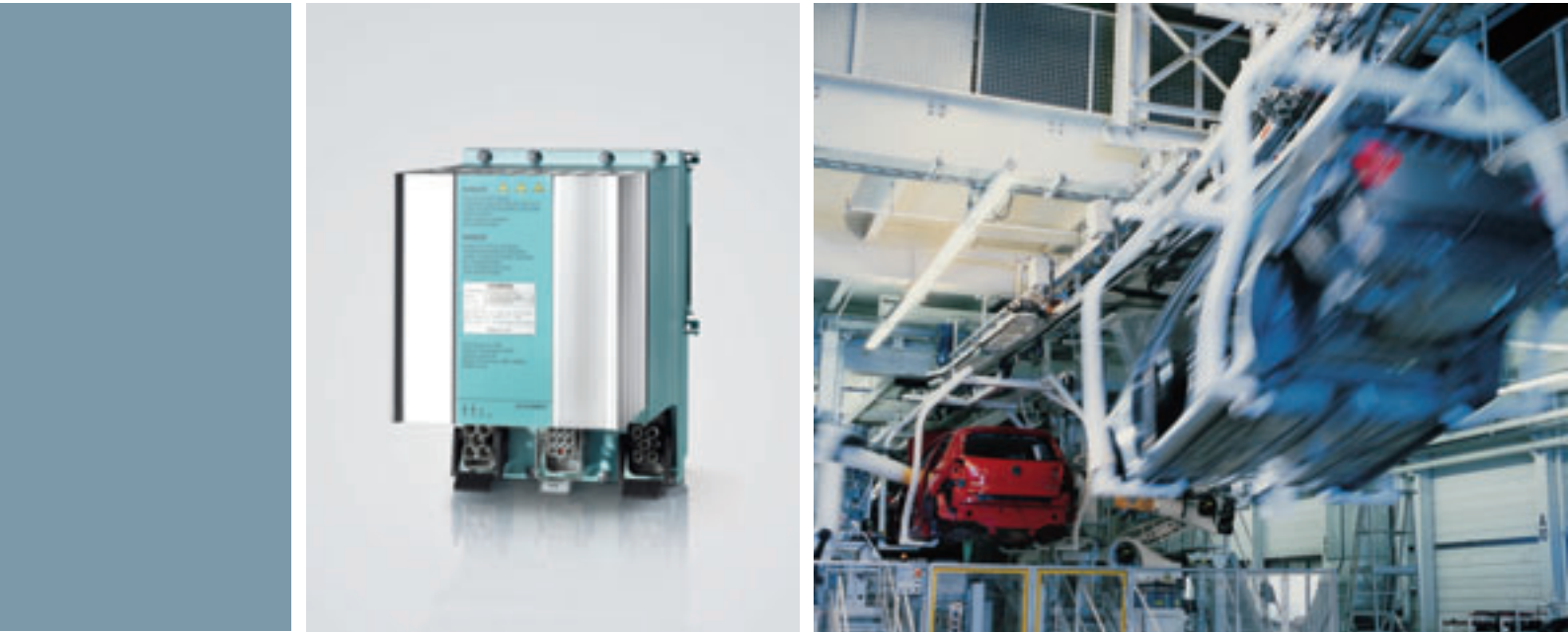
In addition, the electronic motor starters form an integral component of Totally Integrated Automation. They can be integrated in the automation easily and rapidly via the SIMATIC Manager and parameterized in HW-Config.



SIMATIC ET 200pro electronic motor starter (high-feature)

Motor starter	Standard	High-Feature
Power	5.5 kW	5.5 kW
Electromechanical switching	yes	yes
Electronic switching	no	yes
Degree of protection	IP65	IP65
Brake control	AC 400 V (optional)	AC 400 V (optional)
Dimensions (W x H x D) mm	110 x 230 x 150	

## Integration of SIMATIC ET 200pro in the drive technology – with intelligent inverters



ET 200pro FC distributed frequency inverter

The SIMATIC ET 200pro FC frequency inverter expands the ET 200pro system portfolio. It offers numerous outstanding product characteristics as well as a power rating of 1.1 kW at 55 °C (1.5 kW up to 45 °C) in the design of a SIMATIC module. In combination with other modules of the ET 200pro system, the frequency inverter facilitates made-to-measure solution options.

The ET 200pro FC is suitable for the open- and closed-loop control of asynchronous motors in numerous industrial applications, particularly for conveyor technology applications featuring PROFIBUS-linked drives – especially where the interconnection of several drives in distributed cabinet-free assembly is reasonable (e.g. processing cells in the automotive sector or corner transfer units in logistical applications).

The system is based on the hardware and firmware of the SINAMICS G120 frequency inverters. Joint software tools ease initial parameterization and commissioning. The ET 200pro FC is available in two device variants: with and without integrated safety functions.

In addition, the ET 200pro FC offers a multitude of product-specific highlights – for particularly efficient and available drive technology:

- Easy and rapid installation
- Reduced wiring expenditures through self-assembling potential rails and communication bus
- Integration of up to five inverters in one station
- V/f control and sensorless frequency control
- Abolishment of brake resistance and chopper; high energy efficiency through recovery option of braking energy into the network

- Integrated safety functions for functional safety – without laborious external circuits
- Communication via PROFIBUS or PROFINET
- Integrated brake control (DC 180V)
- Integrated motor protection through thermal motor model and evaluation of PTC or KTY 84 temperature sensors
- High availability through comprehensive diagnostic options
- Power: up to 1.1 kW (1.5 kW with reduced ambient temperature)
- Integrated EMC filter of Class A (acc. to EN55011)
- Optional Micro Memory Card for automatic parameter download
- Dimensioning of the motor/frequency inverter system with the SIZER (version 2.8 or higher)
- Parameterization via STARTER standard software (version 4.1 or higher, SP1)

## A league of its own – integrated safety functions

The fail-safe variant of SIMATIC ET 200pro FC offers comprehensive safety functions certified in accordance with Category 3 of EN954-1 and SIL 2 of IEC61508.

- Safe torque off “STO”; safely disconnected torque for protection against active drive movements.
- Safe stop 1 “SS1”; safe stop 1 for the continuous monitoring of a safe brake ramp.
- Safely limited speed “SLS”; safely limited speed for the protection against dangerous movements due to limit speed exceedance.

Both the “safe stop 1” as well as the “safely limited speed” function can be executed without a motor sensor or encoder. The realization expenditures are minimal.

The safety functions can be controlled via inputs of the Safety local isolator module (F-RSM) or via field bus by means of the F-Switch PROFIsafe module.



Safety Solution local with motor starters and frequency inverters

Overview of ET200pro FC	
Frequency inverters pluggable in ET 200 pro	max. 5
Dimensions (W x H x D)	155 x 230 x 213 mm
Weight	4 kg
Degree of protection	IP65
Network topology	TT, TN
Input voltage	3 AC 380 V to 3 AC 480 V + 10 % –10 %
Line frequency	47 to 63 Hz
Rated power	1.1 kW (0°–55 °C) 1.5 kW (0°–45 °C)
Average load during cycle 300 sec – 100 %	+ 150 % for 60 s, + 200 % for 3 s
Permissible operation position	vertical
Pulse frequency	2 kHz to 16 kHz
Brake control	180 V DC
Motor temperature	PTC, KTY 84
Approvals, standards	cUL, CE; EN 954-1, IEC 61508

## SIMATIC ET 200pro with Safety Integrated and PROFINET



### Volkswagen Nutzfahrzeuge, Germany – Vibrating roller test bed

#### Requirements

Volkswagen Nutzfahrzeuge (VWN), an autonomous brand of the Volkswagen corporation, has relocated the final noise test in the transporter works in Hanover to the workshop hall. Now, the commercial vehicle business is operating a vibrating roller test bed in its works in Hanover in cooperation with the automation initiative of the German automotive industry (AIDA). The customer's requirements were extensive: The vibrating roller test bed had to be linked into the existing network structure (PROFINET); fail-safe communication was just as important as a reduction in training costs. The use of distributed I/O was also demanded.

#### Solution

The distributed I/O had to be installed in the support structure of the test bed, in a compact space close to the vibration dampers. Therefore, the only option was a cabinet-free solution of extremely high ruggedness and industrial compatibility, which is why SIMATIC ET 200pro was used. An S7-400F control was used to ensure fail-safe communication via PROFINET. In addition to the SIMATIC ET 200pro – in cabinet-free assembly – the SIMATIC ET 200S, which is installed beside the control in the control cabinet, serves as distributed I/O device.

Both distributed I/O systems are assembled as standard and fail-safe variant. A PROFINET-capable SCALANCE X208pro switch in degree of protection IP65 distributes the incoming and outgoing data.

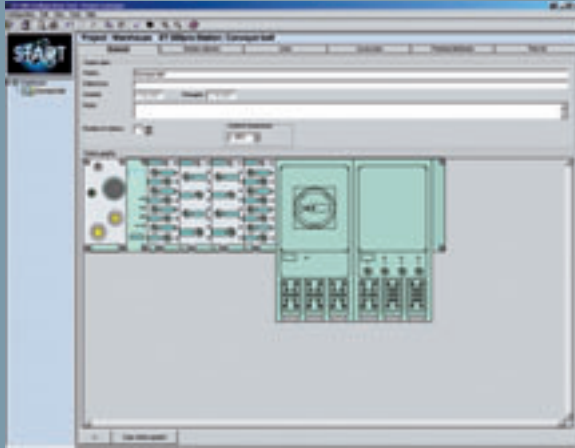
#### Benefits

The application of SIMATIC ET 200pro resulted in considerable advantages: Costs were saved thanks to the standardization and optimization of the spare parts inventory. The requested reduction in training costs for maintenance and service personnel was also realized. Due to the possibility of replacing the module during operation – so-called hot swapping – a high system availability can be guaranteed. In addition, also the installation and wiring expenditures for the safety-oriented system components were reduced.



Support in Advance –

# the SIMATIC ET 200 Configurator



Even in advance of configuring your station, we offer you the ideal support – with the SIMATIC ET 200 configurator. This software tool not only creates an order list, including accessories, but also supports you in complying with limit values such as load currents, slot rules or parameters.

## Technical data

General technical data		Dimensions	
Degree of protection	IP65/66/67	Interface module with connection module M12, 7/8"	90 x 130 x 73 mm
Vibration resistance	up to 5 g up to 25 g shock (module-dependent)	connection module direct	90 x 130 x 120 mm
Ambient temperature	0 to 55° Celsius or –25° to 55° Celsius (module-dependent)	connection module ECOFAST	90 x 130 x 80 mm
Number of expansion modules	max. 16	Expansions modules digital, analog fail-safe	45 x 130 x 60 mm 90 x 130 x 60 mm
Station width	up to max. 1 m	RFID communication module 3RF 170C	90 x 130 x 35 mm
Diagnostics	module-specific or channel-specific	Pneumatic module	90 x 130 x 47 mm
Approvals, standards	CE, cULus	Power module with connection 7/8" connection direct connection ECOFAST	45 x 130 x 73 mm 45 x 130 x 120 mm 45 x 130 x 80 mm
		Bus terminating module	19 x 130 x 60 mm
		Direct and reversing starter	110 x 230 x 150 mm
		Isolator module	110 x 230 x 170 mm
		Safety local isolator module	110 x 230 x 170 mm
		400-V disconnecting module	110 x 230 x 170 mm
		Frequency inverter	155 x 230 x 213 mm

# Module Portfolio



see page 6/7

Interface modules (IM) (incl. terminating module)				
PROFIBUS			PROFINET	
		Order no. body		Order no. body
Type selection	IM 154-1 DP IM 154-2 DP HF*	6ES7 154-1 6ES7 154-2	IM 154-4 PN HF*	6ES7 154-4
Protocol	PROFIBUS DP DP V0, DP V1 Slave		PROFINET IO PROFINET Device	
Transmission rate max.	12 Mbit/sec		100 Mbit/sec	
Firmware update	via PROFIBUS		via Micro Memory Card	
Connection modules (CM)	CM IM DP direkt CM IM DP ECOFAST Cu CM IM DP M12, 7/8"		CM IM PN M12, 7/8" CM IM PN 2xRJ45 CM IM PN 2xSCRJ FO	



see page 10

Digital electronics modules	
	Order no. body
EM 8 DI DC 24 V	6ES7 141-4BF.
EM 8 DI DC 24 V HF	6ES7 141-4BF.
EM 4 DO DC 24 V, 2 A	6ES7 142-4BD.
EM 4 DO DC 24 V, 2 A HF	6ES7 142-4BD.
EM 8 DO DC 24 V, 0,5 A	6ES7 142-4BF.

Analog electronics modules	
	Order no. body
EM 4AI U HF	6ES7 144-4FF.
EM 4AI I HF	6ES7 144-4GF.
EM 4AI RTD HF	6ES7 144-4JF.
EM 4AO U HF	6ES7 145-4FF.
EM 4AO I HF	6ES7 145-4GF.

Connection modules	
Various connection modules are available for the I/O screw connection	
	Order no. body
CM IO 8xM8	6ES7 194-4EB.
CM IO 2xM12	6ES7 194-4FB.
CM IO 4xM12	6ES7 194-4CA.
CM IO 4xM12 invers	6ES7 194-4CA.
CM IO 8xM12	6ES7 194-4CB.
CM IO 1xM23	6ES7 194-4FA.



see page 10

Fail-safe electronics modules EM	
	Order no. body
EM 8/16 F-DI DC 24 V	6ES7 148-FA.
EM 4/8 F-DI/F-DO DC 24 V	6ES7 148-4FC.

Connection modules	
The following connection modules are available	
	Order no. body
CM IO F 12xM12	6ES7 194-4DC.
CM IO F 16xM12	6ES7 194-4DD.



Failsafe switch	
	Order no.
F-Switch PROFIsafe 24 V DC, incl. bus module	6ES7 148-4FS00-0AB0

Connection module	
The following connection module is available	
	Order no.
Connection module for F-Switch 24 V DC	6ES7 194-4DA00-0AA0



Power modules (incl. bus module)		
		Order no. body
Type selection	PM-E DC 24 V	6ES7 148-4CA.
Supply voltage	DC 24 V	
Connection modules (CM)	CM PM direct	6ES7 194-4BC.
	CM PM ECOFAST Cu	6ES7 194-4BA.
	CM PM 7/8"	6ES7 194-4BD.



see page 10

RFID module RF 170C	
	Order no. body
Electronics module	6GT2002-0HD.
Connection block	6GT2002-1HD.



see page 11

Pneumatic module PM 148-P	
	Order no. body
EM 16DO DC 24 V CPV10	6ES7 148-4E.
EM 16DO DC 24 V CPV14	

Connection module	
The following connection modules are available (via FESTO)	
CPV10	(via FESTO)
CPV14	(via FESTO)



see page 11

CPU-Modul IM 154-8 CPU	
	Order no. body
CPU	6ES7 154-8AB.
Connection block	6ES7 194-4AN.



see page 14/15

SIMATIC ET 200pro motor starters		
		Order no. body
Standard motor starters	Direct starter, mechanical	3RK1 304-5.S40-4AA.
	Reversing starter, mechanical	3RK1 304-5.S40-5AA.
High-feature motor starters	Direct starter, mechanical,	3RK1 304-5.S40-2AA
	Reversing starter, mechanical	3RK1 304-5.S40-3AA.
	Direct starter, electronic	3RK1 304-5.S70-2AA.
	Reversing starter, electronic	3RK1 304-5.S70-3AA.
<b>Standard and high-feature motor starters</b> Optionally with 400 V AC brake control Power range up to 5.5 kW 2 device types: 0.15 - 2 A and 1.5 to 12 A Depending on the electronic motor starter's setting: <ul style="list-style-type: none"> <li>• as electronic starter between 0.15–2 A and 1.5–9 A (4 kW)</li> <li>• as soft starter between 0.15–2 A and 1.5–12 A (5.5 kW)</li> </ul>		
Special modules		
		Order no.
Isolator module		3RK1 304-0HS00-6AA0
Safety local isolator module		3RK1 304-0HS00-7AA0
400-V disconnecting module		3RK1 304-0HS00-8AA0



see page 15/16

SIMATIC ET 200pro frequency inverters	
	Order no.
Standard frequency inverter	6SL3235-0TE21-1RB0
Fail-safe frequency inverter	6SL3235-0TE21-1SB0
Power range	1.1 kW (0 °C–55 °C) 1.5 kW (0 °C–45 °C)
Brake control	180 V DC
Motor temperature	PTC, KTY 84

## Further information on the Internet at:

SIMATIC ET 200 range:  
[www.siemens.com/et200](http://www.siemens.com/et200)

Totally Integrated Automation:  
[www.siemens.com/totally-integrated-automation](http://www.siemens.com/totally-integrated-automation)

PROFINET:  
[www.siemens.com/profinet](http://www.siemens.com/profinet)

SIMATIC Safety Integrated:  
[www.siemens.com/f-cpu](http://www.siemens.com/f-cpu)

ECOFAST standard:  
[www.siemens.com/ecofast](http://www.siemens.com/ecofast)

SIRIUS® motor starters:  
[www.siemens.com/sirius-motorstarter](http://www.siemens.com/sirius-motorstarter)

SIMATIC ET 200pro frequency converters:  
[www.siemens.com/et200pro-fc](http://www.siemens.com/et200pro-fc)

Your local contact partners are listed at:  
[www.siemens.com/automation/partner](http://www.siemens.com/automation/partner)

Information material is available  
for ordering and download at:  
[www.siemens.com/simatic/printmaterial](http://www.siemens.com/simatic/printmaterial) and  
[www.siemens.com/sirius-starting](http://www.siemens.com/sirius-starting)

Siemens AG  
Industry Sector  
Industry Automation  
and Drive Technologies  
P.O. Box 48 48  
90327 NÜRNBERG, GERMANY  
  
[www.siemens.com/automation](http://www.siemens.com/automation)

Subject to change without prior notice 04/08  
Order No.: E20001-A800-P305-V2-7600  
Dispo 27602  
21/12365 FGET.52.8.03 WS 04085.0  
Printed in Germany  
© Siemens AG 2008

The information provided in this brochure contains merely general descriptions or characteristics of performance which in actual case of use do not always apply as described or which may change as a result of further development of the products. An obligation to provide the respective characteristics shall only exist if expressly agreed in the terms of contract.

All product designations may be trademarks or product names of Siemens AG or supplier companies whose use by third parties for their own purposes could violate the rights of the owners.