

SIEMENS



# The ideal drive for simple and cost-effective positioning

SINAMICS S110: The compact single-axis servo drive with integrated safety function.

# SINAMICS S110 – Converter for basic positioning tasks



## Reliably positioning single axes – quickly and precisely

For many applications in machinery and plant construction, machine axes must be positioned as simply as possible – however also quickly and precisely. SINAMICS S110 was specifically designed for this purpose. When it involves moving a machine axis reliably and with adequate performance from one position to another then SINAMICS S110 is the optimum choice.

## Everything that a positioning drive requires

SINAMICS S110 integrates all of the required positioning functions and can control both synchronous as well as induction servomotors. It supports the wide variety of encoder types most frequently used in practice. An analog  $\pm 10$  V setpoint interface, a pulse/direction interface, a USS interface as well as various fieldbus interfaces are available to connect a SINAMICS S110 drive unit to a higher-level control.

## The perfect solution for a wide range of applications

Typical examples for using SINAMICS S110 drives include:

- Handling equipment
- Feed and withdrawal equipment
- Stacking units
- Automatic assembly machines
- Laboratory automation
- Tool changers
- Adjuster axes
- Tracking equipment  
e.g. solar panels
- Medical technology and health systems  
e.g. patient beds

## Unique in its class – integrated safety functions

SINAMICS S110 frequency converters distinguish themselves as a result of the integrated safety functions. All of the relevant safety directives can be implemented without incurring any significant additional costs.

## Totally Integrated Automation with SINAMICS S110











SINAMICS S110 is the ideal positioning drive suitable for applications in conjunction with the SIMATIC automation system. All components of the automation solution can be programmed, parameterized and commissioned using a standard, integrated engineering platform – seamlessly without any system transition. With its fieldbus interfaces, SINAMICS S110 is flexible and can be integrated into the widest range of system environments.

### SINAMICS S110

- The positioning specialist
- Onboard safety functions
- Ideal for use with SIMATIC
- Can be used with every control

# SINAMICS – The optimum drive for every application

The drive family for leading edge drive solutions that are fit for the future

Low voltage							DC	Medium voltage	
For basic applications		For demanding applications				For basic servo applications	For basic and sophisticated applications	For applications with high power ratings	
									
SINAMICS G110	SINAMICS G110D	SINAMICS G120P	SINAMICS G120D	SINAMICS G120C	SINAMICS G120	SINAMICS G130/G150	SINAMICS S110	SINAMICS DCM	SINAMICS GL150 / GM150 / SM150 / SL150
V/f control	V/f control/FCC	V/f control/FCC/vector control without encoder	V/f control/FCC/vector control with and without encoder			Servo control	V/f control/vector control/servo control		Closed-loop speed/torque control
0.12 – 3 kW	0.75 – 7.5 kW	0.37 – 90 kW	0.75 – 7.5 kW	0.55 – 18.5 kW	0.37 – 250 kW	75 – 2700 kW	0.12 – 90 kW	0.12 – 4500 kW	75 – 1200 kW
Pumps, fans, conveyor belts	Conveyor systems	Pumps, fans, compressors	Pumps, fans, conveyor belts, compressors, mixers, crushers, extruders			Single-axis positioning applications in machinery and plant building	Production machines (packaging machines, textile and printing machines, paper machines, plastics machines), machine tools, plants, process lines and rolling mills	Test stands, crosscutters, centrifuges	Rolling mill drives, wire-drawing machines, extruders and kneaders, cable railways and lifts, test stand drives
Standard engineering tools							Standard engineering tools		
SIZER — for simple planning and engineering							STARTER — for fast commissioning, optimizing and diagnostics		

**SINAMICS offers the optimum drive for each and every drive task – and all of the drives can be engineered, parameterized, commissioned and operated in the same standard fashion.**

## SINAMICS – fit for every drive application

- Wide range of power ratings from 0.12 kW to 120 MW
- Available in low-voltage and medium-voltage versions
- Standard functionality using a common hardware and software platform
- Standard engineering using just two tools for all drives: SIZER for engineering and STARTER for parameterizing, commissioning and diagnostics
- High degree of flexibility and combinability

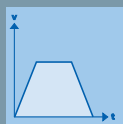
## Standard and integrated in the SINAMICS family

The SINAMICS S110 positioning drive has the same look and feel as the SINAMICS S120 motion control drive system. It is possible to quickly and simply migrate to SINAMICS S120 if a drive solution, equipped with SINAMICS S110, requires an even higher performance.

# SINAMICS S110 – Positioning functions for all generally encountered applications



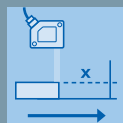
Linear and  
rotary axes



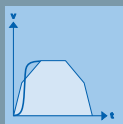
Positioning



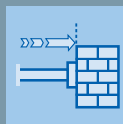
Automatic  
positioning



Positioning  
on the fly



Jerk limiting



Travel to  
endstop



## Powerful, efficient and reliable

The SINAMICS S110 single-axis drive can control linear axes just the same as rotary axes in-line with the particular application requirements. Axes can be positioned to absolute target points or moved through relative distances. An optional following error monitoring function that can be activated immediately issues an alarm if irregularities occur while traversing. The zero speed monitoring at the end positions also has an alarm function. When required, jerk limiting can ensure that the axis starts and stops smoothly. As a consequence, even sensitive products or containers filled with liquid can be efficiently moved but at the same time carefully with low associated stress.

## "MDI" mode

The "MDI"<sup>1</sup> mode is the simplest way of positioning using SINAMICS S110. The positioning parameters (velocity, target position/travel distance – optionally also acceleration rates) can be entered from the higher-level control, and are activated by the start command. If required, individual parameters for positioning travel can be modified as the axis moves.

## "Traversing blocks" mode

Simple traversing profiles can be implemented in the "traversing blocks" mode. Up to 16 position or traversing distances can be saved in the drive together with the corresponding velocity and acceleration parameters. These traversing blocks can be executed either sequentially or according to additional criteria.

## "Jog" mode

Goods randomly arriving on a conveyor belt can be brought into a precise position using the "jog" mode. Epos function<sup>2</sup> can also be simply used to clamp workpieces using the travel to endstop function.

### Epos<sup>2</sup> positioning functions

- Linear/rotary axes
- Point-to-point positioning, absolute/relative
- Traversing profiles
- Flying positioning
- Travel to fixed endstop
- Jerk limiting
- Motion monitoring, standstill monitoring
- Monitoring travel range limits

<sup>1</sup> MDI: Manual Data Input

<sup>2</sup> Epos: Easy Positioning



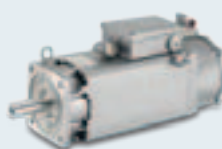
# SINAMICS S110 – One of the most universal and safest positioning drives



SIMOTICS S-1FK7 servomotor

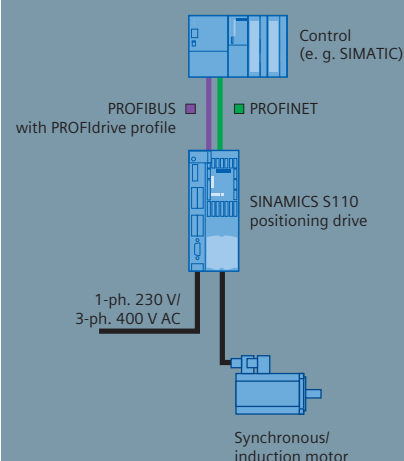


SIMOTICS GP  
low-voltage motor



SIMOTICS M-1PH8 main motor

Single-axis SINAMICS S110 positioning drive  
connected to a higher-level control via PROFIBUS interface



## Versatile single-axis servo drive

As drive converter for standard positioning tasks, SINAMICS S110 operates quickly and efficiently. This can involve machinery axes with a higher dynamic performance, which define the primary process of a machine or plant, as well as also actuator axes that are less critical from a time perspective. SINAMICS S110 positions synchronous and induction motors with power ratings of up to 90 kW.

## Open and connection-friendly for all motors

SINAMICS S110 can be used with various motors, also from other manufacturers. However, the best and simplest way is to select a complete solution with a Siemens motor. Both SIMOTICS S-1FK7/1FT7 synchronous servomotors as well as also the smooth-running SIMOTICS M-1PH8 induction motors have electronic rating plates and a digital DRIVE-CLiQ interface that permits drive systems to be quickly commissioned.

## Universal connection to higher-level controls

The SINAMICS S110 positioning drive is available with a PROFIBUS or PROFINET interface and supports standard protocols such as PROFIdrive and PROFIsafe for connection to a higher-level control system. SINAMICS S110 can be optimally integrated into the SIMATIC automation system via PROFIBUS and PROFINET. Further, SINAMICS S110 can also be connected to a higher-level control via CANopen, USS protocol, +/- 10 V analog or pulse/direction interface.

## Safety-based motion

The positioning functions of the SINAMICS S110 are complemented by an extensive set of integrated safety functions. These safety functions support the straightforward implementation of innovative safety concepts in compliance with the appropriate standards. As the safety functions are integrated they respond very quickly in critical situations to avoid damage to man and machine.

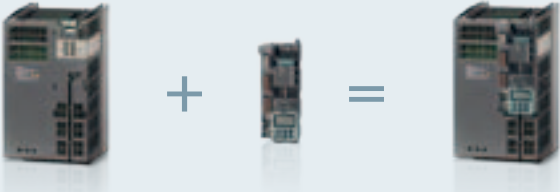
Safety functions are either controlled using integrated safety-relevant input terminals or via PROFIBUS/PROFINET using the PROFIsafe profile.

## Increased safety and productivity with integrated safety functions

- Safe Torque Off (STO)
- Safe Operating Stop (SOS)
- Safe Stop, Cat. 1 (SS1)
- Safe Stop, Cat. 2 (SS2)
- Safe Direction (SDI)<sup>1</sup>
- Safely Limited Speed (SLS)
- Safe Speed Monitor (SSM)
- Safe Brake Control (SBC)

<sup>1</sup> from firmware release V4.4

# SINAMICS S110 – Selection and ordering data

Control Units		Power Module PM340	Control Unit CU305	SINAMICS S110
	Order No.	 <p>A Power Module PM340 with a mounted Control Unit CU305 form a functional SINAMICS S110 positioning drive.</p>		
CU305 DP	6SL3040-0JA00-0AA0			
CU305 PN	6SL3040-0JA01-0AA0			
CU305 CAN	6SL3040-0JA02-0AA0			
Accessories for Control Units (optional)				
MMC card SINAMICS S110 for storing the safety license or to back up project data	6SL3054-4AG00-0AA0			
Basic Operator Panel BOP20	6SL3055-0AA00-4BA0			
Safety license (Extended Functions)	6SL3054-0AA10-0AA0			

Power Modules				
Rated power	Rated output current	Frame size	PM340 Power Module	
			Without line filter	With integrated line filter
kW	A		Order No.	Order No.
Line supply voltage, 1-ph. 200 ... 240 V AC				
0.12	0.9	FS A	6SL3210-1SB11-0UA0	6SL3210-1SB11-0AA0
0.37	2.3	FS A	6SL3210-1SB12-3UA0	6SL3210-1SB12-3AA0
0.75	3.9	FS A	6SL3210-1SB14-0UA0	6SL3210-1SB14-0AA0
Line supply voltage, 3-ph. 380 ... 480 V AC				
0.37	1.3	FS A	6SL3210-1SE11-3UA0	-
0.55	1.7	FS A	6SL3210-1SE11-7UA0	-
0.75	2.2	FS A	6SL3210-1SE12-2UA0	-
1.1	3.1	FS A	6SL3210-1SE13-1UA0	-
1.5	4.1	FS A	6SL3210-1SE14-1UA0	-
2.2	5.9	FS B	6SL3210-1SE16-0UA0	6SL3210-1SE16-0AA0
3	7.7	FS B	6SL3210-1SE17-7UA0	6SL3210-1SE17-7AA0
4	10.2	FS B	6SL3210-1SE21-0UA0	6SL3210-1SE21-0AA0
7.5	18	FS C	6SL3210-1SE21-8UA0	6SL3210-1SE21-8AA0
11	25	FS C	6SL3210-1SE22-5UA0	6SL3210-1SE22-5AA0
15	32	FS C	6SL3210-1SE23-2UA0	6SL3210-1SE23-2AA0
18.5	38	FS D	6SL3210-1SE23-8UA0	6SL3210-1SE23-8AA0
22	45	FS D	6SL3210-1SE24-5UA0	6SL3210-1SE24-5AA0
30	60	FS D	6SL3210-1SE26-0UA0	6SL3210-1SE26-0AA0
37	75	FS E	6SL3210-1SE27-5UA0	6SL3210-1SE27-5AA0
45	90	FS E	6SL3210-1SE31-0UA0	6SL3210-1SE31-0AA0
55	110	FS F	6SL3210-1SE31-1UA0	6SL3210-1SE31-1AA0
75	145	FS F	6SL3210-1SE31-5UA0	6SL3210-1SE31-5AA0
90	178	FS F	6SL3210-1SE31-8UA0	6SL3210-1SE31-8AA0

Please contact your local Siemens sales person or order the drive unit directly through:  
[www.siemens.com/automation/mall](http://www.siemens.com/automation/mall)

# SINAMICS S110 – Everything at a glance

SINAMICS S110 - drive converters for basic positioning tasks						
Frame size	FS A	FS B	FS C	FS D	FS E	FS F
						
Drive type	AC/AC unit, modular					
Degree of protection	IP20					
Line supply voltage $V_{line}$ /power ranges						
1-ph. 200 ... 240 V AC	0.12 ... 0.75 kW (0.16 ... 1HP)	–	–	–	–	–
3-ph. 380 ... 480 V AC	0.37 ... 1.5 kW (0.5 ... 2.0HP)	2.2 ... 4 kW (3 ... 5.4 HP)	7.5 ... 15 kW (10.2 ... 20.4 HP)	18.5 ... 30 kW (25.15 ... 40.8HP)	37 ... 45 kW (50.3 ... 61.2 HP)	55 ... 90 kW (74.8 ... 122.4 HP)
Positioning functions	Point-to-point positioning; absolute/relative; linear/rotary axis; flying positioning; traversing blocks (max. 16)					
Monitoring functions	Traversing range limits, following error, standstill, motor temperature					
Additional technological functions	BICO technology, technology controller					
Safety functions acc. to EN 954-1, Cat. 3, EN 61508, SIL 2 or EN ISO 13849-1, PLd	STO: Safe Torque Off, SOS: Safe Operating Stop, SS1, SS2: Safe Stop 1 <sup>3</sup> , Safe Stop 2, SBC: Safe Brake Control, SDI (Safe Direction) <sup>3,4</sup> , SLS: Safely Limited Speed <sup>3</sup> , SSM: Safe Speed Monitor <sup>3</sup>					
Communication interfaces	PROFINET, PROFIBUS DP, CANopen, RS232/USB protocol, pulse/direction, +/-10 V analog interface					
Communication profiles	PROFIdrive, PROFIsafe					
Encoders that can be connected	HTL/TTL; SSI; DRIVE-CLiQ, additional encoders via SMC interface module					
Onboard inputs/outputs <sup>1</sup>	4 DI, 24 V, floating; 4 DI/DO, 24 V; 1 AI (12 bit); 1 PTC/KTY temperature sensor connection					
Safety-related onboard inputs/outputs <sup>2</sup>	3 F-DI, 24 V; 1 F-DO, 24 V					
Line supply frequency	43 ... 63 Hz					
Output voltage	$V_{line}$					
Output frequency	0 ... 300 Hz					
Motors	Synchronous motors, induction motors					
Closed-loop control technique	Servo control, speed control, position control					
Control performance	Positioning: 4 ms					
Tools	Engineering: SIZER, commissioning: STARTER					
Typical applications	Pick & place tasks, high-bay racking units, simple handling tasks, positioning rotary tables, positioning adjuster and actuator axes in all machinery construction sectors					

<sup>1</sup> DI: Digital Input, DO: Digital Output; AI: Analog Input

<sup>2</sup> F-DI/F-DO: fail-safe digital input/output; when not used for safety, each F-DI can be used as two standard DIs.

<sup>3</sup> also available without encoder

<sup>4</sup> from firmware release V4.4

Additional information on SINAMICS is provided under  
[www.siemens.com/sinamics](http://www.siemens.com/sinamics)

The addresses and contact partners are provided under  
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