Simple and cost-effective positioning

SINAMICS S110 single-axis drive
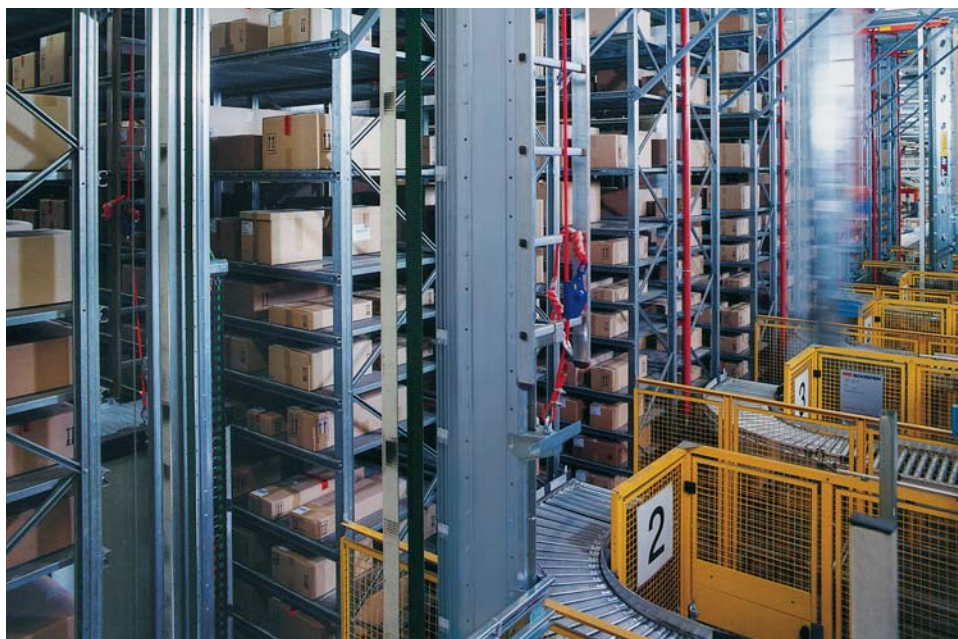

SINAMICS drives

Answers for industry.

SIEMENS

SINAMICS S110 –
servo drive for basic positioning tasks

Reliably positioning single axes – precisely and fast

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 axes 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 +/-10 V setpoint interface as well as various field bus 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 systems
• Tool changing mechanisms
• Adjuster and actuator 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 guidelines and directives can be implemented without requiring any additional equipment and resources.

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 – and that's seamlessly without any system break. With its field bus 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 on every control
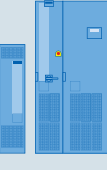
SINAMICS S110 –
Everything at a glance
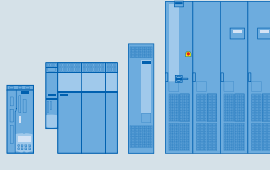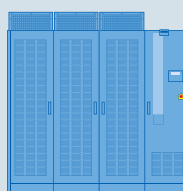
SINAMICS S110 drive converters for standard positioning tasks						
Frame size	FS A	FS B	FS C	FS D	FS E	FS F
Drive type	AC/AC drive, modular					
Degree of protection	IP20					
Line supply voltage V_{line} /power ranges						
1-ph. 200 ... 240 V AC	0.12 ... 0.75 kW (0.16 ... 1HP)	–	–	–	–	–
3-ph. 380 ... 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 actual value setting; 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 or EN 61508, SIL 2	STO: Safe Torque Off, SOS: Safe Operating Stop, SS1, SS2: Safe Stop 1, Safe Stop 2, SBC: Safe Brake Control, SLS: Safely-Limited Speed, SSM: Safe Speed Monitor					
Communication interfaces	PROFIBUS DP, CANopen, RS 232					
Communication profiles	PROFIdrive, PROFIsafe					
Encoders that can be connected	HTL/TTL; SSI; DRIVE-CLiQ					
Onboard inputs/outputs [1]	4 DI, 24 V, floating; 4 DI/DO, 24 V; 1 AI (12 bit); 1 PTC/KTY temperature sensor connector					
Safety-related onboard inputs/outputs [2]	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					

[1] DI: Digital Input, DO: Digital Output; AI: Analog Input
[2] F-DI/F-DO: fail-safe digital input/output; when not used for safety, each F-DI can be used as two standard DIs.

SINAMICS –
the optimum drive for every application

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

	Low voltage						Medium voltage
For basic applications	For demanding applications			For basic positioning applications	For sophisticated applications		For applications with high power ratings
SINAMICS G110	SINAMICS G120	SINAMICS G120D	SINAMICS G130/G150	SINAMICS S110	SINAMICS S120	SINAMICS S150	SINAMICS GM150/SM150/GL150
V/f control	V/f control/vector control			Servo control	V/f control/vector control/servo control		V/f control/vector control
0.12–3 kW	0.37–250 kW	0.75–7.5 kW	75–1,500 kW	0.12–90 kW	0.12–4,500 kW	75–1,200 kW	0.8–120 MW
Pumps, fans, conveyor belts	Pumps, fans, conveyor belts, compressors, mixers, crushers, extruders			Single-axis positioning applications in machinery and plant building	Motion control applications in production machines (packaging, textile and printing machines, paper machines, plastics machines), machine tools, plants and process lines	Test stands, crosscutters, centrifuges	Pumps, fans, compressors, mixers, extruders, crushers, rolling mills, mine hoists

Standard Engineering Tools

SIZER – for simple planning and engineering   STARTER – for fast commissioning, optimization and diagnostics

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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 20 MW

- Low voltage as well as medium voltage versions

- Standard and integrated 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 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 even more performance.

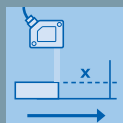# SINAMICS S110 – positioning functions for all generally encountered applications
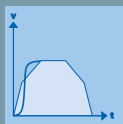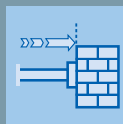
Linear and rotary axes
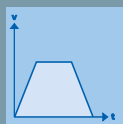
Positioning

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"[1] 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 can be simply used to clamp workpieces using the travel to endstop function.

Epos[2] 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

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[1] MDI: Manual Data Input
[2] Epos: Easy Positioning

SINAMICS S110 – one of the most universal and safest positioning drives
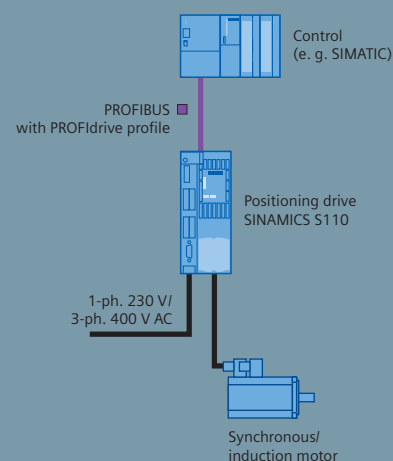

1FK7 synchronous servomotor

1LA standard induction motor

1PH7 induction motor

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

Control (e. g. SIMATIC)

PROFIBUS with PROFIdrive profile

Positioning drive SINAMICS S110

1-ph. 230 V/ 3-ph. 400 V AC

Synchronous/ induction motor

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 high 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 is open when it comes to the source of the motor that is being used. The complete solution with motors from Siemens is a harmonized to create the optimum solution. Both 1FK7/1FT7 synchronous servomotors as well as also the smooth-running 1PH7 induction motors have electronic type plates and a digital DRIVE-CLiQ interface that permits drive systems to be quickly commissioned.

Universal connection to higher level control systems

The SINAMICS S110 positioning drive is available with a PROFIBUS interface and supports standard protocols such as PROFIdrive and PROFIsafe for connection to a higher-level control system: Further, SINAMICS S110 can also be connected to a higher-level control via the CANopen interface. SINAMICS S110 can be optimally integrated into the SIMATIC automation system via PROFIBUS.
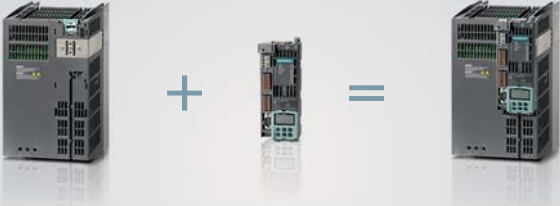
Safety-based motion

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 safety-relevant onboard input terminals or via PROFIBUS using the PROFIsafe profile.

Increased safety and productivity with integrated safety functions

- Safe Torque Off (STO)
- Safe Operating Stop (SLS)
- Safe Stop, Cat. 1 (SS1)
- Safe Stop, Cat. 2 (SS2)
- Safely Limited Speed (SLS)
- Safe Speed Monitor (SSM)
- Safe Brake Control (SBC)

SINAMICS S110 –
selection and ordering data

Control Units	
	Order No.
CU305 DP	6SL3040-0JA00-0AA0
CU305 CAN	6SL3040-0JA02-0AA0

Accessoires for Control Units	
MMC card SINAMICS S110 for storing a safety license or optionally storing the parametrization data	6SL3054-4AG00-0AA0
Safety license (Extended Functions)	6SL3054-0AA10-0AA0

Power Module PM340 **Control Unit CU305** **SINAMICS S110**

A Power Module PM340 with a mounted Control Unit CU305 form a functional SINAMICS S110 positioning drive.

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	6SL3210-1SE11-2UA0	-
1.1	3.1	FS A	6SL3210-1SE11-1UA0	-
1.5	4.1	FS A	6SL3210-1SE11-1UA0	-
2.2	5.9	FS B	6SL3210-1SE11-0UA0	6SL3210-SE16-0AA0
3	7.7	FS B	6SL3210-1SE11-7UA0	6SL3210-SE17-7AA0
4	10.2	FS B	6SL3210-1SE11-0UA0	6SL3210-SE21-0AA0
7.5	18	FS C	6SL3210-1SE11-8UA0	6SL3210-SE21-8AA0
11	25	FS C	6SL3210-1SE11-5UA0	6SL3210-SE22-5AA0
15	32	FS C	6SL3210-1SE11-2UA0	6SL3210-SE23-2AA0
18.5	38	FS D	6SL3210-1SE11-8UA0	6SL3210-SE23-8AA0
22	45	FS D	6SL3210-1SE11-5UA0	6SL3210-SE24-5AA0
30	60	FS D	6SL3210-1SE11-0UA0	6SL3210-SE26-0AA0
37	75	FS E	6SL3210-1SE11-5UA0	6SL3210-SE27-5AA0
45	90	FS E	6SL3210-1SE11-0UA0	6SL3210-SE31-0AA0
55	110	FS F	6SL3210-1SE11-1UA0	6SL3210-SE31-1AA0
75	145	FS F	6SL3210-1SE11-5UA0	6SL3210-SE31-5AA0
90	178	FS F	6SL3210-1SE11-8UA0	6SL3210-SE31-8AA0

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

You will find additional information about SINAMICS under

www.siemens.com/sinamics

You will find the addresses of your contact partners under

www.siemens.com/automation/partner

With the A&D mall you can immediately order products
electronically through the Internet

www.siemens.com/automation/mall