SINAMICS V60

The perfect solution for basic servo applications

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SINAMICS

Answers for industry.

SIEMENS

SINAMICS V60 with 1FL5 servomotors

The solution for basic servo applications

There is a requirement to automate motion sequences in increasingly more applications. Basic motion sequences with low demands on the dynamic performance are involved as well as more infrequently used motion sequences, which should increase the operator friendliness of increasingly more flexible machines, but not directly influence the number of machine cycles.

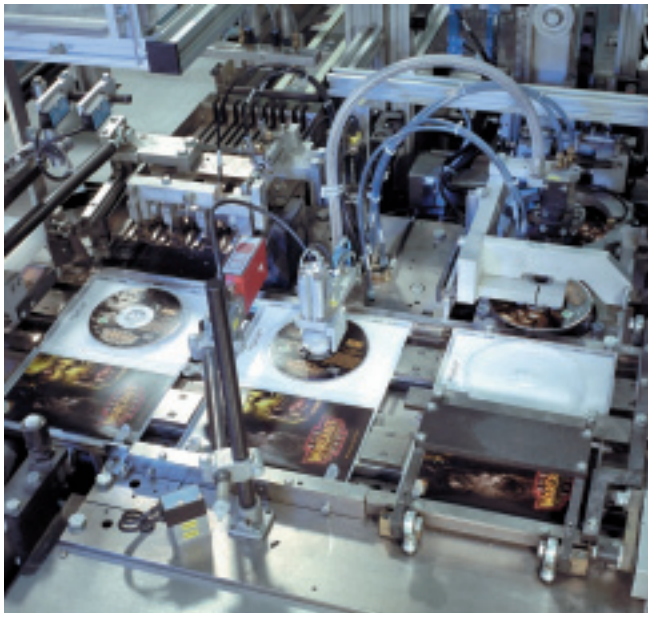
Servo drive technology with a high dynamic performance is frequently not required for axes used to adjust formats or for basic machines. That is why Siemens is offering a simple, cost-effective drive solution for these types of applications with its SINAMICS V60 basic performance servo drive combined with rugged 1FL5 servomotors.

The solution is especially suitable in conjunction with PLC systems for positioning tasks, for instance:

- Stacking and unstacking magazines
- Indexing rotary tables
- Indexing conveyor belts, axes and other transport equipment
- Controlling simple, interpolating axes
- Positioning servo valves
- Positioning adjusting axes
- Positioning feed axes in simple machine tools.

In applications where the masses to be moved are low, for example in laboratory automation or for labeling, the combination of SINAMICS V60 and 1FL5 motors represents a favorably priced solution where acceptable dynamic performance can be achieved.
The PLC (e.g. SIMATIC S7-1200) supplies the drive with setpoints – via the well-proven pulse/direction interface – which then optimally implements these in the closed speed loop with the motor.
The use of the pulse/direction interface in conjunction with the servomotor combines the simplicity of a stepper motor control and the performance of the servo drive to provide the optimum configuration in this power range.

SINAMICS V60 stands out due to its easy handling. Four fixed motor/converter combinations are available, which simplify the selection and commissioning of the corresponding drive components.



Highlights:

- **Simple component selection:**
  Based on the rated torque required for his application, the user selects the optimum converter/motor combination.
- **Complete solution:**
  SINAMICS V60 is designed for operation with 1FL5 servomotors. SINAMICS V60 and 1FL5 motors, together with the matching connection system, form a ready-to-run drive system.
- **Simple commissioning:**
  The drive solution is commissioned by simply setting parameters at the device. The motor data are already preset.
- **Simple connection to a higher-level control system:**
  SINAMICS V60 is coupled to a higher-level control system via a pulse/direction interface.

SINAMICS V60

SINAMICS V60 servo converter

The SINAMICS V60 servo converter has been especially designed to address simple servo applications, where the main focus is on cost efficiency.
With the pulse/direction interface, it forms the perfect solution for basic positioning tasks in conjunction with programmable logic controllers, such as SIMATIC S7-1200 or SIMATIC S7-200.

The performance data is perfectly harmonized to 1FL5 servomotors.

- Compact module with integrated infeed, inverter and closed-loop position control for one servo axis
- Supply voltage 220 V ... 240 V 3 AC
- 4 versions with output currents of 4 A, 6 A, 7 A and 10 A
- Pulse/direction setpoint interface (5 V differential signals) to the higher-level control system
- No fans for maintenance-free operation
- High degree of ruggedness through coated PC boards
- Commissioning and configuring without PC-based tools
- Simple commissioning using the integrated operator panel with keys and 7-segment display
- 200 % overload capability
- Preconfigured motor data already saved in the drive
- CE certified
- Motors that can be connected: 1FL5 servomotors

1FL5 servomotor

1FL5 servomotor

The 1FL5 servomotor is designed for operation with the SINAMICS V60 servo converter. Together, they form an optimally coordinated axis package.

- 4 motor types with 4 Nm, 6 Nm, 7.7 Nm and 10 Nm
- Rated speed of 2000 rpm
- Integrated TTL encoder with 2500 PPR (13-bit resolution in conjunction with SINAMICS V60)
- Degree of protection IP54, natural cooling
- Optional holding brake
- Rugged connectors
- Preassembled cable, 5 or 10 m long
- Optional plain motor shaft or motor shaft with feather key
- Servo converters that can be connected: SINAMICS V60

The preconfigured motor/drive combinations ensure quick and easy commissioning. The rugged design offers an optimum combination of functionality and the appropriate technology.

SINAMICS V60 / SIMATIC S7-1200

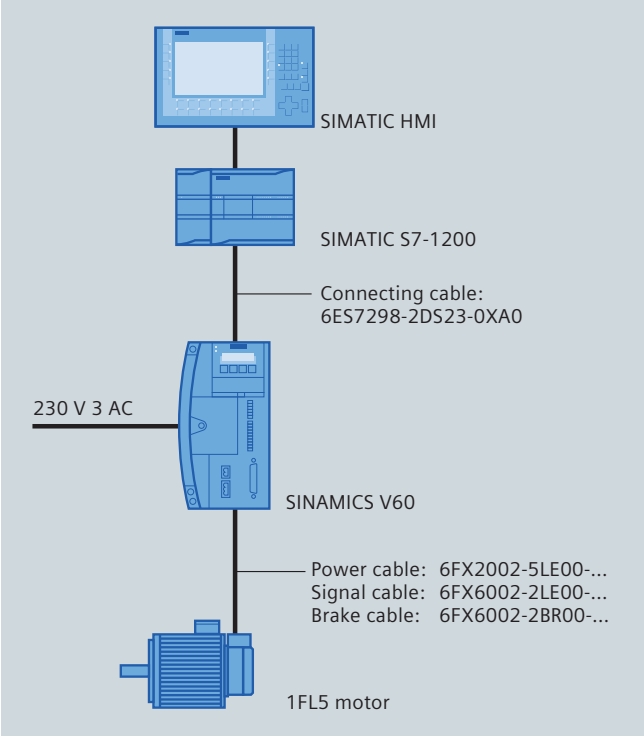
The ideal automation team

SINAMICS V60 and the SIMATIC S7-1200 PLC form an ideal automation team to address basic positioning tasks.
By using predefined function blocks of the S7-1200, the most important tasks necessary in conjunction with positioning can be realized from the PLC program, for instance:

- Reference point approach to synchronize the mechanical system with the positioning electronics after power on
- Jog to manually traverse the positioning axis forwards or backwards
- Traversing the positioning axis to a predefined position (absolute positioning) or through a predefined distance (relative positioning)
- Executing motion sequences

SINAMICS V60 is controlled via a pulse/direction interface.

The traversing direction of the drive is defined using the direction signal. The drive speed is defined by the frequency of the pulse outputs. The frequency is generated via the interface blocks, using the internal frequency generator of the S7-1200 based on the speed specified by the user.
The blocks are in conformance with the PLCopen standard.



SIMATIC S7-1200 and SINAMICS V60 configuration

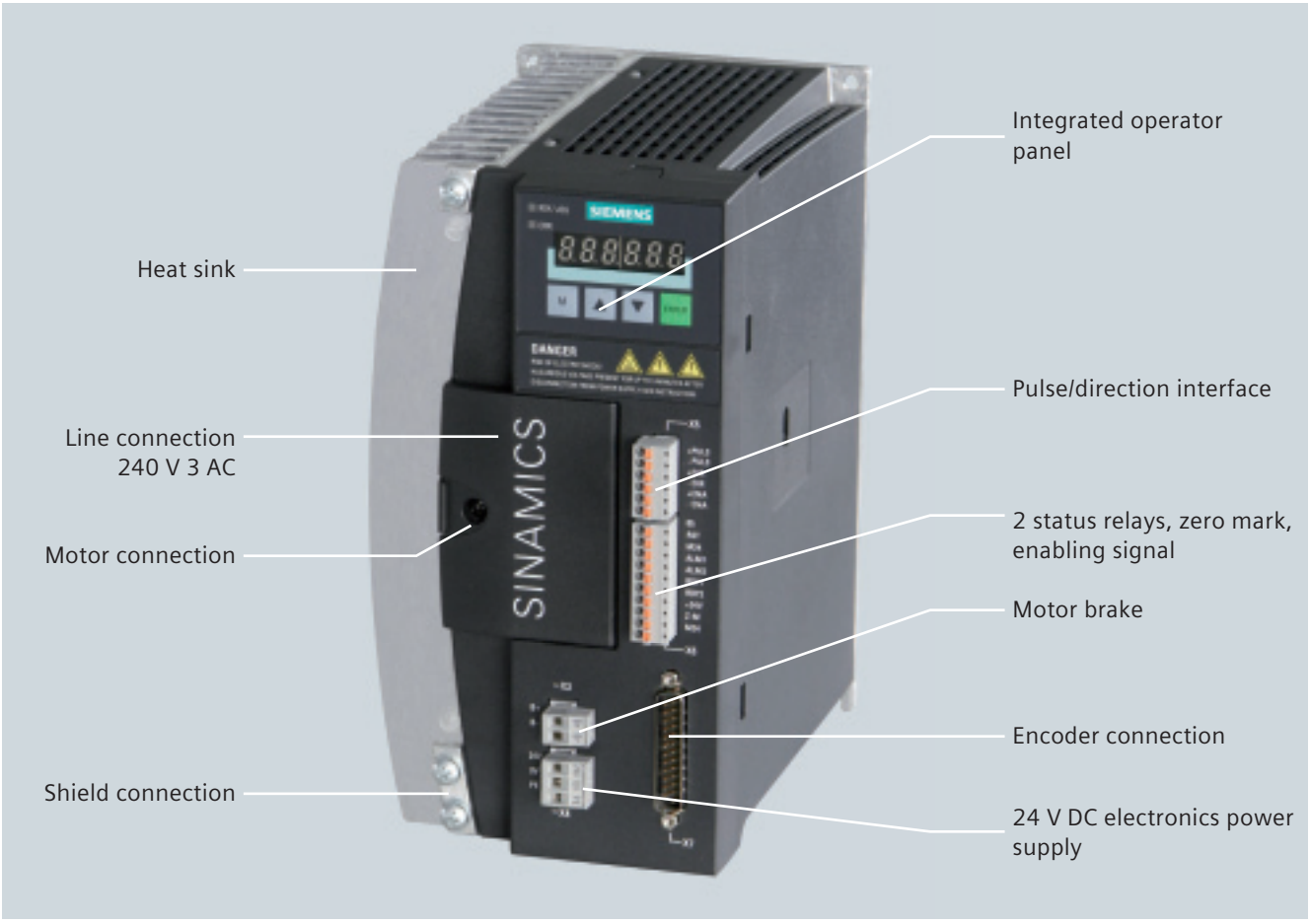
SIMATIC S7-1200 with SIMATIC HMI operator panel

SINAMICS V60

Simple interfaces, simple handling, simple commissioning

SINAMICS V60 stands out due to its especially easy handling.
Preassembled cables from the S7-1200 to the SINAMICS V60 power unit, and from the SINAMICS V60 to the motor, are available to ensure fault-free wiring.

The SINAMICS V60 is parameterized using an operator panel integrated in the converter. An external PC is not required.



SINAMICS V60 connections

Power cable

Signal cable

Brake cable

SINAMICS V60 servo converter

Technical data

	SINAMICS V60			
Order number	6SL3210-5CC14-0UA0	6SL3210-5CC16-0UA0	6SL3210-5CC17-0UA0	6SL3210-5CC21-0UA0
Type designation	CPM60.1 Controlled Power Module			
Rated power PN	0.8 kW	1.2 kW	1.4 kW	2 kW
Output current				
• Rated current I_n	4 A	6 A	7 A	10 A
• Peak current I_{max}	8 A	12 A	14 A	20 A
Input voltage	220 ... 240 V 3 AC –15 %/+10 %			
Input frequency	50 ... 60 Hz ±10 %			
Infeed	Non-stabilized			
Electronics power supply	24 V DC –15 %/+20 %			
24 V DC supply [A]	0.8 A (1.4) in conjunction with motors without brake (with brake)			
Input voltage pulse/direction interface				
• Rated value	5 V DC			
• Frequency range	≤ 333 kHz			
Cooling	Natural cooling			
Ambient temperature				
• Storage/transport	–20 ... 80 °C			
• Operation	0 ... 45 °C without derating, > 45 ... 55 °C derating to 70 %			
Relative humidity	< 95 % (no condensation)			
Height	Up to 1000 m without derating, > 1000 ... 2000 m derating to 80 %			
Conductor cross-section, max.	2.5 mm^2			
Motors that can be connected	1FL5			
Degree of protection	IP20			
Encoder evaluation	TTL encoder with 2500 PPR (13-bit resolution using electronic multiplication)			
Overload capability: 200 %				
• for 300 ms every 10 sec	from 0 to I_{max}			
• for 30 ms every 10 sec	from I_n to I_{max}			
Power loss	36 W	47 W	54 W	70 W
Cooling air required	0.005 m^3/s	0.005 m^3/s	0.005 m^3/s	0.005 m^3/s
Sound pressure level L_{pA} (1 m)	< 45 dB	< 45 dB	< 45 dB	< 45 dB
Dimensions [1]				
• Width	106 mm	106 mm	106 mm	123 mm
• Height	226 mm	226 mm	226 mm	226 mm
• Depth	200 mm	200 mm	200 mm	200 mm
Weight	2.63 kg	2.63 kg	2.63 kg	3.44 kg
Certification	CE			

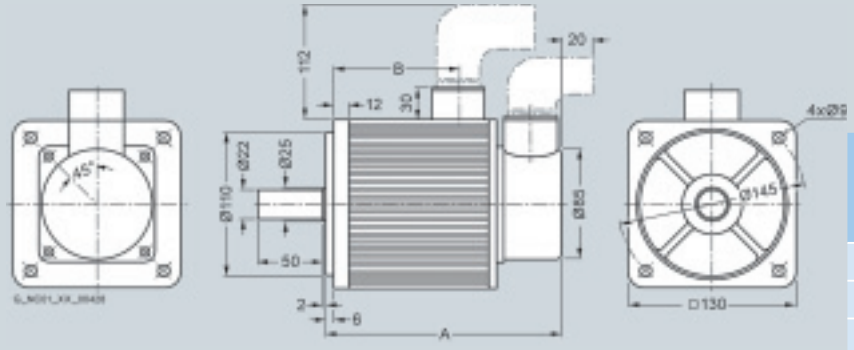
[1] Minimum clearances: 25 mm between drive modules, 100 mm to other control cabinet components.

1FL5 servomotors

Technical data

	1FL5 servomotors			
Order number	1FL5060...	1FL5062...	1FL5064...	1FL5066...
Torque				
• Rated torque M_n	4 Nm	6 Nm	7.7 Nm	10 Nm
• Torque, max. $M_{max.}$	8 Nm	12 Nm	15.4 Nm	20 Nm
Rated power	0.8 kW	1.2 kW	1.5 kW	2.0 kW
Rated speed	2000 rpm			
Encoder	TTL encoder with 2500 PPR			
Type of construction acc. to EN 60034-7 (IEC 60034-7)	IM B5 (IM V1, IM V3)			
Degree of protection acc. to EN 60034-7 (IEC 60034-7)	IP65			
Cooling	Natural cooling			
Shaft extension according to DIN 748-3	Plain shaft or shaft with feather key (full key balancing)			
Coating	Black			
Stator winding insulation to EN 60034-1 (IEC 60043-1)	Temperature class 130 (B)			
Ambient temperature				
• Storage/transport	–20 ... 80 °C			
• Operation	0 ... 45 °C without derating, > 45 ... 55 °C derating to 70 %			
Power loss	36 W	47 W	54 W	70 W
Moment of inertia	11.01 x 10^{-4} kgm²	15.44 x 10^{-4} kgm²	20.17 x 10^{-4} kgm²	25.95 x 10^{-4} kgm²
Dimensions				
• Edge dimensions	130 mm	130 mm	130 mm	130 mm
• Length (without/with brake)	221/263 mm	239/281 mm	253/295 mm	277/319 mm
Weight (without/with brake)	6/8.6 kg	7.6/10.2 kg	8.6/11.2 kg	10.6/13.2 kg
Certification	CE			

Dimensions



Motor version Nm	A without brake (with brake) mm	B mm
4	163 (205)	80
6	181 (223)	98
7.7	195 (237)	112
10	219 (261)	136

Ordering data SINAMICS V60/1FL5 servomotor				
Rated torque Nm	4.0	6.0	7.7	10.0
Rated power kW	0.8	1.2	1.5	2.0
Order number SINAMICS V60	6SL3210-5CC14- 0 U A 0	6SL3210-5CC16- 0 U A 0	6SL3210-5CC17- 0 U A 0	6SL3210-5CC21- 0 U A 0
Order number 1FL5 servomotor	1FL5060-0AC21- 0 A ■ 0	1FL5062-0AC21- 0 A ■ 0	1FL5064-0AC21- 0 A ■ 0	1FL5066-0AC21- 0 A ■ 0
Feather key, without brake	A	A	A	A
Feather key, with brake	B	B	B	B
Plain shaft, without brake	G	G	G	G
Plain shaft, with brake	H	H	H	H

Cables		
Signal cable	6FX6002-2LE00-1 ■ ■ 0	
Power cable	6FX6002-5LE00-1 ■ ■ 0	
Brake cable	6FX6002-2BR00-1 ■ ■ 0	
Cable lengths: 5 m		A F
Cable lengths: 10 m		B A

Additional information

www.siemens.com/sinamics
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support.automation.siemens.com

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