

SINAMICS S210

1 AC 230 V

Edition 03/21



WARNING

Danger to life if the safety instructions and installation instructions are not observed
The Quick Installation Guide only contains the most important information for the installation of the converter. If the safety instructions and installation instructions in the associated documentation are not observed, accidents involving severe injuries or death can occur.

- Observe the safety instructions and installation instructions given in the associated operating instructions: www.siemens.com/sinamics-s210
- Also observe the safety instructions for the integrated functional Safety functions. Make sure that these functions are fully operational again after replacing a converter.



DANGER

Danger to life through electric shock due to residual charge in the DC link capacitors
Because of the DC link capacitors, a hazardous voltage is present for up to 5 minutes after the power to the converter has been removed.

Contact with live parts of the converter can result in death or serious injury.

- Do not open the protective covers or the terminal covers until 5 minutes after the power has been removed.
- Before starting any work, check that the system is in a voltage-free state by measuring all terminals, including to ground.
- Ensure that the associated warning labels, in the appropriate languages, are attached.

Technical data

Order number:	6SL3210-5HB10-1UF0	6SL3210-5HB10-2UF0	6SL3210-5HB10-4UF0	6SL3210-5HB10-8UF0	
Line supply					
• Line voltage	1 AC 200 ... 240 V ±10 %				
• Input frequency	Hz	50/60			
Rated input current	A	1.4	2.7	5	9.3
Inrush current	A	8.0	8.0	8.0	8.0
Power dissipation	W	15.7	23.2	38.5	71.1
Electronic supply					
• Ext. supply voltage	24 V -15 % ... +20 %				
• Current, max.	A	without brake: 0.8; with brake: ≤1.2 (keep open), ≤2.2 (opening, for max. 200ms) - Refer to manual			
Output for motor					
• Rated power	kW	0.1	0.2	0.4	0.75
• Rated output current	A	0.8	1.36	2.4	4.4
• Output current, max.	A	3.1	4.8	8.7	16
Pulse frequency	kHz	8			
Output frequency	Hz	0 ... 550			
EMC filter (integrated)	Category C2 (≤ 10 m) / Category C3 (≤ 25 m)				
Brake resistor	None 1)	Integrated	Integrated	Integrated	
Digital inputs	2 Measuring probes or Reference marks 1 Failsafe input (F-DI) 1 Temperature monitor for ext. brake resistor				
Cooling	Convection (without fan)				
Frame Size	FSA	FSA	FSB	FSC	
Dimensions					
• Width	mm	45	45	55	75
• Height	mm	170	170	170	170
• Depth	mm	170	170	170	195
Weight, approx.	kg	1.1	1.1	1.2	1.9
Climatic conditions for operation	0 ... 50 °C, Relative humidity: 5 ... 95 % condensation, spraying water and ice formation not permitted Up to max. 4000 m • Up to 1000 m above sea level w/o derating • Above 1000 m Derating 10 % current or 5 K per 1000 m • Above 2000 m Isolation-transformer required				
Installation altitude					
Pollution degree	2 (according to EN 6180051)				
Protection acc. EN60529	IP20, Must be installed in a control cabinet				
Short-circuit current (SCCR)	≤ 65 kA rms				
Fuse according to IEC	3NA3 801 (6 A) 3NA3 801 (6 A) 3NA3 803 (10 A) 3NA3 805 (16 A)				
Fuse according to UL, classes ²	6 A 6 A 10A 20A				
Directives and Standards	CE, cULus, RCM, EAC, KC				
1) Due to the available DC-Link capacity an internal brake resistor is not required for normal operation. 2) Any class from class J, T, CC, G, etc., which are equal or better than Class RK5 fuses.					

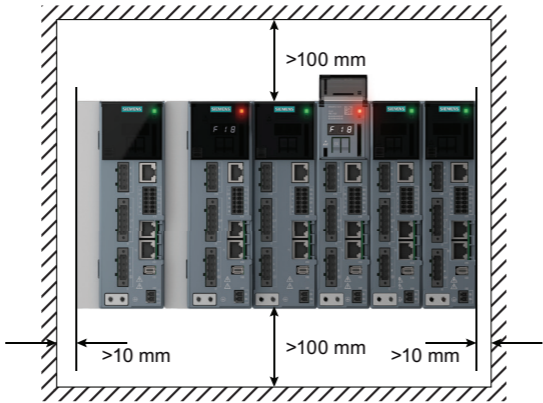
Mounting the converter

The converter may be operated only in closed housings or in higher-level control cabinets with protective covers that are closed, and when all of the protective devices are used. The installation of the converter in a metal control cabinet or the protection with another equivalent measure must prevent the spread of fire and emissions outside the control cabinet.

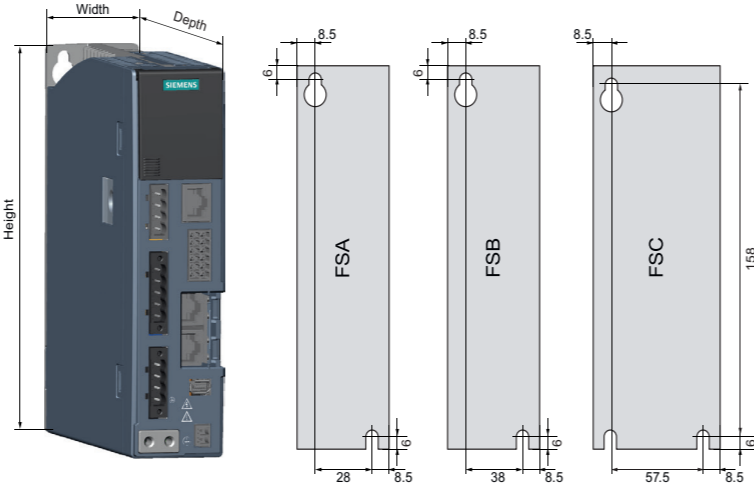
Protect the converter, e.g. by installing it in a control cabinet with degree of protection IP54 according to IEC 60529 or NEMA 12. Further measures may be necessary for particularly critical operating conditions. If condensation or conductive pollution can be excluded at the installation site, a lower degree of control cabinet protection may be permitted.

Leave a minimum 100 mm clearance to other devices at the top and bottom. A lateral clearance between multiple SINAMICS S210 converters is not mandatory. Observe a lateral clearance of at least 10 mm to other devices.

Clearance distances



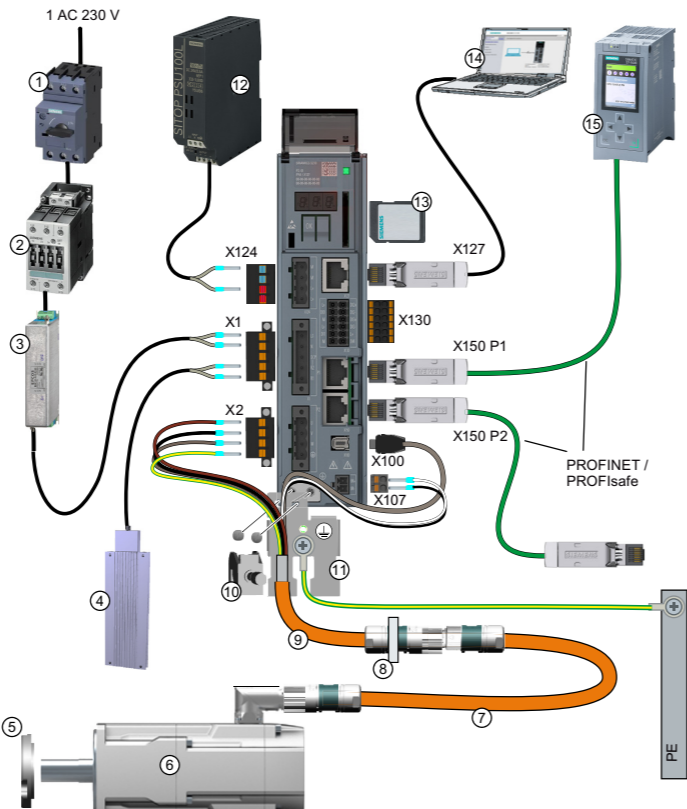
Dimensional drawings and drill dimensions



Dimensions

Frame size	Width (mm)	Height (mm)	Depth (mm)	Weight (kg)
FSA	45	170	170	1.1
FSB	55	170	170	1.2
FSC	75	170	195	1.9

System overview



System overview (cont'd)

①	Fuse and circuit breaker	⑧	SPEED-CONNECT plug socket
②	Line contactor (optional)	⑨	SPEED-CONNECT cable
③	Line filter (optional)	⑩	Shield clamp
④	External braking resistor (optional)	⑪	Shielding plate
⑤	Motor sealing ring for IP65 (optional)	⑫	Power supply 24 V
⑥	Servomotor 1FK2	⑬	SD Memory card
⑦	SPEED-CONNECT extension cable (optional)	⑭	Commissioning using PC
		⑮	Control example; SIMATIC S7-1500 PLC

Connection the converter

Install the converter so that you comply with local regulations for erecting and installing low voltage systems.

Notes

Operating displays for converter operation

If, when switching over a function from ON to OFF, an LED or other similar display is not lit or not active; this does not indicate that the device is switched-off or in a no-current condition.

Converter is grounded (earthed) correctly

Make sure that the shield of the motor cable is properly grounded (earth). Use the shielding clamp which comes with the cable to mount the cable to the converter's shielding plate.

Protective devices

Install suitable protective equipment between the line supply and converter.

<https://support.industry.siemens.com/cs/document/109748999>

Protection and monitoring equipment

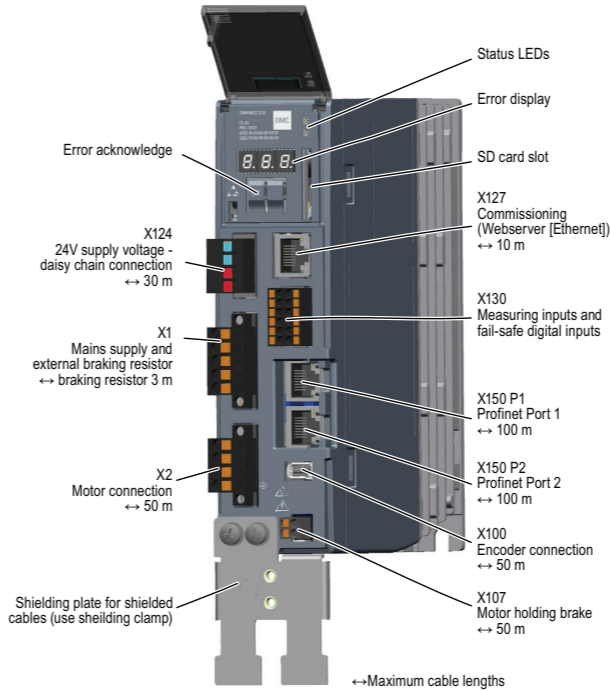
To provide protection against short-circuit, use the overcurrent devices listed in the Technical data (fuses, circuit breakers etc.).

If the apparent impedance of the line supply at the infeed point is not suitable, so that fuses do not rupture in the specified time in the case of insulation failure (ground fault, fault to frame), then you must use additional residual current protective devices RCD (RCCB or MRCD), type B.

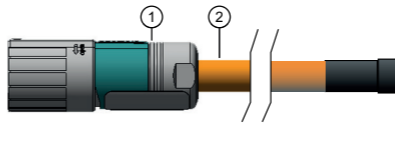
To prevent an RCD from unnecessarily tripping as a result of operational leakage currents, the following preconditions must be fulfilled:

- The neutral point of the line supply is grounded.
- Use an RCCB type B with a response limit current of 300 mA. Connect the RCCB in series with the overcurrent protective devices.
- Use a separate RCD for each converter.
- The motor cables are shorter than 50 m (164 ft) shielded.

Connections and operator controls on the converter



Cables and connections



①	M12, M17, M23 or M40 round connector 10 pin	④	Cables for holding brake
②	MOTION-CONNECT OCC cable	⑤	Power cables
③	Shielding	⑥	SIEMENS IX connector for signal line

System connections

X1: Line connection and connection for external braking resistor

	Pin	Connection for	Explanation
	L1	Phase L1 line system	
	N	Neutral conductor	
	DCP	External braking resistor Internal braking resistor	If you are using the internal braking resistor, DCP and R2 must be jumpered. If you are using the external braking resistor, remove the jumper between DCP and R2. Connect the external braking resistor by means of terminals DCP and R1
	R2	Internal braking resistor	
	R1	External braking resistor	

Weidmuller: BLF 5.08HC/05/180F SN BK BX, article number 1012670000

As daisy chain: BLDF 5.08/05/180F SN BK BX, article number 1000970000

The terminals are spring-type terminals.

Permissible conductor cross-sections for single-core connection or for the connection of flexible cables with end sleeves:

- 0.2 mm² ... 2.5 mm², AWG: 26 ... 12

X2: Power connections for the motor

	Pin	Pin assignment	Colour coding for Siemens OCC cables
	U	Motor phase U	Brown
	V	Motor phase V	Black
	W	Motor phase W	Gray
	PE	Protective ground	Green-yellow

Weidmuller: BLF 5.08HC/05/180F SN BK BX, article number 1012660000

The terminals are spring-type terminals.

Permissible conductor cross-sections for single-core connection or for the connection of flexible cables with end sleeves:

- 0.2 mm² ... 2.5 mm², AWG: 26 ... 12

X100: Siemens IX connector: Encoder connection

	Pin	Pin assignment	Explanation
	1	TXP	Sending data + / encoder power supply M
	2	TXN	Sending data - / encoder power supply M
	3	Reserved	
	4	Reserved	
	5	Reserved	
	6	RXP	Receiving data + / encoder power supply P24+
	7	RXN	Receiving data + / encoder power supply P24+
	8	Reserved	
	9	Reserved	
	10	Reserved	

Siemens IX. Article number 6FX2003-0DE01

X107: Motor holding brake

	Pin	Pin assignment	Explanation
	BR-	B-	Voltage for motor holding brake, 0 V (white)
	BR+	B+	Voltage for motor holding brake, 24 V (black)

Phoenix 1745894 FMC 1.5 / 2-ST-3.81, article number 1745894

The terminals are spring-type terminals.

Permissible conductor cross-sections: for single-core connection or for flexible cables with end sleeves without plastic protection or long end sleeves with plastic protection:

- 0.25 mm² ... 1.5 mm², AWG: 24 ... 16

for flexible cables with end sleeves with plastic protection:

- 0.25 mm² ... 0.75 mm², AWG: 24 ... 19

Connect the wires for the holding brake to the connector X107 also if you are using a motor without holding brake.

X124: 24 VDC control voltage

	Pin	Pin assignment	Explanation
	0 V	0 V	Power supply for the converter electronics
	0 V	0 V	
	24 V	+24 V	
	24 V	+24 V	

Dinkle: Article number 2ESS-6621-04P

The terminals are spring-type terminals.

Permissible conductor cross-sections for single-core connection or for the connection of flexible cables with end sleeves:

- 0.2 mm² ... 2.5 mm², AWG: 24 ... 12

X130: Connector for digital inputs

	Pin	Pin assignment	Pin assignment	Pin
	+	+24 V output	Fail-safe digital inputs	D1 2+
	DI 0	High-speed DI, measuring input		D1 2-
	M	Ground		D1 3+
	+	+24 V output	+24 V output	D1 3-
	DI 1	High-speed DI, measuring input		+
	M	Ground	Digital input	DI 4

Phoenix 1790140 DFMC 1.5/6-ST-3.5, Article number 1790140

The terminals are spring-type terminals.

Permissible conductor cross-sections:

- for single-wire connection: 0.2 mm² ... 1.5 mm², AWG: 24 ... 16
- for flexible cables with end sleeves: 0.25 mm² ... 1.5 mm², AWG: 24 ... 16
- for flexible cables with end sleeves with plastic protection: 0.25 mm² ... 0.75 mm², AWG: 24 ... 19

Commissioning with web server

Use the web server integrated in the converter for the commissioning. The Web server integrated in the converter supports the following browsers:

- Microsoft Internet Explorer (Version 11)
- Microsoft Edge (Version 14)
- Mozilla Firefox (Version 62)
- Google Chrome (Version 69)

- Mount the motor on the mechanical system. Connect the motor to the converter.
- Connect the converter to your Commissioning-PC via the Ethernet interface (X127).
- Switch the converter on.

The converter powers up and reads the motor data.

- Start the Internet-Browser for commissioning.
- Enter the IP address of the converter in the input line of your browser.

Default-IP-Address: 169.254.11.22 (Subnet-Mask: 255.255.0.0).

Assigning an Administrator password

In order to get full access to the converter, you have to log-in as an Administrator. For access as an Administrator, a password is required. After connecting the Service interface (X127) to the PC, a dialog to assign the Administrator password appears for 10 minutes.

The following mask appears only if the Administrator password has not been assigned and only for a duration of 10 minutes after connecting to the X127 of the converter. If the 10 minutes has expired, disconnect and reconnect the LAN-cable again.

Assign an Administrator password.

Initial Setup

 en_Sie müssen den Benutzer "Administrator" innerhalb von 10 Minuten erstmalig konfigurieren, um sich auf das Antriebsgerät verbinden zu können.

Password

Confirm password

Security information

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement and continuously maintain a holistic, state-of-the-art industrial security concept. Siemens products and solutions only form one element of such a concept. For more information about industrial security, please visit <https://www.siemens.com/industrialsecurity>

Drive

Device name:

Article number: 6SL3210-6H11-1JF0

Firmware version: V4.9 (4.90.24.00)

The screenshot displays the SIMATIC Manager HW Config software interface. The top bar shows the Siemens logo, the project name 'SIMATIC S210', the user 'Administrator', and the language 'English'. The left-hand navigation pane contains icons for Home, Tools, and a list of components. The main area shows a hierarchical tree of components: PC, PLC, Drive, and Motor. Each component is connected to the central SIMATIC 320 station. The Motor component is expanded, showing detailed specifications. The bottom bar contains icons for Control panel, Support, and Save changes.

Component Details:

- PC:** Established connection, IP address: 169.254.11.22
- PLC:** Established connection, IP address: 192.168.0.12, Name: simatic-s210-pn, Telegram: 105
- Drive:**
 - Device type: SIMATIC S210
 - Device name:
 - Article number: 6ES3210-5HB1x-0U0
 - Serial number: P-P30050000
 - Firmware version: V4.9 (4.90.24.00)
 - Rated supply voltage: 220 V
 - Rated current: 2.56 A
 - Rated power: 0.40 kW
- Motor:**
 - Motor type: 289
 - Article number: 6ES3210-5HB1x-0U0
 - Serial number: P-P30050000
 - Rated voltage: 125 V
 - Rated power: 0.40 kW
 - Rated speed: 3000 0 1/min
 - Rated torque: 1.27 Nm
 - Encoder type: 10051
 - Brake available: No

Bottom Bar:


- Control panel
- Support
- Save changes

For more detailed information, please refer to the S210 Operating Instructions.

Perform a One-Button-Tuning

For the optimization of the control parameters, perform the following procedure:


1. Select 'Commissioning'
2. Select 'Tuning'
3. Click on „Take Control“ and confirm the confirmation prompt (Orange/white bar appears).
4. Choose a Dynamic setting according to the mechanical capabilities of your machine.
5. Click on „Start tuning“.
6. Enter the permissible angle of rotation for the required measurement about which the motor and the connected machine are permitted to turn without causing a damage to the mechanics (the angle should at least be 60°, a greater angle leads to better results).
7. Confirm with OK and the tuning will start.



Control panel

If it is required to move the axis this can be done using the control panel. Click on the button 'Control panel' in the footer, take over the control and enter the desired speed.

Now the axis can be moved by holding the 'Rotate Left/Right' buttons.



You can also save the parameter settings and restore them later if required or you can reset the converter to the factory defaults.

For this choose the menu item 'Backup & Restore'.

In the 'System' menu you can change passwords and enable the access to the web server via the Profinet interface (X150).

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SINAMICS S210

Type	Time received	Alarm	Time removed
	2017-05-09 13:26:42.861	1912: FB.PRN: Taktzykluschroner Betrieb Lebenszeitschenaustfall (S)	2017-05-09 13:26:42.862
	2017-05-09 13:33:39.354	1912: FB.PRN: Taktzykluschroner Betrieb Lebenszeitschenaustfall (S)	2017-05-09 13:33:39.355
	2017-05-09 13:21:42.573	1912: FB.PRN: Taktzykluschroner Betrieb Lebenszeitschenaustfall (S)	2017-05-09 13:21:42.574
	2017-05-09 13:19:27.422	1912: FB.PRN: Taktzykluschroner Betrieb Lebenszeitschenaustfall (S)	2017-05-09 13:19:27.423
	2017-05-09 12:14:37.222	1912: FB.PRN: Taktzykluschroner Betrieb Lebenszeitschenaustfall (S)	2017-05-09 12:14:37.223
	2000-01-06 17:13:48.555	1912: FB.PRN: Taktzykluschroner Betrieb Lebenszeitschenaustfall (S)	2000-01-06 17:13:48.555
	2017-05-08 14:48:16.173	1912: FB.PRN: Taktzykluschroner Betrieb Lebenszeitschenaustfall (S)	2017-05-08 17:11:48.0
	2017-05-09 13:29:10.196	1099: UTC Synchronisation Toleranz verletzt (S)	2017-05-09 13:29:10.196
	2017-05-09 13:34:52.174	7095: Antrieb: One Button Tuning aktiviert (S)	2017-05-09 13:30:01.881

Control panel

Support

Save changes

Diagnostic of the converter

Besides the diagnose with the Webserver troubleshooting can be done directly on the device. The alarms and faults are shown in the display of the converter according to the message classes defined in PROFIdrive.

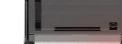
Display and operational elements

The converter displays the current operating state via two LEDs.

- RDY: Status of the converter
- COM: Status of the communication

Faults can be acknowledged with the OK button.

When using an SD-Card, push it into the slot (label to the left). When parameters were saved on the card after commissioning, an easy exchange of the converter is possible in case of a defect. Switch the converter off to plug-in or remove the SD card.



Safety functions

100%

Fault	Cause of fault (see 'Fault cases and remedial measures' below)														
Motor does not start	A	B													
Motor starts slowly	A		C		F										
Humming sound when starting			C		F										
Humming sound in operation	A		C		F										
High temperature rise under no-load operation				D		I									
High temperature rise under load	A		C			I									
High temperature rise of individual winding sections					F										
Uneven running							J	K							
Grinding sound, running noise									L						
Radial vibrations										M	N	O	P		R
Axial vibrations												O		Q	R

SINAMICS S210 Operating Instructions
www.siemens.com/sinamics-s210

Security information

In order to protect technical infrastructures, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art IT security concept. Siemens' products and solutions constitute one element of such a concept. For more information about cyber security, please visit:

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Germany

<https://www.siemens.com/cybersecurity#Ouraspiration>

A QR code is located on the left, and a standard 1D barcode is on the right. Below the barcode, the ISBN number 978-1-55542-732-9 is printed.