SIEMENS

Fundamental safety instructions 1

Scope of delivery 2

Installing 3

Commissioning 4

More information

SINAMICS

SINAMICS G120P CU230P-2 Control Units

Compact Operating Instructions

SIEMENS

SIE

Edition 01/2017

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

/ DANGER

indicates that death or severe personal injury will result if proper precautions are not taken.

/ WARNING

indicates that death or severe personal injury may result if proper precautions are not taken.

CAUTION

indicates that minor personal injury can result if proper precautions are not taken.

NOTICE

indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

/ WARNING

Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

Trademarks

All names identified by ® are registered trademarks of Siemens AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Table of contents

1	Fundam	Fundamental safety instructions			
	1.1	General safety instructions	4		
	1.2	Industrial security	5		
2	Scope o	f delivery	ε		
3	Installing]	7		
	3.1	Plugging the Control Unit onto the Power Module	7		
	3.2	Overview of the interfaces	10		
	3.3	Terminal strips	12		
	3.4	Factory interface settings	14		
	3.5	Default setting of the interfaces	16		
4	Commissioning				
	4.1	Tools to commission the converter	33		
	4.2	Commissioning with BOP-2 operator panel			
	4.2.1 4.2.2	Start quick commissioning and select the application class			
	4.2.2	Identifying the motor data and optimizing the closed-loop control			
	4.3 4.3.1	Connecting the inverter to the fieldbus PROFINET and PROFIBUS			
	4.3.2	Modbus RTU			
	4.3.3	BACnet MS/TP			
	4.4	Frequently required parameters	46		
5	More inf	ormation	49		
	5.1	Overview of the manuals	49		
	5.2	Technical support	50		

This manual describes how you install the CU230P-2 Control Unit of the SINAMICS G120P inverter and commission it.

What is the meaning of the symbols in the manual?



Reference to further information in the manual



An operating instruction starts here.



This concludes the operating instruction.



Download from the Internet



DVD that can be ordered

3

Fundamental safety instructions

1.1 General safety instructions



Danger to life if the safety instructions and residual risks are not observed

If the safety instructions and residual risks in the associated hardware documentation are not observed, accidents involving severe injuries or death can occur.

- Observe the safety instructions given in the hardware documentation.
- Consider the residual risks for the risk evaluation.

/ WARNING

Danger to life or malfunctions of the machine as a result of incorrect or changed parameterization

As a result of incorrect or changed parameterization, machines can malfunction, which in turn can lead to injuries or death.

- Protect the parameterization (parameter assignments) against unauthorized access.
- Respond to possible malfunctions by applying suitable measures (e.g. EMERGENCY STOP or EMERGENCY OFF).

1.2 Industrial security

Note

Industrial security

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

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 represent one component of such a concept.

The customer is responsible for preventing unauthorized access to its plants, systems, machines and networks. Systems, machines and components should only be connected to the enterprise network or the internet if and to the extent necessary and with appropriate security measures (e.g. use of firewalls and network segmentation) in place.

Additionally, Siemens' guidance on appropriate security measures should be taken into account. For more information about industrial security, please visit:

Industrial security (http://www.siemens.com/industrialsecurity).

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends to apply product updates as soon as available and to always use the latest product versions. Use of product versions that are no longer supported, and failure to apply latest updates may increase customer's exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed at:

Industrial security (http://www.siemens.com/industrialsecurity).

/!\warning

Danger to life as a result of unsafe operating states resulting from software manipulation

Software manipulations (e.g. viruses, trojans, malware or worms) can cause unsafe operating states in your system that may lead to death, serious injury, and property damage.

- Keep the software up to date.
- Incorporate the automation and drive components into a holistic, state-of-the-art industrial security concept for the installation or machine.
- Make sure that you include all installed products into the holistic industrial security concept.
- Protect files stored on exchangeable storage media from malicious software by with suitable protection measures, e.g. virus scanners.

2

Scope of delivery

The delivery comprises at least the following components:

 A CU230P-2 Control Unit ready for operation with installed firmware. Options for upgrading and downgrading the firmware can be found on the Internet:



Firmware (http://support.automation.siemens.com/WW/news/en/67364620).

The fieldbus interface of the Control Unit depends on the Article No. You can find the designation, the article number, the hardware version (e.g. 02) and the firmware version (e.g. 4.6) on the Control Unit rating plate ①.

L SERVICE LA LINE	Designation	Article number	Fieldbus
1	CU230P-2 HVAC	6SL3243-0BB30-1HA3	USS, Modbus RTU, BACnet MS/TP, P1
	CU230P-2 DP	6SL3243-0BB30-1PA3	PROFIBUS DP
SIVANUES	CU230P-2 PN	6SL3243-0BB30-1FA0	PROFINET IO, EtherNet/IP

- Compact Operating Instructions in German and English
- The inverter contains open-source software (OSS). OSS comprises open source text and satisfies special license terms.

The OSS license terms are saved in the inverter. You can transfer the OSS license terms to a PC using a memory card where you can read them.

Transferring OSS license terms to a PC

Procedure



To transfer OSS license terms to a PC, proceed as follows:

- 1. Switch off the inverter power supply.
- 2. Insert an empty memory card into the card slot of the inverter.
 - Overview of the interfaces (Page 10)
- 3. Switch on the inverter power supply.
- 4. The inverter writes file "Read_OSS.ZIP" to the memory card within approximately 30 seconds.
- 5. Switch off the inverter power supply.
- 6. Withdraw the memory card from the inverter.
- 7. Insert the memory card into the card reader of a PC.
- 8. Please read the license terms.
- You have transferred the OSS license terms to a PC.

Installing

3.1 Plugging the Control Unit onto the Power Module

Permissible Power Modules

You may operate the Control Unit with the following Power Modules:

- PM230
- PM240P-2
- PM240-2
- PM250
- PM330

Installing the Control Unit - General

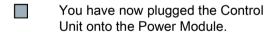
Each Power Module has an appropriate holder for the Control Unit and a release mechanism.

Inserting the Control Unit



Proceed as follows to plug the Control Unit onto a Power Module:

- 1. Place the two catches of the Control Unit in the matching grooves of the Power Module.
- 2. Press the Control Unit onto the Power Module until you hear that it latches.



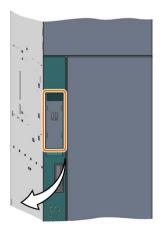
Removing the Control Unit

Remove the Control Unit from the Power Module by pressing the release mechanism.

Special features for the PM330 Power Module

To insert or detach the Control Unit, you must open the lefthand cover of the Power Module.

Close the cover before you commission the inverter.



3.1 Plugging the Control Unit onto the Power Module

Special features for the PM230 Power Module IP55, FSA ... FSC

To insert or detach the Control Unit, you must release eight or ten fixing screws of the cover and then remove the cover.

The Power Module release mechanism is shown in the diagram.

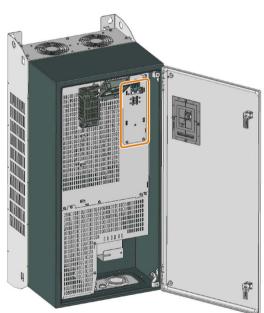
Attach the cover again before you commission the inverter. Do not damage the seal of the cover when attaching it.



Installing the Control Unit, PM230 IP55 - FSD ... FSF

To insert or detach the Control Unit, you must open the front door of the Power Module.

Close the door before you commission the inverter. Check to ensure that the seals are not damaged.



Plugging on an operator panel

Procedure



To plug an Operator Panel on the Control Unit, proceed as follows:

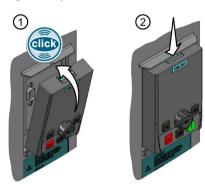
- 1. Locate the lower edge of the Operator Panel into the matching recess of the Control Unit.
- 2. Plug the Operator Panel onto the inverter until the latch audibly engages.
- You have plugged an operator panel onto the Control Unit.

The operator panel is ready for operation when you connect the inverter to



Mounting the operator panel or dummy cover on the IP55 Power Module

Either an operator panel or the dummy cover must be plugged on for the inverter to achieve degree of protection IP55.



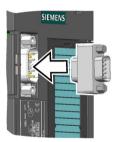
- 1) Attaching the operator panel or dummy cover: Press the operator panel or dummy cover onto the inverter as shown until you hear it click into place.
- (2) Removing the operator panel or dummy cover: Use a suitable screwdriver to press the interlock downwards.



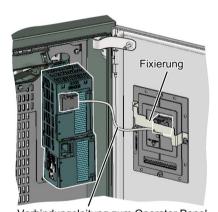
Tools to commission the converter (Page 33)

The following accessory is included in the Power Module scope of supply to connect the Control Unit with the operator panel:

- An adapter, required for PM230 IP55 Power Modules, FSA ... FSC
- A connecting cable and a bar to fix the connector, required for PM230 IP55 Power Modules, FSD ... FSF



Adapter



Verbindungsleitung zum Operator Panel

Connecting cable

3.2 Overview of the interfaces

Interfaces at the front of the Control Unit

To access the interfaces at the front of the Control Unit, you must lift the Operator Panel (if one is being used) and open the front doors.

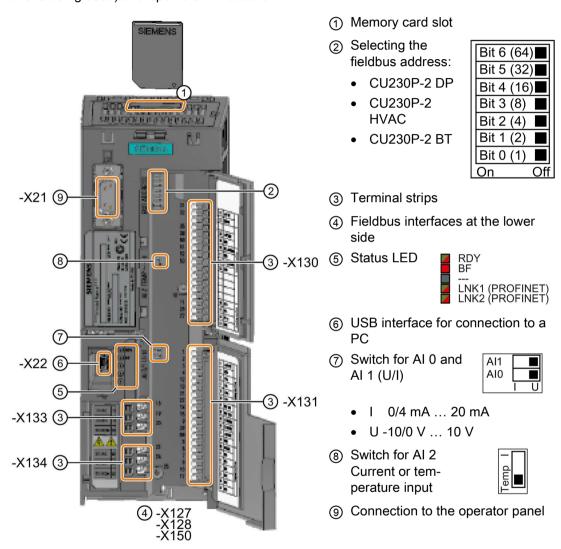


Table 3- 1 Number of inputs and outputs

Digital inputs DI	Digital outputs DO	Analog inputs Al	Analog outputs AO	Input for motor tem- perature sensor
6	3	4	2	1

Table 3-2 Permissible cables and wiring options

Solid or flexible conductors	Finely stranded conductor with non-insulated end sleeve	Finely stranded conductor with partially insulated end sleeve
8 mm 0.5 1.5 mm ²	8 mm 0.5 1.0 mm ²	8 mm 0.5 mm ²
Cables with twin end sleeves are not permissible.		

EMC-compliant wiring

Measures to ensure EMC-compliant wiring of the Control Unit:

Use the shield connection kit of the Control Unit to connect the shield and provide strain relief for cables/conductors.

Shield connection kit	Article number
Shield connection kit 1 for the CU230P-2 Control Units with all fieldbus interfaces except for PROFINET.	6SL3264-1EA00-0FA0
Shield connection kit 3 for the CU230P-2 and CU240E-2 Control Units with PROFINET interface.	6SL3264-1EA00-0HB0

If you use shielded cables, then you must connect the shield to the mounting plate of the control cabinet or with the shield support of the inverter through a good electrical connection and a large surface area.



Additional information about EMC-compliant wiring is available on the Internet:

EMC installation guideline (http://support.automation.siemens.com/WW/view/en/60612658)

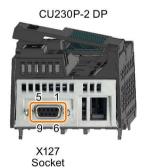
Interfaces at the lower side of the CU230P-2 Control Unit



X150 X150 P1 P2

Pin

- 1 RX+, receive data +
- 2 RX-, receive data -
- 3 TX+. Transmit data +
- 4
- 5
- 6 TX-, transmit data -
- 7
- 8 ---



Pin

- 1 Shield, ground connection
- 2
- 3 RxD/TxD-P, receive and transmit (B/B')
- CNTR-P, control signal
- DGND, reference potential for data (C/C') 5
- 6 VP, supply voltage
- 8 RxD/TxD-N, receive and transmit (A/A')
- 9 ---

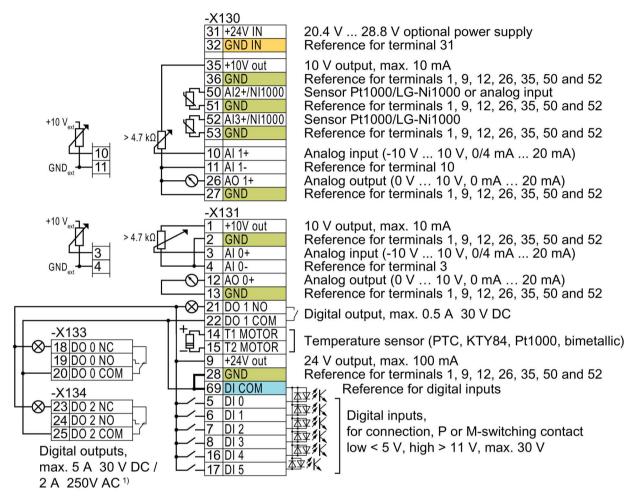


Pin

- 1 0 V, reference potential
- P+, RS485P, receive and transmit
- N-, RS485N, receive and transmit
- Cable shield
- 5

3.3 Terminal strips

Terminal strips with wiring example



¹⁾ The following applies to systems compliant with UL: Maximum current, 3 A 30 VDC or 2 A 250 VAC

Figure 3-1 Wiring the digital inputs with p-switching contacts and an internal 24 V power supply (terminal 9)

GND All terminals

All terminals labelled with reference potential "GND" are connected internally in the inverter.

DI COM

Reference potential "DI COM" is electrically isolated from "GND". The Control Unit is delivered with a jumper between terminals 28 and 69.

 \rightarrow If, as shown above, you wish to use the 24-V supply from terminal 9 as supply for the digital inputs, then it is mandatory that this jumper is used.

31 +24 V IN 32 GND IN When an optional 24 V power supply is connected at terminals 31, 32, even when the Power Module is disconnected from the line supply, the Control Unit remains in operation. The Control Unit thus maintains fieldbus communication, for example.

→ At terminals 31, 32, only connect a power supply that is in accordance with SELV (Safety Extra Low Voltage) or PELV (Protective Extra Low Voltage).

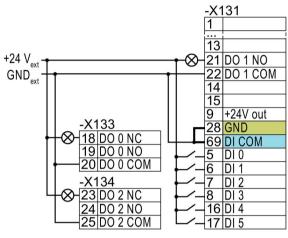
→ if you also wish to use the power supply at terminals 31, 32 for the digital inputs, then you must connect "DI COM" and "GND IN" with one another at the terminals.

			0+	
	4	ΑI	0-	
ĺ	40		4.	
	10	ΑI	1+	
	10 11	ΑI	1-	

You may use the internal 10 V power supply or an external power supply for the analog inputs.

→ When you use the internal 10 V power supply, you must connect AI 0 or AI 1 with "GND".

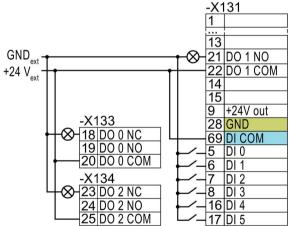
Additional options for wiring the digital inputs



You must remove the jumper between terminals 28 and 69 if it is necessary to have electrical isolation between the external power supply and the internal inverter power supply.

Remove the jumper between terminals

Connecting P-switching contacts with an external power supply



28 and 69.

Connecting M-switching contacts with an external power supply

3.4 Factory interface settings

The factory setting of the interfaces depends on the Control Unit.

Control Units with PROFIBUS or PROFINET interface

The function of the fieldbus interface and digital inputs DI 0, DI 1 depends on DI 3.

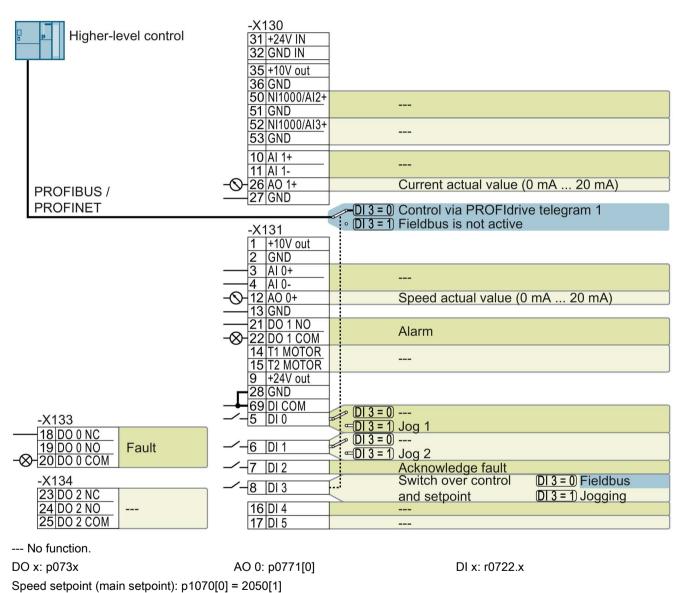


Figure 3-2 Factory setting of the CU230P-2 DP and CU230P-2 PN Control Units

Control Units with USS interface

The fieldbus interface is not active.

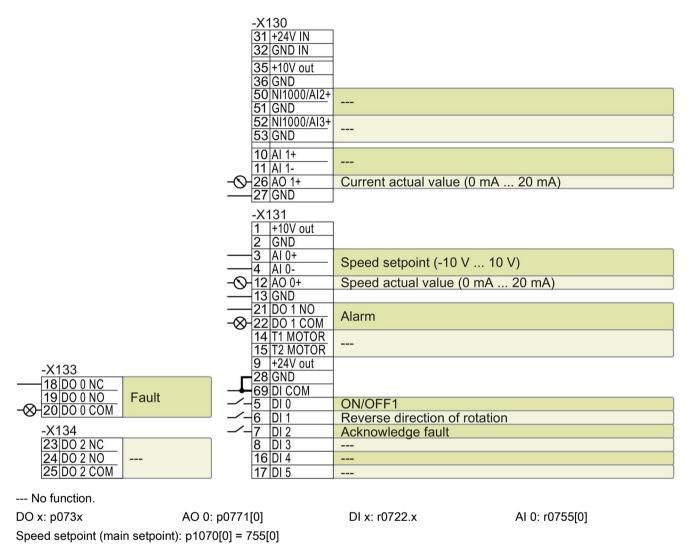


Figure 3-3 Factory setting of CU230P-2 HVAC Control Units

Changing the function of the terminals

The function of the terminals and fieldbus interface can be adjusted.

In order that you do not have to successively change terminal for terminal, several terminals can be jointly set using default settings ("p0015 Macro drive unit").

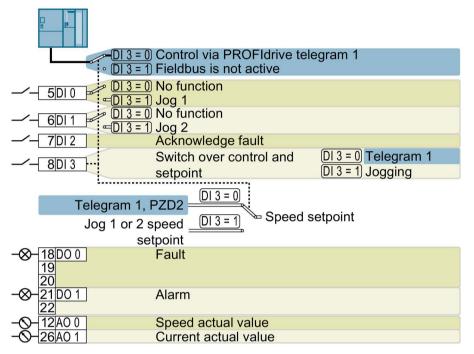
The terminal settings made in the factory described above correspond to the following default settings:

- Default setting 12 (p0015 = 12): "Standard I/O with analog setpoint"
- Default setting 7 (p0015 = 7): "Fieldbus with data set switchover"

3.5 Default setting of the interfaces

Default setting 7: "Fieldbus with data set switchover"

Factory setting for inverters with PROFIBUS or PROFINET interface

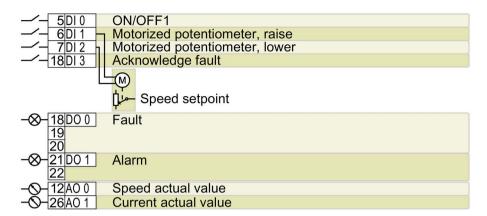


DO 0: p0730, DO 1: p0731 AO 0: p0771[0], AO 1: p0771[1] DI 0: r0722.0, ..., DI 3: r0722.3

Speed setpoint (main setpoint): p1070[0] = 2050[1] Jog 1 speed setpoint: p1058, factory setting: 150 rpm Jog 2 speed setpoint: p1059, factory setting: -150 rpm

Designation in the BOP-2: FB cdS

Default setting 9: "Standard I/O with MOP"



DO 0: p0730, DO 1: p0731 AO 0: p0771[0], AO 1: p0771[1]

DI 0: r0722.0, ..., DI 3: r0722.3

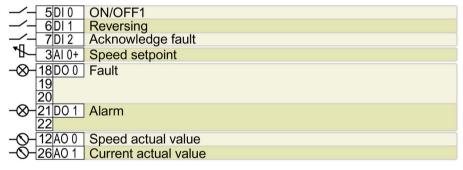
Motorized potentiometer, setpoint after the ramp-function generator: r1050

Speed setpoint (main setpoint): p1070[0] = 1050

Designation in the BOP-2: Std MoP

Default setting 12: "Standard I/O with analog setpoint"

Factory setting for inverters with USS, Modbus, BACnet, MS/TP or P1 interface



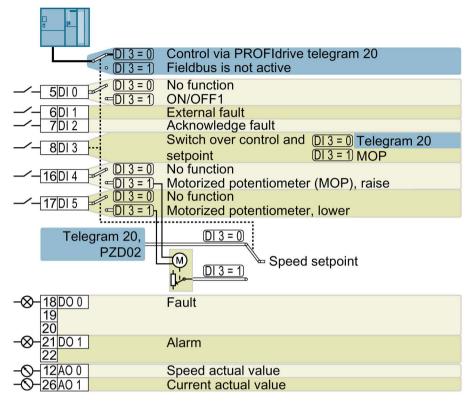
DO 0: p0730, AO 0: p0771[0], DI 0: r0722.0, ..., DI 2: r0722.2 AI 0: r0755[0] DO 1: p0731 AO 1: p0771[1]

Speed setpoint (main setpoint): p1070[0] = 755[0]

Designation in the BOP-2: Std ASP

3.5 Default setting of the interfaces

Default setting 14: "Process industry with fieldbus"



DO 0: p0730, DO 1: p0731

AO 0: p0771[0], AO 1: p0771[1]

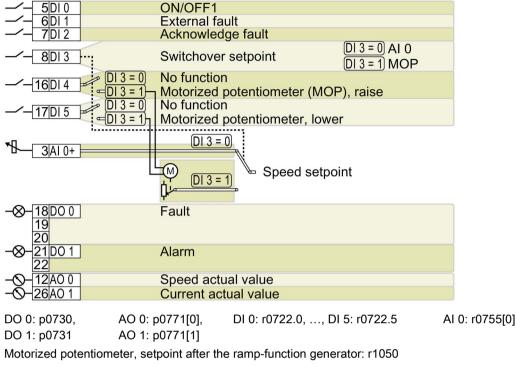
DI 0: r0722.0, ..., DI 5: r0722.5

Motorized potentiometer, setpoint after the ramp-function generator: r1050

Speed setpoint (main setpoint): p1070[0] = 2050[1], p1070[1] = 1050

Designation in the BOP-2: Proc Fb

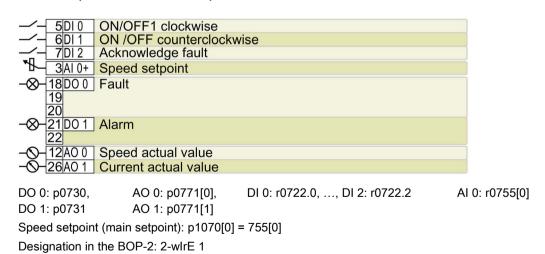
Default setting 15: "Process industry"



Speed setpoint (main setpoint): p1070[0] = 755[0], p1070[1] = 1050

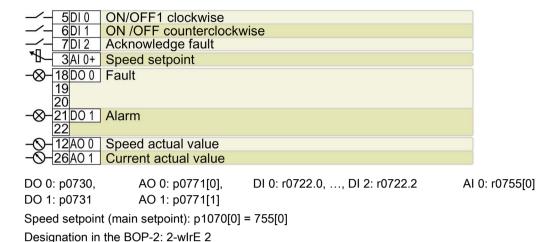
Designation in the BOP-2: Proc

Default setting 17: "2-wire (forward/backward 1)"

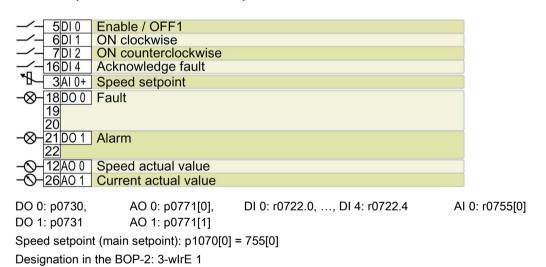


3.5 Default setting of the interfaces

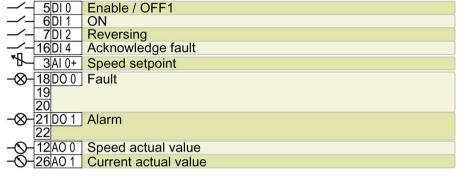
Default setting 18: "2-wire (forward/backward 2)"



Default setting 19: "3-wire (enable/forward/backward)"



Default setting 20: "3-wire (enable/on/reverse)"



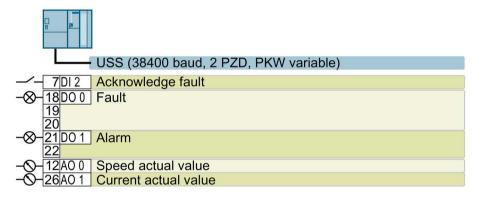
DO 0: p0730, AO 0: p0771[0], DI 0: r0722.0, ..., DI 4: r0722.4 AI 0: r0755[0]

DO 1: p0731 AO 1: p0771[1]

Speed setpoint (main setpoint): p1070[0] = 755[0]

Designation in the BOP-2: 3-wlrE 2

Default setting 21: "USS fieldbus"

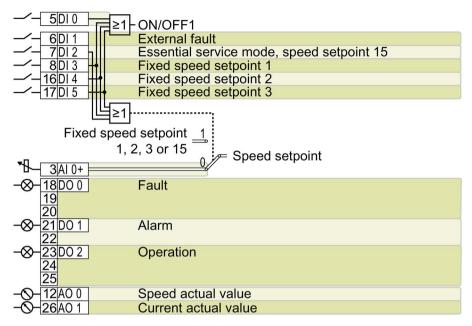


DO 0: p0730, DO 1: p0731 AO 0: p0771[0], AO 1: p0771[1] DI 2: r0722.2

Speed setpoint (main setpoint): p1070[0] = 2050[1]

Designation in the BOP-2: FB USS

Default setting 101: "Universal application"



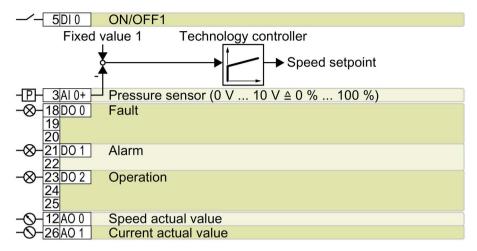
DO 0: p0730, ..., AO 0: p0771[0], AO 1: p0771[1] DI 0: r0722.0, ..., DI 5: r0722.5 AI 0: r0755[0] DO 2: p0732

Additional settings:

- Fixed speed setpoint 1: p1001 = 800 rpm
- Fixed speed setpoint 2: p1002 = 1000 rpm
- Fixed speed setpoint 3: p1003 = 1200 rpm
- If several of the DI 3 ... DI 5 = high, the inverter adds the corresponding fixed speeds.
- Fixed speed setpoint 15 for essential service mode (ESM): p1015 = 1500 rpm
- "Flying restart" is enabled: p1200 = 1
- Automatic restart is active. After a power failure, the inverter automatically acknowledges possible faults and switches on the motor: p1210 = 26

Designation in the BOP-2: P_F 6PA

Default setting 103: "Pump pressure control"

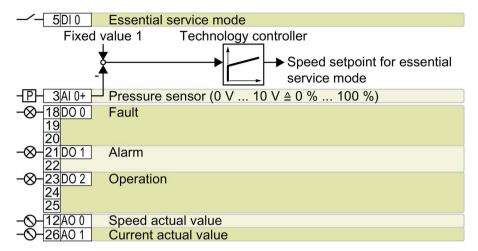


DO 0: p0730, ..., DO 2: p0732 AO 0: p0771[0], AO 1: p0771[1] DI 0: r0722.0 Al 0: r0755[0] Additional settings:

- Differential pressure control using the technology controller
- Technological unit: p0595 = 1 (%), reference variable: p0596 = 1
- Default setting of the technology controller:
 - Enable: p2200 = 1
 - Fixed value 1: p2201 = 50 %
 - Ramp-up/down time for setpoint: p2257 = p2258 = 30 s
 - Ramp-up/down time for controller output: p2293 = 30 s
 - Upper and lower limits, actual value: p2267 = 120 %, p2268 = -10 %
 - Actual value filter time constant: p2265 = 10 s
 - Proportional gain K_P, integral time T_I, differentiation time constant T_D: p2280 (K_P) = 1, p2285 (T_I) = 30 s, p2274 (T_D) = 0 s
- "Flying restart" is enabled: p1200 = 1
- Automatic restart is active. After a power failure, the inverter automatically acknowledges possible faults and switches on the motor: p1210 = 26

Designation in the BOP-2: P_F dPc

Default setting 104: "ESM stairwell pressure control"

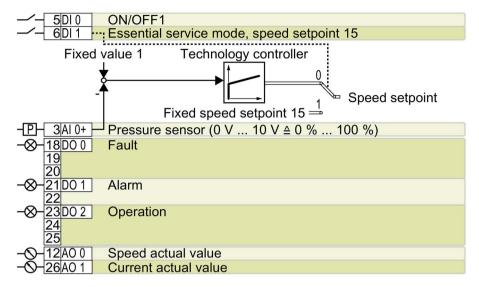


DO 0: p0730, ..., DO 2: p0732 AO 0: p0771[0], AO 1: p0771[1] DI 0: r0722.0 Al 0: r0755[0] Additional settings:

- · Pressure control using the technology controller
- Analog inputs smoothing time constant: p0753 = 500 ms
- Technological unit: p0595 = 1 (%), reference variable: p0596 = 1
- Default setting of the technology controller:
 - Enable: p2200 = 1
 - Fixed value 1: p2201 = 40 %
 - Ramp-up/down time for setpoint: p2257 = p2258 = 30 s
 - Ramp-up/down time for controller output: p2293 = 30 s
 - Upper and lower limits, actual value: p2267 = 120 %, p2268 = -10 %
 - Actual value filter time constant: p2265 = 10 s
 - Proportional gain K_P , integral time T_I , differentiation time constant T_D : p2280 (K_P) = 1.2, p2285 (T_I) = 25 s, p2274 (T_D) = 0 s
 - Technology controller minimum limiting p2292 = 30 %
 - Technology controller output signal start value p2302 = 35 %
- "Flying restart" is enabled: p1200 = 1
- Automatic restart is active. After a power failure, the inverter automatically acknowledges possible faults and switches on the motor: p1210 = 26

Designation in the BOP-2: P_F Stw

Default setting 105: "Fan pressure control + ESM with fixed setpoint"



DO 0: p0730, ..., AO 0: p0771[0], AO 1: p0771[1] DI 0: r0722.0, DI 1: r0722.1 AI 0: r0755[0] DO 2: p0732

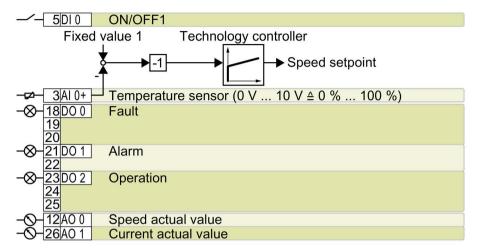
Additional settings:

- Pressure control using the technology controller
- Analog inputs smoothing time constant: p0753 = 500 ms
- Technological unit: p0595 = 1 (%), reference variable: p0596 = 1
- Fixed speed setpoint 15 for essential service mode (ESM): p1015 = 1350 rpm
- · Default setting of the technology controller:
 - Enable: p2200 = 1
 - Fixed value 1: p2201 = 40 %
 - Ramp-up/down time for setpoint: p2257 = p2258 = 30 s
 - Ramp-up/down time for controller output: p2293 = 30 s
 - $-\,$ Upper and lower limits, actual value: p2267 = 120 %, p2268 = -10 %
 - Actual value filter time constant: p2265 = 10 s
 - Proportional gain K_P , integral time T_I , differentiation time constant T_D : p2280 (K_P) = 1.1, p2285 (T_I) = 35 s, p2274 (T_D) = 0 s
 - Technology controller minimum limiting p2292 = 20 %
 - Technology controller output signal start value p2302 = 50 %
- "Flying restart" is enabled: p1200 = 1
- Automatic restart is active. After a power failure, the inverter automatically acknowledges possible faults and switches on the motor: p1210 = 26

Designation in the BOP-2: P_F Pc5

3.5 Default setting of the interfaces

Default setting 106: "Cooling tower with active sensor + hibernation"

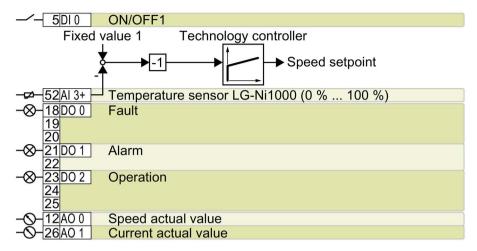


DO 0: p0730, ..., DO 2: p0732 AO 0: p0771[0], AO 1: p0771[1] DI 0: r0722.0 Al 0: r0755[0] Additional settings:

- Temperature control using the technology controller
- Analog inputs smoothing time constant: p0753 = 100 ms
- Technological unit: p0595 = 1 (%), reference variable: p0596 = 1
- · Default setting of the technology controller:
 - Enable: p2200 = 1
 - Fixed value 1: p2201 = 26 %
 - Ramp-up/down time for setpoint: p2257 = p2258 = 30 s
 - Ramp-up/down time for controller output: p2293 = 30 s
 - Upper and lower limits, actual value: p2267 = 120 %, p2268 = -10 %
 - Actual value filter time constant: p2265 = 10 s
 - Proportional gain K_P, integral time T_I, differentiation time constant T_D: p2280 (K_P) = 1.2, p2285 (T_I) = 25 s, p2274 (T_D) = 0 s
 - Technology controller system deviation inversion: p2306 = 1
- Default setting hibernation mode:
 - Activated: p2398 = 1
 - Start speed: p2390 = 50 rpm
 - Delay time: p2391 = 60 s
 - Restart value with technology controller: p2392 = 1 %
 - Restart speed relative w/o technology controller: p2393 = 100 rpm
- "Flying restart" is enabled: p1200 = 1
- Automatic restart is active. After a power failure, the inverter automatically acknowledges possible faults and switches on the motor: p1210 = 26

Designation in the BOP-2: P_F ctF1

Default setting 107: "Cooling tower with LG-Ni1000 sensor + hibernation"



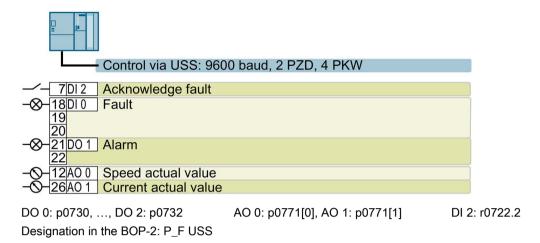
DO 0: p0730, ..., DO 2: p0732 AO 0: p0771[0], AO 1: p0771[1] DI 0: r0722.0 AI 3: r0755[3] Additional settings:

- · Temperature control using the technology controller
- Analog inputs smoothing time constant: p0753 = 100 ms
- Technological unit: p0595 = 1 (%), reference variable: p0596 = 1
- Default setting of the technology controller:
 - Enable: p2200 = 1
 - Fixed value 1: p2201 = 26 %
 - Ramp-up/down time for setpoint: p2257 = p2258 = 30 s
 - Ramp-up/down time for controller output: p2293 = 30 s
 - Upper and lower limits, actual value: p2267 = 120 %, p2268 = -100 %
 - Actual value filter time constant: p2265 = 10 s
 - Proportional gain K_P, integral time T_I, differentiation time constant T_D: p2280 (K_P) = 1.2, p2285 (T_I) = 25 s, p2274 (T_D) = 0 s
 - Technology controller minimum limiting p2292 = 20 %
 - Technology controller system deviation inversion: p2306 = 1
- · Default setting hibernation mode:
 - Activated: p2398 = 1
 - Start speed: p2390 = 50 rpm
 - Delay time: p2391 = 60 s
 - Restart value with technology controller: p2392 = 1 %
 - Restart speed relative w/o technology controller: p2393 = 100 rpm
- "Flying restart" is enabled: p1200 = 1
- Automatic restart is active. After a power failure, the inverter automatically acknowledges possible faults and switches on the motor: p1210 = 26

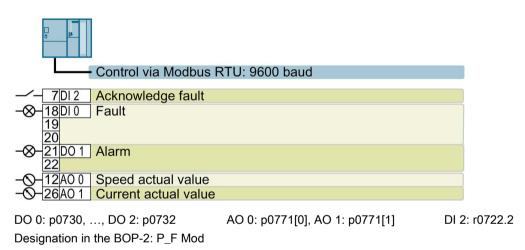
Designation in the BOP-2: P_F ctF2

3.5 Default setting of the interfaces

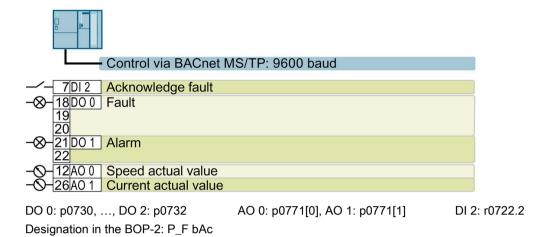
Default setting 108: "USS fieldbus"



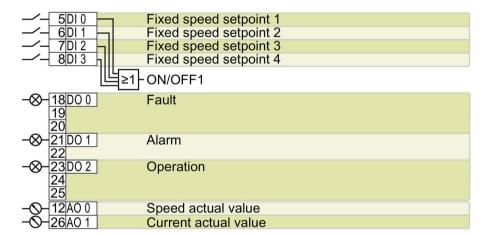
Default setting 109: "Modbus RTU field"



Default setting 110: "BACnet MS/TP fieldbus"



Default setting 111: "Fixed setpoints"

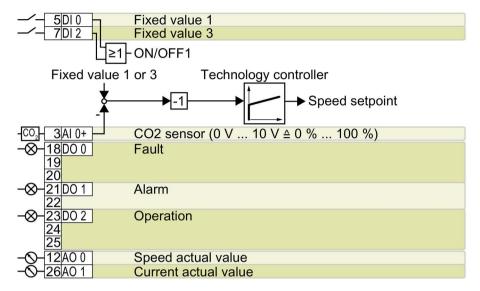


DO 0: p0730, ..., DO 2: p0732 AO 0: p0771[0], AO 1: p0771[1] DI 0: r0722.0, ..., DI 3: r0722.3 Additional settings:

- Fixed speed setpoint 1: p1001 = 300 rpm
- Fixed speed setpoint 2: p1002 = 600 rpm
- Fixed speed setpoint 3: p1003 = 900 rpm
- Fixed speed setpoint 4: p1004 = 1200 rpm
- If several of the DI 0 ... DI 3 = high, the inverter adds the corresponding fixed speeds.
- "Flying restart" is enabled: p1200 = 1
- Automatic restart is active. After a power failure, the inverter automatically acknowledges possible faults and switches on the motor: p1210 = 26

Designation in the BOP-2: P_F _F55

Default setting 112: "CO2 sensor, 2 PID setpoints"



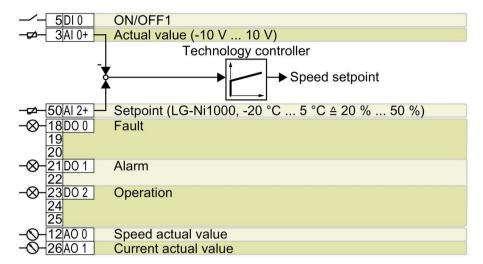
DO 0: p0730, ..., AO 0: p0771[0], AO 1: p0771[1] DI 0: r0722.0, DI 2: r0722.2 AI 0: r0755[0] DO 2: p0732

Additional settings:

- CO₂ control using the technology controller
- Analog inputs smoothing time constant: p0753 = 500 ms
- Technological unit: p0595 = 1 (%), reference variable: p0596 = 1
- · Default setting of the technology controller:
 - Enable: p2200 = 1
 - Fixed value 1: p2201 = 50 %
 - Fixed value 3: p2203 = 10 %
 - Technology controller setpoint 1: p2253 = r2224 (active fixed value)
 - Ramp-up/down time for setpoint: p2257 = p2258 = 30 s
 - Upper and lower limits, actual value: p2267 = 120 %, p2268 = -10 %
 - Actual value filter time constant: p2265 = 10 s
 - Technology controller system deviation inversion: p2306 = 1
- "Flying restart" is enabled: p1200 = 1
- Automatic restart is active. After a power failure, the inverter automatically acknowledges possible faults and switches on the motor: p1210 = 26

Designation in the BOP-2: P_F_CO2

Default setting 113: "Temperature-dependent pressure setpoint"



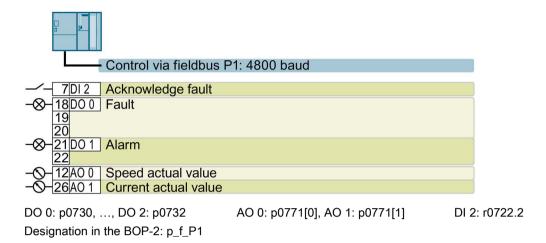
DO 0: p0730, ..., AO 0: p0771[0], AO 1: p0771[1] DI 0: r0722.0 AI 0: r0755[0], AI 2: r0755[2] DO 2: p0732

Additional settings:

- Temperature control using the technology controller
- Technological unit: p0595 = 1 (%), reference variable: p0596 = 1
- Default setting of the technology controller:
 - Enable: p2200 = 1
 - Upper and lower limits, setpoint: p20229 = 0.5, p20230 = 0.2
 - Ramp-up/down time for setpoint: p2257 = p2258 = 30 s
 - Ramp-up/down time for controller output: p2293 = 30 s
 - Upper and lower limits, actual value: p2267 = 120 %, p2268 = -10 %
 - Actual value filter time constant: p2265 = 10 s
 - Technology controller minimum limiting p2292 = 20 %
- "Flying restart" is enabled: p1200 = 1
- Automatic restart is active. After a power failure, the inverter automatically acknowledges possible faults and switches on the motor: p1210 = 26

Designation in the BOP-2: P_F_tP5

Default setting 114: "P1 fieldbus"



Default setting 120: "PID settings for pumps and fans"

The default setting restores the function of the terminal strip to the factory setting.

Technology controller setting:

- Ramp-up/down time for setpoint: p2257 = p2258 = 30 s
- Ramp-up/down time for controller output: p2293 = 30 s
- Actual value upper limit: p2267 = 120%
- Actual value filter time constant: p2265 = 10 s

Designation in the BOP-2: P_F_PID

Commissioning

4.1 Tools to commission the converter

Operator panel

An operator panel is used to commission, troubleshoot and control the inverter, as well as to back up and transfer the inverter settings.



The Intelligent Operator Panel (IOP) is available for snapping onto the inverter, or as handheld with a connecting cable to the inverter. The graphics-capable plain text display of the IOP enables intuitive operation and diagnostics of the inverter.

The IOP is available in two versions:

- With European languages
- With Chinese, English and German

Additional information about the compatibility of the IOP and inverters is available in the Internet:



Compatibility of the IOP and Control Units (http://support.automation.siemens.com/WW/view/en/67273266)



The Operator Panel BOP-2 for snapping onto the inverter has a two-line display for diagnostics and operating the inverter.

Operating Instructions of the BOP-2 and IOP operator panels:



Overview of the manuals (Page 49)

PC tools



STARTER and Startdrive are PC tools that are used to commission, troubleshoot and control the inverter, as well as to back up and transfer the inverter settings. You can connect the PC with the inverter via USB or via the PROFIBUS / PROFINET fieldbus.



Connecting cable (3 m) between PC and inverter: Article number 6SL3255-0AA00-2CA0



STARTER DVD: Article number 6SL3072-0AA00-0AG0

Startdrive DVD: Article number 6SL3072-4CA02-1XG0



STARTER (http://support.automation.siemens.com/WW/view/en/26233208)

Startdrive (http://support.automation.siemens.com/WW/view/en/68034568)

STARTER videos (http://www.automation.siemens.com/mcms/mc-drives/en/low-voltageinverter/sinamics-g120/videos/Pages/videos.aspx)

Startdrive tutorial (http://support.automation.siemens.com/WW/view/en/73598459)

4.2 Commissioning with BOP-2 operator panel

4.2.1 Start quick commissioning and select the application class

Starting quick commissioning

Preconditions



- The power supply is switched on.
- The operator panel displays setpoints and actual values.

Procedure



Proceed as follows to carry out quick commissioning:



Press the ESC key.



Press one of the arrow keys until the BOP-2 displays the "SETUP" menu.



To start quick commissioning, in the "SETUP" menu, press the OK key.



If you wish to restore all of the parameters to the factory setting before the quick commissioning, proceed as follows:

- 1. Press the OK key.
- 2. Switchover the display using an arrow key: nO → YES
- 3. Press the OK key.



You must select the application class if you are not using a PM230, but instead, a PM240-2, PM240P-2 or PM330 Power Module. The next steps after having selected an application class are described in the operating instructions.



Overview of the manuals (Page 49)



Select the motor standard.

- KW 50HZ: IEC
- HP 60HZ: NEMA
- KW 60HZ: IEC 60 Hz



Set the inverter supply voltage.



Select the motor type. If a 5-digit motor code is stamped on the motor rating plate, select the corresponding motor type with motor code.

Motors without motor code stamped on the rating plate:

- INDUCT: Third-party induction motor
- 1L... IND: 1LE1, 1LG6, 1LA7, 1LA9 induction motors

Motors with motor code stamped on the rating plate:

• 1LE1 IND 100: 1LE1 . 9

1PC1 IND: 1PC1

1PH8 IND: Induction motor

1FP1: Reluctance motor

Depending on the inverter, the motor list in BOP-2 can deviate from the list shown above.



If you have selected a motor type with motor code, you must now enter the motor code. The inverter assigns the following motor data corresponding to the motor code.

If you do not know the motor code, then you must set the motor code = 0, and enter motor data from p0304 and higher from the rating plate.



87 Hz motor operation The BOP-2 only indicates this step if you selected IEC as the motor standard (EUR/USA, P100 = KW 50HZ).



Rated motor voltage



Rated motor current



Rated motor power



Rated motor frequency



Rated motor speed



Motor cooling:

SELF: Natural cooling

FORCED: Forced-air cooling

• LIQUID: Liquid cooling

NO FAN: Without fan



Select the appropriate application:

- VEC STD: In all applications, which do not fit the other setting options.
- PUMP FAN: Applications involving pumps and fans
- SLVC 0HZ: Applications with short ramp-up and ramp-down times. However, this setting
 is not suitable for hoisting gear and cranes/lifting gear.
- PUMP 0HZ: Setting only for steady-state operation with slow speed changes. We recommend setting VEC STD if load surges in operation cannot be ruled out.

The selection option depends on the Power Module being used. There is no selection option for PM230 Power Modules.

4.2 Commissioning with BOP-2 operator panel



Select the control mode:

- VF LIN: U/f control with linear characteristic
- VF LIN F: Flux current control (FCC)
- VF QUAD: U/f control with square-law characteristic
- SPD N EN: Sensorless vector control

Select a suitable control mode

Control mode	U/f control with linear or square-law characteristic Flux current control (FCC)	Vector control without encoder
Closed-loop control characteristics	 Typical correction time after a speed change: 100 ms 200 ms Typical correction time after a load surge: 500 ms The control mode is suitable to address the following requirements: Motor power ratings < 45 kW Ramp-up time 0 → Rated speed (dependent on the rated motor power): 1 s (0.1 kW) 10 s (45 kW) Applications with increasing load torque without load surges The control mode is insensitive with respect to inaccurate motor data settings 	 Typical correction time after a speed change: < 100 ms Typical correction time after a load surge: 200 ms The vector control controls and limits the motor torque Torque accuracy that can be achieved: ± 5 % for 15 % 100 % of the rated speed We recommend vector control for the following applications: Motor power ratings > 11 kW For load surges 10 % >100 % of the rated motor torque The vector control is necessary for a ramp-up time 0 → Rated speed (dependent on the rated motor power): 1 s (0.1 kW) < 10 s (250 kW).
Application examples	Pumps, fans, and compressors with flow characteristic	Pumps and compressors with displacement machines
Motors that can be operated	Induction motors	Induction, synchronous and reluctance motors
Power Modules that can be oper- ated	No restrictions	
Max. output frequency	550 Hz	240 Hz 150 Hz with PM330 Power Module
Commissioning	Contrary to vector control, no speed control- ler has to be set	100 Fiz. Mar. Moss Forest Models



Select the default setting for the interfaces of the inverter that is suitable for your application.



Default setting of the interfaces (Page 16)



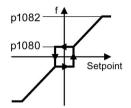


Figure 4-1 Minimum and maximum motor frequency

/ CAUTION

Material damage caused by the motor unexpectedly accelerating

Depending on the particular Power Module, the inverter sets the minimum frequency p1080 to 20% of the maximum frequency. Also for a setpoint = 0, for p1080 > 0, after the motor is switched on it accelerates to the minimum frequency. Material damage can occur if the motor unexpectedly accelerates.

• If the application requires a minimum frequency = 0, then set p1080 = 0.

AI SCALE P758__

Scaling of analog input 0



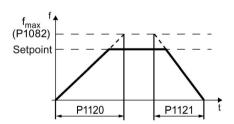


Figure 4-2 Ramp-up and ramp-down time of the motor

OFF3 RP P113<u>5</u> Ramp-down time for the OFF3 command



Motor data identification: Select the method which the inverter uses to measure the data of the connected motor:

- OFF: Motor data is not measured.
- STIL ROT: Recommended setting: Measure the motor data at standstill and with the motor rotating. The inverter switches off the motor after the motor data identification has been completed.

4.2 Commissioning with BOP-2 operator panel

 STILL: Measure the motor data at standstill. The inverter switches off the motor after the motor data identification has been completed.

Select this setting if one of the following cases is applicable:

- You have selected the control mode "SPD N EN". However, the motor cannot rotate freely – for example, if the traversing range is mechanically limited.
- You have selected U/f control as control mode, e.g. "VF LIN" or "VF QUAD".
- ROT: Measure the motor data with the motor rotating. The inverter switches off the motor after the motor data identification has been completed.



Complete quick commissioning:

Switchover the display using an arrow key: nO → YES

Press the OK key.

You have completed quick commissioning.

4.2.2 Identifying the motor data and optimizing the closed-loop control

The inverter has several techniques to automatically identify the motor data and optimize the speed control.

To start the motor data identification routine, you must switch-on the motor via the terminal strip, fieldbus or from the operator panel.



Risk of death due to machine motion while motor data identification is active

For the stationary measurement, the motor can make several rotations. The rotating measurement accelerates the motor up to its rated speed. Secure dangerous machine parts before starting motor data identification:

- Before switching on, ensure that nobody is working on the machine or located within its working area.
- · Secure the machine's work area against unintended access.
- Lower hanging/suspended loads to the floor.

Preconditions

 You selected a method of motor data identification during quick commissioning, e.g. measuring motor data while the motor is stationary.



When quick commissioning is complete, the inverter issues alarm A07991.

The motor has cooled down to the ambient temperature.

An excessively high motor temperature falsifies the motor data identification results.

Procedure when using the BOP-2 operator panel



To start the motor data identification, proceed as follows:



Press the HAND/AUTO key.



The BOP-2 displays the symbol indicating manual operation.



Switch on the motor.



During motor data identification, "MOT-ID" flashes on the BOP-2.



If the inverter again outputs alarm A07991, then it waits for a new ON command to start the rotating measurement.

If the inverter does not output alarm A07991, switch off the motor as described below, and switch over the inverter control from HAND to AUTO.



Switch on the motor to start the rotating measurement.



During motor data identification, "MOT-ID" flashes on the BOP-2.

The motor data identification can take up to 2 minutes depending on the rated motor power.



Depending on the setting, after motor data identification has been completed, the inverter switches off the motor - or it accelerates it to the setpoint.

If required, switch off the motor.



Switch the inverter control from HAND to AUTO.



You have completed the motor data identification.

4.3 Connecting the inverter to the fieldbus

Where can I find instructions for the fieldbus connection of the inverter?

Instructions for connecting to a fieldbus can be downloaded from the Internet:



- Application examples (http://support.automation.siemens.com/WW/view/en/60733299)
- Operating Instructions: CU230P-2 operating instructions (https://support.industry.siemens.com/cs/ww/en/view/109478827)
- "Fieldbuses" function manual: Manuals for the Control Unit (http://support.automation.siemens.com/WW/view/en/30563628/133300)

Description files for fieldbuses

The description files are electronic device data sheets which contain all the required information of a higher-level controller. You can configure and operate the inverter on a fieldbus with the appropriate description file.



Generic Station Description for PROFIBUS: GSD (http://support.automation.siemens.com/WW/view/en/23450835)

GSD Markup Language for PROFINET: GSDML

(http://support.automation.siemens.com/WW/view/en/26641490)

Ethernet/IP: EDS (http://support.automation.siemens.com/WW/view/en/78026217)

BACnet MS/TP: PICS (http://www.big-

eu.org/uploads/tx_teproddb/catalog_pdf/PICS_CU230P-2_HVAC_v46_HF.docx)

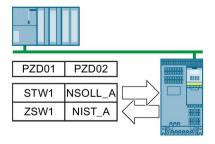
Alternative for the download for GSD and GSDML

GSD and GSDML are saved in the inverter. If you insert a memory card in the inverter and set p0804 = 12, then the inverter writes the GSD or the GSDML to the memory card. You can then transfer the file to your programming device or PC using the memory card.

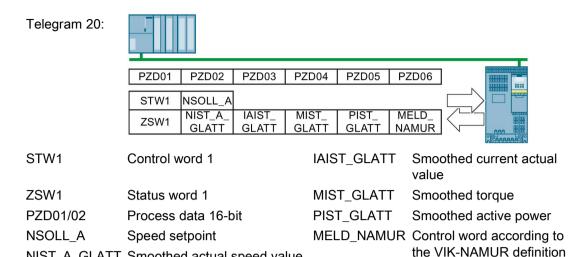
4.3.1 PROFINET and PROFIBUS

Examples for telegrams via PROFIBUS and PROFINET

Telegram 1:



STW1 Control word 1
ZSW1 Status word 1
PZD01/02 Process data 16-bit
NSOLL_A Speed setpoint
NIST_A Speed actual value



Control word 1 (STW1), PZD receive word 1 (word: r2050[0], bits: r2090.00 ... r2090.15)

NIST_A_GLATT Smoothed actual speed value

Bit	Meaning	Explanation
0	0 = OFF1	The motor brakes with the ramp-down time p1121 of the ramp-function generator. The inverter switches off the motor at standstill.
	0 → 1 = ON	The inverter goes into the "ready" state. If, in addition bit 3 = 1, then the inverter switches on the motor.
1	0 = OFF2	Switch off the motor immediately, the motor then coasts down to a standstill.
	1 = No OFF2	Precondition in order to be able to switch on the motor using bit 0 (ON command).
2	0 = Quick stop (OFF3)	The motor brakes with the OFF3 ramp-down time p1135 down to standstill.
	1 = No quick stop (OFF3)	Precondition in order to be able to switch on the motor using bit 0 (ON command).
3	0 = Inhibit operation	Switch off the motor immediately → motor coasts down to a standstill.
	1 = Enable operation	Precondition in order to be able to switch on the motor using bit 0 (ON command).
4	0 = Disable RFG	The inverter immediately sets its ramp-function generator output to 0.
	1 = Do not disable RFG	The ramp-function generator can be enabled.
5	0 = Stop RFG	The output of the ramp-function generator stops at the actual value.
	1 = Enable RFG	The output of the ramp-function generator follows the setpoint.
6	0 = Inhibit setpoint	The inverter brakes the motor with the ramp-down time p1121 of the ramp-function generator.
	1 = Enable setpoint	Motor accelerates with the ramp-up time p1120 to the setpoint.
7	0 → 1 = Acknowledge faults	Acknowledge fault. If the ON command is still active (bit 0 = 1), the inverter switches to "closing lockout" state.
8, 9	Reserved	
10	0 = No control via PLC	The inverter ignores the process data from the fieldbus.
	1 = Control via PLC	Control via fieldbus, the inverter accepts the process data from the fieldbus.
11	1 = Direction reversal	Invert setpoint in the inverter.
12	Not used	
13	1 = MOP up	Increase the setpoint saved in the motorized potentiometer.
14	1 = MOP down	Reduce the setpoint saved in the motorized potentiometer.
15	Reserved	Changes over between settings for different operation interfaces (command data sets).

4.3 Connecting the inverter to the fieldbus

Status word 1 (ZSW1), PZD send word 1 (word: p2051[0], bits: p2080[0] ... p2080[15])

Bit	Meaning	Comments
0	1 = Ready to start	Power supply switched on; electronics initialized; pulses locked.
1	1 = Ready	Motor is switched on (ON/OFF1 = 1), no fault is active. With the command "Enable operation" (STW1.3), the inverter switches on the motor.
2	1 = Operation enabled	Motor follows setpoint. See control word 1, bit 3.
3	1 = Fault active	The inverter has a fault. Acknowledge fault using STW1.7.
4	1 = OFF2 inactive	Coast down to standstill is not active.
5	1 = OFF3 inactive	Quick stop is not active.
6	1 = Closing lockout active	It is only possible to switch on the motor after an OFF1 followed by ON.
7	1 = Alarm active	Motor remains switched on; no acknowledgement is necessary.
8	1 = Speed deviation within the tolerance range	Setpoint / actual value deviation within the tolerance range.
9	1 = Master control requested	The automation system is requested to accept the inverter control.
10	1 = Comparison speed reached or exceeded	Speed is greater than or equal to the corresponding maximum speed.
11	1 = torque limit reached	Comparison value for current or torque has been reached or exceeded.
12	1 = Holding brake open	Signal to open and close a motor holding brake.
13	0 = Alarm, motor overtempera- ture	
14	1 = Motor rotates clockwise	Internal inverter actual value > 0
	0 = Motor rotates counter- clockwise	Internal inverter actual value < 0
15	0 = Alarm, inverter thermal overload	

Fault word according to the VIK-NAMUR definition (MELD_NAMUR), PZD send word 16 (word: p2051[5], bits: r3113.00 ... r3113.15)

Bit	Meaning
0	0 = Control Unit has a no fault
	1 = Control Unit fault
1	1 = line fault: Phase failure or inadmissible voltage
2	1 = DC link overvoltage
3	1 = Power Module fault, e.g. overcurrent or overtemperature
4	1 = inverter overtemperature
5	1 = ground fault/phase fault in the motor cable or in the motor
6	1 = motor overload
7	1 = communication error to the higher-level control
8	1 = error in a safe monitoring channel
10	1 = internal communication error in the inverter
11	1 = line fault
15	1 = other fault

4.3.2 Modbus RTU

Settings for Modbus RTU

Parameter	Explanation					
p0015 = 109	Macro drive unit					
	Set communic	cation via Modbu	ıs RTU			
	Defau	It setting of the in	nterfaces (Page 16)			
p2020	Fieldbus inter	face baud rate	4: 2400 baud		9: 57600 baud	
	p0015 = 109 s	sets p2020 = 6	5: 4800 baud 6: 9600 baud 7: 19200 baud 8: 38400 baud		10: 76800 baud 11: 93750 baud 12: 115200 baud 13: 187500 baud	
p2021	Fieldbus inter	face address	1			
	Valid USS addresses: 1 247.					
	The parameter is only active if address 0 is set at the Control Unit address switch.					
		change only becomes active after the inverter power supply is switched off and witched on again.				
p2024	Fieldbus interface	[0] Maximum po slave	ermissible telegram p	rocessi	ng time of the Modbus	
	times	[2] dead time between two telegrams				
r2029	Fieldbus	[0] number of e	rror-free telegrams	[4] nur	mber of parity errors	
	interface	[1] number of rejected telegrams		[5] number of starting character		
	error statis- tics	[2] number of framing errors		errors		
	ucs	[3] number of overrun errors		[6] number of checksum errors		
			[7]		[7] number of length errors	
p2030 = 2	Fieldbus inter	interface protocol selection				
	p0015 = 109 sets p2013 = 2 → Modbus RTU					
p2031	Fieldbus inter parity	face Modbus	0: No parity 1: Odd parity 2: Even parity			

4.3.3 BACnet MS/TP

Settings for BACnet MS/TP

Parameter	Explanation					
p0015 = 110	Macro drive unit					
	Set communic	Set communication via BACnet MS/TP				
	Defau	It setting of the in	nterfaces (Page 16)			
p2020	Fieldbus inter	face baud rate	4: 2400 baud		9: 57600 baud	
	p0015 = 110 s	sets p2020 = 6	5: 4800 baud 6: 9600 baud		10: 76800 baud 11: 93750 baud	
			7: 19200 baud		12: 115200 baud	
			8: 38400 baud		13: 187500 baud	
p2021	Fieldbus inter	face address	1			
	Valid USS add	dresses: 1 12	7.			
	The parameter is only active if address 0 is set at the Control Unit address switch.					
	A change only becomes active after the inverter power supply is switched off and switched on again.					
p2024	Fieldbus inter	face times	[0] maximum permissible processing time (APDU timeout)			
p2025	Fieldbus SS E	BACnet settings	[0] = device object in	nstance	number	
			[1] = info maximum	number	frames	
			[2] = APDU number	of retrie	es	
			[3] = maximum mas	ter addr	ress	
p2026	Fieldbus inter	face BACnet CO	V increment			
	_	ue at which poin nedCOVNotifica		and UnC	ConfirmedCOVNotification	
r2029	Fieldbus	[0] number of e	rror-free telegrams [4] number of parity errors		nber of parity errors	
	interface	[1] number of rejected telegrams		[5] number of starting character		
	error statis- tics	[2] number of fr	aming errors	errors		
	ucs	[3] number of o	verrun errors	[6] nur	nber of checksum errors	
				[7] nur	nber of length errors	
p2030 = 5		face protocol sel				
	p0015 = 110 s	00015 = 110 sets p2013 = 5 → BACnet MS/TP				

Control word

Parame	eter		BACNet	Meaning	
r2090	.00	p0840	BV20	ON/OFF1	Switch on motor
	.01	p0844	BV27	No OFF2	Precondition in order to be able to switch on
	.02	p0848	BV28	No quick stop (OFF3)	the motor (ON command).
	.03	p0852	BV26	Enable operation	
	.04	p1140	BV26	Do not disable RFG	The ramp-function generator can be enabled
	.05	p1141	BV26	Enable RFG	The output of the ramp-function generator follows the setpoint
	.06	p1142	BV26	Enable setpoint	Motor accelerates with the ramp-up time p1120 to the setpoint
	.07	p2103	BV22	Acknowledge faults	
	.08, .09		N/A	Reserved	
	.10	p0854	BV93	Master control by PLC	Control via fieldbus, the inverter accepts the process data from the fieldbus
	.11	p1113	BV21	Direction reversal	Invert setpoint in the inverter
	.12		N/A	Reserved	
	.13	p1035	N/A	MOP raise	Increase the setpoint saved in the motorized potentiometer
	.14	p1036	N/A	MOP lower	Reduce the setpoint saved in the motorized potentiometer
	.15		N/A	Reserved	

4.4 Frequently required parameters

Parame	ter	Explanation						
p0015		Macro drive unit Set defaults for inputs and outputs via a macro.						
r0018		Control Unit firmware version						
p0096		Application class		1:	Expert Standard Drive Control Dynamic Drive Control	Standard Drive Control		
p0100				1:	0: Europe 50 [Hz] 1: NEMA motor (60 Hz, US units) 2: NEMA motor (60 Hz, SI units)			
p0304		Rated motor volt	age [V]					
p0305		Rated motor curr	ent [A]					
p0307		Rated motor pow	er [kW	or [hp]				
p0310		Rated motor freq	uency	[Hz]				
p0311		Rated motor spe						
p0601		Motor temperatu	re sens	or type				
		Terminal 14	Γ1 moto	or (+) 0:	No sensor (factory setting)	2: KTY84 (→ P0604)		
			Γ2 moto		4 PTO (P0004)			
p0625		Motor ambient te	mperat	ure during	commissioning [° C]	•		
p0640		Current limit [A]						
r0722	Digital inputs status							
	.0	Terminal 5	DI 0	Selection	of the possible settings:			
	.1	Terminal 6	DI 1	p0840 O	N/OFF (OFF1)	p1110 inhibit negative direction		
	.2	Terminal 7	DI 2		coast down (OFF2)	p1111 inhibit positive direction		
	.3	Terminal 8	DI 3		o quick stop (OFF3) nconditionally release holding brake	p1113 setpoint inversion p1122 bypass ramp-function gen-		
	.4	Terminal 16	DI 4	•	sed speed setpoint selection bit 0	erator p1140 enable/inhibit ramp-function		
	.5	Terminal 17	DI 5	p1021 fix	ed speed setpoint selection bit 1			
	.11	Terminal 3, 4	AI 0		ted speed setpoint selection bit 2 ted speed setpoint selection bit 3	generator p1141 continue/freeze ramp-		
	.12	Terminal 10, 11	Al 1	p1035 m p1036 m p2103 ac p1055 jo p1056 jo	otorized potentiometer raise setpoi otorized potentiometer lower setpo knowledge faults g bit 0	int function generator		
p0730		Signal source for	termin	al DO 0	Selection of the possible settings	:		
		20 (NO contact) 20 (NC contact)		52.0 ready for switching on 52.1 ready for operation	53.0 DC braking active 53.1 n_act > p2167 (n_off)			
p0731		Signal source for	r termin	al DO 1	52.2 operation enabled 52.3 fault present	53.2 n_act ≤ p1080 (n_min) 53.3 l_act > p2170		
		Terminals 21, 22 (NO contact)			52.4 coast down active (OFF2)	53.3 act > p2170 53.4 n_act > p2155		
p0732		Signal source for terminal DO 2			52.5 quick stop active (OFF3)	53.5 n_act ≤ p2155		
		Terminals 24, 25 (NO contact) Terminals 23, 25 (NC contact)			52.7 alarm present 52.14 motor rotates forwards	53.6 n_act ≥ n_set 53.10 technology controller output at lower limit 53.11 technology controller output at upper limit		

Parame	eter	Explanation				
r0755		Analog inputs actual	value [%]			
	[0]	Terminals 3, 4	AI 0			
	[1]	Terminals 10, 11	Al 1			
	[2]	Terminals 50, 51	Al 2			
	[3]	Terminals 52, 53	Al 3			
p0756		Analog input type		0: Unipolar voltage input (0 V+10	V)	
-	[0]	AI 0		1: Unipolar voltage input monitored (
	[1]	Al 1		2: Unipolar current input (0 mA+20 3: Unipolar current input monitored (-		
	[2]	Al 2		4: Bipolar voltage input (-10 V+10		
	[3]	Al 3		6: LG-Ni1000 temperature sensor 7: PT1000 temperature sensor 8: No sensor connected 10: Temperature sensor DIN Ni 1k (6180 ppm / K)		
p0771		Analog outputs signa	l source	Selection of the possible settings:		
	[0]	Terminals 12, 13	AO 0	0: Analog output locked	25: Output voltage, smoothed	
	[1]	Terminals 26, 27	AO 1	21: Speed actual value 24: Output frequency, smoothed	26: DC-link voltage smoothed 27: Actual current value (smoothed absolute value)	
p0776		Analog outputs, type		0: Current output (0 mA +20 mA)		
	[0]	AO 0		1: Voltage output (0 V +10 V)		
	[1]	AO 1		2: Current output (+4 mA +20 mA)		
p0922		PROFIdrive telegram	selection			
p1001		Fixed speed setpoint	1			
p1002		Fixed speed setpoint	2			
p1003		Fixed speed setpoint	3			
p1004		Fixed speed setpoint	4			
p1058		Jog 1 speed setpoint				
p1059		Jog 2 speed setpoint				
p1070		Main setpoint		Selection of the possible settings:		
				0: Main setpoint = 0 755[0]: Analog input 0 1024: Fixed setpoint	1050: Motorized potentiometer 2050[1]: PZD 2 from the fieldbus	
p1080		Minimum speed [rpm]			
p1082		Maximum speed [rpn	ո]			
p1120		Ramp-function gener	ator ramp-u	p time [s]		
p1121		Ramp-function generator ramp-down time [s]				
p1300		Open-loop/closed-	Selection o	f the possible settings:		
				ol with linear characteristic ol with linear characteristic and FCC	2: U/f control with parabolic characteristic 20: Speed control (without encoder)	
p1310		Starting (voltage boo	st) permane	ent	, , ,	
p1800		Pulse frequency setpoint				

4.4 Frequently required parameters

Parameter	Explanation						
p1900	Motor data identification and rotating measurement						
	0: Locked						
	1: Identify motor data and optimize the speed controller						
	2: Identify motor data (at standstill) 3: Optimize the appeal controller (retating in operation)						
	3: Optimize the speed controller (rotating in operation) 11: Ident. motor data and opt. speed controller, change to operation (not available with PM230 or PM250						
	Power Module)	occu controller, change to open	ation (not available man) in 200 or i in 200				
	12: Identify motor data (at standstill), change to operation (not available with PM230 or PM250 Power						
	ule)	<u> </u>					
p2030	Fieldbus interface protocol selection	The possible settings depend					
	Selection	0: No protocol 1: USS	5: BacNet 7: PROFINET				
		2: Modbus RTU	8: P1				
		3: PROFIBUS	10: EtherNet/IP				
r2050	Words received via fieldbus (16	bit)					
	r2050[0]: PZD01 r2050[11]: F	ZD12					
p2051	Words sent via fieldbus (16 bit)						
	p2051[0]: PZD01 p2051[16]:	PZD17					
p2080	Binector-connector converter, st	atus word 1					
	p2080[0]: Bit 0 p2080[15]: Bit	15					
r2090	PROFIdrive PZD1 receive bit-by-bit (control word 1)						
	r2090.00: Bit 0 r2090.15: Bit	15					
p2200	Technology controller enable	1: Technology controller is er	nabled				
p2201 p2215	Technology controller fixed value	e 1 15					
p2220 p2223	Technology controller fixed value	e selection bit 0 3					
r2224	Technology controller fixed value	e active					
p2253	Technology controller setpoint 1						
p2254	Technology controller setpoint 2						
p2257	Technology controller ramp-up t	ime					
p2258	Technology controller ramp-dow	n time					
p2264	Technology controller actual val	ue					
p2265	Technology controller actual val	ue filter time constant					
p2267	Technology controller upper limi	t actual value					
p2268	Technology controller lower limit actual value						
p2271	Technology controller actual value inversion (sensor type)	0: No inversion 1: invert actual value signal (t	this should be set if the actual value decreas-				
		es with increasing motor spec	ed)				
p2274	•	Technology controller differentiation time constant					
p2280	Technology controller proportional gain						
p2285	Technology controller integral time						
p2293	Technology controller ramp-up/r	amp-down time					

More information

5.1 Overview of the manuals



Manuals with additional information that can be downloaded:

 CU230P-2 Compact Operating Instructions (https://support.industry.siemens.com/cs/ww/en/view/109482992)

Commissioning the inverter (this manual)



 CU230P-2 operating instructions (https://support.industry.siemens.com/cs/ww/en/view/109482995)

Installing, commissioning and maintaining the inverter. Advanced commissioning



 EMC installation guideline (http://support.automation.siemens.com/WW/view/en/60612658)

EMC-compliant control cabinet design, potential equalization and cable routing



CU230P-2 List Manual (https://support.industry.siemens.com/cs/ww/en/view/109482956)

Parameter lists, alarms and faults. Graphic function diagrams



 "Fieldbus" function manual (https://support.industry.siemens.com/cs/ww/en/view/109483004)

Configuring fieldbuses.



 BOP-2 operating instructions (https://support.industry.siemens.com/cs/ww/en/view/109483379)

Using the operator panel.



 IOP operating instructions (https://support.industry.siemens.com/cs/ww/en/view/109478559)

Using the operator panel, installing the door mounting kit for IOP



5.2 Technical support

• Application manual IOP (https://support.industry.siemens.com/cs/ww/en/view/109483443)

The commissioning wizards in the IOP



 Power Module Installation Manual (https://support.industry.siemens.com/cs/ww/en/ps/13224/man)

Installing Power Modules, reactors and filters. Technical specifications, maintenance

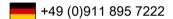


Accessories manual (https://support.industry.siemens.com/cs/ww/en/ps/13225/man)

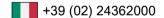
Installation descriptions for inverter components, e.g. line reactors or line filters. The printed installation descriptions are supplied together with the components.



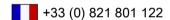
5.2 Technical support







+34 902 237 238





You can find additional telephone numbers for Technical Support in the Internet:

Product support (http://www.siemens.com/automation/service&support)

Further information

SINAMICS converters: www.siemens.com/sinamics

PROFINET www.siemens.com/profinet

Siemens AG Digital Factory Motion Control Postfach 3180 91050 ERLANGEN Germany

