

SINAMICS G120C

Converter

Getting Started · 01/2013



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SINAMICS G120C

SINAMICS G120C converter

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Getting Started

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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.



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



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



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



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:



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.

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This Getting Started Guide describes how you install and commission the SINAMICS G120C converter.

What is the meaning of the symbols in the manual?



1 An operating instruction starts here.



This concludes the operating instruction.

Firmware upgrade and downgrade

Options for upgrading and downgrading the firmware can be found on the Internet at
<http://support.automation.siemens.com/WW/news/en/67364620>.

1

Product overview

The SINAMICS G120C is a range of converters for controlling the speed of three phase motors. The converter is available in three frame sizes.

You find a label with the order number:

- On the front of the converter after removing the blind cover or the operator panel.
- On one side of the converter.

	Rated output power	Rated output current	Order number		
	based on Low Overload		Unfiltered	Filtered	
Frame Size A	0.55 kW	1.7 A	6SL3210-1KE11-8U	1	6SL3210-1KE11-8A
	0.75 kW	2.2 A	6SL3210-1KE12-3U	1	6SL3210-1KE12-3A
	1.1 kW	3.1 A	6SL3210-1KE13-2U	1	6SL3210-1KE13-2A
	1.5 kW	4.1 A	6SL3210-1KE14-3U	1	6SL3210-1KE14-3A
	2.2 kW	5.6 A	6SL3210-1KE15-8U	1	6SL3210-1KE15-8A
	3.0 kW	7.3 A	6SL3210-1KE17-5U	1	6SL3210-1KE17-5A
	4.0 kW	8.8 A	6SL3210-1KE18-8U	1	6SL3210-1KE18-8A
Frame Size B	5.5 kW	12.5 A	6SL3210-1KE21-3U	1	6SL3210-1KE21-3A
	7.5 kW	16.5 A	6SL3210-1KE21-7U	1	6SL3210-1KE21-7A
Frame Size C	11.0 kW	25.0 A	6SL3210-1KE22-6U	1	6SL3210-1KE22-6A
	15.0 kW	31.0 A	6SL3210-1KE23-2U	1	6SL3210-1KE23-2A
	18.5 kW	37.0 A	6SL3210-1KE23-8U	1	6SL3210-1KE23-8A
SINAMICS G120C USS/MB (USS, Modbus RTU)			B	B	
SINAMICS G120C DP (PROFIBUS)			P	P	
SINAMICS G120C PN (PROFINET, EtherNet/IP)			F	F	
SINAMICS G120C CANopen			C	C	

Figure 1-1 Identifying the converter

Safety notes

Use for the intended purpose

The frequency converter described in this manual is a device for controlling an asynchronous low-voltage motor. The converter is designed for installation in electrical installations or machines.

It has been approved for industrial and commercial use on industrial networks. Its use in public line supplies requires a different configuration and/or additional measures.

The technical specifications and information about connection conditions are indicated on the rating plate and in the operating instructions.



DANGER

Danger to life when live parts are touched

Touching live parts can result in death or severe injury.

Note the following:

- Only work on electrical equipment if you are qualified to do so.
- When carrying out any work, always comply with the country-specific safety rules.

Follow the six steps to ensure safety:

1. Prepare for shutdown and inform team members who will be affected by the procedure.
2. Switch off the machine so that it is in a no-voltage state:
 - Switch off the machine.
 - Wait until the discharge time specified on the warning labels has elapsed.
 - Check that it really is in a no-voltage condition, from phase conductor to phase conductor and phase conductor to protective conductor.
 - Check that all auxiliary circuits are also in a no-voltage state.
 - Ensure that the motor cannot move.
3. Identify all other dangerous energy sources, e.g. compressed air, hydraulic systems or water.
4. Isolate or neutralize all hazardous energy sources by closing switches, grounding or short-circuiting or closing valves, for example.
5. Lock out all energy sources to prevent reclosing.
6. Make sure that the machine is completely locked out ... and that you have the right machine!

After you have completed the work, restore operational readiness in the inverse sequence.



! WARNING

Danger to life when live parts are touched on damaged devices

Hazardous voltages can be present at the housing or exposed components on damaged devices.

- Ensure compliance with the limit values specified in the technical specifications during transport, storage and operation.
- Do not use any damaged devices.
- The components must be protected against conductive contamination (e.g. by installing them in a cabinet with degree of protection IP54B to EN 60529).

Assuming that conductive contamination at the installation site can definitely be excluded, a lower degree of cabinet protection may be permitted.

! WARNING

Danger to life due to unexpected movement of machines when using mobile wireless devices or mobile phones

Using mobile radios or mobile phones with a transmit power > 1 W closer than approx. 2 m to the frequency converter may cause the devices to malfunction, affecting the functional safety of machines and, therefore, putting people at risk or causing material damage.

- Switch off mobile radios and mobile telephones when you are close to the converter.



NOTICE

Damage due to electric fields or electrostatic discharge

Electric fields or electrostatic discharge can result in malfunctions as a result of damaged individual components, integrated circuits, modules or devices.

- Package, store, transport and send the electronic components, modules or devices only in the original product packaging or in other suitable materials, e.g. conductive foam rubber or aluminum foil.
- Only touch components, modules and devices if you are grounded by means of one of the following measures:
 - Wearing an ESD armband or
 - Wearing ESD shoes or ESD grounding straps in ESD areas with conductive flooring
- Only place electronic components, modules or devices on conductive surfaces (table with ESD surface, conductive ESD foam, ESD packaging, ESD transport container, for example).



! CAUTION

Risk of burns due to touching hot surfaces

During operation and for a short time after the frequency converter shuts down, the surface of the device can reach a high temperature. Touching the surface of the converter can cause burns.

- Do not touch the device during operation.
- After shutting down the converter, wait for the device to cool down before touching it.

Residual risks of power drive systems

The control and drive components of a drive system are approved for industrial and commercial use in industrial line supplies. Their use in public line supplies requires a different configuration and/or additional measures.

These components may only be operated in closed housings or in higher-level control cabinets with protective covers that are closed, and when all of the protective devices are used.

These components may only be handled by qualified and trained technical personnel who are knowledgeable and observe all of the safety instructions on the components and in the associated technical user documentation.

When assessing the machine's risk in accordance with the EC Machinery Directive, the machine manufacturer must take into account the following residual risks emanating from the control and drive components of a drive system:

1. Unintentional movements of driven machine components during commissioning, operation, maintenance, and repairs caused by, for example:
 - Hardware defects and/or software errors in the sensors, controllers, actuators, and connection technology
 - Response times of the controller and drive
 - Operating and/or ambient conditions outside of the specification
 - Condensation / conductive contamination
 - Parameterization, programming, cabling, and installation errors
 - Use of radio devices / cellular phones in the immediate vicinity of the controller
 - External influences / damage

2. In the event of a fault, exceptionally high temperatures, including an open fire, as well as emissions of light, noise, particles, gases, etc. can occur inside and outside the inverter, e.g.:
 - Component malfunctions
 - Software errors
 - Operating and/or ambient conditions outside of the specification
 - External influences / damageInverters of the Open Type / IP20 degree of protection must be installed in a metal control cabinet (or protected by another equivalent measure) such that the contact with fire inside and outside the inverter is not possible.
3. Hazardous shock voltages caused by, for example:
 - Component malfunctions
 - Influence of electrostatic charging
 - Induction of voltages in moving motors
 - Operating and/or ambient conditions outside of the specification
 - Condensation / conductive contamination
 - External influences / damage
4. Electrical, magnetic and electromagnetic fields generated in operation that can pose a risk to people with a pacemaker, implants or metal replacement joints, etc. if they are too close.
5. Release of environmental pollutants or emissions as a result of improper operation of the system and/or failure to dispose of components safely and correctly.

Note

The components must be protected against conductive contamination (e.g. by installing them in a control cabinet with degree of protection IP54 according to EN 60529).

Assuming that conductive contamination at the installation site can definitely be excluded, a lower degree of cabinet protection may be permitted.

For more information about residual risks of the components in a drive system, see the relevant sections in the technical user documentation.

Installing

3.1 Mechanical installation

! WARNING

Danger of fire spreading due to inadequate housing

Fire and smoke development can cause severe personal injury or material damage.

- Install devices without a protective housing in a metal control cabinet (or protect the device by another equivalent measure) in such a way that contact with fire inside and outside the device is prevented.

! WARNING

Danger of fire through overheating due to insufficient ventilation clearances

Insufficient ventilation clearances increase the probability of failure and reduce the service life of devices. In the worst-case scenario, devices overheating can put persons at risk through smoke development and fire.

- Ensure compliance with the specified minimum clearance as ventilation clearance for the respective component. Minimum clearances can be found in the dimension drawings or in the "Product-specific safety instructions" at the start of the respective section.

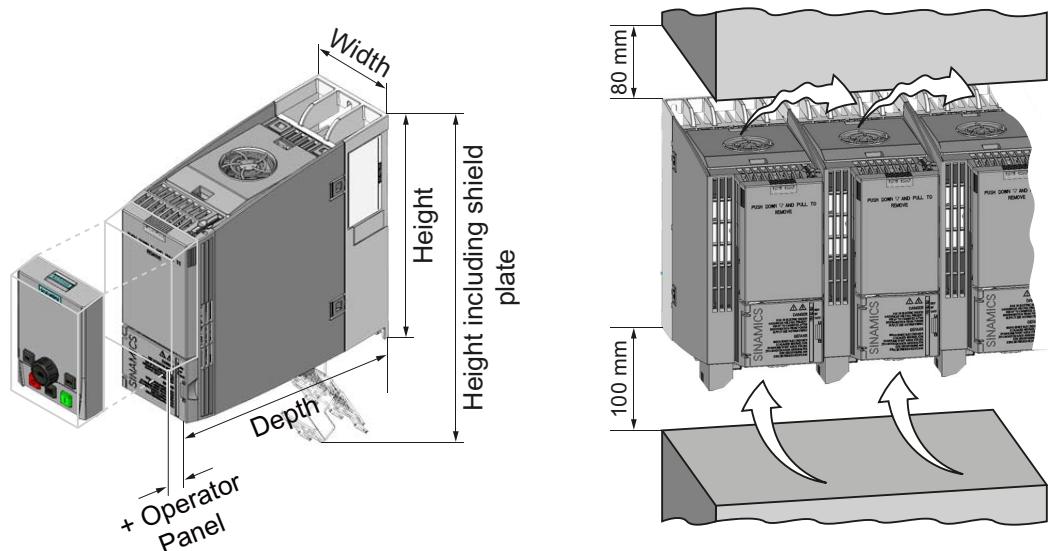
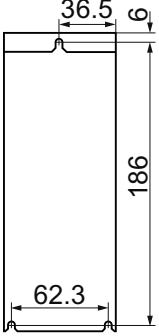
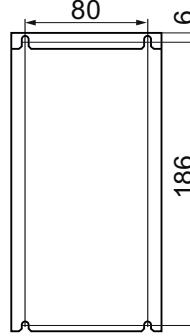
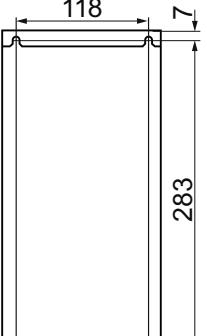


Figure 3-1 Dimensions and minimum spacing to other devices

Installing

3.1 Mechanical installation

Table 3- 1 Dimensions, drilling patterns, and fixing elements

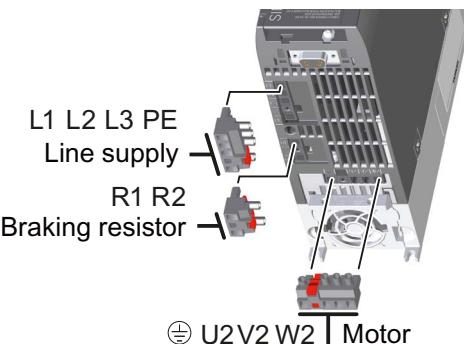
	Frame Size A 0.55 kW - 4.0 kW	Frame Size B 5.5 kW - 7.5 kW	Frame Size C 11 kW - 18.5 kW
Height	196 mm	196 mm	295 mm
Height including shield plate	276 mm	276 mm	375 mm
Width	73 mm	100 mm	140 mm
Depth of the converter with PROFINET interface	225.4 mm	225.4 mm	225.4 mm
Depth of the converter with USS/MB, CANopen, or PROFIBUS interface	203 mm	203 mm	203 mm
Additional depth when the Operator Panel is attached	+ 21 mm when Operator Panel IOP (Intelligent Operator Panel) is attached + 6 mm when Operator Panel BOP-2 (Basic Operator Panel) is attached		
Drilling pattern	  		
Fixing elements	3 x M4 studs, 3 x M4 nuts, 3 x M4 washers	4 x M4 studs, 4 x M4 nuts, 4 x M4 washers	4 x M5 studs, 4 x M5 nuts, 4 x M5 washers
Locked-rotor (starting) torque	2.5 Nm	2.5 Nm	2.5 Nm

3.2 Electrical installation

3.2.1 Connecting the line supply, motor, and other components

Overview of the connection plugs

The plugs for connecting the line supply, motor, and braking resistor can be found on the underside of the converter.



WARNING

Danger of death caused by high leakage currents when the external protective conductor is interrupted

The inverter conducts high leakage currents > 3.5 mA via the protective conductor. When the protective conductor is interrupted, touching live components can result in electric shock, which can lead to death or serious injuries.

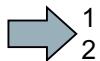
- Connect a protective conductor, which satisfies at least one of the following conditions, to the inverter:
 - The protective conductor is routed so that it is protected against mechanical damage. Cables routed in control cabinets or enclosed machine enclosures are considered to be adequately protected.
 - The protective conductor routed as an individual conductor has a cross-section of $\geq 10 \text{ mm}^2 \text{ Cu}$.
 - In a multi-core cable the protective conductor has a cross-section of $\geq 2.5 \text{ mm}^2 \text{ Cu}$.
 - Two parallel protective conductors with the same cross-section are installed.
 - The protective conductor corresponds to the local regulations for equipment with increased leakage current.

Installing

3.2 Electrical installation

Connecting the converter and its components

Procedure

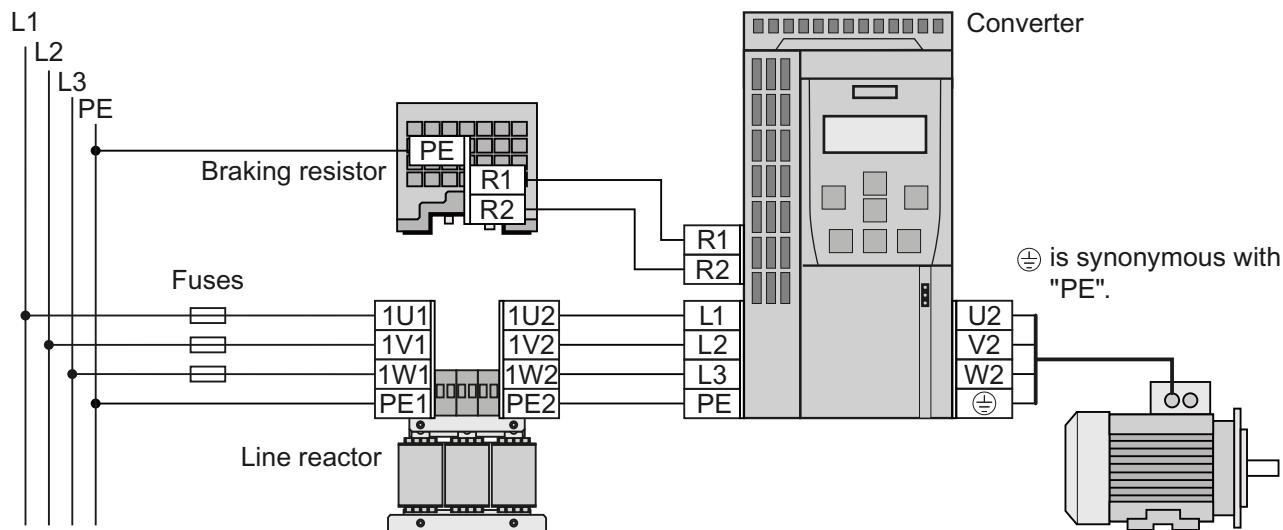


To connect the converter and its components, proceed as follows:

1. Check the table below to ensure you are using the correct fuses.
2. If you are using a line reactor or braking resistor, use the table below to check whether these components are suitable for the converter.
3. Connect the converter and its components.
4. If an EMC-compliant installation is required, you must use shielded cables. Refer also to section: Installing the converter in compliance with EMC rules (Page 24).



You have now connected the converter and its components.



Converter	Fuse	UL/cUL fuse	Braking resistor	Line reactor
FSA	0.55 kW ... 1.1 kW 1.5 kW 2.2 kW 3.0 kW ... 4.0 kW	3NA3801 (6 A) 3NA3803 (10 A) 3NA3805 (16 A)	10 A Class J	6SL3201-0BE14-3AA0
				6SL3203-0CE21-0AA0
			15 A Class J	6SL3201-0BE21-8AA0
				6SL3203-0CE21-8AA0
FSB	5.5 kW 7.5 kW	3NA3807 (20 A) 3NA3810 (25 A)	20 A Class J 25 A Class J	6SL3201-0BE23-8AA0
				6SL3203-0CE23-8AA0
FSC	11 kW 15 kW 18.5 kW	3NA3817 (40 A) 3NA3820 (50 A) 3NA3822 (63 A)	40 A Class J 50 A Class J 60 A Class J	6SL3201-0BE23-8AA0
				6SL3203-0CE23-8AA0

Converter	Converter cable cross-section (tightening torque)		Line reactor (tightening torque)			Braking resistor (tightening torque)	
FSA	0.55 kW ... 4 kW	2.5 mm ² (0.5 Nm)	14 AWG (4.5 lbf in)	4 mm ² (0.8 Nm)	12 AWG (7 lbf in)	PE M4 (3 Nm/26.5 lbf in)	2.5 mm ² (0.5 Nm)
FSB	5.5 kW ... 7.5 kW	6 mm ² (0.6 Nm)	10 AWG (5.5 lbf in)	10 mm ² (1.8 Nm)	8 AWG (16 lbf in)	PE M5 (5 Nm / 44 lbf in)	14 AWG (4.5 lbf in)
FSC	11 kW ... 18.5 kW	16 mm ² (1.5 Nm)	5 AWG (13.5 lbf in)	16 mm ² (4 Nm)	5 AWG (35 lbf in)		6 mm ² (0.6 Nm)

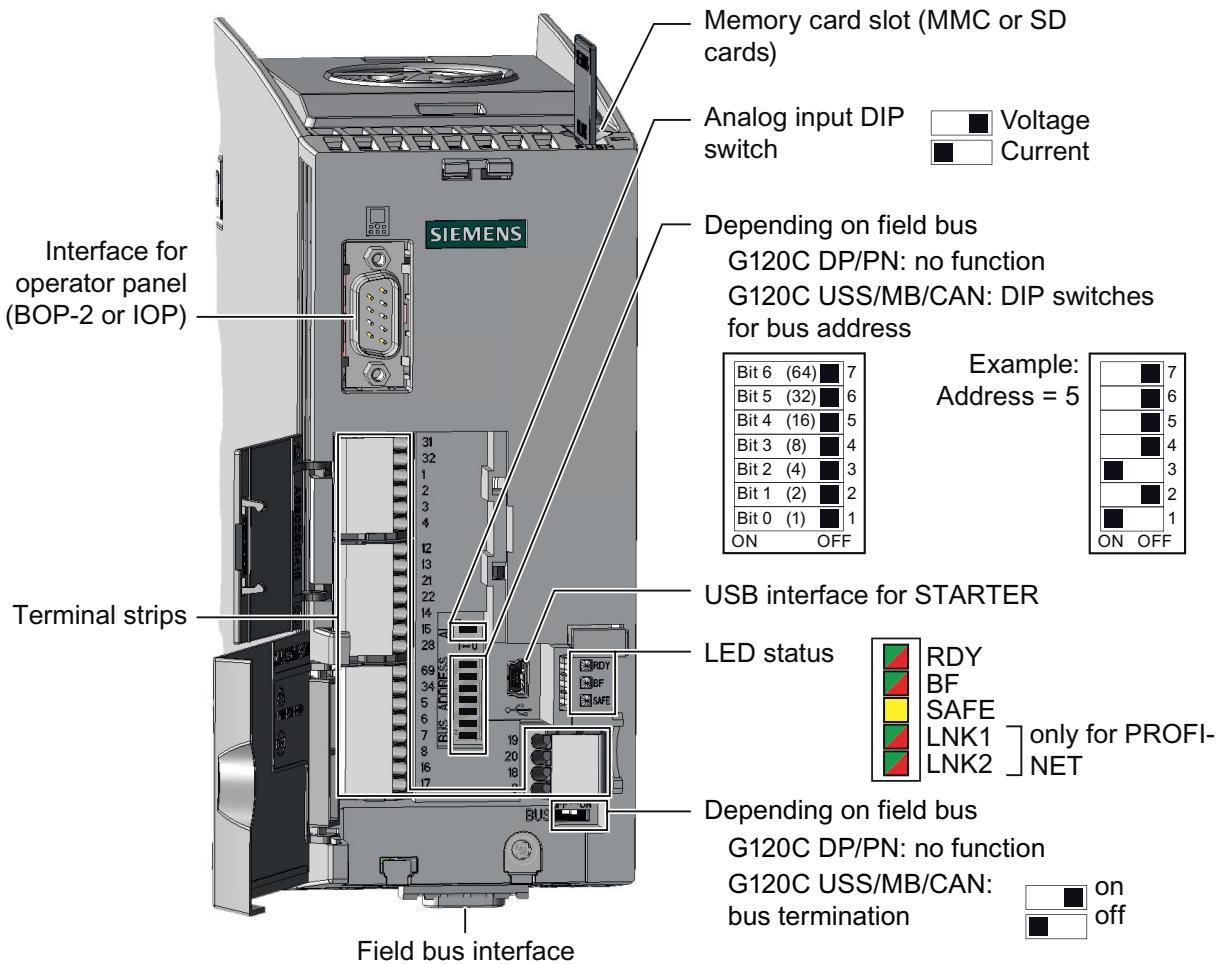
Components for United States / Canadian installations (UL/CSA)

This equipment is capable of providing internal motor overload protection according to UL508C. Take the following actions in order to comply with UL508C:

- Use UL/CSA-certified J-type fuses, overload circuit-breakers or intrinsically safe motor protection devices.
- For each frame size A to C use class 1 75° C copper wire only.
- Install the converter with any external recommended suppressor with the following features:
 - Surge-protective devices; device shall be a Listed Surge-protective device (Category code VZCA and VZCA7).
 - Rated nominal voltage 480/277 V_{AC}, 50/60 Hz, 3-phase.
 - Clamping voltage V_{PR} = 2000 V, I_N = 3 kA min, MCOV = 508 V_{AC}, SCCR = 40 kA.
 - Suitable for Type 1 or Type 2 SPD application.
 - Clamping shall be provided between phases and also between phase and ground.
- Do not change the parameter p0610 (factory setting of p0610 = 12 means: the drive reacts on a motor overtemperature with an immediate alarm and after a certain time with a fault).

3.2.2 Process and user interfaces

Overview of process and user interfaces



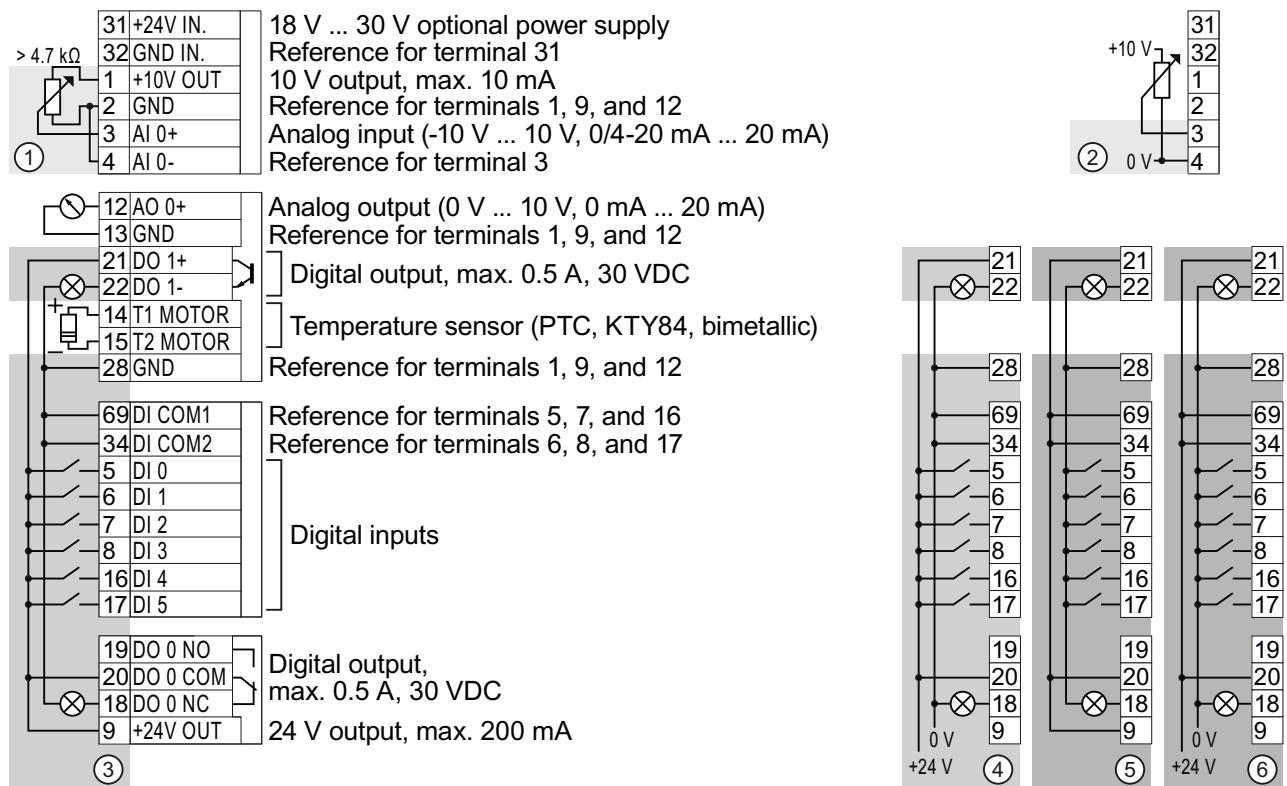
WARNING

Danger to life as a result of hazardous voltages when connecting an unsuitable power supply

Death or serious injury can result when live parts are touched in the event of a fault.

- For all connections and terminals of the electronic boards, only use power supplies that provide PELV (Protective Extra Low Voltage) or SELV (Safety Extra Low Voltage) output voltages.

Wiring variations of the terminal strips



- ① The analog input is supplied from the internal 10 V voltage.
- ② The analog input is supplied from an external 10 V source.
- ③ Wiring when using the internal power supplies. Connecting a contact that switches to P potential.
- ④ Wiring when using external power supplies. Connecting a contact that switches to P potential.
- ⑤ Wiring when using the internal power supplies. Connecting a contact that switches to M potential.
- ⑥ Wiring when using external power supplies. Connecting a contact that switches to M potential.

3.2.3 Finding a suitable setting for the interfaces

The inputs and outputs of the frequency inverter and the fieldbus interface have specific functions when set to the factory settings.

When you put the frequency inverter into operation, you can change the function of each of its inputs and outputs and the setting of the fieldbus interface.

To make the setting process easier, the inverter has various predefined assignments (macros).

Only the inputs and outputs whose functions change by selecting a specific assignment, are shown on the following pages.

Procedure



To select one of the inverter's pre-assigned settings, proceed as follows:

1. Think about which of the input and output functions you are using in the application.
2. Find the I/O configuration (macro) that best suits your application.
3. Note the macro number of the corresponding default setting.

You must set this macro number when putting the frequency inverter into operation.



You have found the appropriate inverter pre-assignment.

Macro 1: Two fixed speeds	Macro 2: Two fixed speeds with safety function	Macro 3: Four fixed speeds																																																																																																																																							
<table border="1"> <tr><td>5</td><td>DI 0</td><td>ON/OFF1 right</td></tr> <tr><td>6</td><td>DI 1</td><td>ON/OFF1 left</td></tr> <tr><td>7</td><td>DI 2</td><td>Acknowledge</td></tr> <tr><td>8</td><td>DI 3</td><td>---</td></tr> <tr><td>16</td><td>DI 4</td><td>Fixed speed 3</td></tr> <tr><td>17</td><td>DI 5</td><td>Fixed speed 4</td></tr> <tr><td>3</td><td>AI 0</td><td>---</td></tr> <tr><td>4</td><td></td><td></td></tr> <tr><td>18</td><td>DO 0</td><td>Fault</td></tr> <tr><td>19</td><td></td><td></td></tr> <tr><td>20</td><td></td><td></td></tr> <tr><td>21</td><td>DO 1</td><td>Alarm</td></tr> <tr><td>22</td><td></td><td></td></tr> <tr><td>12</td><td>AO 0</td><td>Speed</td></tr> <tr><td>13</td><td></td><td>0 V ... 10 V</td></tr> </table> <p>DI 4 and DI 5 = high: The converter adds both fixed speeds.</p>	5	DI 0	ON/OFF1 right	6	DI 1	ON/OFF1 left	7	DI 2	Acknowledge	8	DI 3	---	16	DI 4	Fixed speed 3	17	DI 5	Fixed speed 4	3	AI 0	---	4			18	DO 0	Fault	19			20			21	DO 1	Alarm	22			12	AO 0	Speed	13		0 V ... 10 V	<table border="1"> <tr><td>5</td><td>DI 0</td><td>ON/OFF1</td></tr> <tr><td>6</td><td>DI 1</td><td>Fixed speed 1</td></tr> <tr><td>7</td><td>DI 2</td><td>Fixed speed 2</td></tr> <tr><td>8</td><td>DI 3</td><td>Acknowledge</td></tr> <tr><td>16</td><td>DI 4</td><td>---</td></tr> <tr><td>17</td><td>DI 5</td><td>Reserved for safety function</td></tr> <tr><td>3</td><td>AI 0</td><td>---</td></tr> <tr><td>4</td><td></td><td></td></tr> <tr><td>18</td><td>DO 0</td><td>Fault</td></tr> <tr><td>19</td><td></td><td></td></tr> <tr><td>20</td><td></td><td></td></tr> <tr><td>21</td><td>DO 1</td><td>Alarm</td></tr> <tr><td>22</td><td></td><td></td></tr> <tr><td>12</td><td>AO 0</td><td>Speed</td></tr> <tr><td>13</td><td></td><td>0 V ... 10 V</td></tr> </table> <p>DI 0 and DI 1 = high: The converter adds both fixed speeds.</p>	5	DI 0	ON/OFF1	6	DI 1	Fixed speed 1	7	DI 2	Fixed speed 2	8	DI 3	Acknowledge	16	DI 4	---	17	DI 5	Reserved for safety function	3	AI 0	---	4			18	DO 0	Fault	19			20			21	DO 1	Alarm	22			12	AO 0	Speed	13		0 V ... 10 V	<table border="1"> <tr><td>5</td><td>DI 0</td><td>ON/OFF1</td></tr> <tr><td>6</td><td>DI 1</td><td>Fixed speed 1</td></tr> <tr><td>7</td><td>DI 2</td><td>Fixed speed 2</td></tr> <tr><td>8</td><td>DI 3</td><td>Acknowledge</td></tr> <tr><td>16</td><td>DI 4</td><td>---</td></tr> <tr><td>17</td><td>DI 5</td><td>Reserved for safety function</td></tr> <tr><td>3</td><td>AI 0</td><td>---</td></tr> <tr><td>4</td><td></td><td></td></tr> <tr><td>18</td><td>DO 0</td><td>Fault</td></tr> <tr><td>19</td><td></td><td></td></tr> <tr><td>20</td><td></td><td></td></tr> <tr><td>21</td><td>DO 1</td><td>Alarm</td></tr> <tr><td>22</td><td></td><td></td></tr> <tr><td>12</td><td>AO 0</td><td>Speed</td></tr> <tr><td>13</td><td></td><td>0 V ... 10 V</td></tr> </table> <p>Multiple DIs = high: The converter adds the corresponding fixed speeds.</p>	5	DI 0	ON/OFF1	6	DI 1	Fixed speed 1	7	DI 2	Fixed speed 2	8	DI 3	Acknowledge	16	DI 4	---	17	DI 5	Reserved for safety function	3	AI 0	---	4			18	DO 0	Fault	19			20			21	DO 1	Alarm	22			12	AO 0	Speed	13		0 V ... 10 V
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Macro 4: PROFIBUS or PROFINET	Macro 5: PROFIBUS or PROFINET with safety function																																																																																											
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Macro 7: Switching between fieldbus and jog via DI 3 Factory setting for converters with PROFIBUS or PROFINET interface		Macro 8: Motorized potentiometer (MOP) with safety function																																																												
PROFIdrive telegram 1		<table border="1"> <tr><td>5 DI 0</td><td>---</td><td>5 DI 0</td><td>Jog 1</td></tr> <tr><td>6 DI 1</td><td>---</td><td>6 DI 1</td><td>Jog 2</td></tr> <tr><td>7 DI 2</td><td>Acknowledge</td><td>7 DI 2</td><td>Acknowledge</td></tr> <tr><td>8 DI 3</td><td>LOW</td><td>8 DI 3</td><td>HIGH</td></tr> <tr><td>16 DI 4</td><td>---</td><td>16 DI 4</td><td>---</td></tr> <tr><td>17 DI 5</td><td>---</td><td>17 DI 5</td><td>---</td></tr> <tr><td>3 AI 0</td><td>---</td><td>3 AI 0</td><td>---</td></tr> <tr><td>4</td><td></td><td>4</td><td></td></tr> <tr><td>18 DO 0</td><td>Fault</td><td>18 DO 0</td><td>Fault</td></tr> <tr><td>19</td><td></td><td>19</td><td></td></tr> <tr><td>20</td><td></td><td>20</td><td></td></tr> <tr><td>21 DO 1</td><td>Alarm</td><td>21 DO 1</td><td>Alarm</td></tr> <tr><td>22</td><td></td><td>22</td><td></td></tr> <tr><td>12 AO 0</td><td>Speed</td><td>12 AO 0</td><td>Speed</td></tr> <tr><td>13</td><td>0 V ... 10 V</td><td>13</td><td>0 V ... 10 V</td></tr> </table>	5 DI 0	---	5 DI 0	Jog 1	6 DI 1	---	6 DI 1	Jog 2	7 DI 2	Acknowledge	7 DI 2	Acknowledge	8 DI 3	LOW	8 DI 3	HIGH	16 DI 4	---	16 DI 4	---	17 DI 5	---	17 DI 5	---	3 AI 0	---	3 AI 0	---	4		4		18 DO 0	Fault	18 DO 0	Fault	19		19		20		20		21 DO 1	Alarm	21 DO 1	Alarm	22		22		12 AO 0	Speed	12 AO 0	Speed	13	0 V ... 10 V	13	0 V ... 10 V
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Macro 9: Motorized potentiometer (MOP)	Macro 12: Two-wire control using method 1 Factory setting for converters without PROFIBUS or PROFINET interface.	Macro 13: Setpoint via analog input with safety function																																																																																																																								
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Installing

3.2 Electrical installation

Macro 14: Switching between fieldbus and motorized potentiometer (MOP) via DI 3																																																																																											
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Macro 15: Switching between analog setpoint and motorized potentiometer (MOP) via DI 3	Macro 17: Two-wire control using method 2	Macro 18: Two-wire control using method 3																																																																																																																																							
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Macro 19: Three-wire control using method 1	Macro 20: Three-wire control using method 2	Macro 21: USS fieldbus Macro 22: CANopen fieldbus																																																																																										
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3.2.4 Wiring the terminal strip

NOTICE

Damage to the inverter when using long signal cables

Using long cables at the inverter's digital inputs and 24 V power supply can lead to overvoltage during switching operations. Overvoltage can damage the inverter.

- If you use cables of more than 30 m at the digital inputs and 24 V power supply, connect an overvoltage protection element between the terminal and the associated reference potential.
We recommend using the Weidmüller overvoltage protection terminal with designation MCZ OVP TAZ DIODE 24VDC.

Prerequisites

- Use suitable cables:
 - Solid or flexible cables.
 - Suitable cable cross-section: 0.5 mm² (21 AWG) to 1.5 mm² (16 AWG).
When completely connecting up the unit, we recommend cables with a cross-section of 1 mm² (18 AWG).
- Do not use wire end ferrules.

- You have found an appropriate pre-assignment for the terminal strips, which you can now use to wire the inverter.

See also Section: Finding a suitable setting for the interfaces (Page 17).

- You have the appropriate tools:

- Small screwdriver to open the spring-loaded terminals
- Tool for stripping the cables

Procedure



To wire the inverter's terminal strip, proceed as follows:

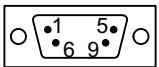
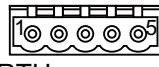
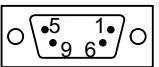
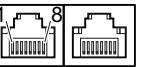
1. Remove the last 10 mm (approx.) of the cable insulation.
2. Using the screwdriver, press on the orange operator control of the spring-loaded terminal hard enough to open the terminal.
3. Insert the cable into the terminal as far as it will go and remove the screwdriver.
4. Ensure that the cable is securely connected by pulling on it lightly.
5. Wire all the required terminals on the strip in this way.
6. Route the signal cables in such a way that you can completely close the front doors after wiring the terminal strip.
7. 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.
See also: Installing the converter in compliance with EMC rules (Page 24)

8. Use a cable grip.

You have now wired the inverter's terminal strips.

3.2.5 Fieldbus interface assignment

The fieldbus interface is on the underside of the converter.

CANopen	USS / Modbus RTU	PROFIBUS	PROFINET EtherNet/IP
 <ul style="list-style-type: none"> 1 Not used 2 CAN_L, CAN signal (dominant, low) 3 CAN_GND, CAN reference 4 Not used 5 (CAN_SHLD), optional cable shield 6 (GND), optional CAN reference 7 CAN_H, CAN signal (dominant, high) 8 Not used 9 Not used 	 <ul style="list-style-type: none"> 1 0 V, reference potential 2 RS485N, receive and transmit (-) 3 RS485P, receive and transmit (+) 4 Cable shield 5 Not used 	 <ul style="list-style-type: none"> 1 Shield, ground connection 2 Not used 3 RxD/TxD-P, Receive/send data P(A/A') 4 CNTR-P, control signal 5 DGND, Data reference potential (C/C') 6 VP, Supply voltage, positive 7 Not used 8 RxD/TxD-N, Receive/send data N(A/A') 9 Not used 	 <ul style="list-style-type: none"> 1 RX+, receive data + 2 RX-, receive data - 3 TX+, transmit data + 4 Not used 5 Not used 6 TX-, transmit data - 7 Not used 8 Not used

The description files contain the information required to configure and operate the converter on a fieldbus under a higher-level control.

Description file	Download	Alternative to download
GSD for PROFIBUS	Internet: (http://support.automation.siemens.com/WW/view/en/23450835)	GSD and GSDML are saved in the converter. The converter writes its GSD or GSDML to the memory card once you insert this card in the converter and set p0804 to 12. You can then transfer the file to your programming device or PC using the memory card.
GSDML for PROFINET	Internet: (http://support.automation.siemens.com/WW/view/en/26641490)	
EDS for CANopen	Internet: (http://support.automation.siemens.com/WW/view/en/48351511)	---
EDS for Ethernet/IP	---	Further information can be found in the operating instructions

3.2.6 Installing the converter in compliance with EMC rules

Rules for EMC-compliant cable routing

Preconditions

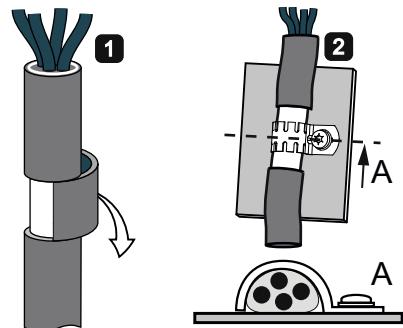
- The converter is mounted on a metal mounting plate. The mounting plate is unpainted and has good electrical conductivity.
- Use shielded cables for the following connections:
 - Motor and motor temperature sensor
 - Braking resistor
 - Fieldbus
 - Inputs and outputs of the terminal strip

Procedure

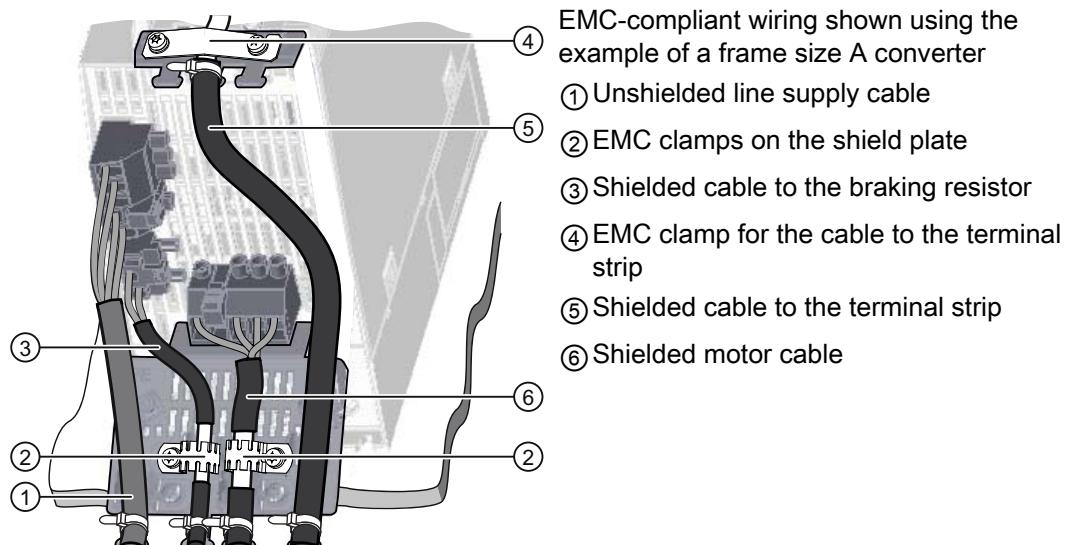


To install the converter cables in compliance with EMC rules, proceed as follows:

1. Expose the shields of the shielded cables.
2. Place the shields on the mounting plate or on the converter shield plate using EMC clamps.



The converter is wired in compliance with EMC rules.

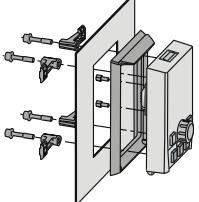


4

Commissioning

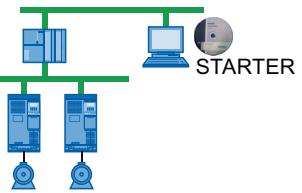
4.1 Overview of commissioning tools

Accessories for commissioning and data backup

Operator Panels for commissioning, diagnostics and controlling inverters		Order number
	<p>BOP-2 (Basic Operator Panel) - for snapping onto the frequency inverter</p> <ul style="list-style-type: none"> Copying of drive parameters Two-line display Guided basic commissioning 	6SL3255-0AA00-4CA1
	<p>IOP (Intelligent Operator Panel) - for snapping onto the frequency inverter</p> <ul style="list-style-type: none"> Copying of drive parameters Plain text display Menu-based operation and application wizards 	6SL3255-0AA00-4JA0
	<p>Door mounting kit for IOP/BOP-2</p> <ul style="list-style-type: none"> For installation of the BOP-2 or IOP in a control cabinet door. Degree of protection with IOP: IP54 or UL Type 12 Degree of protection with BOP-2: IP55 	6SL3256-0AP00-0JA0
	<p>IOP - with handheld For mobile use of the IOP</p>	6SL3255-0AA00-4HA0
PC tools for commissioning, diagnostics and controlling of the converter		
	<p>PC Connection Kit Includes a STARTER DVD and USB port.</p>	6SL3255-0AA00-2CA0

Commissioning

4.1 Overview of commissioning tools

	STARTER Commissioning tool (PC software) connection to the converter via USB port, PROFIBUS or PROFINET Downloading: STARTER (http://support.automation.siemens.com/WW/view/en/1080498/5/130000)	STARTER on the DVD: 6SL3072-0AA00-0AG0
	Drive ES Basic As an option to STEP 7 with routing function via network limits for PROFIBUS and PROFINET	6SW1700-5JA00-5AA0
Memory cards: to save and transfer the converter settings		
	MMC card	6SL3254-0AM00-0AA0
	SD card	6ES7954-8LB00-0AA0

If you intend to commission the converter with IOP operator panel

The IOP offers commissioning wizards and help texts for an intuitive commissioning. For further information refer to the IOP operating instructions.

If you intend to commission the converter with PC tool STARTER

Overview of the most important steps:

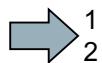
1. Connect the PC to the converter via USB and start the STARTER tool.
2. Choose the project wizard (menu "Project / New with assistant").
 - In the project wizard choose "Find drive units online".
 - Select USB as interface (Access point of the application: "DEVICE ...", interface parameter assignment used: "S7USB").
 - Finish the project wizard.
3. STARTER has now created your project and inserted a new drive.
 - Select the drive in your project and go online .
 - In your drive open the "Configuration" mask (double click).
 - Start commissioning with the "Assistant" button.

For further information refer to converter operating instructions.

4.2 Commissioning with BOP-2 operator panel

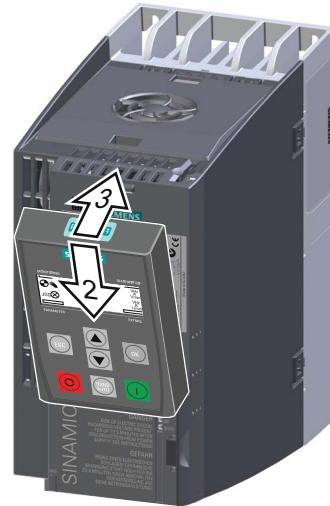
Installing the basic operator panel BOP-2

Procedure



For installing the BOP-2 operator panel you have to proceed as follows:

1. Remove the blind cover from the converter.
2. Place the bottom edge of the BOP-2 casing into the lower recess of the converter housing.
3. Push the BOP-2 towards the converter until the release-catch clicks into place on the converter housing.



The BOP-2 is installed. When you supply the voltage to the converter, the operator panel BOP-2 is ready to operate.

Setting the basic commissioning data

Basic commissioning is the first step of the commissioning procedure. The BOP-2 operator panel guides you through the basic commissioning process and prompts you to enter the most important data for your converter.

Prerequisite



You have inserted the BOP-2 operator panel on the inverter and connected the inverter to a power supply.

The Operator Panel has powered up and displays setpoints and actual values.

Procedure



To enter the data for basic commissioning, proceed as follows:

1. Press the ESC key.
2. Press one of the arrow keys until the BOP-2 displays the "SETUP" menu.
3. In the "SETUP" menu, press the OK key to start basic commissioning.

4.2 Commissioning with BOP-2 operator panel

4.  If you wish to restore all of the parameters to the factory setting before the basic commissioning:

4.1. Switch over the display using an arrow key: nO → YES

4.2. Press the OK key.

5.  Select the motor control mode. The most important control modes are:

VF LIN V/f control with a linear characteristic for basic applications, e.g. horizontal conveyors.

VF QUAD V/f control with a square-law characteristic for basic pump and fan applications.

SPD N EN We recommend that you use the closed-loop speed control.

The control modes are described in the operating instructions of your converter.

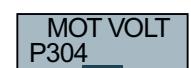
6. Transfer the data from the motor rating plate to the converter:

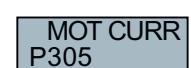
- 6.1.  Motor standard

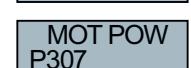
KW 50HZ IEC

HP 60HZ NEMA

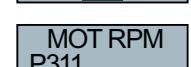
KW 60HZ IEC 60 Hz

- 6.2.  Rated voltage

- 6.3.  Rated current

- 6.4.  IEC power (kW)

NEMA (HP)

- 6.5.  Rated speed

SIEMENS		H	EFF I
D-91056 Erlangen			
3~Mot. 1LE10011AC434AA0		E0807/0496382	
IEC/EN 60034 100L	IMB3	IP55	
25 kg	Th.Cl. 155(F)	-20°C Tamb	40°C
	Bearing	UNIREX-N3	
DE	6206-2ZC3	15g	Intervall: 4000hrs
NE	6206-2ZC3	11g	
60Hz:	SF 1.15 CONT NEMA MG1-12		
	V	Hz	A
(2)	400	△	50
	690	Y	50
	460	△	60
	3.5	2.05	3.15
	1.5	1.5	1.5
	0.73	0.73	0.69
	84.5%	84.5%	86.5%
	970	970	1175
	(1)	(3)	(4)
	(5)		

7.  Motor data identification

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

OFF No measurement of motor data.

STIL ROT Recommended setting: Measure the motor data at standstill and with the motor rotating.

STILL Measure the motor data at standstill.

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

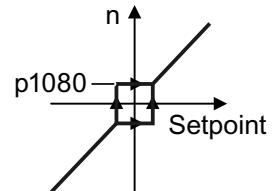
- You have selected the control mode "SPD N EN". However, the motor cannot rotate freely – for example, if the traversing range is mechanically limited.
- You have selected V/f control as a control mode, e.g. "VF LIN" or "VF QUAD".

ROT Measuring the motor data while it is rotating.

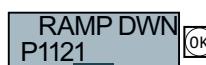
8.  Select the configuration for the interfaces of the inverter that is suitable for your application. You can find possible configurations in Section: Finding a suitable setting for the interfaces (Page 17)

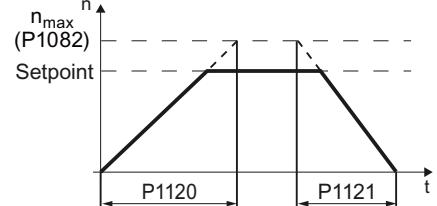
coN 2 SP	Macro 1	Std ASPS	Macro 13
coN SAFE	Macro 2	Proc FB	Macro 14
coN 4 SP	Macro 3	Proc	Macro 15
coN Fb	Macro 4	2-wire 1	Macro 17
coN Fb S	Macro 5	2-wire 2	Macro 18
Fb SAFE	Macro 6	3-wire 1	Macro 19
Fb cdS	Macro 7	3-wire 2	Macro 20
MoP SAFE	Macro 8	USS	Macro 21
Std MoP	Macro 9	CAN	Macro 22
Std ASP	Macro 12		

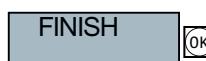
9.  Set the minimum speed of the motor.



10.  Set the ramp-up time of the motor.

11.  Set the ramp-down time of the motor.



12.  Complete the basic commissioning:

- 12.1. Switch over the display using an arrow key: nO → YES
12.2. Press the OK key.



You have entered all of the data that is necessary for the basic commissioning of your converter.

Identifying the motor data and optimizing the closed-loop control

Following basic commissioning, the converter generally has to measure other motor data and optimize its current and speed controllers.

To start motor data identification, you must switch on the motor. It does not matter whether you use the terminal strip, fieldbus, or operator panel to enter the ON command.

! WARNING

Injury from machine movements when switching the motor on

Switching on the motor for identification purposes may result in machine movements that could cause injuries.

Secure dangerous machine parts before starting motor data identification:

- Before switching on check that no parts are loose on the machine or can be spun out.
- 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 loads to the floor.

Preconditions

- In the basic commissioning, you have selected the motor identification (MOT ID). In this case, after the basic commissioning has been completed, the converter issues the alarm A07991.



You can recognize an active alarm from the corresponding symbol on the BOP-2.

- The motor is cooled down to the ambient temperature.

If the motor is too hot, the motor data identification will provide incorrect values and the closed-loop speed control will become unstable.

Procedure

→ 1
2

To initiate motor data identification and optimization of the motor control, proceed as follows:

1. ⇒ Press the HAND/AUTO key. The BOP-2 displays the HAND symbol.
2. Switch on the motor.
3. Wait until the converter switches off the motor after completion of the motor data identification. The measurement takes several seconds.
4. Save the measurements so that they are protected against power failure.
 If you have also selected a rotating measurement in addition to the motor data identification, then the converter again issues the alarm A07991.
5. Switch the motor on again in order to optimize the speed control.
6. Wait until the converter switches off the motor after completion of the optimization. The optimization can take up to one minute.

7. Switch the converter control from HAND to AUTO.

8. Save the measurements so that they are protected against power failure.

You have now completed motor data identification and the closed-loop speed control has been optimized.

4.3 Further settings

4.3.1 Operate the converter with the BOP-2

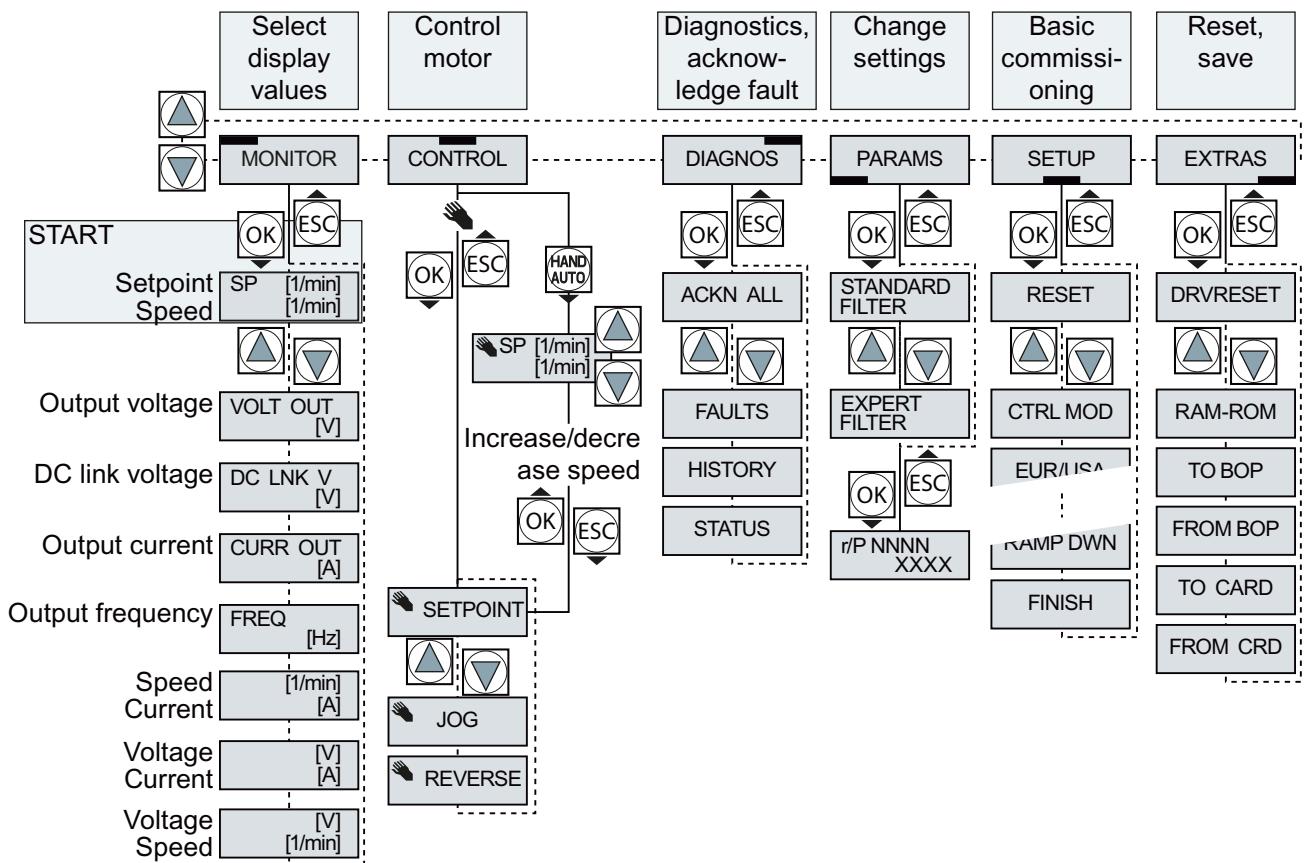


Figure 4-1 Menu of the BOP-2

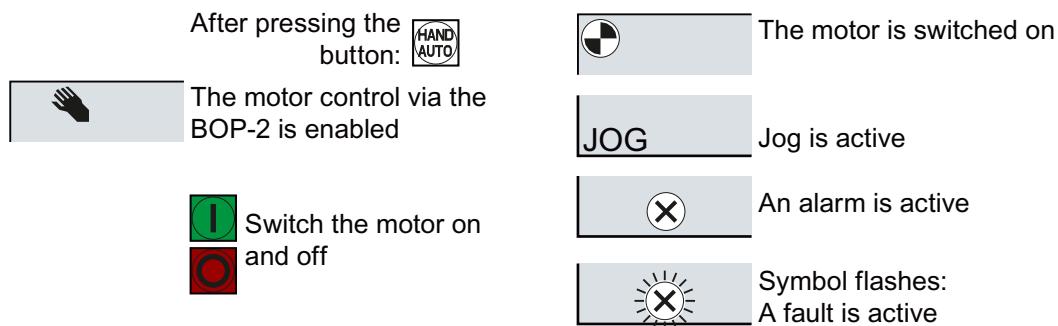


Figure 4-2 Other keys and symbols of the BOP-2

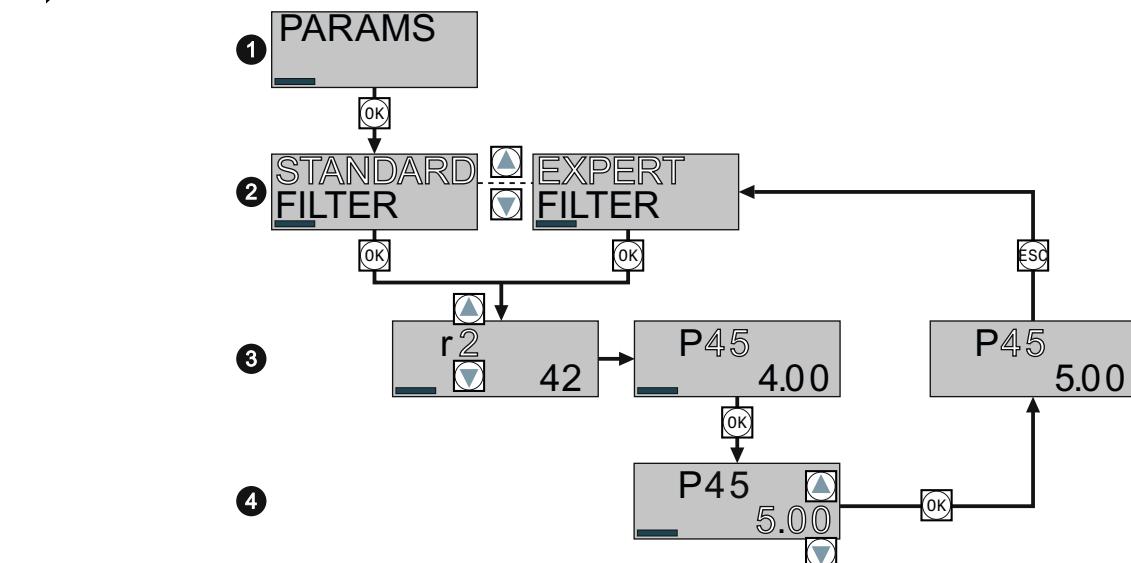
Changing settings using BOP-2

You can modify the settings of your converter by changing the values of its parameters. The converter only permits changes to "write" parameters. Write parameters begin with a "P", e.g. P45.

The value of a read-only parameter cannot be changed. Read-only parameters begin with an "r", for example: r2.

Procedure

To change write parameters using the BOP-2, proceed as follows:



1. Select the menu to display and change parameters.
Press the OK key.
2. Select the parameter filter using the arrow keys.
Press the OK key.
 - STANDARD: The inverter only displays the most important parameters.
 - EXPERT: The inverter displays all of the parameters.

3. Select the required number of a write parameter using the arrow keys.
Press the OK key.

4. Select the value of the write parameter using the arrow keys.
Accept the value with the OK key.



You have now changed a write parameter using the BOP-2.

The converter saves all the changes made using the BOP-2 so that they are protected against power failure.

Changing indexed parameters

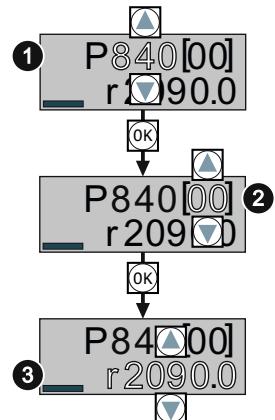
For indexed parameters, several parameter values are assigned to a parameter number. Each of the parameter values has its own index.

Procedure



To change an indexed parameter, proceed as follows:

1. Select the parameter number.
2. Press the OK button and set the parameter index.
3. Press the OK button and set the parameter value for the selected index.



You have now changed an indexed parameter.

Directly select the parameter number

The BOP-2 offers the possibility of setting the parameter number digit by digit.

Prerequisite

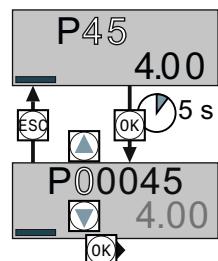
The parameter number is flashing in the BOP-2 display.

Procedure



To select the parameter number directly, proceed as follows:

1. Press the OK button for longer than five seconds.
2. Change the parameter number digit-by-digit.
If you press the OK button then the BOP-2 jumps to the next digit.
3. If you have entered all of the digits of the parameter number, press the OK button.



- You have now entered the parameter number directly.

Entering the parameter value directly

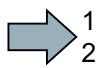
The BOP-2 offers the option of setting the parameter value digit by digit.

Prerequisite

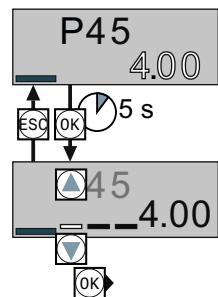
The parameter value flashes in the BOP-2 display.

Procedure

To select the parameter value directly, proceed as follows:



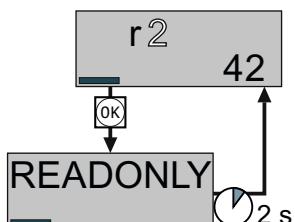
1. Press the OK button for longer than five seconds.
2. Change the parameter value digit-by-digit.
If you press the OK button then the BOP-2 jumps to the next digit.
3. If you have entered all of the digits of the parameter value, press the OK button.



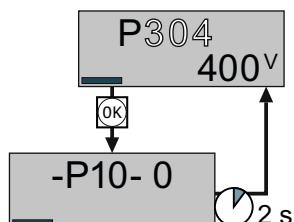
- You have now entered the parameter value directly.

When must you not change a parameter?

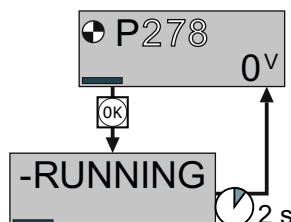
The converter indicates why it currently does not permit a parameter to be changed:



You have attempted to change a read-only parameter.



You must change to basic commissioning to set this parameter.

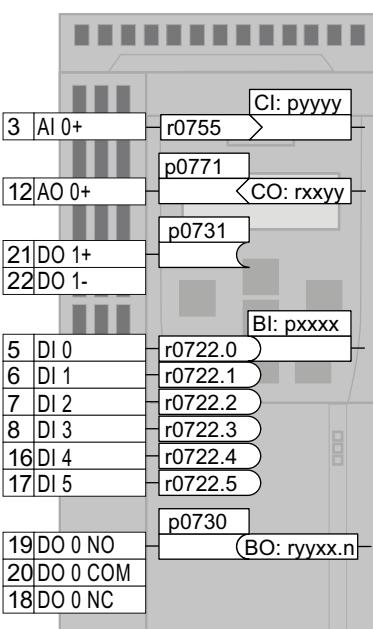


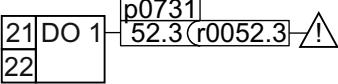
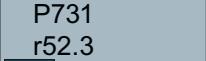
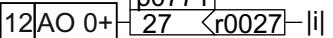
You must turn the motor off to set this parameter.

The operating state in which you can change a parameter is provided in the List Manual for each parameter.

4.3.2 Changing the function of terminals

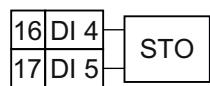
To change the function of a terminal you must set the terminal's signal connection in the converter.

Overview	Procedure	Example		
	<p>Digital input</p> <p>1. Select the required function marked using a "BI" parameter. 2. Set this parameter to the value of the status parameter r0722.x of the required digital input.</p> <p>You have changed the function of the digital input.</p> <p>If you want to switch the converter's master control (e.g., when selecting macro 7), you must set the correct parameter index:</p> <ul style="list-style-type: none"> Index 0 (e.g., P840[00]) applies for the interface assignment on the left side of the macro illustration. Index 1 (e.g., P840[01]) applies for the interface assignment on the right side of the macro illustration. <p>See also Section: Finding a suitable setting for the interfaces (Page 17).</p>	<p>You want to switch on the motor via DI2</p> <p>7 DI 2 → r0722.2 722.2 → ON/OFF1</p> <p>Setting process with the BOP-2:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>P840 [00]</td> </tr> <tr> <td>r722.2</td> </tr> </table>	P840 [00]	r722.2
P840 [00]				
r722.2				
	<p>Analog input</p> <p>1. Select the required function marked using a "CI" parameter. 2. Set this parameter to the value of status parameter r0755.x of the analog input. 3. Determine whether the analog input is a current or a voltage input: <ul style="list-style-type: none"> Set the I/U switch on the front of the converter in the correct position. Set the p0756[00] parameter to the corresponding value. </p> <p>You have changed the function of the analog input.</p> <p>If you want to switch the converter's master control (e.g., when selecting macro 7), you must set the correct parameter index:</p> <ul style="list-style-type: none"> Index 0 (e.g., P2253[00]) applies for the interface assignment on the left side of the macro illustration. Index 1 (e.g., P2253[01]) applies for the interface assignment on the right side of the macro illustration. <p>See also Section: Finding a suitable setting for the interfaces (Page 17).</p>	<p>You want to specify the setpoint of the technology controller via AI 0</p> <p>3 AI 0+ → r0755 755[0] → p1075</p> <p>Setting process with the BOP-2:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>P2253 [00]</td> </tr> <tr> <td>r755 [00]</td> </tr> </table>	P2253 [00]	r755 [00]
P2253 [00]				
r755 [00]				

Overview	Procedure	Example
	Digital output  1. Select the required function marked using a "BO" parameter. 2. Set the parameter p073x of the required digital output to the value of the "BO" parameter.	You want to report a "fault" signal via the DO 1.  Setting process with the BOP-2: 
	 You have changed the function of the digital output.	
	Analog output  1. Select the required function marked using a "CO" parameter. 2. Set parameter p0771 of the analog output to the value of the "CO" parameter. 3. Using P0776[0], determine whether the analog output is a current or voltage output.	You want to display the signal for the active current via AO 0:  Setting in BOP -2 : 
	 You have changed the function of the analog output.	

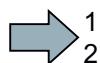
4.3.3 Releasing the failsafe function "Safe Torque Off" (STO)

Precondition



You selected an interface assignment with terminals reserved for a failsafe function. See also Finding a suitable setting for the interfaces (Page 17).

Procedure



For releasing the STO function you have to set the following parameters:

1. p0010 = 95 - Enter commissioning of fail-safe functions.
2. p9761 = ... - Enter password for fail-safe function (factory setting = 0).
3. p9762 = ... - Enter new password, if required (0 ... FFFF FFFF).
4. p9763 = ... - Confirm new password.
5. p9601.0 = 1 - Select STO via terminal strip.
6. p9659 = ... - Set the forced checking procedure timer.
7. p9700 = D0 - Copy fail-safe parameters.
8. p9701 = DC - Confirm fail-safe parameters.
9. p0010 = 0 - Finish commissioning of fail-safe functions



You have released the STO function.

4.3.4 Parameter list

The following list contains the basic parameter information with access level 1 ... 3. The complete parameter list is provided in the list manual, see Product support (Page 58).

No.	Description
Operation and visualization	
r0002	Drive operating display
p0003	Access level
p0010	Drive, commissioning parameter filter
p0015	Macro drive unit See also Finding a suitable setting for the interfaces (Page 17).
r0018	Control Unit firmware version
r0020	Speed setpoint smoothed [100 % Δ p2000]
r0021	CO: Actual speed smoothed [100 % Δ p2000]
r0022	Speed actual value rpm smoothed [rpm]
r0024	Output frequency smoothed [100 % Δ p2000]
r0025	CO: Output voltage smoothed [100 % Δ p2001]
r0026	CO: DC link voltage smoothed [100 % Δ p2001]
r0027	CO: Absolute actual current smoothed [100 % Δ p2002]
r0031	Actual torque smoothed [100 % Δ p2003]
r0032	CO: Active power actual value smoothed [100 % Δ r2004]
r0034	Motor utilization [100 Δ 100%]
r0035	CO: Motor temperature [100°C Δ p2006]
r0036	CO: Power unit overload I ² t [100 Δ 100%]
r0039	Energy consumption
p0040	0 → 1 Reset the energy consumption display
r0041	Energy usage saved/energy saved
p0045	Smoothing time constant, display values [ms]
r0046	CO/BO: Missing enable signals
r0047	Motor data identification routine and speed controller optimization
r0050	CO/BO: Command Data Set CDS effective
r0051	CO/BO: Drive Data Set DDS effective
r0052	CO/BO: Status word 1 .00 Ready to start .01 Ready .02 Operation enabled .03 Fault active .04 Coast down active (OFF2) .05 Quick stop active (OFF3)

No.	Description	
	.06	Closing lockout active
	.07	Alarm active
	.08	Deviation, setpoint/actual speed
	.09	Control requested
	.10	Maximum speed reached
	.11	I,M,P limit reached
	.12	Motor holding brake open
	.13	Alarm overtemperature motor
	.14	Motor rotates forwards
	.15	Alarm inverter overload
	r0053	CO/BO: Status word 2
	r0054	CO/BO: Control word 1 .00 ON/OFF1 .01 OFF2 .02 OFF3 .03 Enable ramp-function generator .04 Enable ramp-function generator .05 Continue ramp-function generator .06 Enable speed setpoint .07 Acknowledge fault .08 Jog bit 0 .09 Jog bit 1 .10 Master control by PLC .11 Direction reversal (setpoint) .13 Motorized potentiometer, raise .14 Motorized potentiometer, lower .15 CDS bit 0
	r0055	CO/BO: Supplementary control word .00 Fixed setpoint, bit 0 .01 Fixed setpoint, bit 1 .02 Fixed setpoint, bit 2 .03 Fixed setpoint, bit 3 .04 DDS selection, bit 0 .05 DDS selection, bit 1 .08 Technology controller enable .09 DC braking enable .11 Droop enable .12 Closed-loop torque control active .13 External fault 1 (F07860) .15 CDS bit 1
r0056	CO/BO: Status word, closed-loop control	

No.	Description						
r0060	CO: Speed setpoint before setpoint filter [100 % \pm p2000]						
r0062	CO: Speed setpoint after filter [100 % \pm p2000]						
r0063	CO: Speed actual value unsmoothed [100 % \pm p2000]						
r0064	CO: Speed controller system deviation [100 % \pm p2000]						
r0065	Slip frequency [100 % \pm p2000]						
r0066	CO: Output frequency [100 % \pm p2000]						
r0067	CO: Output current, maximum [100 % \pm p2002]						
r0068	CO: Absolute current actual value unsmoothed [100 % \pm p2002]						
r0070	CO: Actual DC link voltage [100 % \pm p2001]						
r0071	Maximum output voltage [100 % \pm p2001]						
r0072	CO: Output voltage [100 % \pm p2001]						
r0075	CO: Current setpoint field-generating [100 % \pm p2002]						
r0076	CO: Current actual value field-generating [100 % \pm p2002]						
r0077	CO: Current setpoint torque-generating [100 % \pm p2002]						
r0078	CO: Current actual value torque-generating [100 % \pm p2002]						
r0079	CO: Torque setpoint, total [100 % \pm p2003]						
r0080	CO: Actual torque value						
	[0] unsmoothed	[1] smoothed					
r0082	CO: Active power actual value						
	[0] unsmoothed	[1] smoothed with p0045					
	[2] Electric power						
Commissioning							
p0100	IEC/NEMA motor standard						
	0	IEC motor (50 Hz, SI units)					
	1	NEMA motor (60 Hz, US units)					
	2	NEMA motor (60 Hz, SI units)					
p0124	CU Identification via LED						
p0133	Motor configuration						
	.00	1: Delta	.01	1: 87 Hz			
		0: Star		0: No 87 Hz			
p0170	Number of Command Data Sets (CDS)						
p0180	Number of Drive Data Sets (DDS)						
Power Module							
p0201	Power unit code number						
r0204	Power unit, hardware properties						

No.	Description						
p0205	Power unit application						
	0	Load cycle with high overload					
	1	Load cycle with light overload					
r0206	Rated power unit power [kw/hp]						
r0207	Rated power unit current						
r0208	Rated power unit line supply voltage [V]						
r0209	Power unit, maximum current						
p0210	Drive unit line supply voltage [V]						
p0219	Braking resistor braking power [kW]						
p0230	Drive filter type, motor side						
	0	No filter					
	1	Motor reactor					
	2	dv/dt filter					
	3	Siemens sine-wave filter					
	4	Sine wave filter, third-party manufacturer					
p0233	Power unit motor reactor [mH]						
p0234	Power unit sine-wave filter capacitance [μ F]						
r0238	Internal power unit resistance						
p0287	Ground fault monitoring thresholds [100 % \pm r0209]						
r0289	CO: Maximum power unit output current [100 % \pm p2002]						
p0290	Power unit overload response						
	0	Reduce output current or output frequency					
	1	No reduction, shutdown when overload threshold is reached					
	2	Reduce I_output or f_output and f_pulse (not using I2t).					
	3	Reduce the pulse frequency (not using I2t)					
p0292	Power unit temperature alarm threshold [°C]						
p0295	Fan run-on time [s]						
Motor							
p0300	Motor type selection						
	0	No motor					
	1	Induction motor					
	2	Synchronous motor					
	10	1LE1 standard induction motor					
	13	1LG6 standard induction motor					
	17	1LA7 standard induction motor					
	19	1LA9 standard induction motor					
	100	1LE1 standard induction motor					
p0301	Motor code number selection						

Commissioning

4.3 Further settings

No.	Description				
p0304	Rated motor voltage [V]				
p0305	Rated motor current [A]				
p0306	Number of motors connected in parallel				
p0307	Rated motor power [kW]				
p0308	Rated motor power factor				
p0310	Rated motor frequency [Hz]				
p0311	Rated motor speed [rpm]				
p0312	Rated motor torque [Nm]				
p0320	Motor rated magnetizing current/short-circuit current [A]				
p0322	Maximum motor speed [rpm]				
p0323	Maximum motor current [A]				
r0330	Rated motor slip				
r0331	Actual motor magnetizing current/short-circuit current				
r0333	Rated motor torque [Nm]				
p0335	Motor cooling type				
p0340	Automatic calculation of motor/control parameters				
p0341	Motor moment of inertia [kgm ²]				
p0342	Ratio between the total and motor moment of inertia [kgm ²]				
r0345	Nominal motor starting time				
p0346	Motor excitation build-up time [s]				
p0347	Motor de-excitation time [s]				
p0350	Motor stator resistance, cold [Ω]				
p0352	Cable resistance [Ω]				
r0395	Actual stator resistance				
r0396	Actual rotor resistance				
Technology and units					
p0500	Technology application				
p0505	Selecting the system of units				
1	System of units SI				
2	Referred system of units/SI				
3	US system of units				
4	System of units, referred/US				
p0573	Inhibit automatic reference value calculation				
p0595	Selecting technological units				
1	%	2	1 referred, no dimensions		
3	bar	4	°C	5	Pa
6	ltr/s	7	m ³ /s	8	ltr/min
9	m ³ /min	10	ltr/h	11	m ³ /h
12	kg/s	13	kg/min	14	kg/h

No.	Description										
	15	t/min	16	t/h	17	N					
	18	kN	19	Nm	20	psi					
	21	°F	22	gallon/s	23	inch ³ /s					
	24	gallon/min	25	inch ³ /min	26	gallon/h					
	27	inch ³ /h	28	lb/s	29	lb/min					
	30	lb/h	31	lbf	32	lbf ft					
	33	K	34	rpm	35	parts/min					
	36	m/s	37	ft ³ /s	38	ft ³ /min					
	39	BTU/min	40	BTU/h	41	mbar					
	42	inch wg	43	ft wg	44	m wg					
	45	% r.h.	46	g/kg							
p0596	Reference quantity, technological units										
	Thermal motor monitoring and motor model, maximum current										
p0601	Motor temperature sensor type										
	0	No sensor									
	1	PTC warning & timer									
	2	KTY84									
	4	Bimetallic NC contact warning & timer									
p0604	Motor temperature alarm threshold [°C]										
p0605	Motor temperature fault threshold [°C]										
p0610	Motor overtemperature response										
	0	No response, alarm only, no reduction of I _{max}									
	1	Alarm with reduction of I _{max} and fault									
	2	Alarm and fault, no reduction of I _{max}									
p0611	I _{2t} motor model thermal time constant [s]										
p0614	Thermal resistor adaptation reduction factor										
p0615	I _{2t} motor model fault threshold [°C]										
p0625	Motor ambient temperature [°C]										
p0637	Q flux, flux gradient saturated [mH]										
p0640	Current limit [A]										
	Command sources and terminals on the Control Unit										
r0720	CU number of inputs and outputs										
r0722	CO/BO: CU digital inputs, status										
	.00	DI 0 (terminal 5)									
	.01	DI 1 (terminal 6)									
	.02	DI 2 (terminal 7)									
	.03	DI 3 (terminal 8)									
	.04	DI 4 (terminal 16)									
	.05	DI 5 (terminal 17)									
	.11	DI 11 (terminals 3, 4) AI 0									

No.	Description
r0723	CO/BO: CU digital inputs, status inverted
p0730	BI: CU signal source for terminal DO 0 NO: Terminal 19 / NC: Terminal 18
p0731	BI: CU signal source for terminal DO 1 NO: Terminal 21
r0747	CU, digital outputs status
p0748	CU, invert digital outputs
r0751	BO: CU analog inputs status word
r0752	CO: CU analog inputs input voltage/current actual AI0 (terminals 3/4)
r0755	CO: CU analog inputs actual value in percent, AI0 (terminals 3/4) [100 ± 100%]
p0756	CU analog input type (terminals 3, 4)
	0 Unipolar voltage input (0 V ... +10 V)
	1 Unipolar voltage input monitored (+2 V... +10 V)
	2 Unipolar current input (0 mA ... +20 mA)
	3 Unipolar current input monitored (+4 mA ... +20 mA)
	4 Bipolar voltage input (-10 V...+10 V)
	8 No sensor connected
p0757	CU analog input characteristic value x1
p0758	CU analog input characteristic value y1 [%]
p0759	CU analog input characteristic value x2
p0760	CU analog input characteristic value y2 [%]
p0761	CU analog input wire break monitoring response threshold
p0764	CU analog inputs deadband [V]
p0771	CI: CU analog output signal source, AO 0 (terminals 12, 13) [100 ± 100%]
r0772	CU analog output, output value currently referred
r0774	CU analog output, output voltage/current actual [100% ± p2001]
p0775	CU analog output activate absolute value generation
p0776	CU analog output type

No.	Description
0	Current output (0 mA ... +20 mA)
1	Voltage output (0 V... +10 V)
2	Current output (+4 mA ... +20 mA)
p0777	CU analog output characteristic value x1 [%]
p0778	CU analog output characteristic value y1 [V]
p0779	CU analog output characteristic value x2 [%]
p0780	CU analog output characteristic value y2 [V]
p0782	BI: CU analog output invert signal source, AO 0 (terminals 12,13)
r0785	BO: CU analog outputs status word
	.00 1 = AO 0 negative
p0795	CU digital inputs, simulation mode
p0796	CU digital inputs, simulation mode setpoint
p0797	CU analog inputs, simulation mode
p0798	CU analog inputs, simulation mode setpoint
Change over and copy data sets	
p0802	Data transfer with memory card as source/target
p0803	Data transfer with device memory as source/target
p0804	Data transfer start
	12 Start transfer of the GSD for PROFIBUS master on the memory card
p0806	BI: Inhibit master control
r0807	BO: Master control active
p0809	Copy Command Data Set CDS
p0810	BI: Command data set selection CDS bit 0
p0819	Copy drive data set DDS
p0820	BI: Drive data set selection DDS, bit 0
p0826	Motor changeover, motor number
r0835	CO/BO: Data set changeover status word
r0836	CO/BO: Command data set CDS selected
r0837	CO/BO: Drive data set DDS selected
Sequence control (e.g. ON/OFF1)	
p0840	BI: ON/OFF (OFF1)
p0844	BI: No coast down/coast down (OFF2) signal source 1

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4.3 Further settings

No.	Description
p0845	BI: No coast down/coast down (OFF2) signal source 2
p0848	BI: No quick stop/quick stop (OFF3) signal source 1
p0849	BI: No quick stop/quick stop (OFF3) signal source 1
p0852	BI: Enable operation
p0854	BI: Master control by PLC
p0855	BI: Unconditionally release holding brake
p0856	BI: Enable speed controller
p0858	BI: Unconditionally close holding brake
r0898	CO/BO: Control word sequence control
r0899	CO/BO: Status word sequence control
PROFIBUS, PROFIdrive	
p0918	PROFIBUS address
p0922	PROFIdrive telegram selection
	1 Standard telegram 1, PZD-2/2
	20 Standard telegram 20, PZD-2/6
	352 SIEMENS telegram 352, PZD-6/6:
	353 SIEMENS telegram 353, PZD-2/2, PKW-4/4
	354 SIEMENS telegram 354, PZD-6/6, PKW-4/4
	999 Free telegram configuration with BICO
Faults (Part 1)	
r0944	CO: Counter for fault buffer changes
r0945	Fault code
r0946	Fault code list
r0947	Fault number
r0948	Fault time received in milliseconds [ms]
r0949	Fault value
p0952	Fault cases, counter
r0963	PROFIBUS baud rate
r0964	Device identification
p0965	PROFIdrive profile number
p0969	System runtime relative [ms]
Restoring the factory setting Saving parameters	
p0970	Reset drive parameters
	0 Inactive
	1 Reset start parameters
	5 Starts a safety parameter reset
	10 Starts to download setting 10

No.	Description
	11 Starts to download setting 11
	12 Starts to download setting 12
	100 Starts a BICO interconnection reset
p0971	Save parameters
	0 Inactive
	1 Save drive object
	10 Save in a non-volatile memory as setting 10
	11 Save in a non-volatile memory as setting 11
	12 Save in a non-volatile memory as setting 12
p0972	Drive unit reset
Setpoint channel	
p1000	Speed setpoint selection
p1001	CO: Fixed speed setpoint 1 [rpm]
p1002	CO: Fixed speed setpoint 2 [rpm]
p1003	CO: Fixed speed setpoint 3 [rpm]
p1004	CO: Fixed speed setpoint 4 [rpm]
p1005	CO: Fixed speed setpoint 5 [rpm]
p1006	CO: Fixed speed setpoint 6 [rpm]
p1007	CO: Fixed speed setpoint 7 [rpm]
p1008	CO: Fixed speed setpoint 8 [rpm]
p1009	CO: Fixed speed setpoint 9 [rpm]
p1010	CO: Fixed speed setpoint 10 [rpm]
p1011	CO: Fixed speed setpoint 11 [rpm]
p1012	CO: Fixed speed setpoint 12 [rpm]
p1013	CO: Fixed speed setpoint 13 [rpm]
p1014	CO: Fixed speed setpoint 14 [rpm]
p1015	CO: Fixed speed setpoint 15 [rpm]
p1016	Fixed speed setpoint mode
	1 Direct selection
	2 Selection, binary coded
p1020	BI: Fixed speed setpoint selection bit 0
p1021	BI: Fixed speed setpoint selection bit 1
p1022	BI: Fixed speed setpoint selection bit 2
p1023	BI: Fixed speed setpoint selection bit 3
r1024	CO: Fixed speed setpoint effective [100 % ≈ p2000]
r1025	BO: Fixed speed setpoint status
p1030	Motorized potentiometer configuration
	00 Storage active
	01 Automatic operation, ramp-function generator active
	02 Initial rounding active

No.	Description	No.	Description
	03 Storage in NVRAM active	r1114	CO: Setpoint after the direction limiting [100 % Δ p2000]
p1035	BI: Motorized potentiometer setpoint raise	r1119	CO: Ramp-function generator setpoint at the input [100 % Δ p2000]
p1036	BI: Motorized potentiometer setpoint lower		
p1037	Motorized potentiometer maximum speed [rpm]	p1120	Ramp-function generator ramp-up time [s]
p1038	Motorized potentiometer minimum speed [rpm]	p1121	Ramp-function generator ramp-down time [s]
p1040	Motorized potentiometer start value [rpm]	p1130	Ramp-function generator initial rounding-off time [s]
p1043	BI: Motorized potentiometer, accept setting value	p1131	Ramp-function generator final rounding-off time [s]
p1044	CI: Motorized potentiometer setting value [100 % Δ p2000]	p1134	Ramp-function generator rounding-off type
r1045	CO: Motorized potentiometer, setpoint in front of the ramp-function generator [rpm]	0	Continuous smoothing
p1047	Motorized potentiometer ramp-up time [s]	1	Discontinuous smoothing
p1048	Motorized potentiometer ramp-down time [s]	p1135	OFF3 ramp-down time [s]
r1050	CO: Motorized potentiometer setpoint after the ramp-function generator [100 % Δ p2000]	p1136	OFF3 initial rounding-off time [s]
p1055	BI: Jog bit 0	p1137	OFF3 final rounding-off time [s]
p1056	BI: Jog bit 1	p1138	CI: Acceleration ramp scaling [100 Δ 100%]
p1058	Jog 1 speed setpoint [rpm]	p1139	CI: Ramp down scaling [100 Δ 100%]
p1059	Jog 2 speed setpoint [rpm]	p1140	BI: Enable ramp-function generator
p1070	CI: Main setpoint [100 % Δ p2000]	p1141	BI: Continue ramp-function generator
p1071	CI: Main setpoint scaling [100 Δ 100%]	p1142	BI: Enable speed setpoint
r1073	CO: Main setpoint effective [100 % Δ p2000]	r1149	CO: Ramp-function generator acceleration [100 % Δ p2007]
p1075	CI: Supplementary setpoint [100 % Δ p2000]	r1170	CO: Speed controller setpoint sum [100 % Δ p2000]
p1076	CI: Supplementary setpoint scaling [100 Δ 100%]	r1198	CO/BO: Control word, setpoint channel
r1077	CO: Supplementary setpoint effective [100 % Δ p2000]	Functions (e.g. motor holding brake)	
r1078	CO: Total setpoint effective [100 % Δ p2000]	p1200	Flying restart operating mode
p1080	Minimum speed [rpm]	0	Flying restart inactive
p1082	Maximum speed [rpm]	1	Flying restart always active (start in setpoint direction)
p1083	CO: Speed limit in positive direction of rotation [rpm]	4	Flying restart always active (start only in setpoint direction)
r1084	CO: Speed limit positive effective [100 % Δ p2000]	p1201	BI: Flying restart enable signal source
p1086	CO: Speed limit in negative direction of rotation [rpm]	p1202	Flying restart search current [100 % Δ r0331]
r1087	CO: Speed limit negative effective [100 % Δ p2000]	p1203	Flying restart search rate factor [%]
p1091	Skip speed 1 [rpm]		A higher value results in a longer search time.
p1092	Skip speed 2 [rpm]		
p1101	Skip speed bandwidth [rpm]		
p1106	CI: Minimum speed signal source		
p1110	BI: Inhibit negative direction		
p1111	BI: Inhibit positive direction		
p1113	BI: Setpoint inversion		

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4.3 Further settings

No.	Description
p1206	Set fault number without automatic restart
p1210	Automatic restart mode
	0 Inhibit automatic restart
	1 Acknowledge all faults without restarting
	4 Restart after line supply failure, without additional start attempts
	6 Restart after fault with additional start attempts
	14 Restart after line supply failure following manual acknowledgement
	16 Restart after fault following manual acknowledgement
	26 Acknowledging all faults and restarting for an ON command
p1211	Automatic restart, start attempts
p1212	Automatic restart, delay time start attempts [s]
p1213	Automatic restart, monitoring time [s]
p1215	Motor holding brake configuration
	0 No motor holding brake being used
	3 Motor holding brake like sequential control, connection via BICO
p1216	Motor holding brake, opening time [ms]
p1217	Motor holding brake, closing time [ms]
p1230	BI: DC braking activation
p1231	DC braking configuration
	0 No function
	4 DC braking
	5 DC braking OFF1/OFF3
	14 DC braking below starting speed
p1232	DC braking, braking current [A]
p1233	DC braking time [s]
p1234	Speed at the start of DC braking [rpm]
r1239	CO/BO: DC braking status word
p1240	V _{DC} controller or V _{DC} monitoring configuration (vector control)
	0 Inhibit V _{DC} controller
	1 Enable V _{DC_max} controller
	2 Enable V _{DC_min} controller (kinetic buffering)
	3 Enable V _{DC_min} controller and V _{DC_max} controller
r1242	V _{DC_max} controller switch-in level [100 % \triangleq p2001]
p1243	V _{DC_max} controller dynamic factor [%]
p1245	V _{DC_min} controller switch-in level (kinetic buffering) [%]

No.	Description
r1246	V _{DC_min} controller switch-in level (kinetic buffering) [100 % \triangleq p2001]
p1247	V _{DC_min} controller dynamic factor (kinetic buffering) [%]
p1249	V _{DC_max} controller speed threshold [rpm]
p1254	V _{DC_max} controller automatic ON level detection
	0 Automatic detection inhibited
	1 Automatic detection enabled
p1255	V _{DC_min} controller time threshold [s]
p1256	V _{DC_min} controller response (kinetic buffering)
	0 Buffer V _{DC} until undervoltage, n < p1257 \rightarrow F07405
	1 Buffer V _{DC} until undervoltage, n < p1257 \rightarrow F07405, t > p1255 \rightarrow F07406
p1257	V _{DC_min} controller speed threshold [rpm]
p1280	V _{DC} controller or V _{DC} monitoring configuration (V/f)
	0 Inhibit V _{DC} controller
	1 Enable V _{DC_max} controller
r1282	V _{DC_max} controller switch-in level (V/f) [100 % \triangleq p2001]
p1283	V _{DC_max} controller dynamic factor (V/f) [%]
p1284	V _{DC_max} controller time threshold (U/f) [s]
V/f control	
p1300	Open-loop/closed-loop control operating mode
	0 V/f control with linear characteristic
	1 V/f control with linear characteristic and FCC
	2 V/f control with parabolic characteristic
	3 V/f control with parameterizable characteristic
	4 V/f control with linear characteristic and ECO
	5 V/f control for drive requiring a precise frequency (e.g. textiles)
	6 V/f control for drive requiring a precise frequency and FCC
	7 V/f control for parabolic characteristic and ECO
	19 V/f control with independent voltage setpoint
	20 Speed control (without encoder)

No.	Description				
	<p>The graph shows the relationship between voltage U and frequency f. A straight line represents the V/f characteristic. Several points on this line are labeled with parameter names: $P1312$, $P1311$, and $P1310$. The vertical axis is labeled U and the horizontal axis is labeled f.</p>				
p1302	V/f control configuration <table border="1"> <tr> <td>.0</td> <td>Motor holding brake with constant stop</td> </tr> <tr> <td>3</td> <td>frequency</td> </tr> </table>	.0	Motor holding brake with constant stop	3	frequency
.0	Motor holding brake with constant stop				
3	frequency				
p1310	Voltage boost permanent [100 % \pm p0305]				
p1311	Voltage boost when accelerating [%]				
p1312	Voltage boost when starting [%]				
r1315	Voltage boost, total [100 % \pm p2001]				
	<p>The graph shows the relationship between voltage U and frequency f. A straight line represents the V/f characteristic. Several points on this line are labeled with parameter names: $r0071$, $p1327 (U4)$, $p1325 (U3)$, $p1323 (U2)$, $p1321 (U1)$, $r1315$, $p1322 (f2)$, $p1324 (f3)$, $p1326 (f4)$, and $p1082$. The vertical axis is labeled U and the horizontal axis is labeled f.</p>				
p1320	V/f control programmable characteristic frequency 1 [Hz]				
p1321	V/f control programmable characteristic voltage 1 [V]				
p1322	Characteristic frequency 2 [Hz]				
p1323	Characteristic voltage 2 [V]				
p1324	Characteristic frequency 3 [Hz]				
p1325	Characteristic voltage 3 [V]				
p1326	Characteristic frequency 4 [Hz]				
p1327	Characteristic voltage 4 [V]				
p1330	Cl: V/f control independent voltage setpoint [100 % \pm p2001]				
p1334	V/f control slip compensation starting frequency [Hz]				
p1335	Slip compensation, scaling [100 % \pm r0330]				
p1336	Slip compensation limit value [100 % \pm r0330]				

No.	Description
r1337	CO: Actual slip compensation [100 % \pm 100%]
p1338	V/f mode resonance damping gain
p1340	I_{max} frequency controller proportional gain
r1343	CO: I_{max} controller frequency output [100 % \pm p2000]
p1349	U/f mode resonance damping maximum frequency [Hz]
p1351	CO: Motor holding brake starting frequency [100 % \pm 100%]
p1352	Cl: Motor holding brake starting frequency [100 % \pm 100%]
	Vector control
r1438	CO: Speed controller speed setpoint [100 % \pm p2000]
p1452	Speed controller speed actual value smoothing time (SLVC) [ms]
p1470	Speed controller encoderless operation P gain
p1472	Speed controller sensorless operation integral time [ms]
p1475	Cl: Speed controller torque setting value for motor holding brake [100 % \pm p2003]
r1482	CO: Speed controller I torque output [100 % \pm p2003]
r1493	CO: Moment of inertia, total
p1496	Acceleration pre-control scaling [%]
p1511	Cl: Supplementary torque 1 [100 % \pm p2003]
r1516	CO: Supplementary torque and acceleration torque [100 % \pm p2003]
p1520	CO: Torque limit upper [Nm]
p1521	CO: Torque limit lower [Nm]
p1522	Cl: Torque limit upper [100 % \pm p2003]
p1523	Cl: Torque limit lower [100 % \pm p2003]
p1524	CO: Torque limit upper/motoring scaling [100 % \pm 100%]
p1525	CO: Torque limit lower scaling [100 % \pm 100%]
r1526	CO: Torque limit upper without offset [100 % \pm p2003]
r1527	CO: Torque limit lower without offset [100 % \pm p2003]
p1530	Power limit motoring [kW]
p1531	Power limit regenerative [kW]
r1538	CO: Upper effective torque limit [100 % \pm p2003]
r1539	CO: Lower effective torque limit [100 % \pm p2003]
r1547	CO: Torque limit for speed controller output

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No.	Description		
	[0]	Upper limit [100 % \triangleq p2003]	
	[1]	Lower limit [100 % \triangleq p2003]	
p1552	CI: Torque limit upper scaling without offset [100 \triangleq 100%]		
p1554	CI: Torque limit lower scaling without offset [100 \triangleq 100%]		
p1570	CO: Flux setpoint [100 \triangleq 100%]		
p1580	Efficiency optimization [%]		
r1598	CO: Flux setpoint total [100 \triangleq 100%]		
p1610	Torque setpoint static (SLVC) [100 % \triangleq r0333]		
p1611	Supplementary accelerating torque (SLVC) [100 % \triangleq r0333]		
r1732	CO: Direct-axis voltage setpoint [100 % \triangleq p2001]		
r1733	CO: Quadrature-axis voltage setpoint [100 % \triangleq p2001]		
p1745	Motor model error threshold stall detection [%]		
Gating unit			
p1800	Pulse frequency setpoint [kHz]		
r1801	CO: Pulse frequency [100 % \triangleq p2000]		
p1820	Reverse the output phase sequence		
	0	Off	
	1	On	
Motor identification			
p1900	Motor data identification and rotating measurement		
	0	Inhibited	
	1	Identify the motor data at standstill and with the motor rotating	
	2	Identify motor data at standstill	
	3	Identify motor data with the motor rotating	
p1901	Test pulse evaluation configuration		
	.00	Phase short-circuit test pulse active	.01 Ground fault detection test pulse active
	.02	Test pulse for every pulse enable	
p1909	Motor data identification control word		
p1910	Motor data identification selection		
p1959	Rotating measurement configuration		
p1960	Rotating measurement selection		
	0	Inhibited	
	1	Rotating measurement in encoderless operation	
	3	Speed controller optimization in encoderless operation	

No.	Description		
p1961	Saturation characteristic speed to determine [%]		
p1965	Speed_ctrl_opt speed [100 % \triangleq p0310]		
p1967	Speed_ctrl_opt dynamic factor [%]		
Reference values			
p2000	Reference speed reference frequency [rpm]		
p2001	Reference voltage [V]		
p2002	Reference current [A]		
p2003	Reference torque [Nm]		
r2004	Reference power		
p2006	Reference temperature [°C]		
p2010	Commissioning interface baud rate		
p2011	Commissioning interface address		
p2016	CI: Comm IF USS PZD send word		
USS or Modbus RTU			
p2020	Fieldbus interface baud rate:		
	4	2400 baud	5 4800 baud
	6	9600 baud	7 19200 baud
	8	38400 baud	9 57600 baud
	10	76800 baud	11 93750 baud
	12	115200 baud	13 187500 baud
p2021	Fieldbus interface address		
p2022	Fieldbus interface USS PZD number		
p2023	Fieldbus interface USS PKW number		
	0	PKW 0 words	3 PKW 3 words
	4	PKW 4 words	127 PKW variable
p2024	Fieldbus interface times [ms]		
	[0]	Maximum processing time	
	[1]	Character delay time	
	[2]	Telegram pause time	
r2029	Fieldbus interface error statistics		
	[0]	Number of error-free telegrams	
	[1]	Number of rejected telegrams	
	[2]	Number of framing errors	
	[3]	Number of overrun errors	
	[4]	Number of parity errors	
	[5]	Number of starting character errors	
	[6]	Number of checksum errors	
p2030	Fieldbus interface protocol selection		
	0	No protocol	
	1	USS	

No.	Description	
r2032	2	MODBUS
	3	PROFIBUS
	4	CAN
	Master control, control word effective	
	.00	ON / OFF1
	.01	OFF2 inactive
	.02	OFF3 inactive
	.03	Enable operation
	.04	Enable ramp-function generator
	.05	Start ramp-function generator
p2037	.06	Enable speed setpoint
	.07	Acknowledge fault
	.08	Jog bit 0
	.09	Jog bit 1
	.10	Master control by PLC
	PROFIdrive STW1.10 = 0 mode	
	0	Freeze setpoints and further process sign-of-life
	1	Freeze setpoints and sign-of-life
	2	Setpoints are not frozen
	PROFIdrive STW/ZSW interface mode	
p2038	0	SINAMICS
	2	VIK-NAMUR
p2040	Fieldbus interface monitoring time [ms]	
PROFIBUS, PROFIdrive		
p2042	PROFIBUS ID Number	
	0	SINAMICS
	2	VIK-NAMUR
r2043	BO: PROFIdrive PZD state	
	.00	Setpoint failure
	.02	Fieldbus operational
p2044	PROFIdrive fault delay [s]	
p2047	PROFIBUS additional monitoring time [ms]	
r2050	CO: PROFIdrive PZD receive word	
	[0]	PZD 1 ... [7] PZD 8
p2051	CI: PROFIdrive PZD send word	
	[0]	PZD 1 ... [7] PZD 8
r2053	PROFIdrive diagnostics send PZD word	
	[0]	PZD 1 ... [7] PZD 8
r2054	PROFIBUS status	
	0	Off
	1	No connection (search for baud rate)
	2	Connection OK (baud rate found)
	3	Cyclic connection with master (data exchange)
	4	Cyclic data OK
	PROFIBUS diagnosis standard	
	[0]	Master bus address
	[1]	Master input total length bytes
	[2]	Master output total length bytes
	PROFIBUS address switch diagnostics	
	CO: IF1 PROFIdrive PZD receive double word	
	[0]	PZD 1 + 2 ... [10] PZD 11 + 12
r2061	CI: IF1 PROFIdrive PZD send double word	
	[0]	PZD 1 + 2 ... [10] PZD 11 + 12
r2063	IF1 PROFIdrive diagnostics PZD send double word	
	[0]	PZD 1 + 2 ... [10] PZD 11 + 12
r2067	IF1 PZD maximum interconnected	
	[0]	Receiving
	[1]	Sending
r2074	PROFIdrive diagnostics bus address PZD receive	
	[0]	PZD 1 ... [7] PZD 8
r2075	PROFIdrive diagnostics telegram offset PZD receive	
	[0]	PZD 1 ... [7] PZD 8
r2076	PROFIdrive diagnostics telegram offset PZD send	
	[0]	PZD 1 ... [7] PZD 8
r2077	PROFIBUS diagnostics peer-to-peer data transfer addresses	
p2079	PROFIdrive PZD telegram selection extended	
	See p0922	
p2080	BI: Binector-connector converter, status word 1	
	The individual bits are combined to form status word 1.	
p2088	Binector-connector converter, invert status word	
r2089	CO: Send binector-connector converter status word	
	[0]	Status word 1
	[1]	Status word 2
	[2]	Free status word 3
	[3]	Free status word 4
	[4]	Free status word 5
r2090	BO: PROFIdrive PZD1 receive bit-serial	
r2091	BO: PROFIdrive PZD2 receive bit-serial	
r2092	BO: PROFIdrive PZD3 receive bit-serial	

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4.3 Further settings

No.	Description			
r2093	BO: PROFIdrive PZD4 receive bit-serial			
r2094	BO: Connector-binector converter binector output			
r2095	BO: Connector-binector converter binector output			
p2098	Invert connector-binector converter binector output			
p2099	CI: Connector-binector converter signal source			
Faults (Part 2) and alarms				
p2100	Setting the fault number for fault response			
p2101	Setting the fault response			
	0	None	1	OFF1
	2	OFF2	3	OFF3
	5	STOP2	6	DC braking
p2103	BI: 1. Acknowledge faults			
p2104	BI: 2. Acknowledge faults			
p2106	BI: External fault 1			
r2110	Alarm number			
p2111	Alarm counter			
p2112	BI: External alarm 1			
r2122	Alarm code			
r2123	Alarm time received [ms]			
r2124	Alarm value			
r2125	Alarm time removed [ms]			
p2126	Setting fault number for acknowledge mode			
p2127	Sets acknowledgement mode			
p2128	Selecting fault/alarm code for trigger			
r2129	CO/BO: Trigger word for faults and alarms			
r2130	Fault time received in days			
r2131	CO: Actual fault code			
r2132	CO: Actual alarm code			
r2133	Fault value for float values			
r2134	Alarm value for float values			
r2135	CO/BO: Status word, faults/alarms 2			
r2136	Fault time removed in days			
r2138	CO/BO: Control word, faults/alarms			
r2139	CO/BO: Status word, faults/alarms 1			
r2169	CO: Actual speed smoothed signals			
r2197	CO/BO: Status word monitoring functions 1			
r2198	CO/BO: Status word monitoring 2			
r2199	CO/BO: Status word monitoring 3			
Technology controller				
p2200	BI: Technology controller enable			
p2201	CO: Techn. controller fixed value 1 [100 \pm 100%]			

No.	Description						
p2202	CO: Techn. controller fixed value 2 [100 \pm 100%]						
p2203	CO: Techn. controller fixed value 3 [100 \pm 100%]						
p2204	CO: Techn. controller fixed value 4 [100 \pm 100%]						
p2205	CO: Techn. controller fixed value 5 [100 \pm 100%]						
p2206	CO: Techn. controller fixed value 6 [100 \pm 100%]						
p2207	CO: Techn. controller fixed value 7 [100 \pm 100%]						
p2208	CO: Techn. controller fixed value 8 [100 \pm 100%]						
p2209	CO: Techn. controller fixed value 9 [100 \pm 100%]						
p2210	CO: Techn. controller fixed value 10 [100 \pm 100%]						
p2211	CO: Techn. controller fixed value 11 [100 \pm 100%]						
p2212	CO: Techn. controller fixed value 12 [100 \pm 100%]						
p2213	CO: Techn. controller fixed value 13 [100 \pm 100%]						
p2214	CO: Techn. controller fixed value 14 [100 \pm 100%]						
p2215	CO: Techn. controller fixed value 15 [100 \pm 100%]						
p2216	Techn. controller fixed value selection method						
	0	Fixed value selection direct					
	1	Fixed value selection binary					
p2220	BI: Techn. controller fixed value selection bit 0						
p2221	BI: Techn. controller fixed value selection bit 1						
p2222	BI: Techn. controller fixed value selection bit 2						
p2223	BI: Techn. controller fixed value selection bit 3						
r2224	CO: Techn. controller fixed value active [100 \pm 100%]						
r2225	CO/BO: Techn. controller fixed value selection status word						
	Techn. controller number currently						
	Techn. controller motorized potentiometer configuration						
	.00	Storage active					
	.02	Initial rounding active					
	.03	Non-volatile data save active for p2230.0 = 1					
	.04	Ramp-function generator always active					
r2231	Techn. controller motorized potentiometer setpoint memory						
p2235	BI: Techn. controller motorized potentiometer setpoint up						
p2236	BI: Techn. controller motorized potentiometer setpoint down						
p2237	Techn. controller motorized potentiometer maximum value [%]						
p2238	Techn. controller motorized potentiometer minimum value [%]						
p2240	Techn. controller motorized potentiometer start value [%]						

No.	Description	No.	Description
r2245	CO: Techn. controller motorized potentiometer setpoint before RFG [100 ± 100%]	p2274	Techn. controller actual differentiation time constant [s]
p2247	Techn. controller motorized potentiometer ramp-up time [s]	p2280	Techn. controller proportional gain
p2248	Techn. controller motorized potentiometer ramp-down time [s]	p2285	Techn. controller integral time [s]
r2250	CO: Techn. controller motorized potentiometer setpoint after RFG [100 ± 100%]	p2286	BI: Hold techn. controller integrator
p2251	Techn. controller mode	p2289	CI: Techn. controller pre-control signal [100 ± 100%]
	0 Techn. controller as main speed setpoint	p2291	CO: Techn. controller maximum limit [100 ± 100%]
	1 Techn. controller as additional speed setpoint	p2292	CO: Techn. controller minimum limit [100 ± 100%]
p2253	CI: Techn. controller setpoint 1 [100 ± 100%]	p2293	Techn. controller ramp-up/ramp-down time [s]
p2254	CI: Techn. controller setpoint 2 [100 ± 100%]	p2294	CO: Techn. controller output signal [100 ± 100%]
p2255	Techn. controller setpoint 1 scaling [100 ± 100%]	p2295	CO: Techn. controller output scaling [100 ± 100%]
p2256	Techn. controller setpoint 2 scaling [100 ± 100%]	p2296	CI: Techn. controller output scaling [100 ± 100%]
p2257	Techn. controller ramp-up time [s]	p2297	CI: Techn. controller maximum limit signal source [100 ± 100%]
p2258	Techn. controller ramp-down time [s]	p2298	CI: Techn. controller minimum limit signal source [100 ± 100%]
r2260	CO: Techn. controller setpoint after ramp function generator [100 ± 100%]	p2299	CI: Techn. controller limit offset [100 ± 100%]
p2261	Techn. controller setpoint filter time constant [s]	p2302	Techn. controller output signal start value [%]
p2263	Techn. controller type	p2306	Techn. controller fault signal inversion
	0 D component in the actual value signal	0 No inversion	
	1 D component in the fault signal		1 Inversion of the techn. controller fault signal
p2264	CI: Techn. controller actual value [100 ± 100%]	r2344	CO: Techn. controller last speed setpoint (smoothed) [100 ± 100%]
p2265	Techn. controller actual value filter time constant [s]	p2345	Techn. controller fault response
r2266	CO: Techn. controller actual value after filter [100 ± 100%]	0 Function inhibited	
p2267	Techn. controller upper limit actual value [100 ± 100%]		1 For a fault: change over to r2344 (or p2302)
p2268	Techn. controller lower limit actual value [100 ± 100%]		2 For a fault: Change over to p2215
p2269	Techn. controller gain actual value [%]	r2349	CO/BO: Techn. controller status word
p2270	Techn. controller actual value function selection	p2900	CO: Fixed value 1 [100 ± 100%]
	0 No function	p2901	CO: Fixed value 2 [100 ± 100%]
	2 x^2	r2902	CO: Fixed values [100 ± 100%]
p2271	Techn. controller actual value inversion (sensor type)	p2930	CO: Fixed value M [Nm]
	0 No inversion	Messages	
	1 Inversion of the technology controller actual value signal	r3113	CO/BO: NAMUR message bit bar
r2272	CO: Techn. controller actual value scaled [100 ± 100%]	p3117	Change safety message type
r2273	CO: Techn. controller error [100 ± 100%]		0: Safety messages are not reparameterized
			1: Safety messages are reparameterized
Motor characteristic			
		p3320	Fluid flow machine P = f(n), Y coordinate: P flow 1%, point 1

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4.3 Further settings

No.	Description						
p3321	Fluid flow machine P = f(n), X coordinate: n flow 1%, point 1						
p3322	P = f(n), Y coordinate: P flow 2%, point 2						
p3323	P = f(n), X coordinate: n flow 2%, point 2						
p3324	P = f(n), Y coordinate: P flow 3%, point 3						
p3325	P = f(n), X coordinate: n flow 3%, point 3						
p3326	P = f(n), Y coordinate: P flow 4%, point 4						
p3327	P = f(n), X coordinate: n flow 4%, point 4						
p3328	P = f(n), Y coordinate: P flow 5%, point 5						
p3329	P = f(n), X coordinate: n flow 5%, point 5						
Two/three wire control							
p3330	Bl: 2-3 wire control 1						
p3331	Bl: 2-3 wire control 2						
p3332	Bl: 2-3 wire control 3						
r3333	CO/BO: 2-3 wire output						
	.00	2-3 wire ON					
	.01	2-3 wire reverse					
	.02	2-3 wire ON / invert					
	.03	2-3 wire reverse/invert					
Compound braking							
p3856	Compound braking current [100 ± 100%]						
r3859	CO/BO: Compound braking status word						
Administration parameters							
p3900	Completion of quick commissioning						
r3925	Identification final display						
p3950	Service parameters						
p3981	Faults, acknowledge drive object						
p3985	Master control mode selection						
r3996	Parameter write inhibit status						
r5600	Pe hibernation ID						
	0:	POWER OFF	2:	Hibernation 2			
	255:	Ready					
p5602	Pe hibernation pause time, minimum [s]						
	[0]	Reserved	[1]	Mode 2			
p5606	Pe hibernation duration, maximum [ms]						
	[0]	Reserved	[1]	Mode 2			
p5611	Pe energy-saving properties, general						
	.00	Inhibit PROFIdenergy	.01	Drive triggers OFF1			
	.02	Transition to hibernation from PROFIdrive state 4 possible					

No.	Description						
p5612	Pe energy-saving properties, mode-dependent						
	[0]	Reserved	[1]	Mode 2			
r5613	CO/BO: Pe energy-saving active/inactive						
	.00	Pe active	.01	Pe inactive			
p5614	Bl: Set Pe Switching On Inhibited signal source						
r7758	Know-how protection Control Unit serial number						
r7759	Know-how protection Control Unit reference serial number						
p7760	Write protection/know-how protection status						
	.00	1 = Write protection active					
	.01	1 = Know-how protection active					
	.02	1 = Know-how protection temporarily unlocked					
	.03	1 = Know-how protection cannot be deactivated					
	.04	1 = Memory card copy protection active					
p7761	Write protection						
	0	Deactivate write protection					
	1	Activate write protection					
p7762	Write access for control using multi-master third-party bus system						
	0	Free write access independent of p7761					
	1	No free write access (p7761 is active)					
p7763	Know-how protection OEM exception list number of parameters						
p7764	Know-how protection OEM exception list						
p7765	Know-how protection memory card copy protection						
	0	Memory card deactivate copy protection					
	1	Memory card activate copy protection					
p7766	Know-how protection password input						
p7767	Know-how protection password new						
p7768	Know-how protection password confirmation						
p7769	Know-how protection memory card setpoint serial number						
p7775	NVRAM data action						
r7843	Memory card serial number						
r8570	Macro Drive object						
	Display of the macro files stored in the converter. See also p0015.						
CANopen							
r8600	CAN Device Type						
r8601	CAN Error Register						
p8602	CAN SYNC-Object						

No.	Description						No.	Description					
p8603	CAN COB-ID Emergency Message [hex]						p8723	CAN Transmit PDO 4 [hex]					
p8604	CAN Node Guarding						p8724	CAN Transmit PDO 5 [hex]					
p8606	CAN Producer Heartbeat Time [ms]						p8725	CAN Transmit PDO 6 [hex]					
r8607	CAN Identity Object						p8726	CAN Transmit PDO 7 [hex]					
p8608	CAN Clear Bus Off Error						p8727	CAN Transmit PDO 8 [hex]					
p8609	CAN Error Behavior						p8730	CAN Transmit Mapping for TPDO 1 [hex]					
r8610	CAN First Server SDO						p8731	CAN Transmit Mapping for TPDO 2 [hex]					
p8611	CAN Pre-defined Error Field [hex]						p8732	CAN Transmit Mapping for TPDO 3 [hex]					
p8620	CAN Node-ID						p8733	CAN Transmit Mapping for TPDO 4 [hex]					
r8621	CAN Node-ID effective						p8734	CAN Transmit Mapping for TPDO 5 [hex]					
p8622	CAN bit rate [kBit/s]						p8735	CAN Transmit Mapping for TPDO 6 [hex]					
	0	1000	1	800	2	500	p8736	CAN Transmit Mapping for TPDO 7 [hex]					
	3	250	4	125	5	50	p8737	CAN Transmit Mapping for TPDO 8 [hex]					
	6	20	7	10			p8741	CAN PDO configuration acknowledgment					
p8623	CAN Bit Timing selection [hex]						p8744	CAN PDO Mapping Configuration					
p8630	CAN virtual objects							1:	Predefined connection set				
p8641	CAN Abort Connection Option Code							2:	Free PDO mapping				
	0	No response	1	OFF1			r8750	CAN mapped receive objects 16 bit					
	2	OFF2	3	OFF3			r8751	CAN mapped receive objects 16 bit					
r8680	CAN Diagnosis Hardware						r8784	CO: CAN status word					
p8684	CAN NMT state after booting						p8785	BI: CAN status word bit 8					
p8685	CAN NMT state						p8786	BI: CAN status word bit 14					
p8699	CAN RPDO monitoring time [ms]						p8787	BI: CAN status word bit 15					
p8700	CAN Receive PDO 1 [hex]						p8790	CAN control word - auto interconnection					
p8701	CAN Receive PDO 2 [hex]						r8795	CAN control word					
p8702	CAN Receive PDO 3 [hex]						r8797	CAN Target Torque					
p8703	CAN Receive PDO 4 [hex]						PROFIdrive						
p8704	CAN Receive PDO 5 [hex]						r8820	Identification and Maintenance 0					
p8705	CAN Receive PDO 6 [hex]						p8829	CBE20 Remote Controller number					
p8706	CAN Receive PDO 7 [hex]						r8909	PN Device ID					
p8707	CAN Receive PDO 8 [hex]						p8920	PN Name of station					
p8710	CAN Receive Mapping for RPDO 1 [hex]						p8921	PN IP Address of Station					
p8711	CAN Receive Mapping for RPDO 2 [hex]						p8922	PN Default Gateway of Station					
p8712	CAN Receive Mapping for RPDO 3 [hex]						p8923	PN Subnet Mask of Station					
p8713	CAN Receive Mapping for RPDO 4 [hex]						p8925	PN interfaces configuration					
p8714	CAN Receive Mapping for RPDO 5 [hex]							0:	No function				
p8715	CAN Receive Mapping for RPDO 6 [hex]							1:	Activate the configuration				
p8716	CAN Receive Mapping for RPDO 7 [hex]							2:	Activate the configuration and save				
p8717	CAN Receive Mapping for RPDO 8 [hex]							3:	Delete configuration				
p8720	CAN Transmit PDO 1 [hex]						p8929	PN Remote Controller number					
p8721	CAN Transmit PDO 2 [hex]							0:	Automation or Safety				
p8722	CAN Transmit PDO 3 [hex]												

Commissioning

4.3 Further settings

No.	Description						
	1: Automation and Safety						
r8930	PN Name of Station active						
r8931	PN IP Address of Station active						
r8932	PN Default Gateway of Station active						
r8933	PN Subnet Mask of Station active						
r8935	PN MAC Address of Station						
r8939	PN DAP ID						
r8960	PN Subslot assignment						
r8961	PN IP Addr Remote Controller 1						
r8962	PN IP Addr Remote Controller 2						
p8980	Ethernet/IP profile						
	0:	SINAMICS	1:	ODVA / AC/DC			
p8981	Ethernet/IP ODVA STOP mode						
	0:	OFF1	1:	OFF2			
p8982	Ethernet/IP ODVA speed scaling						
p8983	123:	32	124:	16			
	125:	8	126:	4			
	127:	2	128:	1			
	129:	0.5	130:	0.25			
	131:	0.125	132:	0.0625			
	133:	0.03128					
p8991	USB memory access						
Parameter consistency and storage							
p9400	Safely remove memory card						
	0	No memory card inserted					
	1	Memory card inserted					
	2	Request "safe removal" of the memory card					
	3	"Safe removal" possible					
	100	"Safe removal" not possible due to access					
r9401	Safely remove memory card status						
r9463	Set valid macro						
p9484	BICO interconnections, search signal source						
r9485	BICO interconnections, search signal source number						
r9486	BICO interconnections, search signal source first index						
Safety Integrated							
p9601	SI enable, functions integrated in the drive (processor 1)						
p9610	SI PROFIsafe address (processor 1)						
p9650	SI F-DI changeover, tolerance time (processor 1) [ms]						
Diagnostics (internal)							
r9976	System utilization						
	[1]	Computation time utilization					
	[5]	Highest gross utilization					
r61000	PROFINET Name of Station						
r61001	PROFINET IP of Station						

Trouble shooting

5.1 List of alarms and faults

Axxxxx Alarm

Fyyyyy: Fault

Table 5- 1 The most important alarms and faults of the safety functions

Number	Cause	Remedy						
F01600	STOP A Triggered	STO Select and then deselect again.						
F01650	Acceptance test required	Carry out acceptance test and create test certificate. Switch the Control Unit off and then on again.						
F01659	Write task for parameter rejected	<p>Cause: The converter should be reset to the factory setting. The resetting of the safety functions is, however, not allowed, because the safety functions are currently enabled.</p> <p>Remedy with operator panel:</p> <table border="1"> <tr> <td>p0010 = 30</td><td>Parameter reset</td></tr> <tr> <td>p9761 = ...</td><td>Enter password for the safety functions.</td></tr> <tr> <td>p0970 = 5</td><td>Reset Start Safety Parameter. The converter sets p0970 = 5 if it has reset the parameters.</td></tr> </table> <p>Then reset the converter to the factory setting again.</p>	p0010 = 30	Parameter reset	p9761 = ...	Enter password for the safety functions.	p0970 = 5	Reset Start Safety Parameter. The converter sets p0970 = 5 if it has reset the parameters.
p0010 = 30	Parameter reset							
p9761 = ...	Enter password for the safety functions.							
p0970 = 5	Reset Start Safety Parameter. The converter sets p0970 = 5 if it has reset the parameters.							
A01666	Static 1 signal atF-DI for safe acknowledgment	F-DI to a logical 0 signal.						
A01698	Commissioning mode active for safety functions	This message is withdrawn after the Safety commissioning has ended.						
A01699	Shutdown path test required	After the next time that the "STO" function is deselected, the message is withdrawn and the monitoring time is reset.						
F30600	STOP A Triggered	STO Select and then deselect again.						

Table 5- 2 The most important alarms and faults

Number	Cause	Remedy
F01018	Power-up aborted more than once	<ol style="list-style-type: none"> 1. Switch off the converter power supply and switch it on again. 2. After this fault, the converter powers up with the factory settings. 3. Recommission the converter.
A01028	Configuration error	<p>Explanation: Parameterization on the memory card has been created with a different type of module (order number, MLFB)</p> <p>Check the module parameters and recommission if necessary.</p>
F01033	Unit switchover: Reference parameter value invalid	Set the value of the reference parameter to a value other than 0.0 (p0304, p0305, p0310, p0596, p2000, p2001, p2002, p2003, r2004).
F01034	Unit switchover: Calculation of the parameter values after reference value change unsuccessful	Select the value of the reference parameter so that the parameters involved can be calculated in the per unit notation (p0304, p0305, p0310, p0596, p2000, p2001, p2002, p2003, r2004).
F01122	Frequency at the probe input too high	Reduce the frequency of the pulses at the probe input.

Trouble shooting

5.1 List of alarms and faults

Number	Cause	Remedy
A01590	Motor maintenance interval lapsed	Carry out the maintenance.
A01900	PROFIBUS: Configuration telegram faulty	Explanation: A PROFIBUS master is attempting to establish a connection with a faulty configuration telegram. Check the bus configuration on the master and slave side.
A01910 F01910	Fieldbus SS setpoint timeout	The alarm is generated when p2040 ≠ 0 ms and one of the following causes is present: <ul style="list-style-type: none">• The bus connection is interrupted• The MODBUS master is switched off• Communications error (CRC, parity bit, logical error) An excessively low value for the fieldbus monitoring time (p2040)
A01920	PROFIBUS: Cyclic connection interrupt	Explanation: The cyclic connection to PROFIBUS master is interrupted. Establish the PROFIBUS connection and activate the PROFIBUS master with cyclic operation.
F03505	Analog input, wire break	Check the connection to the signal source for interrupts. Check the level of the signal supplied. The input current measured by the analog input can be read out in r0752.
A03520	Temperature sensor fault	Check that the sensor is connected correctly.
A05000 A05001 A05002 A05004 A05006	Power Module overtemperature	Check the following: <ul style="list-style-type: none">- Is the ambient temperature within the defined limit values?- Are the load conditions and duty cycle configured accordingly?- Has the cooling failed?
F06310	Supply voltage (p0210) incorrectly parameterized	Check the parameterized supply voltage and if required change (p0210). Check the line voltage.
F07011	Motor overtemperature	Reduce the motor load. Check ambient temperature. Check sensor's wiring and connection.
A07012	I2t Motor Module overtemperature	Check and if necessary reduce the motor load. Check the motor's ambient temperature. Check thermal time constant p0611. Check overtemperature fault threshold p0605.
A07015	Motor temperature sensor alarm	Check that the sensor is connected correctly. Check the parameter assignment (p0601).
F07016	Motor temperature sensor fault	Make sure that the sensor is connected correctly. Check the parameterization (p0601).
F07086 F07088	Unit switchover: Parameter limit violation	Check the adapted parameter values and if required correct.
F07320	Automatic restart aborted	Increase the number of restart attempts (p1211). The current number of start attempts is shown in r1214. Increase the wait time in p1212 and/or monitoring time in p1213. Create ON command (p0840). Increase the monitoring time of the power unit or switch off (p0857). Reduce the wait time for resetting the fault counter p1213[1] so that fewer faults are registered in the time interval.
A07321	Automatic restart active	Explanation: The automatic restart (AR) is active. During voltage recovery and/or when remedying the causes of pending faults, the drive is automatically switched back on.

Number	Cause	Remedy
F07330	Search current measured too low	Increase search current (P1202), check motor connection.
A07400	V _{DC_max} controller active	If the controller is not to intervene: <ul style="list-style-type: none"> • Increase the ramp-down times. • Deactivate the V_{DC_max} controller (p1240 = 0 for vector control, p1280 = 0 for V/f control).
A07409	V/f control current limiting controller active	The alarm automatically disappears after one of the following measures: <ul style="list-style-type: none"> • Increase the current limit (p0640). • Reduce load. • Increase the ramp-up time to the speed setpoint.
F07426	Technology controller actual value limited	<ul style="list-style-type: none"> • Adapt the limits to the signal level (p2267, p2268). • Check the actual value scaling (p2264).
F07801	Motor overcurrent	<p>Check current limits (p0640). U/f control: Check the current limiting controller (p1340 ... p1346). Increase acceleration ramp (p1120) or reduce load. Check motor and motor cables for short circuit and ground fault. Check motor for star-delta connection and rating plate parameterization. Check power unit / motor combination. Select flying restart function (p1200) if switched to rotating motor.</p>
A07805	Drive: Power unit overload I _{2t}	<ul style="list-style-type: none"> • Reduce the continuous load. • Adapt the load cycle. • Check the assignment of rated currents of the motor and power unit.
F07807	Short circuit detected	<ul style="list-style-type: none"> • Check the converter connection on the motor side for any phase-phase short-circuit. • Rule out that line and motor cables have been interchanged.
A07850	External alarm 1	<p>The signal for "external alarm 1" has been triggered. Parameter p2112 defines the signal source of the external alarm. Remedy: Rectify the cause of this alarm.</p>
F07860	External fault 1	Remove the external causes for this fault.
F07900	Motor blocked	<ul style="list-style-type: none"> • Make sure that the motor can rotate freely. • Check the torque limit: r1538 for a positive direction of rotation; r1539 for a negative direction of rotation.
F07901	Motor overspeed	Activate precontrol of the speed limiting controller (p1401 bit 7 = 1).
F07902	Motor stalled	<p>Check whether the motor data has been parameterized correctly and perform motor identification. Check the current limits (p0640, r0067, r0289). If the current limits are too low, the drive cannot be magnetized. Check whether motor cables are disconnected during operation.</p>
A07903	Motor speed deviation	<p>Increase p2163 and/or p2166. Increase the torque, current and power limits.</p>
A07910	Motor overtemperature	<p>Check the motor load. Check the motor's ambient temperature. Check the KTY84 sensor.</p>
A07920	Torque/speed too low	The torque deviates from the torque/speed envelope curve.
A07921	Torque/speed too high	<ul style="list-style-type: none"> • Check the connection between the motor and the load.
A07922	Torque/speed out of tolerance	<ul style="list-style-type: none"> • Adapt the parameterization corresponding to the load.
F07923	Torque/speed too low	<ul style="list-style-type: none"> • Check the connection between the motor and the load.
F07924	Torque/speed too high	<ul style="list-style-type: none"> • Adapt the parameterization corresponding to the load.

Trouble shooting

5.1 List of alarms and faults

Number	Cause	Remedy
A07927	DC braking active	Not required
A07980	Rotary measurement activated	Not required
A07981	No enabling for rotary measurement	Acknowledge pending faults. Establish missing enables (see r00002, r0046).
A07991	Motor data identification activated	Switch on the motor and identify the motor data.
F08501	Setpoint timeout	<ul style="list-style-type: none"> Check the PROFINET connection. Set the controller to RUN mode. If the error occurs repeatedly, check the monitoring time set (p2044).
F08502	Monitoring time, sign-of-life expired	<ul style="list-style-type: none"> Check the PROFINET connection.
F08510	Send configuration data not valid	<ul style="list-style-type: none"> Check the PROFINET configuration
A08511	Receive configuration data not valid	
A08526	No cyclic connection	<ul style="list-style-type: none"> Activate the controller with cyclic operation. Check the parameters "Name of Station" and "IP of Station" (r61000, r61001).
A08565	Consistency error affecting adjustable parameters	<p>Check the following:</p> <ul style="list-style-type: none"> IP address, subnet mask or default gateway is not correct. IP address or station name used twice in the network. Station name contains invalid characters.
F08700	Communications error	<p>A CAN communications error has occurred. Check the following:</p> <ul style="list-style-type: none"> Bus cable Baud rate (p8622) Bit timing (p8623) Master <p>Start the CAN controller manually with p8608 = 1 after the cause of the fault has been resolved!</p>
F13100	Know-how protection: Copy protection error	<p>The know-how protection and the copy protection for the memory card are active. An error occurred during checking of the memory card.</p> <ul style="list-style-type: none"> Insert a suitable memory card and switch the converter supply voltage temporarily off and then on again (POWER ON). Deactivate the copy protection (p7765).
F13101	Know-how protection: Copy protection cannot be activated	Insert a valid memory card.
F30001	Overcurrent	<p>Check the following:</p> <ul style="list-style-type: none"> Motor data, if required, carry out commissioning Motor's connection method (Y / Δ) U/f operation: Assignment of rated currents of motor and Power Module Line quality Make sure that the line commutating reactor is connected properly Power cable connections Power cables for short-circuit or ground fault Power cable length Line phases <p>If this doesn't help:</p> <ul style="list-style-type: none"> U/f operation: Increase the acceleration ramp Reduce the load Replace the power unit

Number	Cause	Remedy
F30002	DC-link voltage overvoltage	Increase the ramp-down time (p1121). Set the rounding times (p1130, p1136). Activate the DC link voltage controller (p1240, p1280). Check the line voltage (p0210). Check the line phases.
F30003	DC-link voltage undervoltage	Check the line voltage (p0210).
F30004	Converter overtemperature	Check whether the converter fan is running. Check whether the ambient temperature is in the permissible range. Check whether the motor is overloaded. Reduce the pulse frequency.
F30005	I2t converter overload	Check the rated currents of the motor and Power Module. Reduce current limit p0640. When operating with U/f characteristic: Reduce p1341.
F30011	Line phase failure	Check the converter's input fuses. Check the motor cables.
F30015	Motor cable phase failure	Check the motor cables. Increase the ramp-up or ramp-down time (p1120).
F30021	Ground fault	<ul style="list-style-type: none"> • Check the power cable connections. • Check the motor. • Check the current transformer. • Check the cables and contacts of the brake connection (a wire might be broken).
F30027	Time monitoring for DC link pre-charging	Check the line voltage. Check the line voltage setting (p0210).
F30035	Overttemperature, intake air	<ul style="list-style-type: none"> • Check whether the fan is running. • Check the fan filter elements. • Check whether the ambient temperature is in the permissible range.
F30036	Overttemperature, inside area	
F30037	Rectifier overtemperature	See F30035 and, in addition: <ul style="list-style-type: none"> • Check the motor load. • Check the line phases
A30049	Internal fan defective	Check the internal fan and if required replace.
F30059	Internal fan defective	Check the internal fan and if required replace.
F30074	Communications fault between Control Unit and Power Module	The 24V voltage supply of the converter (terminals 31 and 32) was interrupted briefly. Please check the voltage supply and the wiring.
A30502	DC link overvoltage	<ul style="list-style-type: none"> • Check the device supply voltage (p0210). • Check the line reactor dimensioning
A30920	Temperature sensor fault	Check that the sensor is connected correctly.
A50001	PROFINET configuration error	A PROFINET controller is attempting to establish a connection with a faulty configuration telegram. Check to see whether "Shared Device" is activated (p8929 = 2).
A50010	PROFINET name of station invalid	Correct name of station (p8920) and activate (p8925 = 2).
A50020	PROFINET: Second controller missing	"Shared Device" is activated (p8929 = 2). However, only the connection to a PROFINET controller is present.

For further information, please refer to the List Manual.

Trouble shooting

5.2 Product support

5.2 Product support

Table 5- 3 Technical Support

France	Germany	Italy	Spain	United Kingdom
+33 (0) 821 801 122	+49 (0)911 895 7222	+39 (02) 24362000	+34 902 237 238	+44 161 446 5545
Further service telephone numbers: Product support (http://support.automation.siemens.com/WW/view/en/4000024)				

Table 5- 4 Manuals with further information

Information level	Manual	Content	Available languages	Download or order number
+	Getting Started	(this manual)	English,	Documentation download (http://support.automation.siemens.com/WW/view/en/36426537/133300)
++	Operating instructions - converter	Installing, commissioning and operating the converter. Description of converter functions. Technical data.	German, Italian, French, Spanish, Chinese	SINAMICS Manual Collection Documentation on DVD Order number: 6SL3097-4CA00-0YG0
+++	Function Manual Safety Integrated	Configuring PROFIsafe. Installing, commissioning and operating the integrated fail-safe function.	English, German	
+++	List manual	Complete list of parameters, alarms and faults. Graphic function block diagrams.	English, German, Chinese	
+++	Operating instructions - BOP-2, IOP	Description of operator panel	English, German	

5.3 Spare parts

		Order number
Spare part kit including 5 sets I/O terminals, 2 door sets and 1 blind cover		6SL3200-0SK41-0AA0
Screening plates	Frame size A	6SL3266-1EA00-0KA0
	Frame size B	6SL3266-1EB00-0KA0
	Frame size C	6SL3266-1EC00-0KA0
1 set of connector plugs (mains, motor and breaking resistor)	Frame size A	6SL3200-0ST05-0AA0
	Frame size B	6SL3200-0ST06-0AA0
	Frame size C	6SL3200-0ST07-0AA0
Fan units	Frame size A	6SL3200-0SF12-0AA0
	Frame size B	6SL3200-0SF13-0AA0
	Frame size C	6SL3200-0SF14-0AA0
Top cover with built in fan	Frame size A	6SL3200-0SF40-0AA0
	Frame size B	6SL3200-0SF41-0AA0
	Frame size C	6SL3200-0SF42-0AA0

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