ACOPOSinverter P77

Operating instructions
(April 2025)
MAACPIP77BA-ENG

Translation of the original documentation

Publishing information

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Disclaimer

Version history

B&R makes every effort to keep documents as current as possible.Current versions are available for download on the B&R website (www.br-automation.com).

Version	Date	Comment[1)]
0.1	July 2024	First draft

1) Editorial corrections are not listed.

1 General information

1.1 Overview

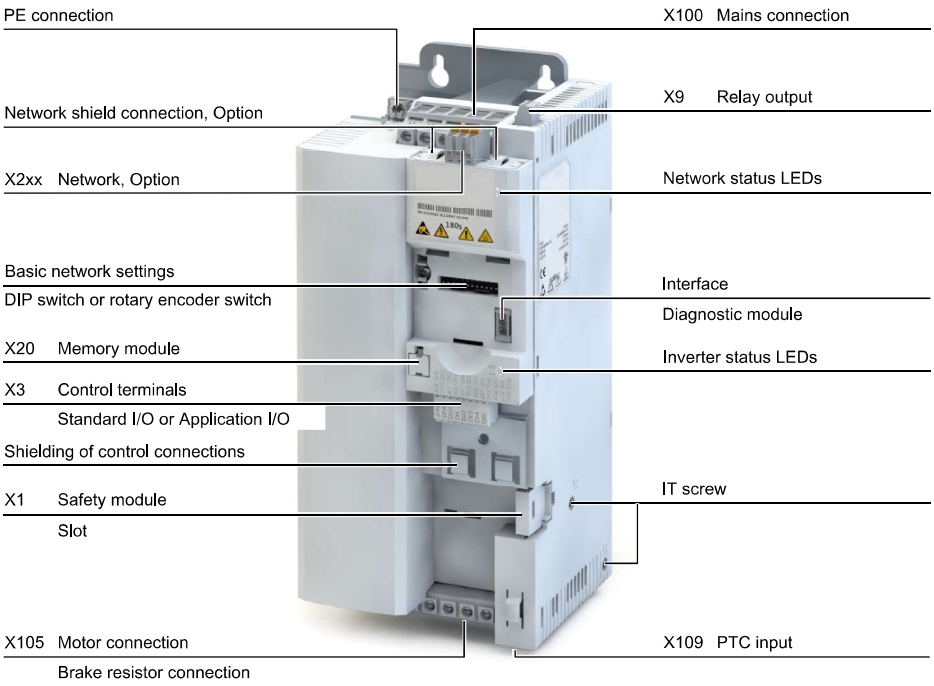


Figure 1: Hardware overview of the inverter

1.2 Information

Please read this documentation carefully before installing the inverter and observe the safety instructions!

This document only includes the most frequently asked questions and presents them in a simplified form for a better overview. Detailed technical and functional explanations can be found in the comprehensive product documentation.

The complete documentation, further information and tools can be found on the Internet: B&R website (https://www.br-automation.com)

1.2.1 Application as directed

- The product is a piece of professional equipment intended for use by trades, specific professions or industry, and not for sale to the general public. IEC 60050 [IEV161-05-05]
- To prevent personal injury and damage to property, higher-level safety and protection systems must be used!
- All transport locks must be removed.
- Operation of the product is only permitted under the specified operating conditions and in the specified mounting orientations.
- The product is only suitable for installation in control cabinets and, depending on the protection class, for wall mounting.
- Operating the product is only permitted with motors that are suitable for operation with inverters.
- Operating the product in private areas, in potentially explosive atmospheres and in areas with harmful gases, oils, acids and radiation is not permitted.

1.2.2 Device-specific standards and directives

- The product meets the protection requirements of the Low-Voltage Directive 2014/35/EU.
- The harmonized standard EN IEC 61800-5-1 is used for the inverters. (Europe).
- UL 61800-5-1 and CAN/CSA C22.2 No.274 are the North American electrical safety standards.

1.2.3 Relevant standards and directives for the operator

- If the product is used in accordance with the technical data, the drive systems comply with the EN IEC 61800-3 categories (Category C2 is similar to FCC Class A).
- The test voltage for insulation resistance tests between a control potential of 24 V and PE must be measured in accordance with EN IEC 61800-5-1.
- The cables must be installed in accordance with EN IEC 60204-1 or US National Electrical Code NFPA 70/Canadian Electrical Code C22.1.

1.2.4 Commissioning

- Commissioning or starting the operation as directed of a machine with the product is prohibited until it has been ensured that the machine meets the regulations of the Machinery Directive 2006/42/EG and the standard EN IEC 60204-1.
- Commissioning or starting the operation as directed is only permissible if the EMC Directive 2014/30/EU is complied with.
- In residential areas, the product may cause EMC interference. The operator is responsible for executing the interference suppression measures.

1.3 Identification of products

Product range														
8														Product group Motion
	Product family													
	I													Variable frequency drives
		Model												
		77												ACOPOSinverter P77
			Number of phases											
			S											1-phase
			T											3-phase
				Voltage range										
				1										90 to 132 V
				2										170 to 264 V
				4										340 to 528 V
					Nominal power									
					0-9									W x 10^5
						0-9								W x 10^4
							0-9							W x 10^3
								0-9						W x 10^2
									0-9					W x 10
											Interface			
										.	0-F			Interface variant 0 ... Standard
										.	0P			Type of interface P ... POWERLINK
													Version	
												-	000	Version 000
Examples														
8	I	77	S	2	0	0	0	2	5	.	0P	-	000	ACOPOSinverter P77, 1 x 200-240 V, 0.25 kW, integrated EMC filter and brake chopper, POWERLINK interface
8	I	77	T	4	0	3	0	0	0	.	0P	-	000	ACOPOSinverter P77, 3 x 380-500 V, 30 kW, integrated EMC filter and brake chopper, POWERLINK interface, shield plate included in delivery

1.4 Organization of notices

Safety notices

Contain **only** information that warns of dangerous functions or situations.

Signal word	Description
Danger!	Failure to observe these safety guidelines and notices will result in death, severe injury or substantial damage to property.
Warning!	Failure to observe these safety guidelines and notices can result in death, severe injury or substantial damage to property.
Caution!	Failure to observe these safety guidelines and notices can result in minor injury or damage to property.
Notice!	Failure to observe these safety guidelines and notices can result in damage to property.

General notices

Contain **useful** information for users and instructions for avoiding malfunctions.

Signal word	Description
Information:	Useful information, application tips and information for avoiding malfunctions.

1.5 Numeric notation

As a rule, a period is used as a decimal separator in this documentation.

Example: 1234.56

1.6 Safety instructions

Basic safety instructions

Danger!

Disregarding the following basic safety instructions and safety information may lead to severe personal injury and damage to property!

- **Only use the product as directed.**
- **Never commission the product in the event of visible damage.**
- **Never modify the product technically.**
- **Never commission the product before assembly has been completed.**
- **Never operate the product without the required covers.**
- **Connect/disconnect all pluggable connections only in deenergized state!**
- **Only remove the product from the installation in a deenergized state.**
- **The product can - depending on their degree of protection - have live, movable or rotating parts during or after operation. Surfaces can be hot. Surfaces can be hot.**
- **Observe all specifications of the corresponding documentation supplied. This is the condition for safe and trouble-free operation and the achievement of the specified product features.**
- **The procedural notes and circuit details given in the associated documentation are suggestions and their transferability to the respective application must be checked. The manufacturer of the product does not take responsibility for the suitability of the process and circuit proposals.**
- **All work with and on the product may only be carried out by qualified personnel. IEC 60364 and CENELEC HD 384 define the qualifications of these persons:**
  - **They are familiar with installing, mounting, commissioning, and operating the product.**
  - **They have the corresponding qualifications for their work.**
  - **They know all accident prevention regulations, guidelines and laws applicable at the operation site and can apply them.**

Warning!

Functional safety

Certain variants of the product support safety functions (e.g. “Safe Torque Off (STO)”) in accordance with the requirements of 2006/42/EC: Machinery Directive [UKCA: S.I. 2008/1597 - The Supply of Machinery (Safety) Regulations 2008].

Be sure to observe the instructions in the documentation regarding the integrated safety technology.

Notice!

Device protection

Carry out insulation resistance tests between 24-V control potential terminals and PE. The maximum test voltage must not exceed 110 V DC.

Notice!

Foreseeable misuse

Inverters are not to be operated with DC motors.

1.6.1 Residual hazards

The user must take the residual hazards mentioned into consideration in the risk assessment for his/her machine/system. If the above is disregarded, this may result in injuries to persons and material damage!

Degree of protection - Personal protection and device protection

Specifications apply to the ready-to-use state.

Motor protection

With some settings of the inverter, the connected motor can be overheated.

- E.g. via the operation of self-ventilated motors at low speeds over a long period.
- E.g. by operating DC-injection braking over a long period.

Product

Observe the warning labels on the product!

Dangerous electrical voltage:
Before working on the product, make sure there is no voltage applied to the power terminals! After mains disconnection, the power terminals will still carry the hazardous electrical voltage for the time given next to the symbol!

Electrostatic sensitive devices:
Before working on the product, the staff must ensure to be free of electrostatic charge!

High leakage current:
Carry out fixed installation and PE connection in compliance with: EN 61800-5-1 / EN 60204-1

Hot surface:
Use personal protective equipment or wait until the device has cooled down!

Protection of the machine/system

- Drives can reach dangerous overspeeds, e. g. by setting high output frequencies in connection with motors and machines not suitable for this purpose.The inverters do not provide protection against such operating conditions. For this purpose, use additional components.
- Only switch the contactor in the motor cable when the inverter is inhibited. Switching them when the inverter is enabled is only permissible when no monitoring components respond.

Motor

If there is a short circuit of two power transistors, a residual movement of up to 180°/number of pole pairs can occur at the motor! (e. g. 4-pole motor: residual movement max. 180°/2 = 90°).

2 Technical data

2.1 Standards and operating conditions

Market approvals		CE (European Union) UKCA (Great Britain) UL (USA) CSA (Canada)		Further information and certificates of approval: B&R website (https://www.br-automation.com)
Environment		RoHS		
Energy efficiency	**High Efficiency**	EN IEC 61800-9-2	Class IE2	
Degree of protection	**EN**	EN IEC 60529	IP20	Data applies to operationally ready mounted state and not in wire range of terminals
	NEMA	NEMA 250	Type 1 (only protection against accidental contact)	
Climate	**Operation**	EN 60721-3-3:1995 + A2:1997	3K3 (-10 ... +60 °C)	Operation at a switching frequency of 2 or 4 kHz: Above +45 °C: reduce rated output current by 2.5 %/°C
				Operation at a switching frequency of 8 or 16 kHz: Above +40°C: reduce rated output current by 2.5 %/°C
				Relative humidity < 95 %, condensation not permissible
			3C3	For chemically active substances
			3S2	For mechanically active substances
Power systems			TT, TN	Voltage to earth: max. 300 V
			IT	Apply the measures described for IT systems!
Mains switching			3 x within one minute possible	
Max. motor cable length			device-specific; see technical data in project planning document	
Max. output frequency			0 Hz ... 599 Hz	
Overload capacity			Heavy Duty: 200 % for 3s, 150 % for 60s Light Duty 167 % for 3 s, 125 % for 60 s	

Further standards and operating conditions can be found in the project planning documents.

3 Mechanical installation

3.1 Important notes

Notice!

UL marking

Modular construction - A complete drive consists of a power unit series no. 8I77*.00-000 in combination with a control unit series no. 8I0CU108.600-1 only.

Marquage UL

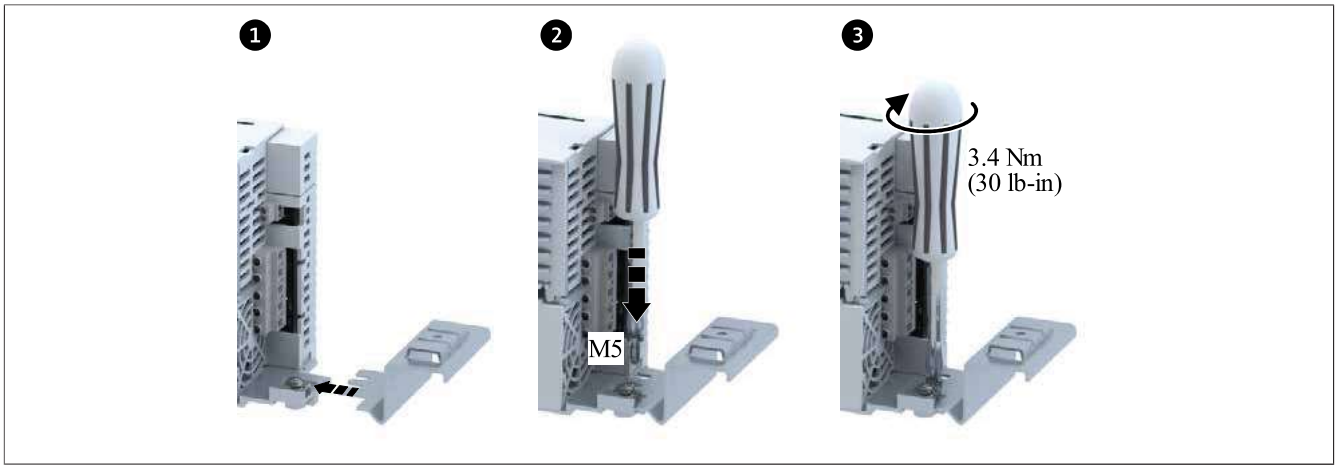
Conception modulaire – Le système d'entraînement complet comprend un module d'alimentation de série 8I77*.00-000, impérativement associé à une unité de commande de série 8I0CU108.600-1.

3.2 Preparation

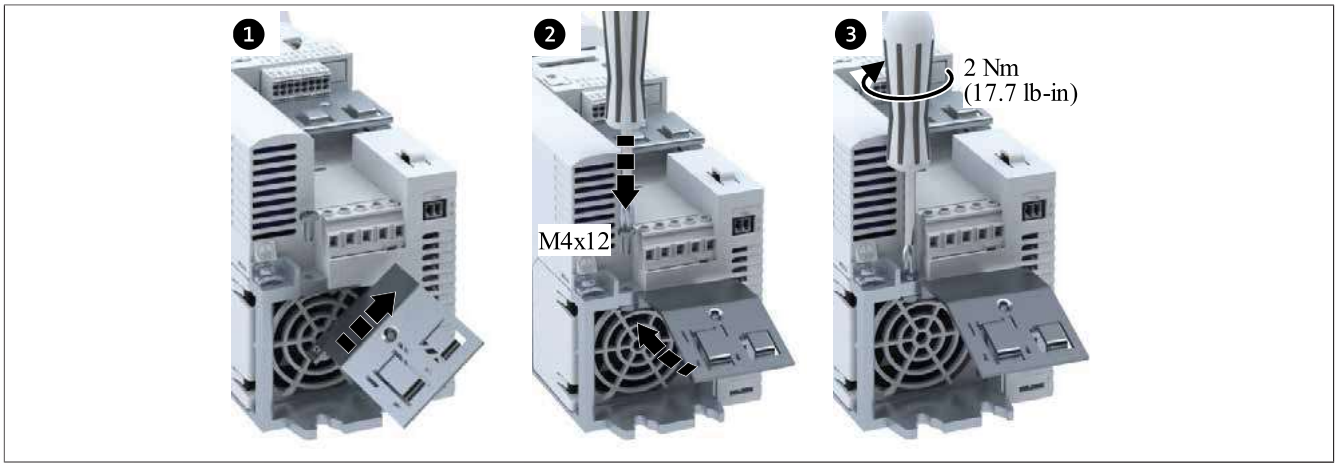
3.2.1 Mounting of shield connection sheet

8I77xx00025 ... 8I77xx00400 (optional accessories)

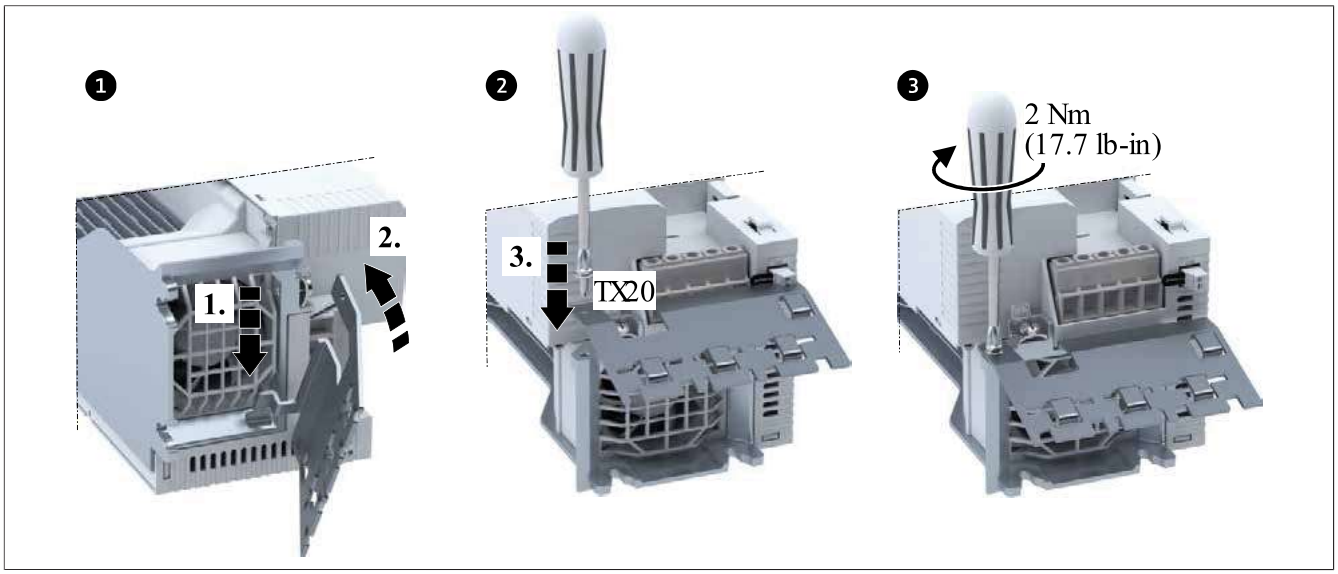
Together with the inverter, the shield connection sheet is screwed onto the mounting plate.



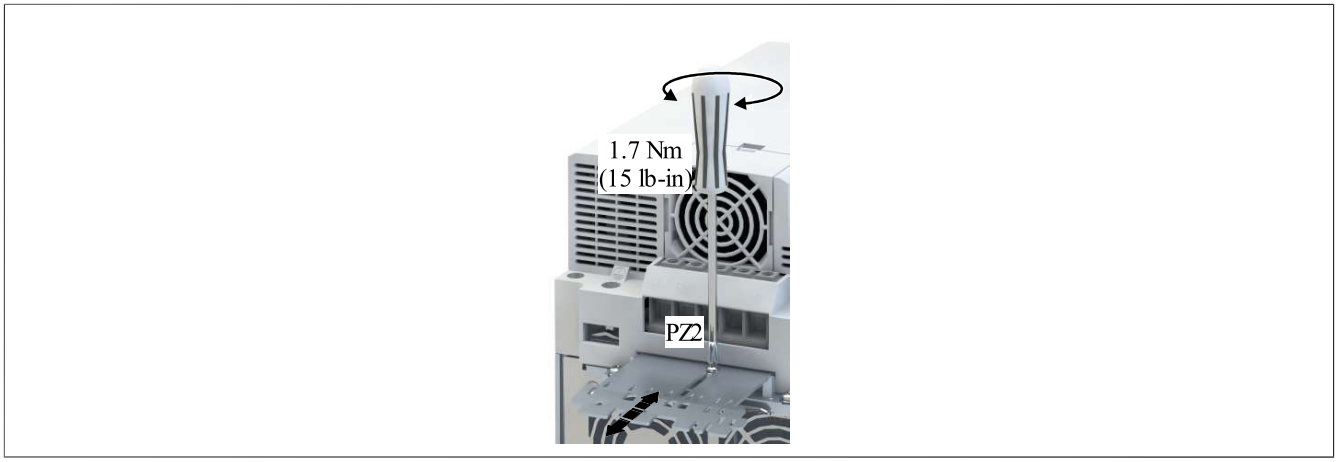
8I77xx00550 (optional accessories)



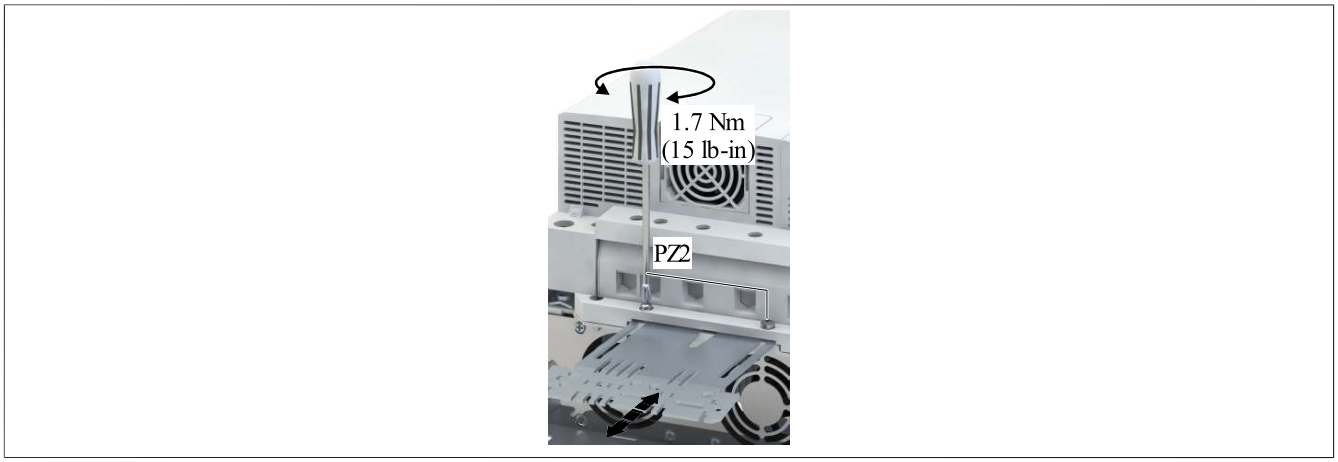
8I77xx00750 ... 8I77xx01100 (optional accessories)



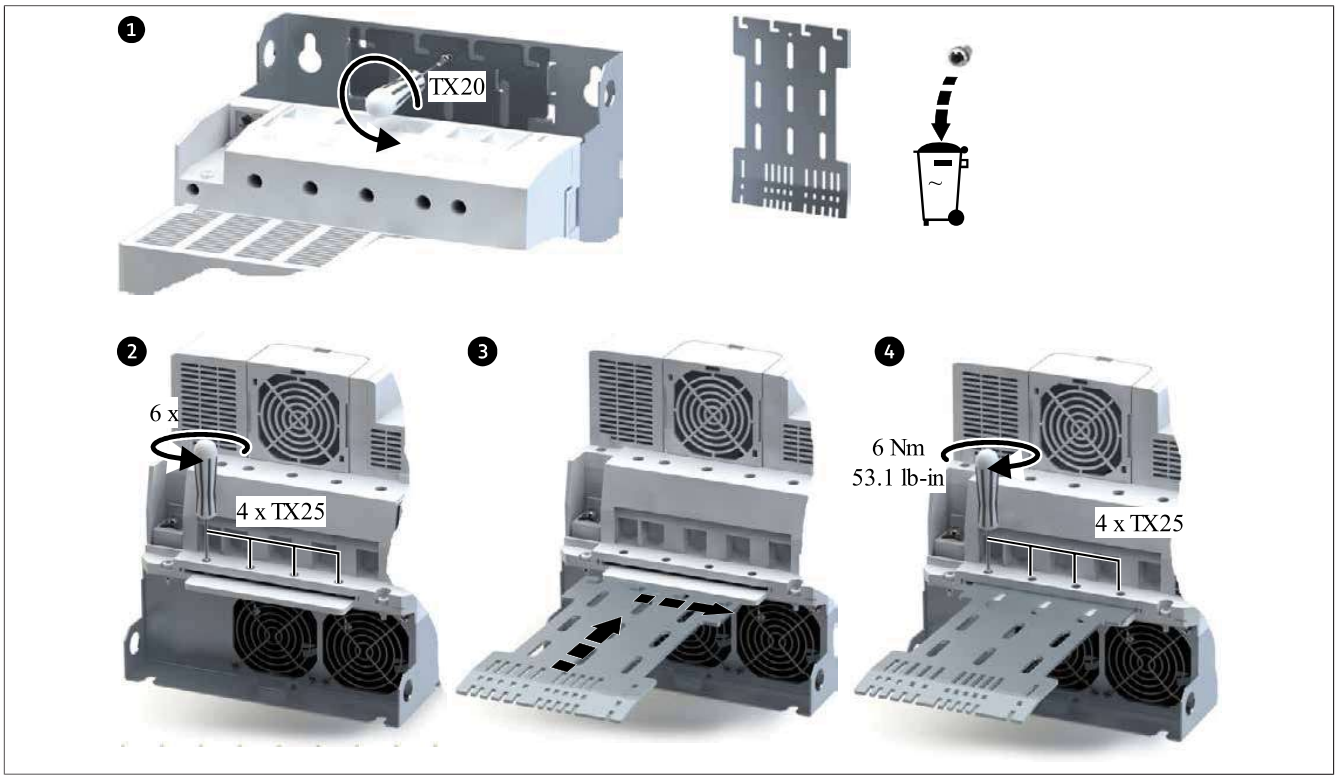
8I77xx01500 ... 8I77xx03000



8I77xx03700 ... 8I77xx04500



8I77xx05500 ... 8I77xx11000



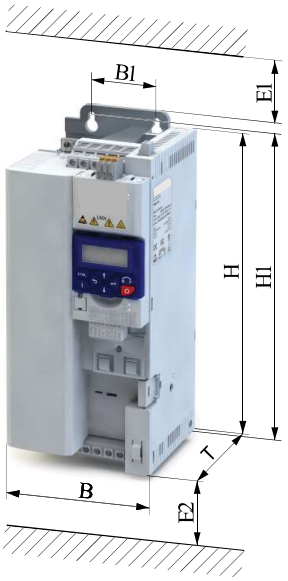
3.3 Dimensions and assembly

Notice!

The specified installation clearances are minimum dimensions to ensure a sufficient air circulation for cooling purposes. They do not take into account the bending radii of the connecting cables.

Several inverters can be mounted directly next to each other, regardless of the device size. No installation clearance is required between the devices.

Inverter	Rated power	Weight	H	B	T	H1	B1	Screws	E1	E2
	[kW]	[kg]	[mm]	[mm]	[mm]	[mm]	[mm]		[mm]	[mm]
1-phase mains connection 120 V devices										
8I77S100025 8I77S100037	0.25 ... 0.37	1	180	60	130	190	-	2x M5	>50	>50
8I77S100075 8I77S100110	0.75 ... 1.1	1.35	250	60	130	260	-	2x M5	>50	>50
1-phase mains connection 230/240 V devices										
8I77S200025 8I77S200037	0.25 ... 0.37	0.8	155	60	130	165	-	2x M5	>50	>50
8I77S200055 8I77S200075	0.55 ... 0.75	1	180	60	130	190	-	2x M5	>50	>50
8I77S200110 8I77S200150 8I77S200220	1.1 ... 2.2	1.35	250	60	130	260	-	2x M5	>50	>50
1-/3-phase mains connection 230/240 V devices										
8I77T200025 8I77T200037	0.25 ... 0.37	0.8	155	60	130	165	-	2x M5	>50	>50
8I77T200055 8I77T200075	0.55 ... 0.75	1	180	60	130	190	-	2x M5	>50	>50
8I77T200110 8I77T200150 8I77T200220	1.1 ... 2.2	1.35	250	60	130	260	-	2x M5	>50	>50
8I77T200400 8I77T200550	4 ... 5.5	2.1	250	90	130	260	30	4x M5	>50	>100
3-phase mains connection 400/480 V devices										
8I77T400037	0.37	0.8	155	60	130	165	-	2x M5	>50	>50
8I77T400055 8I77T400075	0.55 ... 0.75	1	180	60	130	190	-	2x M5	>50	>50
8I77T400110 8I77T400150 8I77T400220	1.1 ... 2.2	1.35	250	60	130	260	-	2x M5	>50	>50
8I77T400300 8I77T400400	3 ... 4	1.35	250	60	130	260	-	2x M5	>50	>50
8I77T400550	5.5	2.3	250	90	130	260	30	4x M5	>50	>50
8I77T400750 8I77T401100	7.5 ... 11	3.7	276	120	130	285	60	4x M5	>50	>100
8I77T401500 8I77T401850 8I77T402200 8I77T403000	15 ... 30	8	342	180	165	365	154	4x M6	>50	>100
8I77T403700 8I77T404500	37 ... 45	17.2	450	250	230	496	210	4x M8	>95	>120
8I77T405500 8I77T407500	55 ... 75	24	536	250	265	596	210	4x M8	>95	>260
8I77T409000 8I77T411000	90 ... 110	35.6	685	258	304	748	210	4x M8	>95	>260



4 Electrical installation

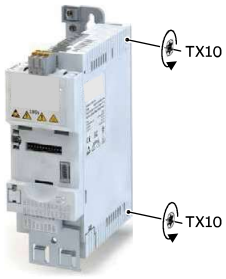
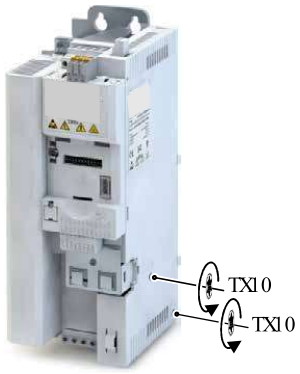
4.1 Preparation for connection to an IT system

Notice!

Internal components have ground potential

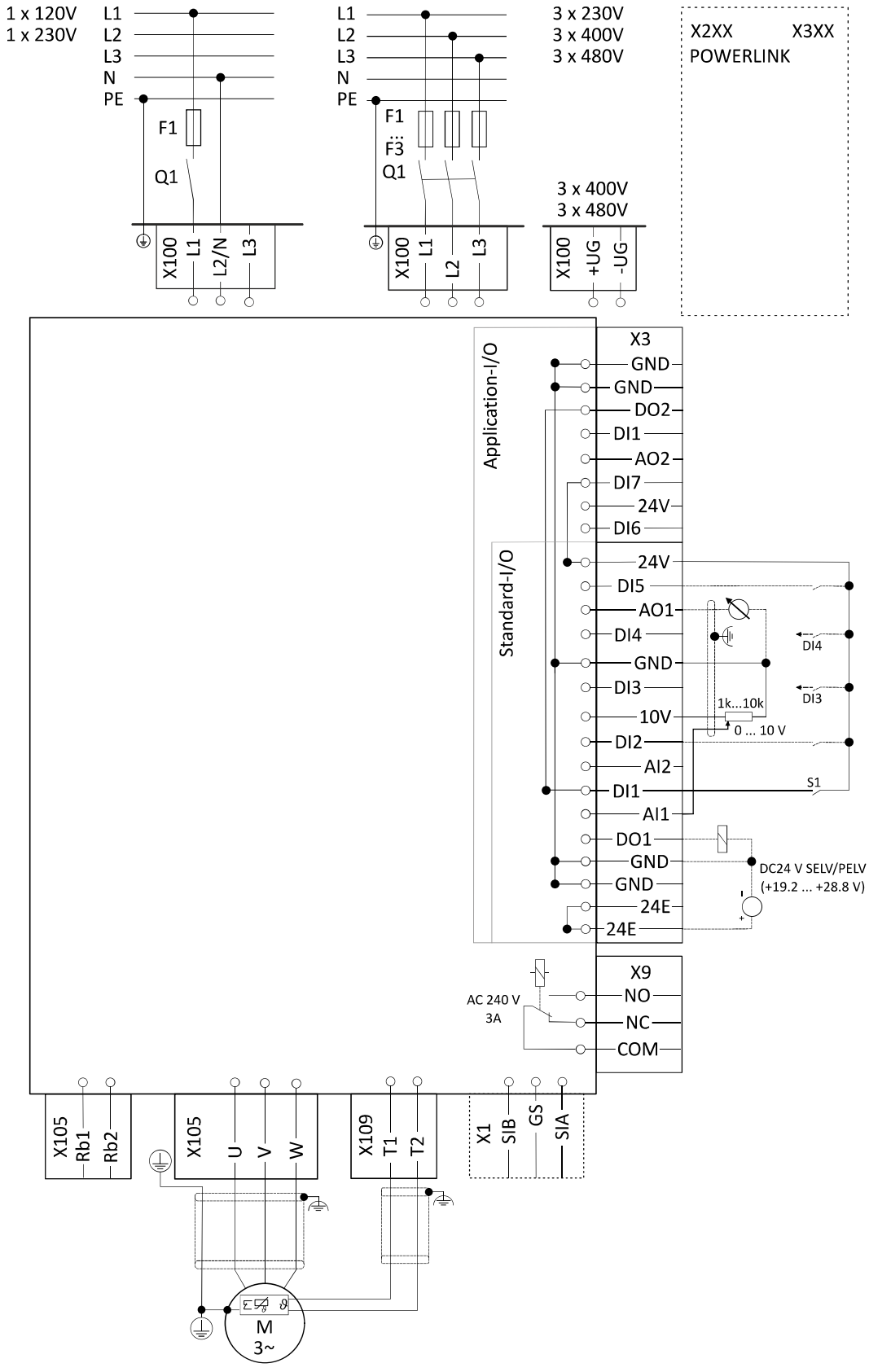
Possible consequence: The monitoring devices of the IT system will be triggered.

- **Connect an isolating transformer upstream.**
- **Before connection to an IT system be absolutely sure to remove the screws marked on the product with "IT".**

8I77xx00025 ... 8I77xx00037	8I77xx00055 ... 8I77xx00400	8I77xx00550 ... 8I77xx01100
		
8I77xx01500 ... 8I77xx03000	**8I77xx03700 ... 8I77xx04500**	**8I77xx05500 ... 8I77xx11000**
		

4.2 Connection diagram

The connection diagram is considered exemplary for all voltage and power classes.

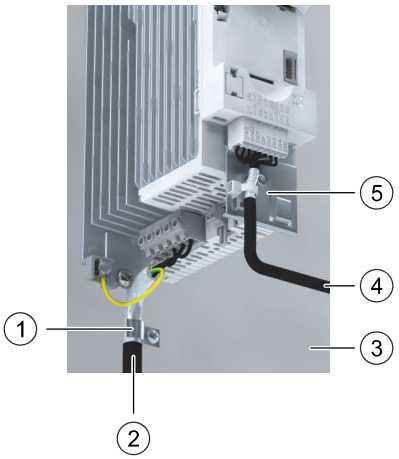


4.2.1 EMC-compliant installation

The drive system of inverter and drive comply with the EMC Directive 2014/30/EU if they are installed according to the specifications of CE-typical drive systems. These guidelines should also be followed in installations requiring FCC Part 15 or ICES 001 compliance. The structure at the installation location must support the EMC-compliant installation with shielded motor cables.

- Please use sufficiently conductive shield connections.
- Connect the housing with shielding effect to the grounded mounting plate with a surface as large as possible, e.g. of inverters and RFI filters.
- Use central earthing points.

The following example shows the effective wiring.



1 Shield connection for motor cable (alternatively: shield connection on an optional motor shield plate)
2 Low-capacitance motor cable
C-core/core/C-core/shield < 75/150 pF/m ≤ 2.5 mm² (≥ AWG 14)
C-core/core/C-core/shield < 150/300 pF/m ≥ 4 mm² (≤ AWG 12)
3 Mounting plate with conductive surface
4 Control cable
5 Shielding of control connections

4.3 1-phase mains connection 120 V (90 V ... 132 V, 45 Hz ... 65 Hz)

Terminal data

Inverter		8I77S1...			
Rated power	kW	0.25 ... 0.37	0.75 ... 1.1	0.25 ... 1.1	0.25 ... 1.1
Connection		Mains connection X100		PE connection	Motor connection X105
Connection type		Screw terminal		Screw	Screw terminal
Max. cable cross-section	mm²	2.5	6	6	2.5
Stripping length	mm	8	8	10	8
Tightening torque	Nm	0.5	0.7	2	0.5
Required tool		⊖ 0.5 x 3.0	⊖ 0.6 x 3.5	⊛ TX20	⊖ 0.5 x 3.0

Rated data and fusing data

Inverter		8I77S1			
		00025	00037	00075	00110
Rated power	kW	0.25	0.37	0.75	1.1
Rated output current	A	1.7	2.4	4.2	6
Max output current (≤ 8 kHz) *	A	3.4	4.8	8.4	12
Operation without mains choke					
Rated mains current	A	6.8	9.6	16.8	22.9
Fuse (EN 60204-1)					
Characteristic		gG/gL or gRL			
Max. rated current	A	16	16	32	32
Max. short circuit current (SCCR)	kA	5	5	5	5
Circuit breaker (EN 60204-1)					
Characteristic		B, C			
Max. rated current	A	16	16	32	32
Max. short circuit current (SCCR)	kA	5	5	5	5
Residual current device (RCD)		≥ 30 mA, type B			

* Overload time = 3 s, recovery time = 12 s

4.4 1-phase mains connection 230/240 V (170 V ... 264 V, 45 Hz ... 65 Hz)

Terminal data

Inverter		8I77S2... (1-phase), 8I77T2... (1/3-phase)			
Rated power	kW	0.25 ... 0.75	1.1 ... 2.2	0.25 ... 2.2	0.25 ... 2.2
Connection		Mains connection X100		PE connection	Motor connection X105
Connection type		Screw terminal		Screw	Screw terminal
Max. cable cross-section	mm²	2.5	6	6	2.5
Stripping length	mm	8	8	10	8
Tightening torque	Nm	0.5	0.7	2	0.5
Required tool		⊖ 0.5 x 3.0	⊖ 0.6 x 3.5	⊛ TX20	⊖ 0.5 x 3.0

Rated data and fusing data

Inverter		8I77S2/8I77T2						
		00025	00037	00055	00075	00110	00150	00220
Rated power	kW	0.25	0.37	0.55	0.75	1.1	1.5	2.2
Rated output current	A	1.7	2.4	3.2	4.2	6	7	9.6
Max output current (≤ 8 kHz) *	A	3.4	4.8	6.4	8.4	12	14	19.2
Operation without mains choke								
Rated mains current	A	4	5.7	7.6	10	14.3	16.7	22.5
Fuse (EN 60204-1)								
Characteristic		gG/gL or gRL						
Max. rated current	A	16	16	16	16	32	32	32
Max. short circuit current (SCCR)	kA	65	65	65	65	65	65	65
Circuit breaker (EN 60204-1)								
Characteristic		B, C						
Max. rated current	A	16	16	16	16	32	32	32
Max. short circuit current (SCCR)	kA	65	65	65	65	65	65	65
Residual current device (RCD)		≥ 30 mA, type B, F **						

* Overload time = 3 s, recovery time = 12 s

** RCD type "F" is only permitted in 1-phase operation (L/N)!

4.5 3-phase mains connection 230/240 V (195 V ... 264 V, 45 Hz ... 65 Hz)

Terminal data

Inverter		8I77T2...					
Rated power	kW	0.25 ... 0.75	1.1 ... 2.2	4 ... 5.5	0.25 ... 5.5	0.25 ... 2.2	4 ... 5.5
Connection		Mains connection X100			PE connection	Motor connection X105	
Connection type		Screw terminal			Screw	Screw terminal	
Max. cable cross-section	mm²	2.5	6	6	6	2.5	6
Stripping length	mm	8	8	9	10	8	9
Tightening torque	Nm	0.5	0.7	0.5	2	0.5	0.5
Required tool		⊖ 0.5 x 3.0	⊖ 0.6 x 3.5	⊖ 0.6 x 3.5	✱ TX20	⊖ 0.5 x 3.0	⊖ 0.6 x 3.5

Rated data (Heavy Duty) und fusing data

Inverter		8I77T2								
		00025	00037	00055	00075	00110	00150	00220	00400	00550
Rated power	kW	0.25	0.37	0.55	0.75	1.1	1.5	2.2	4	5.5
Rated output current (8 kHz)	A	1.7	2.4	3.2	4.2	6	7	9.6	16.5	23
Max output current (≤ 8 kHz) *	A	3.4	4.8	6.4	8.4	12	14	19.2	33	46
Operation without mains choke										
Rated mains current	A	2.6	3.9	4.8	6.4	7.8	9.5	13.6	20.6	28.8
Fuse (EN 60204-1)										
Characteristic		gG/gL or gRL								
Max. rated current	A	16	16	16	16	32	32	32	40	40
Max. short-circuit current (SCCR)	kA	65	65	65	65	65	65	65	65	65
Circuit breaker (EN 60204-1)										
Characteristic		B, C								
Max. rated current	A	16	16	16	16	32	32	32	40	40
Max. short-circuit current (SCCR)	kA	65	65	65	65	65	65	65	65	65
Residual current device (RCD)		≥ 30 mA, type B, F **							≥ 300 mA, type B	

* Overload time = 3 s, recovery time = 12 s ** RCD type "F" is only permitted in 1-phase operation (L/N)!

Rated data (light duty)

Inverter		8I77T2								
		00025	00037	00055	00075	00110	00150	00220	00400	00550
Rated power	kW	-	-	-	-	-	-	-	5.5	7.5
Rated output current (4 kHz)	A	-	-	-	-	-	-	-	20.6	27.6
Max. output current *	A	-	-	-	-	-	-	-	33	46

* Overload time = 3 s, recovery time = 12 s

4.6 3-phase mains connection 400 V (340 V ... 528 V, 45 Hz ... 65 Hz)

Terminal data

Inverter		8I77T4			8I77T4	8I77T4		8I77T4
Rated power	kW	0.37 ... 2.2	3 ... 5.5	3 ... 4	0.37 ... 5.5	0.37 ... 2.2	3 ... 5.5	3 ... 4
Connection		Mains connection X100			PE connection	Motor connection X105		
Connection type		Screw terminal			Screw	Screw terminal		
Max. cable cross-section	mm²	2.5	6	4	6	2.5	6	2.5
Stripping length	mm	8	9	8	10	8	9	8
Tightening torque	Nm	0.5	0.5	0.6	2	0.5	0.5	0.5
Required tool		⊖ 0.5 x 3.0	⊖ 0.6 x 3.5	⊖ 0.5 x 3.0	✱ TX20	⊖ 0.5 x 3.0	⊖ 0.6 x 3.5	⊖ 0.5 x 3.0

Rated data (Heavy Duty) und fusing data

Inverter		8I77T4								
		00037	00055	00075	00110	00150	00220	00300	00400	00550
Rated power	kW	0.37	0.55	0.75	1.1	1.5	2.2	3	4	5.5
Rated output current (8 kHz)	A	1.3	1.8	2.4	3.2	3.9	5.6	7.3	9.5	13
Max output current (≤ 8 kHz) *	A	2.6	3.6	4.8	6.4	7.8	11.2	14.6	19	26
Operation without mains choke										
Rated mains current	A	1.8	2.5	3.3	4.4	5.4	7.8	9.6	12.5	17.2
Fuse (EN 60204-1)										
Characteristic		gG/gL, gRL								
Max. rated current	A	16	16	16	16	16	16	35	35	25
Max. short-circuit current (SCCR)	kA	65	65	65	65	65	65	65	65	65
Circuit breaker (EN 60204-1)										
Characteristic		B, C								
Max. rated current	A	16	16	16	16	16	16	25	25	25
Max. short-circuit current (SCCR)	kA	65	65	65	65	65	65	65	65	65
Residual current device (RCD)		≥ 30 mA, type B								≥ 300 mA, type B

* Overload time = 3 s, recovery time = 12 s

Rated data (light duty)

Inverter		8I77T4								
		00037	00055	00075	00110	00150	00220	00300	00400	00550
Rated power	kW	-	-	-	-	-	-	4	5.5	7.5
Rated output current (4 kHz)	A	-	-	-	-	-	-	8.8	11.9	15.6
Max. output current *	A	-	-	-	-	-	-	14.6	19	26

* Overload time = 3 s, recovery time = 12 s

4.6.1 3-phase mains connection 400 V (340 V ... 528 V, 45 Hz ... 65 Hz)

Terminal data

Inverter		8I77T4					
Rated power	kW	7.5 ... 11	15 ... 30	7.5 ... 11	15 ... 30	7.5 ... 11	15 ... 30
Connection		Mains connection X100		PE connection		Motor connection X105	
Connection type		Screw terminal		Screw		Screw terminal	
Max. cable cross-section	mm²	16	35	16	25	16	35
Stripping length	mm	11	18	11	16	11	18
Tightening torque	Nm	1.2	3.8	3.4	4	1.2	3.8
Required tool		⊖ 0.8 x 4.0	⊖ 0.8 x 5.5	⊕ PZ2	⊕ PZ2	⊖ 0.8 x 4.0	⊖ 0.8 x 5.5

Rated data (Heavy Duty) und fusing data

Inverter		8I77T4					
		00750	01100	01500	01850	02200	03000
Rated power	kW	7.5	11	15	18.5	22	30
Rated output current	A	16.5	23.5	32	40	47	61
Max output current (≤ 8 kHz) *	A	33	47	64	80	94	122
Operation without mains choke							
Rated mains current	A	20	28.4	38.7	48.4	53	-
Fuse (EN 60204-1)							
Characteristic		gG/gL, gRL					
Max. rated current	A	40	40	90	90	90	90
Max. short circuit current (SCCR)	kA	65	65	65	65	65	65
Circuit breaker (EN 60204-1)							
Characteristic		B, C					
Max. rated current	A	40	40	90	90	90	90
Max. short circuit current (SCCR)	kA	65	65	65	65	65	65
Residual current device (RCD)		≥ 30 mA, type B	≥ 30 mA, type B	≥ 300 mA, type B			

* Overload time = 3 s, recovery time = 12 s

Rated data (light duty)

Inverter		8I77T4					
		00750	01100	01500	01850	02200	03000
Rated power	kW	11	15	18.5	22	30	37
Rated output current (4 kHz)	A	23	28.2	38.4	48	56.4	73.2
Max. output current *	A	33	47	64	80	94	122

* Overload time = 3 s, recovery time = 12 s

4.6.2 3-phase mains connection 400 V (340 V ... 528 V, 45 Hz ... 65 Hz)

Terminal data

Inverter		8I77T4							
Rated power	kW	37 ... 45	55 ... 75	90 ... 110	37 ... 75	90 ... 110	37 ... 45	55 ... 75	90 ... 110
Connection		Mains connection X100			PE connection		Motor connection X105		
Connection type		Screw terminal			Screw	Bolt	Screw terminal		
Max. cable cross-section	mm²	50	95	150	35	150	50	95	150
Stripping length	mm	22	32	41	16	-	22	32	41
Tightening torque	Nm	4	10	18	4	10	4	10	18
Required tool		◉ 5.0	◉ 6.0	◉ 8.0	⊕ PZ2	Size 13 key	◉ 5.0	◉ 6.0	◉ 8.0

Rated data (Heavy Duty) und fusing data

Inverter		8I77T4					
		03700	04500	05500	07500	09000	11000
Rated power	kW	37	45	55	75	90	110
Rated output current	A	76	89	110	150	180	212
Max output current (≤ 8 kHz) *	A	152	178	220	300	360	424
Operation without mains choke							
Rated mains current	A	-	-	-	-	-	-
Fuse (EN 60204-1)							
Characteristic		gG/gL, gRL		gR			
Max. rated current	A	125	125	200	200	300	300
Max. short circuit current (SCCR)	kA	22	22	22	22	22	22
Circuit breaker (EN 60204-1)							
Characteristic		B, C					
Max. rated current	A	125	125	200	200	300	300
Max. short circuit current (SCCR)	kA	35	35	35	35	10	10
Residual current device (RCD)		≥ 300 mA, type B					

* Overload time = 3 s, recovery time = 12 s

Rated data (light duty)

Inverter		8I77T4					
		03700	04500	05500	07500	09000	11000
Rated power	kW	45	55	75	90	110	132
Rated output current (4 kHz)	A	91.2	107	132	180	216	254
Max. output current *	A	152	178	220	300	360	424

* Overload time = 3 s, recovery time = 12 s

4.7 3-phase mains connection 480 V (340 V ... 528 V, 45 Hz ... 65 Hz)

Terminal data

Inverter		8I77T4		8I77T4	8I77T4	8I77T4		8I77T4
Rated power	kW	0.37 ... 2.2	3 ... 5.5	3 ... 4	0.37 ... 5.5	0.37 ... 2.2	3 ... 5.5	3 ... 4
Connection		Mains connection X100			PE connection	Motor connection X105		
Connection type		Screw terminal			Screw	Screw terminal		
Max. cable cross-section	mm²	2.5	6	4	6	2.5	6	2.5
Stripping length	mm	8	9	8	10	8	9	8
Tightening torque	Nm	0.5	0.5	0.6	2	0.5	0.5	0.5
Required tool		⊖ 0.5 x 3.0	⊖ 0.6 x 3.5	⊖ 0.5 x 3.0	✱ TX20	⊖ 0.5 x 3.0	⊖ 0.6 x 3.5	⊖ 0.5 x 3.0

Rated data (Heavy Duty) und fusing data

Inverter		8I77T4								
		00037	00055	00075	00110	00150	00220	00300	00400	00550
Rated power	kW	0.37	0.55	0.75	1.1	1.5	2.2	3	4	5.5
Rated output current (8 kHz)	A	1.1	1.6	2.1	3	3.5	4.8	6.3	8.2	11
Max output current (≤ 8 kHz) *	A	2.2	3.2	4.2	6	7	9.6	12.6	16.4	22
Operation without mains choke										
Rated mains current	A	1.5	2.1	2.8	3.7	4.5	6.5	8	10.5	14.3
Fuse (EN 60204-1)										
Characteristic		gG/gL, gRL								
Max. rated current	A	16	16	16	16	16	16	35	35	25
Max. short-circuit current (SCCR)	kA	65	65	65	65	65	65	65	65	65
Circuit breaker (EN 60204-1)										
Characteristic		B, C								
Max. rated current	A	16	16	16	16	16	16	25	25	25
Max. short-circuit current (SCCR)	kA	65	65	65	65	65	65	65	65	65
Residual current device (RCD)		≥ 30 mA, type B								≥ 300 mA, type B

* Overload time = 3 s, recovery time = 12 s

Rated data (light duty)

Inverter		8I77T4								
		00037	00055	00075	00110	00150	00220	00300	00400	00550
Rated power	kW	-	-	-	-	-	-	4	5.5	7.5
Rated output current (4 kHz)	A	-	-	-	-	-	-	7.6	9.8	13.2
Max. output current *	A	-	-	-	-	-	-	12.6	16.4	22

* Overload time = 3 s, recovery time = 12 s

4.7.1 3-phase mains connection 480 V (340 V ... 528 V, 45 Hz ... 65 Hz)

Terminal data

Inverter		8I77T4					
Rated power	kW	7.5 ... 11	15 ... 30	7.5 ... 11	15 ... 30	7.5 ... 11	15 ... 30
Connection		Mains connection X100		PE connection		Motor connection X105	
Connection type		Screw terminal		Screw		Screw terminal	
Max. cable cross-section	mm²	16	35	16	25	16	35
Stripping length	mm	11	18	11	16	11	18
Tightening torque	Nm	1.2	3.8	3.4	4	1.2	3.8
Required tool		⊖ 0.8 x 4.0	⊖ 0.8 x 5.5	⊕ PZ2	⊕ PZ2	⊖ 0.8 x 4.0	⊖ 0.8 x 5.5

Rated data (Heavy Duty) und fusing data

Inverter		8I77T4					
		00750	01100	01500	01850	02200	03000
Rated power	kW	7.5	11	15	18.5	22	30
Rated output current	A	14	21	27	34	40.4	52
Max output current (≤ 8 kHz) *	A	28	42	54	68	81	104
Operation without mains choke							
Rated mains current	A	16.6	23.7	32.3	40.3	44.2	61.5
Fuse (EN 60204-1)							
Characteristic		gG/gL, gRL					
Max. rated current	A	40	40	90	90	90	90
Max. short circuit current (SCCR)	kA	65	65	65	65	65	65
Circuit breaker (EN 60204-1)							
Characteristic		B, C					
Max. rated current	A	40	40	90	90	90	90
Max. short circuit current (SCCR)	kA	65	65	65	65	65	65
Residual current device (RCD)		≥ 30 mA, type B	≥ 30 mA, type B	≥ 300 mA, type B			

* Overload time = 3 s, recovery time = 12 s

Rated data (light duty)

Inverter		8I77T4					
		00750	01100	01500	01850	02200	03000
Rated power	kW	11	15	18.5	22	30	37
Rated output current (4 kHz)	A	18.3	25.2	32.4	40.8	48.5	62.4
Max. output current *	A	28	42	54	68	81	104

* Overload time = 3 s, recovery time = 12 s

4.7.2 3-phase mains connection 480 V (340 V ... 528 V, 45 Hz ... 65 Hz)

Terminal data

Inverter		8I77T4							
Rated power	kW	37 ... 45	55 ... 75	90 ... 110	37 ... 75	90 ... 110	37 ... 45	55 ... 75	90 ... 110
Connection		Mains connection X100			PE connection		Motor connection X105		
Connection type		Screw terminal			Screw	Bolt	Screw terminal		
Max. cable cross-section	mm²	50	95	150	35	150	50	95	150
Stripping length	mm	22	32	41	16	-	22	32	41
Tightening torque	Nm	4	10	18	4	10	4	10	18
Required tool		◉ 5.0	◉ 6.0	◉ 8.0	⊕ PZ2	Size 13 key	◉ 5.0	◉ 6.0	◉ 8.0

Rated data (Heavy Duty) und fusing data

Inverter		8I77T4					
		03700	04500	05500	07500	09000	11000
Rated power	kW	37	45	55	75	90	110
Rated output current	A	65	77	96	124	156	180
Max output current (≤ 8 kHz) *	A	130	154	192	248	312	360
Operation without mains choke							
Rated mains current	A	-	-	-	-	-	-
Fuse (EN 60204-1)							
Characteristic		gG/gL, gRL		gR			
Max. rated current	A	125	125	200	200	300	300
Max. short circuit current (SCCR)	kA	22	22	22	22	22	22
Circuit breaker (EN 60204-1)							
Characteristic		B, C					
Max. rated current	A	125	125	200	200	300	300
Max. short circuit current (SCCR)	kA	35	35	35	35	10	10
Residual current device (RCD)		≥ 300 mA, type B					

* Overload time = 3 s, recovery time = 12 s

Rated data (light duty)

Inverter		8I77T4					
		03700	04500	05500	07500	09000	11000
Rated power	kW	45	55	75	90	110	132
Rated output current (4 kHz)	A	78	92.4	115	149	187	216
Max. output current *	A	130	154	192	248	312	360

* Overload time = 3 s, recovery time = 12 s

4.8 Brake resistor connection

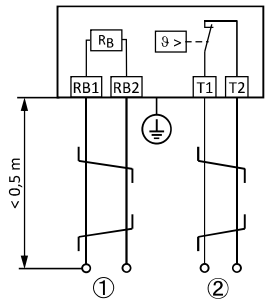
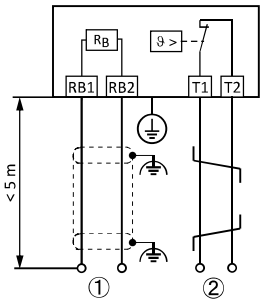
Notice!

Overload

Possible consequences: Irreversible damage to the brake resistor

- **Protect the brake resistor of the inverter against overload with suitable parameterization.**
- **The thermostat of the brake resistor can be used to establish a safety shutdown to disconnect the inverter from the mains.**

Recommendation: Use intrinsically safe brake resistors to be able to dispense with a separate switch-off device (e.g. a contactor).

Short connection cables up to 0.5 m	Long connection cables up to max. 5 m
Up to a cable length of 0.5 m, the cable for the brake resistor and that of the temperature monitoring can be twisted. This procedure reduces problems caused by EMC interference.	The cable of the brake resistor must be shielded The maximum length is 5 m.For the temperature monitoring cable, twisting is sufficient.
	

①	Wiring to the "brake resistor" connection on the inverter or another component with brake chopper.
②	Optional: Wiring to a control contact that is set to monitor the thermal contact. If the thermal contact responds, the voltage supply to the inverter must be disconnected (e.g. switch off the control of the mains contactor).

4.9 Control terminals X3

Connection type		Spring terminal, pluggable
Max. cable cross-section	mm²	1.5
Stripping length	mm	9
Required tool		⊖ 0.4 x 2.5
Application	DI1 DI2 DI3 DI4 DI5	Digital inputs DI3/DI4 can optionally be used as frequency input or encoder input.HIGH active/LOW active switchableLOW = 0 ... +3 V HIGH = +12 V ... +30 V
	DO1	Digital output Max. 100 mA for DO1 and 24 V output
	AI1 AI2	Analog inputs Can optionally be used as voltage input or current input.
	AO1	Analog output Can be optionally used as voltage output or current output.
	24E	24-V input For mains-independent power DC supply of control electron- ics (including communication). Max. 1 A
	10V	10 V output Primarily for the supply of a potentiometer (1 ... 10 kΩ). Max. 10 mA
	24V	24 V output Primarily for the supply of digital inputs. Max. 100 mA for DO1 and 24 V output

Table 1: 30

Notice!

For voltage supply with DC 24 V (± 20 %), use only a safely separated power supply unit in accordance with prevailing SELV/PELV requirements.

4.10 Relay output X9

The relay is not suitable for direct switching of an electromechanical holding brake. Use a corresponding suppressor circuit in case of an inductive or capacitive load.

Connection type		Screw terminal, pluggable
Max. cable cross-section	mm²	1.5
Stripping length	mm	6
Required tool		⊖ 0.4 x 2.5
Application	NO	Normally-open contact
	NC	Normally-closed contact
	COM	Center contact
Max. switching voltage/switching current		AC 240 V/3 A
		DC 24 V/2 A
		DC 240 V/0.16 A

4.11 PTC input X109

In the default setting, the motor temperature monitoring is active! By default, a wire jumper is installed between the terminals T1 and T2. Before connecting a thermal sensor, remove the wire jumper.

Connection type		Screw terminal, pluggable
Max. cable cross-section	mm²	1.5
Stripping length	mm	6
Required tool		⊖ 0.4 x 2.5
Application	T1	Connection of PTC or thermal contact
	T2	
Sensor types		PTC single sensor (DIN 44081)
		PTC triplet sensor (DIN 44082)
		Thermal contact

4.12 Networks

Network	**POWERLINK**
Connection	X286 X287
Connection type	RJ45

4.12.1 POWERLINK

The rotary encoder switches allow you to set the node address (last byte of the IP address).

Resulting IP address: 192.168.100.<switch position>.

When both are in position 0: Node address = setting in 0x23C1:004.

4.13 Functional safety

Danger!

Uncontrolled start-up

Improper installation of the safety technology can cause an uncontrolled starting action of the drives.

Possible consequences: Death or severe injuries

- **Safety technology may only be installed and commissioned by qualified personnel.**
- **All wiring must be EMC-compliant.**
- **All control components (switches, relays, PLC, ...) must comply with the requirements of EN ISO 13849-1 and EN ISO 13849-2.**
- **Switches, relays with at least IP54 enclosure.**
- **Devices with a degree of protection less than IP54 must always be installed in a control cabinet with a minimum protection class of IP54.**
- **The wiring must be shielded.**
- **It is essential to use insulated wire end ferrules for wiring.**
- **All safety-relevant cables outside the control cabinet must be protected, e.g. by means of a cable duct.**
- **Securely eliminate short-circuits and crossed wires according to the specifications of EN ISO 13849-2.**
- **Please refer to EN ISO 13849-1 and EN ISO 13849–2 for all further requirements and measures.**
- **In the case of an external force effect on the drive axes, additional brakes are necessary. In particular, please observe the effect of gravitational force on hanging loads!**
- **For safety-related braking functions, use safety-rated brakes only.**
- **The user must ensure that the inverter is only operated within the specified environmental conditions in its intended application. Only by doing so can the specified safety-related characteristics be adhered to.**

Danger!

Automatic restart when the requirement of the safety function is disabled.

Possible consequences: Death or severe injuries

- **You must implement external measures in accordance with EN ISO 13849-1 to ensure that the drive only starts up again after an acknowledgement.**

Notice!

Overvoltage

Possible consequences: Destruction of the safety component

- **Make sure that the maximum voltage (maximum rated) at the safe inputs does not exceed 32 V DC.**

Notice!

Excessive humidity or condensation

Possible consequences: Malfunction or irreparable damage to safety component

- **Only commission the safety component when it has acclimatized.**

4.14 Safe torque off (STO)

Danger!

No “Emergency switching off” in accordance with EN 60204-1

When using the “Safe torque off (STO)” function, additional measures are required for an “Emergency switching off” in accordance with EN 60204-1. There is no electrical isolation between the motor and inverter, no service switch or repair switch!

Possible consequences: Death or severe injuries

- **An “Emergency off” requires an electrical isolation, e.g. by a central mains contactor.**

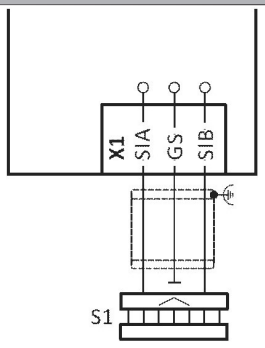
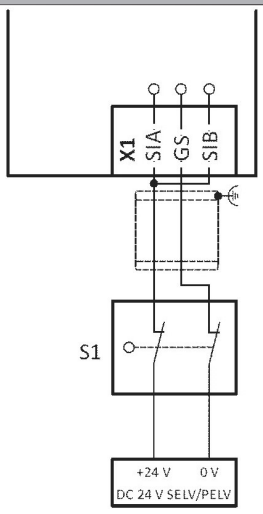
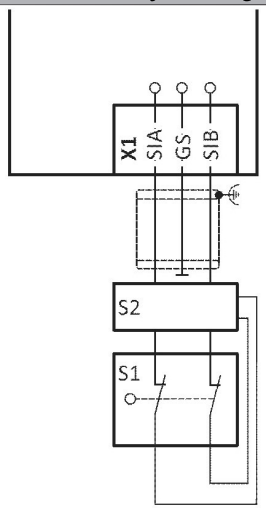
4.14.1 Control terminals X1

Connection type		Spring terminal, pluggable
Max. cable cross-section	mm²	1.5
Stripping length	mm	9
Required tool		⊖ 0.4 x 2.5
Application	SIA SIB	Inputs for connecting active or passive sensors
	GS	Reference potential for SIA and SIB

Specifications for SIA, SIB		**minimum**	**typical**	**maximum**
LOW signal	V	-3	0	5
HIGH signal	V	15	24	30
Runtime	ms		3	
Switch-off time	ms		50	60
Input current SIA	mA		10	14
Input current SIB	mA		7	12
Input peak current	mA		100	
Test pulse duration	ms			1
Test pulse interval	ms	10		

4.14.2 Connection of active and passive sensors

The connection diagrams shown are only example circuits. The user is responsible for the correct safety-related design and selection of the components!

Active sensor	**Passive sensor**	**Passive sensor + safety switching device**
 S1: Active sensor (Example: lightgrid)	 External power supply unit or 24 V output of X3 S1: Passive sensor	 S1: Passive sensor S2: Safety switching device

Safety-related characteristic values and further example circuits can be found in the project planning document.

5 Commissioning

5.1 Initial switch-on

Danger!

Unexpected states during commissioning

Incorrect wiring can cause unexpected states during the commissioning phase.

Possible consequences: Death, severe injuries, or damage to property

- **Wiring must be complete and correct.**
- **Wiring must be free of short circuits and earth faults.**
- **The motor circuit configuration (star/delta) must be adapted to the inverter.**
- **The motor must be connected in-phase (rotating direction).**
- **Check the "emergency switching off" function of the overall system.**
- **Clear hazardous area.**
- **Observe safety instructions and safety clearances.**

Preconditions:

- The power connections must be wired.
- The digital inputs X3/DI1 (start/stop), X3/DI3 (reversal) and X3/DI4 (frequency preset 20 Hz) must be wired.
- The analog input X3/AI1 must not be wired or connected to GND.

1) Switch on mains voltage.
2) Check readiness for operation.
3) Observe LED status displays “RDY” and “ERR” on the inverter front panel.

5.2 Important notes

Danger!

Unexpected and dangerous motor movements and system movements

Incorrect settings during commissioning may cause unexpected and dangerous motor and system movements.

Possible consequences: Death, severe injuries, or damage to property

- **Clear hazardous area.**
- **Observe safety instructions and safety clearances.**

The following plug-on modules are available as accessories for the inverter:

- Keypad module

5.3 Keypad module

Commissioning with the keypad module is described on the following pages.

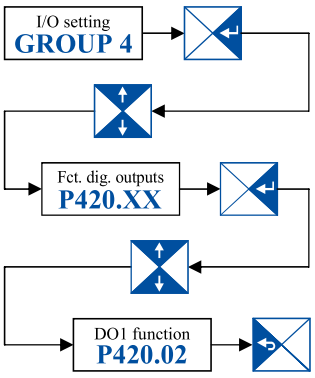
5.3.1 Keypad module – Functions of the keys

Key		Actuation	Action
	Up arrow key Down arrow key	press briefly	• Navigation in the menu • Parameter alteration
	Enter key	press briefly	• Go to Menu/Parameter • Confirm parameter
		press and hold for 3s	Save parameter (“P.SAVED” appears on screen when parameter is saved.)
	Back key	press briefly	Quit Menu/Parameters
	CTRL key	press briefly	Activate keypad control
	Start key	press briefly	Start motor
	R/F key	press briefly	Reverse rotating direction
	Stop key	press briefly	Stop motor

- The motor must be at standstill before parameters can be changed or confirmed.
- The settings are saved temporarily until the motor is switched off again. Press and hold the enter key for 3 s to save the settings permanently.

5.3.2 Example of the keypad handling

Function assignment for digital output DO1 with parameter P420.02:



5.4 Keypad control

Activate temporary keypad control:

1) Press the CTRL key to activate the keypad control.
2) Press the enter key to confirm the change.

Deactivate temporary keypad control:

1) Press the CTRL key to deactivate the keypad control.
2) Press the enter key to confirm the change.

Activate permanent keypad control:

If the keypad does not have a CTRL key, the motor control is activated via the following parameters:

- Set P200.00 to 1.
- Set P201.01 to 1.
- Set P400.01 to 1.
- Set P400.02 to 1.

Start/control/stop motor with keypad:

1) Press the start key to start the motor.
   The keypad shows the motor speed.
2) Change the frequency setpoint using the up arrow key or the down arrow key.
3) Press the stop key to stop the motor.

Reverse rotating direction:

1) Press the R/F key.
2) Press the enter key to confirm the reversal of rotating direction.

5.5 Favorites (group 0)

Group 0 contains the configurable favorites that are also contained in the groups 1 to 4. In the default setting these are the most common parameters for the solution of typical applications.

5.6 Favorites

5.6.1 Favorites (group 0)

Display code	Name	Possible settings/ Value ranges	Keypad code	Information
P100.00	Output frequency	x.x Hz (read only)		Display of the actual output frequency.
P103.00	Actual current	x.x % (read only)		Display of the actual motor current.
P106.00	Motor voltage	x VAC (read only)		Display of the actual motor voltage.
P150.00	Error code	- (Read only)		Error message.
P200.00	Control selection	Flexible I/O	[0]	This selection enables a flexible assignment of the start, stop, and rotating direction commands with digital signal sources.
		Keypad	[1]	This selection enables the motor to start exclusively via the start key of the keypad. Other signal sources for starting the motor are ignored.
P201.01	F-setp.source	Keypad	[1]	The setpoint is specified locally by the keypad.
		Analog input 1	[2]	The setpoint is defined as analog signal via the analog input 1.
		Analog input 2	[3]	The setpoint is defined as analog signal via the analog input 2.
		HTL input	[4]	The digital inputs DI3 and DI4 can be configured as HTL input to use an HTL encoder as setpoint encoder or define the setpoint as a reference frequency ("pulse train").
		Network	[5]	The setpoint is defined as process data object via the network.
		Frequency preset 1 ... 15	[11] ... [25]	For the setpoint selection, “preset” values can be parameterized and selected. All frequency presets are described in detail in the commissioning manual.
P203.01	Start method	Standard	[0]	After start command, the standard ramps are active.
		DC braking	[1]	After start command, the "DC braking" function is active for the time set in P704.02.
		Flying restart circuit	[2]	After the start command, the flying restart circuit is active.
		Premagnetization	[3]	After start command, the standard ramps are active and the premagnetization of the motor is activated. This reduces the motor current and smoothes the acceleration curve during the starting process (only relevant in the V/f motor control mode).
P203.03	Stop method	Coasting	[0]	The motor has no torque (coasts down to standstill).
		Standard ramp	[1]	The motor is brought to a standstill with the deceleration time 1 P221.00 (or deceleration time 2 P223.00 if activated).
		Quick stop ramp	[2]	The motor is brought to a standstill with the deceleration time (P225.00) set for the "quick stop" function.
		Switch-off positioning	[3]	Is similar to the stop method “standard ramp [1]“. Depending on the actual output frequency, however, the inverter delays the beginning of the down-ramping so that the number of motor revolutions until a standstill is reached and thus the stop position is always relatively constant.
P208.01	Mains voltage	230 Veff	[0]	Selection of the mains voltage for actuating the inverter.
		400 Veff	[1]	
		480 Veff	[2]	
		120 Veff	[3]	
P210.00	Min. frequency	0.0 ... 599.0 Hz		Lower limit value for all frequency setpoints.
P211.00	Max. frequency	Device for 50-Hz mains: 50 Hz * Device for 60-Hz mains: 60 Hz *		Upper limit value for all frequency setpoints.
P220.00	Acceleration 1	0.0 ... 5.0 ... 3600.0 s		Acceleration time 1.
P221.00	Deceleration 1	0.0 ... 5.0 ... 3600.0 s		Deceleration time 1
P300.00	Motor ctrl mode	Servo control (SC ASM)	[2]	This control mode is used for servo control of an asynchronous motor.
		Sensorless control (SL PSM)	[3]	This control mode is used for sensorless control of a synchronous motor.
		Sensorless vector control (SLVC)	[4]	This control mode is used for sensorless vector control of an asynchronous motor.
		V/f characteristic control (VFC open loop)	[6]	This control mode is used for the speed control of an asynchronous motor via a V/f characteristic and is the simplest control mode.
		V/f characteristic control(VFC closed loop)	[7]	The control mode is used for speed control of an asynchronous motor via a V/f characteristic with speed feedback.
		Sensorless control (SLSM PSM)	[8]	This control mode is used for sensorless control of a synchronous motor.
P302.00	V/f characteristic shape	Linear	[0]	Linear characteristic with energy optimization in the partial load operational range.
		Square-law	[1]	Square-law characteristic for drives with a square-law load torque over the speed.
		Eco	[3]	Linear characteristic with energy optimization in the partial load operational range.
P303.01	Base voltage	0 ... 230 ... 5000 V *		Base voltage and base frequency define the V/f ratio and thus the gradient of the V/f characteristic. • The V/f base voltage is usually set to the rated motor voltage. • The V/f base frequency is usually set to the rated motor frequency.
P303.02	Base frequency	Device for 50-Hz mains: 50 Hz * Device for 60-Hz mains: 60 Hz *		
P304.00	Limitation of rotation	Only clockwise (CW)	[0]	The motor can only rotate clockwise (CW). The transfer of negative frequency and PID setpoints to the motor control is prevented.
		Both rotating directions	[1]	Both directions of motor rotation are enabled.
P305.00	Switching frequency	8 kHz var/opt/4 *		Selection of the inverter switching frequency.

Display code	Name	Possible settings/ Value ranges	Keypad code	Information
P306.01	Overload selection	Heavy duty	[0]	Load characteristic for high dynamic requirements.
		Light Duty	[1]	Load characteristic for low dynamic requirements.
P308.01	Max. load for 60s	30 ... 150 ... 200 %		Maximum permissible thermal motor utilization (max. permissible motor current for 60 seconds). With regard to rated motor current (P323.00).
P316.01	Fixed V/f boost	0.0 ... 2.5 ... 20.0 % *		Constant voltage boost for the V/f characteristic control without feedback.
P323.00	Rated. mot curr.	0.001 ... 1.700 ... 500.000 A *		Setting of the rated motor current according to motor nameplate.
P324.00	Max. current	0.0 ... 200.0 ... 3000.0 %		Maximum overload current of the inverter. With regard to rated motor current (P323.00).
P400.01	Inverter enable	TRUE	[1]	Assignment of a trigger to the “inverter enable” function. Trigger = TRUE: The inverter is enabled (unless there is another cause for inverter disable). Trigger = FALSE: The inverter is disabled. The motor has no torque and coasts.
P400.02	Run	Digital input 1	[11]	Assignment of a trigger to the “Run” function.
				Function 1: Start / stop motor (default setting) Function 1 is active if no further start commands (start forward/start reverse) have been connected to triggers, no keypad control is active and no network control is active. Trigger = TRUE: Let motor rotate forward (CW). Trigger = FALSE: Stop motor according to stop function (P203.03).
				Function 2: Start enable/stop motor Function 2 is active if further start commands have been connected to triggers, the keypad control is active or the network control is active. Trigger = TRUE: Start commands of the active control source are enabled. Trigger = FALSE: Stop motor.
P400.03	Quick stop	Not connected	[0]	Assignment of a trigger to the “Activate quick stop” function. Trigger = TRUE: Activate quick stop. Quick stop ramp adjustable in P225.00. Trigger = FALSE: Deactivate quick stop
P400.04	Error reset	Digital input 2	[12]	Assignment of a trigger to the “Reset error” function. Trigger = FALSE > TRUE (edge): Active error is reset (acknowledged) if the error condition is not active anymore and the error is resettable. Trigger = FALSE: No action.
P400.05	DC braking	Not connected	[0]	Assignment of a trigger to the “Activate DC braking” function. Trigger = TRUE: Activate DC braking. Trigger = FALSE: Deactivate DC braking.
P400.06	Start forward	Not connected	[0]	Assignment of a trigger to the “Start forward (CW)” function. Trigger = FALSE > TRUE (edge): Let motor rotate forward. Trigger = TRUE > FALSE (edge): No action. Stop motor via P400.02 (default digital input 1).
P400.07	Start reverse	Not connected	[0]	Assignment of a trigger to the “Start reverse (CCW)” function. Trigger = FALSE > TRUE (edge): Let motor rotate backward. Trigger = TRUE > FALSE (edge): No action. Stop motor via P400.02 (default digital input 1).
P400.08	Run forward	Not connected	[0]	Assignment of a trigger to the “Run forward (CW)” function. Trigger = TRUE: Let motor rotate forward Trigger = FALSE: Stop motor.
P400.09	Run reverse	Not connected	[0]	Assignment of a trigger to the “Run reverse (CCW)” function. Trigger = TRUE: Let motor rotate backward. Trigger = FALSE: Stop motor.
P400.13	Reverse rot. dir.	Digital input 3	[13]	Assignment of a trigger to the “Reverse rotating direction” function. Trigger = TRUE: The setpoint specified is inverted (i.e. the sign is inverted). Trigger = FALSE: No action/deactivate function again.
P400.18	Setp: Preset B0	Digital input 4	[14]	Assignment of a trigger to the “Activate preset (bit 0)” function. Bit with the valency 2^0 for the bit-coded selection and activation of a parameterized setpoint (preset value). Trigger = FALSE: Bit = “0”. Trigger = TRUE: Bit = “1”.
P400.19	Setp: Preset B1	Digital input 5	[15]	Assignment of a trigger to the “Activate preset (bit 1)” function. Bit with the valency 2^1 for the bit-coded selection and activation of a parameterized setpoint (preset value). Trigger = FALSE: Bit = “0”. Trigger = TRUE: Bit = “1”.
P400.20	Setp: Preset B2	Not connected	[0]	Assignment of a trigger to the “Activate preset (bit 2)” function. Bit with the valency 2^2 for the bit-coded selection and activation of a parameterized setpoint (preset value). Trigger = FALSE: Bit = “0”. Trigger = TRUE: Bit = “1”.
P420.01	Relay function	Running	[50]	TRUE if inverter and start are enabled and output frequency > 0.2 Hz. Otherwise FALSE.
		Ready for operation	[51]	TRUE if inverter is ready for operation (no error active, no STO active and DC-bus voltage ok). Otherwise FALSE.
		Operation enabled	[52]	TRUE if inverter and start are enabled. Otherwise FALSE.
		Stop active	[53]	TRUE if inverter is enabled and motor is not started and output frequency = 0.
		Error active	[56]	TRUE if error is active. Otherwise FALSE.
		Device warning active	[58]	TRUE if warning is active. Otherwise FALSE.

Display code	Name	Possible settings/ Value ranges	Keypad code	Information
P420.02	DO1 function	Release brake	[115]	Assignment of a trigger to digital output 1. Trigger = FALSE: X3/DO1 set to LOW level. Trigger = TRUE: X3/DO1 set to HIGH level.
P430.01	AI1 input area	0 ... 10 VDC	[0]	Definition of the input range for analog input AI1.
		0 ... 5 VDC	[1]	
		2 ... 10 VDC	[2]	
		-10 ... +10 VDC	[3]	
		4 ... 20 mA	[4]	
		0 ... 20 mA	[5]	
P430.02	AI1 freq @ min	-1000.0 ... 0.0 ... 1000.0 Hz		Scaling of the input signal AI1 to the frequency value. • Direction of rotation according to sign. • The standard setpoint source for operating mode “MS: Velocity mode” is selected in P201.01.
P430.03	AI1 freq @ max	-1000.0 ... 50.0 | 60.0 ... 1000.0 Hz *		
P440.01	AO1 output area	Disabled	[0]	Definition of the output range for analog output AO1.
		0 ... 10 VDC	[1]	
		0 ... 5 VDC	[2]	
		2 ... 10 VDC	[3]	
		4 ... 20 mA	[4]	
		0 ... 20 mA	[5]	
P440.02	AO1 function	Output frequency	[1]	Current output frequency (resolution: 0.1 Hz).
		Frequency setpoint	[2]	Current frequency setpoint (resolution: 0.1 Hz).
		Analog input 1	[3]	Input signal of analog input 1 (resolution: 0.1 %).
P440.03	AO1 min. signal	-2147483648 ... 0 ... 2147483647		Definition of the signal value that corresponds to the minimum value at analog output 1.
P440.04	AO1 max. signal	-2147483648 ... 1000 ... 2147483647		Definition of the signal value that corresponds to the maximum value at analog output 1.
P450.01	Freq. preset 1	0.0 ... 20.0 ... 599.0 Hz		Parameterizable frequency setpoints (preset 1).
P450.02	Freq. preset 2	0.0 ... 40.0 ... 599.0 Hz		Parameterizable frequency setpoints (preset 2).
P450.03	Freq. preset 3	0.0 ... 50.0 | 60.0 ... 599.0 Hz *		Parameterizable frequency setpoints (preset 3).
P450.04	Freq. preset 4	0.0 ... 0.0 ... 599.0 Hz		Parameterizable frequency setpoints (preset 4).

* Default setting dependent on the size

5.7 Basic setting (group 2)

Display code	Name	Possible settings	Keypad code	Information
P225.00	QSP del.time	1.0 s		Quick stop deceleration time for “MS: Velocity mode” • If the "Quick stop" function is activated, the motor is brought to a standstill within the deceleration time set here. • The braking deceleration time set refers to the deceleration from the maximum frequency set (P211.00) to standstill. In the case of a lower actual frequency, the actual deceleration time is reduced accordingly. • Setting is not effective in the operating mode P301.00 = "CiA: Velocity mode [2]".

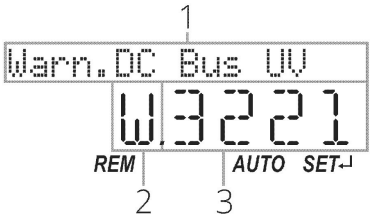
5.8 Motor control (group 3)

Display code	Name	Possible settings	Keypad code	Information
P320.04	Rated torque	50 ... 50000 rpm		General motor data. Carry out settings as specified by motor nameplate data. Note! When you enter the motor nameplate data, take into account the phase connection implemented for the motor (star or delta connection). Only enter the data applying to the connection type selected.
P320.05	Rated frequency	1.0 ... 10000.0 Hz		
P320.06	Rated power	0.00 ... 655.35 kW 0.00 ... 878.84 hp		
P320.07	Rated voltage	0 ... 65535 V		
P320.08	Cos phi	0.00 ... 1.00		
P327.04	Mot. identif.	0 ... 1		1 = start automatic identification of the motor data. • Inverter characteristics, motor equivalent circuit diagram data and controller settings are identified and set automatically. • During the procedure, the motor is energized!
P327.05	Mot. calibrate	0 ... 1		1 = start automatic calibration of the motor data. • A default inverter characteristic is loaded. • The motor equivalent circuit diagram data and controller settings are calculated on the basis of the currently set rated motor data. • The motor is not energized.

6 Troubleshooting

6.1 Error message

If an error is pending, the keypad shows the following information.



1 = Error text

2 = Error type (F = fault, T = trouble, W = warning)

3 = Error code (hexadecimal)

- Faults (F) and trouble (T) are displayed continuously. The inverter is disabled.
- Warnings (W) are displayed every 2 seconds for a short time. The inverter is probably disabled.

6.1.1 Errors can be reset via the stop key.

Errors can be reset via the stop key.

- Prerequisite: Cause of error has been eliminated and no blocking time is active.
- Press the stop key to reset the error. The motor is stopped.
- Press the start key to cancel the stop.

6.2 Error codes

Error code	Description	Classification	Remedy	Blocking time [s]
2250	CiA: Continuous overcurrent (inside the device)	Error	• Check motor and wiring for short circuits. • Check brake resistor and wiring. • Check motor circuit (delta connection, star connection). • Check setting of the motor data.	5
2320	Short circuit or earth leakage on motor side	Error	• Check motor cable. • Check the length of the motor cable. • Use shorter or lower-capacitance motor cable.	5
2340	CiA: Short circuit (inside the device)	Error	• Check motor cable for short circuit.	5
2350	CiA: i^2*t overload (thermal state)	Error	• Check drive sizing. • Check machine/driven mechanics for excessive load. • Check setting of the motor data. • Reduce values for slip compensation (P315.01, P315.02) and oscillation damping (P318.01, P318.02).	5
2382	Error: Device utilization (Ixt) too high	Error	• Check drive sizing. • Reduce maximum overload current of the inverter (P324.00). • In case of high mass inertias, reduce maximum overload current of the inverter (P324.00) to 150 %.	3
2383	Warning: Device utilization (Ixt) too high	Warning	• Check drive sizing.	0
3120	Mains phase fault	Error	• Check mains connection wiring. • Check fuses.	0
3210	DC-bus overvoltage	Error	• Reduce dynamic performance of the load profile	0
3211	Warning: DC-bus overvoltage	Warning	• Check mains voltage. • Check settings for the brake energy management. • Connect brake resistor to the power unit and activate the integrated brake chopper (P706.01 = 0: brake resistance).	0
3220	DC bus undervoltage	Trouble	• Check mains voltage.	0
3221	Warning: DC bus undervoltage	Warning	• Check fuses. • Check DC-bus voltage (P105.00). • Check mains settings.	0
3222	DC-bus voltage too low for switch-on	Warning	• Check mains voltage. • Check fuses. • Check mains settings.	0
4210	PU: Overtemperature fault	Error	• Check mains voltage. • Provide for a sufficient cooling of the device (display of the heatsink temperature in P117.01). • Clean fan and ventilation slots. If required, replace fan. • Reduce switching frequency (P305.00).	0
4281	Heatsink fan warning	Warning	• Clean fan and ventilation slots. If required, replace fan. The fans can be unlocked via locking hooks and can then be removed.	0
4310	Error: Motor overtemperature	Error	• Check drive sizing. • Check motor temperature sensor and wiring (terminals X109/T1 and X109/T2).	5
5112	24 V supply critical	Warning	• Check optional external 24 V voltage supply (terminal X3/24E), if connected. • Check mains voltage.	0
5180	24 V supply overload	Warning	• Check 24 V output and digital outputs for earth fault or overload.	0
6280	Trigger/functions connected incorrectly	Trouble	• Check and correct the assignment of the triggers to the functions. • With keypad or network control, the two functions “Inverter enable” (P400.01) and “Run” (P400.02) can also be set to “Constant TRUE [1]” to start the motor.	0
7180	Motor overcurrent	Error	• Check motor load. • Check drive sizing. • Adapt the set error threshold (P353.01).	1
9080	Keypad removed	Error	• Connect the keypad again or activate another control source.	0
FF02	Error: Brake resistor overload	Error	• Check drive sizing. • Check settings for the brake energy management. • Note! The error will be reset if the thermal load falls below the error threshold (P707.09) of - 20 %.	5
FF06	Motor overspeed	Error	• Adapt the maximum motor speed (P322.00) and the error threshold (P350.01).	1
FF36	Warning: Brake resistor overload	Warning	• Check drive sizing. • Check settings for the brake energy management. • Note! The warning will be reset if the thermal load falls below the warning threshold (P707.08) of - 20 %.	0
FF37	Automatic start disabled	Error	• Deactivate start command and reset error.	0
FF85	Keypad full control active	Warning	• Press the CTRL key to exit control mode.	0

6.3 Status LEDs

Meaning of the status LEDs for the inverter:

LED “RDY” (blue))	LED “ERR” (red))	State/meaning
off	off	No supply voltage
		Mains voltage is switched on, inverter initialized
 blinking	off	Inverter disabled
	 blinking fast	Safe torque off (STO) active, warning present
 blinking	off	Inverter disabled
	 blinking fast	Inverter disabled, warning active.
		Inverter disabled, error active.
	 on briefly every 1.5 s	Inverter disabled, no DC-bus voltage.
	off	Inverter enabled.
	off	The motor rotates according to the specified setpoint or quick stop active.
	 blinking fast	Inverter enabled, warning active. The motor rotates according to the specified setpoint or quick stop active.
	 blinking	Inverter enabled, quick stop active as response to a fault.

6.4 Support

Further information can be found at B&R website (https://www.br-automation.com)

The material number of the product can be found on the nameplate.

7 Disposal

If pollutants are disposed of improperly, they may cause lasting damage to human health and the environment. Thus, electrical and electronic equipment must be collected separately from unsorted municipal waste so that it may be recycled or disposed of properly. If available, put the components to the company internal disposal from where it is passed on to specialized waste management companies. It is also possible to return the components to the manufacturer. For this purpose, please contact the customer service of the manufacturer. More detailed information on disposal can be obtained from the corresponding specialist firms and the competent authorities. The packaging of the component must be disposed of separately. Paper, cardboard and plastics must be recycled.