ACOPOS P3

User's manual
V1.40 (May 2025)
MAACPP3-ENG

Translation of the original documentation

1 General information

1.1 Manual history

Information:

**B&R makes every effort to keep user's manuals as current as possible.
Especially in the area of safety technology, always consult the most current version of this user's manual on the B&R website for valid specifications (www.br-automation.com)!**

Version	Date	Comment
1.40	May 2025	Changes / New features • Chapter "DC bus" ° Updated section "Line filter / Number of servo drives": 2.5 kHz line filter
1.33	December 2024	Changes / New features • Chapter "Technical data" ° Specifications on EnDat 3 added ° Specifications on operation with 1x 24 - 120 VDC added • Chapter "Dimensioning" ° Section Network configurations: Specifications for operation in DC networks extended ° Section Network configurations / design: Specifications on operation with 1x 24 - 120 VDC added ° Section Brake resistor: Specifications on external brake resistors adapted • Appendix ° UL Markings updated
1.32	May 2024	Changes / New features • Chapter "General information" ° Updated information about the Dual-Use Regulation. • Chapter "Technical data" ° New: 8EAC0134.000-1 ° Added information about permissible network configurations with boundary conditions. ° 8EAC plug-in modules: Added information about changing the factory assignment of encoder interfaces. • Chapter "Dimensioning" ° Updated section "Network configurations". • Appendix ° Updated section "Forming DC bus capacitors".
1.31	June 2023	Changes / New features • Chapter "Technical data" ° 8B0F0xx0H000.000-1: Defined specifications for leakage currents more precisely ° 8EF160H300.1-1: Updated information about leakage currents and total length of all motor / hybrid motor cables • Chapter "Dimensioning / Mains connection" ° Updated information about leakage currents in section "Residual current protective devices"

Table 1: Manual history

Version	Date	Comment
1.30	April 2023	Changes / New features • Chapter "Technical data" ° Added energy efficiency data of single-axis modules (IE classification). ° Updated accessories. ° Updated temperature range. ° SafeMOTION modules: Added specifications on the accuracy of the safe current. ° Added input/output circuit diagrams for X4x and X8. ° Added information about assigning an encoder interface plug-in module to a servo drive. ° Added input/output circuit diagrams for plug-in modules. ° New: 8EXF fan modules. ° New: 8ER differential choke. • Chapter "Dimensioning" ° Added specifications for operating on IT power systems. ° Updated specifications for fuse protection of external braking resistors. • New: Appendix E: ACOPOS P3 cable assignment.
1.20	2020-01-31	Changes / New features • Chapter "Technical data" ° Added ACOPOS P3 SafeMOTION 8EI servo drives. ° Added 8EAC0151 plug-in modules. ° Added 8B0W braking resistors. ° Added adapter cables. • Chapter "Dimensioning" ° Updated section "Mains connection" (fuse protection). ° Updated section "DC bus". ° Updated section "Dimensioning braking resistors". • Chapter "Wiring" ° Added section "Insulation and high-voltage testing" • Chapter "Safety technology" ° Added specifications for single-channel STO. • Chapter "Standards and certifications" ° Updated edition status of standards. • Appendix ° Added peak load capacity when using external braking resistors. ° Added forming of DC bus capacitors.
1.10	2017-11-30	Changes / New features • Chapter "General information": - Safety guidelines: Updated "Intended use". - Operation: Updated "Protection against touching electrical parts". • Chapter "Technical data" - Technical data: Updated "Order key". - 8EI servo drives: Added "General requirements". - Revised section "Status indicators" and added section "State transitions". - 8EI servo drives: Revised and updated data, added connector pinouts. - Wiring: Revised and updated overview of connections and individual connections. - Accessories: 8B0F passive line filters, 8EAC plug-in modules, 8EAD display modules, cables, cable extensions, 8SCSE shield component sets, 8EXA covers, 8TB terminals and 8EXC extended keying plugs, added new materials and updated data. • Chapter "Installation" - Dimension diagrams and installation dimensions: Updated dimension diagrams for the upper performance classes of 8EI servo drives. - Dimension diagrams and installation dimensions: Updated figures for the permissible mounting orientations of 8EI servo drives. - Installation and removal of 8EAC plug-in modules: Updated sections "General information", "Installation" and "Removal". • Chapter "Dimensioning" - Mains connection: Updated section "Network configurations". - Mains connection: Updated table for mains voltage range. - Mains connection: Added sections "Dimensioning" and "Design", updated "Protective ground connection (PE)". - DC bus: Added section. - Braking resistor: Updated "General information". • Chapter "Wiring" - General information: Updated section "Installation notes" • Chapter "Safety guidelines" - Principle - Implementing safety functions: Updated "Additional function" - Updated "Wiring enable inputs per safety category 3 / SIL 2 / PL d and functionality (STO): SS1, SLS, SS2 - Safety category 3 / SIL 2 / PL d (variant B).

Table 1: Manual history

Version	Date	Comment
		• Chapter "Standards and certifications" - Updated "Applicable European directives". - Updated "Applicable standards". - Environmental limit values: Updated "Mechanical conditions per EN 61800-2", "Operation and transport". - Updated "Climate conditions per EN 61800-2", "Operation, storage and transport". - Updated standards, safety technology definitions • Added appendix. - Added "Accessories included in delivery". - Added UL marks.
1.0	2016-02-12	Start of manual history publication

Table 1: Manual history

1.2 Safety guidelines

1.2.1 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.

1.2.2 General information

Drive systems and servo motors from B&R Industrial Automation GmbH are designed, developed and manufactured for normal industrial use.

They have not been designed, developed and manufactured for use that involves fatal risks or hazards that could result in death, injury, serious physical harm or other loss without the assurance of exceptionally stringent safety precautions.

In particular, these risks include the use of these devices to monitor nuclear reactions in nuclear power plants, in flight control or flight safety systems as well as in the control of mass transportation systems, medical life support systems or weapons systems.

Servo drives, inverter modules and frequency inverters from B&R Industrial Automation GmbH are not dual-use goods per Annex I | 3A225 of Regulation (EU) 2021/821 of the European Parliament and European Council.
The electrical output frequency of these modules is monitored; if the limit frequency is exceeded, the current movement is aborted and an error is reported.

Servo drives, inverter modules and frequency inverters from B&R Industrial Automation GmbH with the dual-use option are dual-use goods per Annex I | 3A225 of Regulation (EU) 2021/821 of the European Parliament and European Council.
The electrical output frequency of these modules is not monitored.

Modules with the dual-use option are subject to various export restrictions.

Danger!

Drive systems and servo motors can have exposed parts with voltages applied (e.g. terminals) or hot surfaces. Moving machine parts pose additional hazards. There is a risk of serious personal injury or damage to property if the required covers are removed without authorization, the appliance is used incorrectly or it is installed or operated incorrectly.

All tasks such as the transport, installation, commissioning and servicing of devices are only permitted to be carried out by qualified personnel. Qualified personnel are persons who are familiar with the transport, installation, assembly, commissioning and operation of the product and have the appropriate qualifications for their job. National accident prevention regulations must be observed.

The safety guidelines, information about connection conditions (nameplate and documentation) and limit values specified in the technical data must be read carefully before installation and commissioning and must be strictly observed.

1.2.3 Intended use

Servo drives are components designed to be installed in electrical systems or machines. The intended use is prohibited until it has been determined that the machine complies with the regulations of EC Directives 2006/42/EC (Machinery Directive) and 2014/30/EU (EMC Directive).

ACOPOS P3 drive systems are only permitted to be directly operated on grounded industrial power systems (TT, TN, TN-S, TN-C-S) and IT power system.[1)]
When used in residential areas, commercial areas or small businesses, additional protective and filtering measures must be implemented by the user.

For technical data as well as connection and environmental conditions, see the nameplate or this user's manual. Specifications regarding connection and environmental conditions must be observed!

Danger!

Electronic devices are generally not failsafe. If the drive systems fails, the user is responsible for making sure that the motor is brought to a secure state.

1.2.4 Protection against electrostatic discharge

Electrical assemblies that can be damaged by electrostatic discharge (ESD) must be handled accordingly.

1.2.4.1 Packaging

Electrical assemblies with housing do not require special ESD packaging but must be handled properly (see section 1.2.4.2 "Regulations for proper ESD handling " on page 11).

Electrical assemblies without a housing are protected by ESD-suitable packaging.

1.2.4.2 Regulations for proper ESD handling

Electrical assemblies with housing

- Do not touch the connector contacts of connected cables.
- Do not touch the contact tips on circuit boards.

Electrical assemblies without housing

The following applies in addition to "Electrical assemblies with housing":

- All persons handling electrical assemblies and devices in which electrical assemblies are installed must be grounded.
- Assemblies are only permitted to be touched on the narrow sides or front plate.
- Always place assemblies on suitable surfaces (ESD packaging, conductive foam, etc.).
  Metallic surfaces are not suitable surfaces!
- Assemblies must not be subjected to electrostatic discharges (e.g. due to charged plastics).
- A minimum distance of 10 cm from monitors or television sets must be maintained.
- Measuring instruments and devices must be grounded.
- Test probes of floating potential measuring instruments must be discharged briefly on suitable grounded surfaces before measurement.

Individual components

- ESD protective measures for individual components are implemented throughout B&R (conductive floors, shoes, wrist straps, etc.).
- The increased ESD protective measures for individual components are not required for handling B&R products at customer locations.

1.2.5 Transport and storage

During transport and storage, devices must be protected against undue stress (mechanical stress, temperature, humidity, aggressive atmosphere).

[1)] For details and boundary conditions for the permissible network configurations, see Dimensioning.

Drive systems contain components sensitive to electrostatic charges that can be damaged by inappropriate handling. It is therefore necessary to provide the required protective measures against electrostatic discharge when installing or removing these drive systems.

1.2.6 Handling and installation

Warning!

B&R drive systems and servo motors can be heavy.

When handling and installing heavy B&R drive systems or servo motors, there is therefore the risk of personal injury or damage to property caused by shearing, impacts, cutting or crushing. If required, use suitable protective equipment (e.g. safety glasses, protective gloves, safety shoes)!

Installation must be performed according to this documentation using suitable equipment and tools.

Devices are only permitted to be installed by qualified personnel and when the power is switched off. Before installation, voltage to the control cabinet must be switched off and prevented from being switched on again.

General safety guidelines and national accident prevention regulations for working with high voltage systems must be observed.

Electrical installation must be carried out according to applicable national guidelines (e.g. wire cross section, fuses, protective ground connections, see also chapter 4 "Dimensioning").

1.2.7 Operation

1.2.7.1 Protection against touching electrical parts

Danger!

To operate drive systems, it is necessary for certain parts to carry dangerous voltage levels over 60 VDC. Touching one of these components can result in a life-threatening electric shock. This could lead to death, severe injury or damage to property.

Before commissioning the drive system, make sure that all connections are made and all covers are properly installed.

Before applying the mains voltage to a drive system, it must be ensured that it is properly connected to ground potential (PE rail). Ground connections must also be established if the drive system is connected for test purposes or only being operated for a short period of time!

Before applying the mains voltage to a drive system, all voltage-carrying components must be securely covered. During operation, all covers and control cabinet doors must remain closed.

Danger!

If the safety functions integrated in the drive system are used in an application, the safety functions must be fully validated before switching on for the first time. This could result in death, severe injury or damage to property.

Control and power connections can still carry voltage even if the motor is not turning. Touching these connections while the device is switched on is prohibited.

Before performing any work on drive systems, they must first be disconnected from the power system and prevented from being switched on again.

Danger!

Dangerous high voltage!

Before starting work, disconnect the power supply and wait 5 minutes to ensure that the capacitors have discharged. Observe the regulations!
The waiting time of 5 minutes begins as soon as all synchronous motors connected to the drive system that have been disconnected from the power supply are at a standstill. If the synchronous motors are not at a standstill when the drive system is disconnected from the power supply, the waiting time is extended accordingly.

The connections on the drive system for signal voltages in the voltage range 5 to 30 V are safely isolated circuits. The signal voltage connections and interfaces are therefore only permitted to be connected to devices or electrical components that have sufficient isolation per EN 61800-5-1 and protective extra-low voltage that corresponds to voltage class DVC A (SELV, PELV).

Never disconnect the electrical connections of drive systems while voltage is applied. In the worst case, arcs may occur that can subsequently cause personal injury and/or damage to contacts.

1.2.7.2 Protection against burns

The surfaces of servo drives and servo motors can reach very high temperatures during operation.

ACOPOS P3 servo drives are therefore marked as follows:

Figure 1: "Hot surface" warning

1.2.7.3 Protection against hazardous movements

Danger!

Incorrect control of motors can trigger unwanted and dangerous movements! Such faulty behavior can have various causes:

- **Incorrect installation or errors when handling components**
- **Faulty or incomplete wiring**
- **Defective devices (drive system, motor, position sensor, cable, brake)**
- **Incorrect control (e.g. caused by software error)**

Several of these fault causes are detected and prevented by the drive system's internal monitoring. Nevertheless, it is still possible for the motor shaft to move any time after the device is switched on! For this reason, higher-level protective measures must be put in place to ensure that personnel and the machine are protected.

The moving parts on machines must be shielded in such a way as to prevent unintentional access by personnel. This type of protection can be achieved by using stable mechanical protective equipment such as protective covers, protective fences, protective gates or photoelectric sensors.

It is prohibited to remove, bypass or circumvent this safety equipment or to remain within the machine's range of movement.

A sufficient number of emergency switch-offs must be installed in the immediate vicinity of the machine and easily accessible at all times. This emergency switch-off equipment must be checked before the machine is commissioned.

On free running motors, the shaft key (if present) must be removed or measures taken to prevent its ejection. The holding brake built into motors cannot prevent hoisting equipment from dropping the suspended load.

1.2.8 Characteristic values for functional safety

Characteristic values for functional safety are listed in chapter "Safety technology".

Characteristic values are calculated based on a proof test interval of maximum 20 years. Since a proof test cannot be carried out for B&R drive systems, the proof test interval is the same as the system's mission time.

Per the EN ISO 13849, EN 62061 and IEC 61508 standards, the safety functions described in section "Safety technology" cannot be used beyond the specified mission time.

Danger!

The user must ensure that all B&R drive systems that execute a safety function are replaced by new B&R drive systems or removed from operation before their mission time expires.

1.2.9 Environmentally friendly disposal

All drive systems and servo motors from B&R are designed to have as little impact on the environment as possible.

1.2.9.1 Separation of materials

To ensure that devices can be recycled in an environmentally friendly manner, it is necessary to separate out the different materials.

Component	Disposal
Drive systems, servo motors, cables	Electronic recycling
Cardboard/Paper packaging	Paper/Cardboard recycling

Table 2: Environmentally friendly separation of materials

Disposal must be carried out in accordance with applicable legal regulations.

1.2.10 Cybersecurity disclaimer for products

B&R products communicate via a network interface and were developed for secure connection with internal and, if necessary, other networks such as the Internet.

Information:

In the following, B&R products are referred to as "product" and all types of networks (e.g. internal networks and the Internet) are referred to as "network".

It is the sole responsibility of the customer to establish and continuously ensure a secure connection between the product and the network. In addition, appropriate security measures must be implemented and maintained to protect the product and entire network from any security breaches, unauthorized access, interference, digital intrusion, data leakage and/or theft of data or information.

B&R Industrial Automation GmbH and its subsidiaries are not liable for damages and/or losses in connection with security breaches, unauthorized access, interference, digital intrusion, data leakage and/or theft of data or information.

The aforementioned appropriate security measures include, for example:

- Segmentation of the network (e.g. separation of the IT network from the control network[2)])
- Use of firewalls
- Use of authentication mechanisms
- Encryption of data
- Use of anti-malware software

Before B&R Industrial Automation GmbH releases products or updates, they are subjected to appropriate functional testing. Independently of this, we recommend that our customers develop their own test processes in order to be able to check the effects of changes in advance. Such changes include, for example:

[2)] The term "control network" refers to computer networks used to connect control systems. The control network can be divided into zones, and there can be several separate control networks within a company or site. The term "control systems" refers to all types of B&R products such as controllers (e.g. X20), HMI systems (e.g. Power Panel T30), process control systems (e.g. APROL) and supporting systems such as engineering workstations with Automation Studio.

- Installation of product updates
- Significant system modifications such as configuration changes
- Deployment of updates or patches for third-party software (non-B&R software)
- Hardware replacement

These tests should ensure that implemented security measures remain effective and that systems in the customer's environment behave as expected.

2 Technical data

2.1 Order key

8EI	ccc	d	e	f	g	h	.	i	j	kk	-	1

	Icon	Name
ccc	123	Continuous current A_{eff}
d	H M	3x 200 - 480 VAC 3x 200 - 230 VAC or 1x 110 - 230 VAC
e	W	Wall mounting
f	S D T	1-axis module 2-axis module 3-axis module
g	1 S	Hardwired STO safety technology with encoder SafeMOTION, with digital encoder
h	x [1] 0	Module-specific options Standard
i	x [1] 0	Plug-in module included in delivery No plug-in module included in delivery
j	x [1] 0	Configurable accessories included in delivery No configurable accessories included in delivery
kk	xx [1] 00	Customized options No customized options

Table 3: ACOPOS P3 8EI servo drive - Order key

1) Placeholder for the respective option or configuration.

2.1.1 Continuous current A_{eff} (ccc)

Continuous current A_{eff} of the ACOPOS P3 servo drive is listed in the form of a 3-digit code (ccc) as part of the model number.

Order code (ccc)	Continuous current [A_{eff}]	Available as		
		1-axis module	2-axis module	3-axis module
1X6	1.6	Yes	No	No
2X2	2.2	Yes	Yes	Yes
4X5	4.5	Yes	Yes	Yes
8X8	8.8	Yes	Yes	Yes
013	13	Yes	No	No
017	17	Yes	Yes	No
022	22	No	Yes	No
024	24	Yes	No	No
034	34	Yes	No	No
044	44	Yes	No	No

Table 4: Continuous current (ccc)

2.1.2 Module-specific options (h)

ACOPOS P3 8EI servo drives are available without module-specific options (standard) as well as with the module-specific dual-use option.

ACOPOS P3 8EI servo drives with the dual-use option are dual-use goods per Annex I | 3A225 of Regulation (EU) 2021/821 of the European Parliament and European Council.
The electrical output frequency of these modules is not monitored.

Modules with the dual-use option are subject to various export restrictions.

Order code (h)	Module-specific option
0	Standard (no module-specific option)
1	Dual use

Table 5: Module-specific options (h)

2.1.3 Plug-in modules (i)

ACOPOS P3 8EI servo drives can be configured with our without an included plug-in module. The selected plug-in module is added to the content of delivery and included in the package containing the servo drive.

Order code (i)	Plug-in module	
A	Resolver 1x interface	8EAC0122.001-1
C	Resolver 3x interface	8EAC0122.003-1
D	Digital I/O interface	8EAC0130.000-1
H	Digital multi-encoder interface, 1x interface	8EAC0150.001-1
J	Digital multi-encoder interface, 3x interface	8EAC0150.003-1
K	Incremental encoder with 1 interface	8EAC0151.001-1
L	Incremental encoder with 3 Interfaces	8EAC0151.003-1
M	Analog multi-encoder interface, 1x interface	8EAC0152.001-1
N	Analog multi-encoder interface, 3x interface	8EAC0152.003-1
P	Digital I/O Interface with terminal 8TB0230.221A-00	8EAC0130.000-1
Q	Analog/Digital I/O interface with terminal block 8TB0230.221A-00	8EAC0134.000-1
0	No plug-in module included in delivery	

Table 6: Plug-in modules (i)

2.1.4 Configurable accessories (j)

ACOPOS P3 8EI servo drives can be configured to include accessories. The selected accessories are added to the content of delivery and included in the package containing the servo drive.

Order code (j)	Internal braking resistor [1)]	Front cover	Connector set 2 (2-row)	Connector set 1 (1-row)
0	No	No	No	Yes
1	No	No	Yes	No
2	No	Yes	No	Yes
3	No	Yes	Yes	No
4	Yes	No	No	Yes
5	Yes	No	Yes	No
6	Yes	Yes	No	Yes
7	Yes	Yes	Yes	No
A	No	No	No	No
B	No	Yes	No	No
C	Yes	No	No	No
D	Yes	Yes	No	No

1) Installed in the 8EI servo drive.

2.2 8EI servo drives

The 8EI servo drive is available as a 1-, 2- or 3-axis system. It covers a power range from 0.6 to 18 kW or 1.6 to 44 amps. The housing of the 3-axis drive is as compact as a conventional 1-axis drive. Space consumption in the control cabinet is reduced by 69%. In addition, an integrated digital multi-encoder interface is available to the user for each axis.

The printed circuit boards in 8EI servo drives are coated and thus very robust against environmental influences such as dust or moisture.

2.2.1 General requirements

Automation Studio (AS)

ACOPOS P3 8EI servo drives are supported in AS V4.2.5 and later.

2.2.2 Status indicators

2.2.2.1 Overview

8EI servo drives

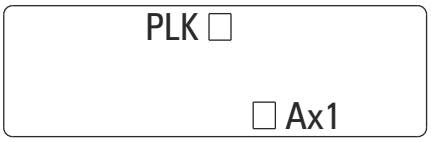
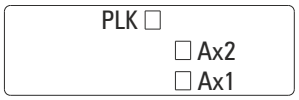
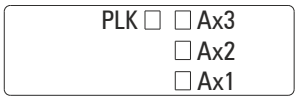
1-axis modules	2-axis modules	3-axis modules
		

Table 7: 8EI servo drives - Status indicators

SafeMOTION 8EI servo drives

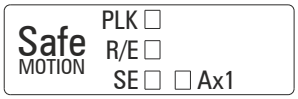
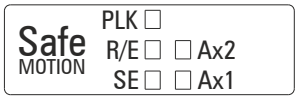
1-axis modules	2-axis modules	3-axis modules
		

Table 8: 8EI SafeMOTION servo drives - Status indicators

2.2.2.2 LED state during startup

The following intervals are used for the LED status indicators:

Width of box: 50 ms
Repeats after: 3,000 ms

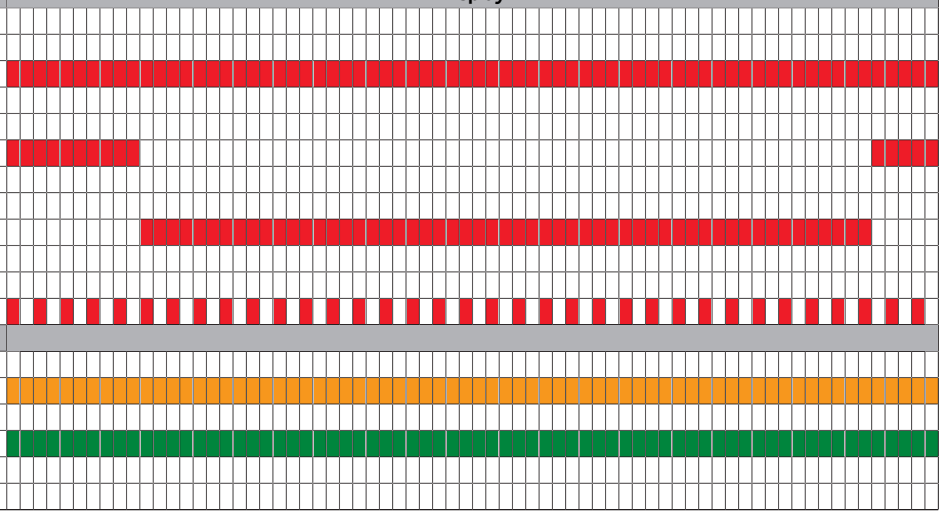
Status	Ax1/Ax2/Ax3	Display
1. Boot procedure for base hardware active	Green	
	Orange	
	Red	
2. Waiting for network telegram	Green	
	Orange	
	Red	
3. Network communication active	Green	
	Orange	
	Red	
4. ACOPOS operating system being transferred/burned	Green	
	Orange	
	Red	
	Ax1/Ax2/Ax3 PLK	
5. Module booting	Green	
	Orange	
	Red	
6. Module ready for operation	Green	
	Orange	
	Red	

Table 9: LED state during startup

2.2.2.3 POWERLINK - LED status indicators

Label	Color	Description	
PLK	Green	Blinking green (1x)	The client detects a valid POWERLINK frame on the network.
		Blinking green (2x)	Cyclic operation on the network, but the client itself is not yet in cyclic operation.
		Blinking green (3x)	Cyclic operation of the client is in preparation.
		Solid green	The client is in cyclic operation.
		Flickering green	The client is not in cyclic operation and also does not detect any other stations on the network in cyclic operation.
	Red	Solid red	The POWERLINK node number of the module is 0.
		Blinking red/green	The client is in an error state (drops out of cyclic operation).
	Orange	Solid orange	Module booting

Table 10: POWERLINK - LED status indicators

2.2.2.4 Ax1/Ax2/Ax3 - LED status indicators

Label	Color	Function	Description	
Ax1 Ax2 Ax3	Green	Ready	Solid green	The module is ready for operation and the power stage can be enabled (operating system present and booted, no pending permanent or temporary errors).
			Blinking green	The module is not ready for operation. **Examples:** • No signal on one or both enable inputs • DC bus voltage outside the tolerance range • Overtemperature on the motor (temperature sensor) • Motor feedback not connected or defective • Motor temperature sensor not connected or defective • Overtemperature on the module (IGBT junction, heat sink, etc.) • Disturbance on network
	Red	Error	Solid red	There is a permanent error on the module. **Examples:** • Permanent overcurrent • Data in EPROM not valid
			Blinking red	Burning ACOPOS P3 operating system
	Orange	Run	Solid orange	The module's power stage is enabled.
	---	---	LED off	No voltage being supplied to module

Table 11: Ax1/Ax2/Ax3 - LED status indicators

2.2.2.5 R/E and SE - LED status indicators

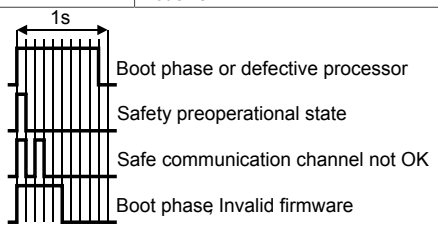
LED	Color		Description
R/E	Green	Red	
	Off	Off	Module not supplied with power, no communication
	Single flash		Mode "Unlink"
	Double flash		Updating firmware
	Blinking		Mode PREOPERATIONAL
	On		Mode RUN
	On	Single flash, inverse	Safety-related firmware invalid
		Triple flash, inverse	Updating safety-related firmware
		On	Communication error
	Off	On	Error
SE	Red	Off	Mode RUN
			
		On	Non-acknowledgeable error state, FAIL SAFE state
	The two "SE" indicators are two separate LEDs that show the states of safety processor 1 and safety processor 2.		

Table 12: R/E and SE - LED status indicators

2.2.3 B&R ID code

The first 4 positions of the serial number correspond to the B&R ID code of an ACOPOS P3 8EI servo drive.

The serial number is located on the left side of the servo drive on the nameplate directly below the barcode.

Figure 2: B&R ID code (marked) as part of the serial number

2.2.4 X4x digital multi-encoder interfaces

Information:

The encoder type for the multi-encoder interface is not predefined from the factory. Before commissioning, configure the encoder type and – depending on the encoder type – the encoder supply voltage in Automation Studio for each multi-encoder interface!

The following encoder types are supported:

Technical data	Encoder type					
	EnDat 2.2	EnDat 3.0	SSI	BiSS (mode C)	HIPERFACE DSL	T-Format
Output voltage [1]	11.45 V ±0.1 V		11.45 V ±0.1 V 5.2 V ±0.1 V [2]		11.45 V ±0.1 V	5.2 V ±0.1 V
Data transfer rate	6.25 Mbit/s	25 Mbit/s	100 to 400 kbit/s	1 to 8.33 Mbit/s	9.375 Mbit/s	2.5 Mbit/s
Terminating resistor	120 Ω	110 Ω	120 Ω		110 Ω	120 Ω
Support [3]	ACOPOS operating system 3.11.0 and higher	ACOPOS operating system 6.2.0 and higher	ACOPOS operating system 5.00.0 and higher	ACOPOS operating system 3.11.0 and higher	ACOPOS operating system 3.16.0 and higher	ACOPOS operating system 5.08.0 and higher
Selection in Automation Studio	EnDat	EnDat3	SSI	BiSS	HIPERFACE DSL	T-Format

Table 13: Supported encoder types

1) The output voltage is not predefined from the factory (with the exception of encoder types EnDat 2.2, EnDat 3.0 and HIPERFACE DSL). It must be configured in Automation Studio based on the encoder type. If no output voltage is configured, then the encoder will not be supplied by digital multi-encoder interface X4x. Power to the encoder can then be supplied externally.

2) Output voltage 5.2 V is only available under the following conditions:

- 8EI servo drive with 8ZECxxx revision D0 and higher - see the device information on the left side cover of the 8EI servo drive
- ACOPOS operating system 3.15.0 and higher (for 8EIxxxxxD... 2-axis modules and 8EIxxxxxT... 3-axis modules)
- ACOPOS operating system 3.17.0 and higher (for 8EIxxxxxS... 1-axis modules)

3) Operating system version from which a certain encoder type is supported.

Caution!

An incorrect configuration can result in irreparable damage to the connected encoder!

2.2.5 Servo drives - Module overview

Order number	Short description	Page
	Wall mounting	
8EI013HWS10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 3x 200-480 VAC, 13 A, 1 axis, wall mounting	37
8EI013HWSS0.XXXX-1	ACOPOS P3 servo drive, 3x 200-480 VAC, 13 A, SafeMOTION, 1 axis, wall mounting	61
8EI017HWD10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 3x 200-480 VAC, 2x 17 A, 2 axis, wall mounting	85
8EI017HWDS0.XXXX-1	ACOPOS P3 servo drive, 3x200-480 VAC, 2x 17 A, SafeMOTION, 2 axes, wall mounting	103
8EI017HWS10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 3x 200-480 VAC, 17 A, 1 axis, wall mounting	37
8EI017HWSS0.XXXX-1	ACOPOS P3 servo drive, 3x 200-480 VAC, 17 A, SafeMOTION, 1 axis, wall mounting	61
8EI022HWD10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 3x 200-480 VAC, 2x 22 A, 2 axis, wall mounting	85
8EI022HWDS0.XXXX-1	ACOPOS P3 servo drive, 3x 200-480 VAC, 2x 22 A, SafeMOTION, 2 axes, wall mounting	103
8EI024HWS10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 3x 200-480 VAC, 24 A, 1 axis, wall mounting	43
8EI024HWSS0.XXXX-1	ACOPOS P3 servo drive, 3x 200-480 VAC, 24 A, SafeMOTION, 1 axis, wall mounting	67
8EI034HWS10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 3x 200-480 VAC, 34 A, 1 axis, wall mounting	43
8EI034HWSS0.XXXX-1	ACOPOS P3 servo drive, 3x 200-480 VAC, 34 A, SafeMOTION, 1 axis, wall mounting	67
8EI044HWS10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 3x 200-480 VAC, 44 A, 1 axis, wall mounting	43
8EI044HWSS0.XXXX-1	ACOPOS P3 servo drive, 3x 200-480 VAC, 44 A, SafeMOTION, 1 axis, wall mounting	67
8EI1X6HWS10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 3x 200-480 VAC, 1.6 A, 1 axis, wall mounting	31
8EI1X6HWSS0.XXXX-1	ACOPOS P3 servo drive, 3x 200-480 VAC, 1.6 A, SafeMOTION, 1 axis, wall mounting	55
8EI1X6MWS10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 1x 110-230 VAC, 3x 200-230 VAC, 1.6 A, 1 axis, wall mounting	24
8EI1X6MWSS0.XXXX-1	ACOPOS P3 servo drive, 1x 110-230 VAC, 3x 200-230 VAC, 1.6 A, SafeMOTION, 1 axis, wall mounting	49
8EI2X2HWD10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 3x 200-480 VAC, 2x 2.2 A, 2 axis, wall mounting	79
8EI2X2HWDS0.XXXX-1	ACOPOS P3 servo drive, 3x 200-480 VAC, 2x 2.2 A, SafeMOTION, 2 axes, wall mounting	97
8EI2X2HWS10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 3x 200-480 VAC, 2.2 A, 1 axis, wall mounting	31
8EI2X2HWSS0.XXXX-1	ACOPOS P3 servo drive, 3x 200-480 VAC, 2.2 A, SafeMOTION, 1 axis, wall mounting	55
8EI2X2HWT10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 3x 200-480 VAC, 3x 2.2 A, 3 axis, wall mounting	116
8EI2X2HWTS0.XXXX-1	ACOPOS P3 servo drive, 3x 200-480 VAC, 3x 2.2 A, SafeMOTION, 3 axes, wall mounting	129
8EI2X2MWD10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 1x 110-230 VAC, 3x 200-230 VAC, 2x 2.2 A, 2 axes, wall mounting	73
8EI2X2MWDS0.XXXX-1	ACOPOS P3 servo drive , 1x 110-230 VAC, 3x 200-230 VAC, 2x 2.2 A, SafeMOTION, 2 axes, wall mounting	91
8EI2X2MWS10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 1x 110-230 VAC, 3x 200-230 VAC, 2.2 A, 1 axis, wall mounting	24
8EI2X2MWSS0.XXXX-1	ACOPOS P3 servo drive, 1x 110-230 VAC, 3x 200-230 VAC, 2.2 A, SafeMOTION, 1 axis, wall mounting	49
8EI2X2MWT10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 1x 110-230 VAC, 3x 200-230 VAC, 3x 2.2 A, 3 axes, wall mounting	109
8EI2X2MWTS0.XXXX-1	ACOPOS P3 servo drive , 1x 110-230 VAC, 3x 200-230 VAC, 3x 2.2 A, SafeMOTION, 3 axes, wall mounting	123
8EI4X5HWD10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 3x 200-480 VAC, 2x 4.5 A, 2 axis, wall mounting	79
8EI4X5HWDS0.XXXX-1	ACOPOS P3 servo drive, 3x 200-480 VAC, 2x 4.5 A, SafeMOTION, 2 axes, wall mounting	97
8EI4X5HWS10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 3x 200-480 VAC, 4.5 A, 1 axis, wall mounting	31
8EI4X5HWSS0.XXXX-1	ACOPOS P3 servo drive, 3x 200-480 VAC, 4.5 A, SafeMOTION, 1 axis, wall mounting	55
8EI4X5HWT10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 3x 200-480 VAC, 3x 4.5 A, 3 axis, wall mounting	116
8EI4X5HWTS0.XXXX-1	ACOPOS P3 servo drive, 3x 200-480 VAC, 3x 4.5 A, SafeMOTION, 3 axes, wall mounting	129
8EI4X5MWD10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 1x 110-230 VAC, 3x 200-230 VAC, 2x 4.5 A, 2 axes, wall mounting	73
8EI4X5MWDS0.XXXX-1	ACOPOS P3 servo drive , 1x 110-230 VAC, 3x 200-230 VAC, 2x 4.5 A, SafeMOTION, 2 axes, wall mounting	91
8EI4X5MWS10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 1x 110-230 VAC, 3x 200-230 VAC, 4.5 A, 1 axis, wall mounting	24
8EI4X5MWSS0.XXXX-1	ACOPOS P3 servo drive, 1x 110-230 VAC, 3x 200-230 VAC, 4.5 A, SafeMOTION, 1 axis, wall mounting	49
8EI4X5MWT10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 1x 110-230 VAC, 3x 200-230 VAC, 3x 4.5 A, 3 axes, wall mounting	109
8EI4X5MWTS0.XXXX-1	ACOPOS P3 servo drive , 1x 110-230 VAC, 3x 200-230 VAC, 3x 4.5 A, SafeMOTION, 3 axes, wall mounting	123
8EI8X8HWD10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 3x 200-480 VAC, 2x 8.8 A, 2 axis, wall mounting	79
8EI8X8HWDS0.XXXX-1	ACOPOS P3 servo drive, 3x 200-480 VAC, 2x 8.8 A, SafeMOTION, 2 axes, wall mounting	97
8EI8X8HWS10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 3x 200-480 VAC, 8.8 A, 1 axis, wall mounting	31
8EI8X8HWSS0.XXXX-1	ACOPOS P3 servo drive, 3x 200-480 VAC, 8.8 A, SafeMOTION, 1 axis, wall mounting	55
8EI8X8HWT10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 3x 200-480 VAC, 3x 8.8 A, 3 axis, wall mounting	116
8EI8X8HWTS0.XXXX-1	ACOPOS P3 servo drive, 3x 200-480 VAC, 3x 8.8 A, SafeMOTION, 3 axes, wall mounting	129
8EI8X8MWD10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 1x 110-230 VAC, 3x 200-230 VAC, 2x 8.8 A, 2 axes, wall mounting	73
8EI8X8MWDS0.XXXX-1	ACOPOS P3 servo drive , 1x 110-230 VAC, 3x 200-230 VAC, 2x 8.8 A, SafeMOTION, 2 axes, wall mounting	91

Order number	Short description	Page
8EI8X8MWS10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 1x 110-230 VAC, 3x 200-230 VAC, 8.8 A, 1 axis, wall mounting	24
8EI8X8MWSS0.XXXX-1	ACOPOS P3 servo drive, 1x 110-230 VAC, 3x 200-230 VAC, 8.8 A, SafeMOTION, 1 axis, wall mounting	49
8EI8X8MWT10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 1x 110-230 VAC, 3x 200-230 VAC, 3x 8.8 A, 3 axes, wall mounting	109
8EI8X8MWTS0.XXXX-1	ACOPOS P3 servo drive , 1x 110-230 VAC, 3x 200-230 VAC, 3x 8.8 A, SafeMOTION, 3 axes, wall mounting	123

2.2.6 1-axis modules

2.2.6.1 Mains input voltage - 1x 110 to 230 VAC / 3x 200 to 230 VAC

2.2.6.1.1 Continuous power up to 2 kW (motor connection)

2.2.6.1.1.1 Order data

Order number	Short description	Figure
	Wall mounting	
8EI1X6MWS10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 1x 110-230 VAC, 3x 200-230 VAC, 1.6 A, 1 axis, wall mounting	
8EI2X2MWS10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 1x 110-230 VAC, 3x 200-230 VAC, 2.2 A, 1 axis, wall mounting	
8EI4X5MWS10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 1x 110-230 VAC, 3x 200-230 VAC, 4.5 A, 1 axis, wall mounting	
8EI8X8MWS10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 1x 110-230 VAC, 3x 200-230 VAC, 8.8 A, 1 axis, wall mounting	
	Optional accessories	
	Display modules	
8EAD0000.000-1	Display module, LCD, 128 x 64, black/white, 1x USB 3.0	
	Fan modules	
8EXF100.0000-00	ACOPOS P3 fan module, replacement fan for ACOPOS P3 servo drive single-width (8EI1X6/8EI2X2/8EI4X5/8EI8X8/8EI013/8EI017xxS)	
	Front covers	
8EXA100.0010-00	ACOPOS P3 cover, B&R orange, single-width, suitable for servo drives 8EI1X6xxSxx.xxxx-x / 8EI2X2xxSxx.xxxx-x / 8EI4X5xxSxx.xxxx-x /8EI8X8xxSxx.xxxx-x	
8EXA100.0020-00	ACOPOS P3 cover, B&R dark gray, single-width, suitable for servo drives 8EI1X6xxSxx.xxxx-x / 8EI2X2xxSxx.xxxx-x / 8EI4X5xxSxx.xxxx-x /8EI8X8xxSxx.xxxx-x	
	Line filters passive	
8B0F0160H000.000-1	Line filter, passive, 16 A, 3x 528 VAC, 50/60 Hz, IP20	
8B0F0160H000.100-1	Passive line filter, 16 A, 3x 528 VAC, 50/60 Hz, IP20, specially designed also for operation at 2.5 kHz	
8B0F0300H000.000-1	Line filter, passive, 30 A, 3x 520 VAC, 50/60 Hz, IP20	
8B0F0550H000.000-1	Line filter, passive, 55 A, 3x 520 VAC, 50/60 Hz, IP20	
	Plug-in modules	
8EAC0122.001-1	ACOPOS P3 plug-in module, resolver interface 10 kHz	
8EAC0130.000-1	ACOPOS P3 plug-in module, 8 digital I/O 24 V (4x 400 mA, 4x 100 mA) individually configurable as inputs or outputs, 2 digital I/O 24 V 2 A configurable in pairs as inputs or outputs, order terminal block 8TB0230.221A-00 separately!	
8EAC0150.001-1	ACOPOS P3 plug-in module, digital multi-encoder interface	
8EAC0151.001-1	ACOPOS P3 plug-in module, incremental encoder interface	
8EAC0152.001-1	ACOPOS P3 plug-in module, analog multi-encoder interface	
	Shield component sets	
8SCSE01.0100-00	ACOPOS P3 shield component set: 1x ACOPOS P3 shield mounting plate, 1x 2x M3x6 screws	
8SCSE01.0300-00	ACOPOS P3 shield component set: 1x support plate with 2 grounding clamps 3-6 mm, 1x M4x6 screw	
8SCSE02.0100-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK14	
8SCSE02.0200-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK20	
	Terminal blocks	
8TB2104.2210-00	4-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively	
8TB2104.2210-50	4-pin push-in terminal block, yellow, 1-row, with locking mechanism, pitch: 5.08 mm, label 1: 4 3 2 1	
8TB2204.2210-50	4-pin push-in terminal block, yellow, 2-row, pitch: 5.08 mm, label 1: 4 3 2 1,	
8TB3102.222C-20	2-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	
8TB3103.222A-20	3-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: PE RB- RB+, coding A: 000	
8TB3106.223C-20	6-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 3: PE L3 N(L2) L1 DC- DC+, coding C: 000010	
8TB3202.222C-40	2-pin push-in terminal block, 2-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	

Table 14: 8EI1X6MWS10.XXXX-1, 8EI2X2MWS10.XXXX-1, 8EI4X5MWS10.XXXX-1, 8EI8X8MWS10.XXXX-1 - Order data

Order number	Short description	Figure
8TB3206.223C-40	6-pin push-in terminal block, 2-row, with locking mechanism, pitch: 7.62 mm, label 3: PE L3 N(L2) L1 DC- DC+, coding C: 000010	
8TB3308.222A-00	4+4-pin push-in terminal block 1-row / 2-row, pitch: 7.62 mm, label 2: T- B- T+ B+ PE W V U coding A: 0000	
	Terminal set	
8EZI8X8MS1.2201-0	Klemmensatz für ACOPOS P3 Module 8EI1X6M*S1, 8EI2X2M*S1, 8EI4X5M*S1, 8EI8X8M*S1, 8EI013M*S1, 8EI017M*S1: 1x 8TB2104.2210-00, 1x 8TB2104.2210-50, 1x 8TB3102.222C-20, 1x 8TB3308.222A-00, 1x 8TB3106.223C-20, 1x 8TB3103.222A-20	
8EZI8X8MS1.2202-0	Klemmensatz für ACOPOS P3 Module 8EI*X*M*S10.****-1, 8EI01*M*S10.****-1: 1x 8TB2104.2210-00, 1x 8TB2204.2210-50, 1x 8TB3202.222C-40, 1x 8TB3308.222A-00, 1x 8TB3206.223C-40, 1x 8TB3103.222A-20	

Table 14: 8EI1X6MWS10.XXXX-1, 8EI2X2MWS10.XXXX-1, 8EI4X5MWS10.XXXX-1, 8EI8X8MWS10.XXXX-1 - Order data

Connection	1-row connector	2-row connector
X1	8TB3106.223C-20	8TB3206.223C-40
X2	8TB3102.222C-20	8TB3202.222C-40
X5x	8TB3308.222A-00	
X6	8TB3103.222A-20	
X7	8TB2104.2210-50	8TB2204.2210-50
X8	8TB2104.2210-00	

Table 15: Terminal blocks - Order numbers

2.2.6.1.1.2 Technical data

Order number	8EI1X6MWS10.XXXX-1	8EI2X2MWS10.XXXX-1	8EI4X5MWS10.XXXX-1	8EI8X8MWS10.XXXX-1
General information				
Support				
Dynamic node allocation (DNA)		Yes		
Slots for plug-in modules		1		
Certifications				
CE		Yes		
UKCA		Yes		
UL		cULus E225616 Power conversion equipment		
KC		Yes		
Mains connection				
Network configurations		TT, TN, TN-S, TN-C-S, IT [1]		
Mains input voltage		1x 110 VAC to 230 VAC ±10% 3x 200 VAC to 230 VAC ±10% 24 to 120 VDC [2]		
Frequency		50 / 60 Hz ±4%		
Installed load	Max. 1 kVA	Max. 1.25 kVA	Max. 2.5 kVA	Max. 5 kVA
Inrush current		Max. 22 A		
Switch-on interval		Typ. 60 s		
Integrated line filter per EN 61800-3, category C3		No [3]		
Terminal connection cross section				
Flexible and fine-stranded wires				
With wire end sleeve		0.25 to 4 mm²		
Approbation data				
UL/C-UL-US		24 to 8 AWG		
CSA		24 to 8 AWG		
Power dissipation at device nominal power without braking resistor		[(30 + 10 * P_{AVG} [kW] + 5.8 * I_{AX1} [A] + 0.25 * I_{BR1}^2 [A]) + P_{VSLOT}) * 1.1] [W] [4]		
Max. line length		3 m [5]		
DC bus connection				
Continuous power [6]	0.4 kW [7]	0.5 kW [7]	1 kW [7]	2 kW [7]
Reduction of continuous power depending on mains input voltage [8]				
Mains input voltage <230 VAC	0.4 kW * (Mains input voltage [V] / 230 V)	0.5 kW * (Mains input voltage [V] / 230 V)	1 kW * (Mains input voltage [V] / 230 V)	2 kW * (Mains input voltage [V] / 230 V)
DC bus capacitance		1880 µF		
Terminal connection cross sections				
Flexible and fine-stranded wires				
With wire end sleeves		0.25 to 4 mm²		
Approbation data				
UL/C-UL-US		24 to 8 AWG		
CSA		24 to 8 AWG		
Max. line length		3 m [9]		

Table 16: 8EI1X6MWS10.XXXX-1, 8EI2X2MWS10.XXXX-1, 8EI4X5MWS10.XXXX-1, 8EI8X8MWS10.XXXX-1 - Technical data

Technical data

Order number	8EI1X6MWS10.XXXX-1	8EI2X2MWS10.XXXX-1	8EI4X5MWS10.XXXX-1	8EI8X8MWS10.XXXX-1
24 VDC power supply				
Input voltage	24 VDC ±25%			
Input capacitance	5500 µF			
Current consumption	0.9 A + Current for motor holding brake [10]			
Terminal connection cross sections				
Flexible and fine-stranded wires				
With wire end sleeves	0.25 to 4 mm²			
Approbation data				
UL/C-UL-US	24 to 8 AWG			
CSA	24 to 8 AWG			
Max. line length	30 m			
Motor connection				
Quantity	1			
Continuous power per motor connection [11]	0.4 kW [7]	0.5 kW [7]	1 kW [7]	2 kW [7]
Continuous current per motor connection [12]	1.6 A_{eff}	2.2 A_{eff}	4.5 A_{eff}	8.8 A_{eff}
Reduction of continuous current depending on switching frequency [13]				
Switching frequency 5 kHz	No reduction			
Switching frequency 10 kHz	No reduction			
Switching frequency 20 kHz	No reduction			0.109 A/K (starting at 33.7°C) [14]
Reduction of continuous current depending on installation elevation				
Starting at 500 m above sea level	0.16 A_{eff} per 1000 m	0.22 A_{eff} per 1000 m	0.45 A_{eff} per 1000 m	0.88 A_{eff} per 1000 m
Peak current per motor connection	4.5 A_{eff}	6 A_{eff}	12.25 A_{eff}	24 A_{eff}
Peak power output	1 kW	1.25 kW	2.5 kW	5 kW
Nominal switching frequency	5 kHz			
Possible switching frequencies [15]	2.5 / 5 / 10 / 20 kHz [16]			
Insulation stress of the connected motor per IEC TS 60034-25:2004	Limit value curve A [17]			
Protective measures				
Overload protection	Yes			
Short-circuit and ground fault protection	Yes			
Max. output frequency	598 Hz [18]			
Variant				
U, V, W, PE	Connector			
Shield connection	Yes Clamping range of the grounding clamp: 11 to 16 mm			
Terminal connection cross section				
Flexible and fine-stranded wires				
With wire end sleeve	1.5 to 6 mm²			
Approbation data				
UL/C-UL-US	24 to 8 AWG			
CSA	24 to 8 AWG			
Max. motor line length depending on switching frequency				
Switching frequency 5 kHz	75 m [19]			
Switching frequency 10 kHz	38 m [19]			
Switching frequency 20 kHz	19 m [19]			
Motor holding brake connection				
Quantity	1			
Output voltage [20]	Depends on the input voltage on connector X2			
Continuous current per connection	1.3 A			
Max. internal resistance	0.25 Ω			
Extinction potential	Approx. 30 V			
Max. extinction energy per switching operation	1.5 Ws			
Max. switching frequency	0.5 Hz			
Terminal connection cross section				
Flexible and fine-stranded wires				
With wire end sleeve	0.25 to 4 mm²			
Approbation data				
UL/C-UL-US	24 to 8 AWG			
CSA	24 to 8 AWG			
Protective measures				
Overload and short-circuit protection	Yes			
Open-circuit monitoring	Yes			
Undervoltage monitoring	Yes			
Response threshold for open-circuit monitoring	Approx. 30 mA			

Table 16: 8EI1X6MWS10.XXXX-1, 8EI2X2MWS10.XXXX-1, 8EI4X5MWS10.XXXX-1, 8EI8X8MWS10.XXXX-1 - Technical data

Order number	8EI1X6MWS10.XXXX-1	8EI2X2MWS10.XXXX-1	8EI4X5MWS10.XXXX-1	8EI8X8MWS10.XXXX-1
Response threshold for undervoltage monitoring	Approx. 23 V			
Max. line length	75 m [21]			
Braking resistor [22]				
Peak power int./ext.	1.5 kW / 11 kW			
Continuous power int./ext.	100 W / 970 W			
Minimum braking resistance (ext.)	12 Ω			
Protective measures				
Overload protection	No			
Short-circuit and ground fault protection	Short-circuit protection: Yes Ground fault protection: No			
Max. line length	3 m			
Fieldbus				
Type	POWERLINK V2 controlled node (CN)			
Variant	2x RJ45, shielded, 2-port hub			
Line length	Max. 100 m between 2 stations (segment length)			
Transfer rate	100 Mbit/s			
Enable inputs				
Quantity	2			
Circuit	Sink			
Electrical isolation				
Input - ACOPOS P3	Yes			
Input - Input	Yes			
Input voltage				
Nominal	24 VDC			
Maximum	30 VDC			
Input current at nominal voltage	Approx. 9 mA			
Switching threshold				
Low	<5 V			
High	>15 V			
Switching delay at nominal input voltage				
Enable 1 → 0, PWM off	2 ms			
Enable 0 → 1, ready for PWM	0.3 ms ACP10 5.16.2 and later: 4.3 ms	0.3 ms ACP10 5.16.2 and later: 4.3 ms		
Modulation compared to ground potential	Max. ±38 V			
OSSD signal connections [23]	0.5 ms			
Terminal connection cross sections				
Flexible and fine-stranded wires				
With plastic wire end sleeves	0.25 to 2.5 mm²			
Approbation data				
UL/C-UL-US	26 to 12 AWG			
CSA	26 to 12 AWG			
Max. line length	30 m			
Encoder interfaces				
Quantity	1			
Type	Digital multi-encoder interface, configurable [24]			
Connections	8-pin female Mini I/O connector			
Status indicators	None [25]			
Electrical isolation				
Encoder - ACOPOS P3	No			
Max. encoder cable length	75 m Depends on the cross section of the power supply wires in the encoder cable [26]			
Encoder power supply				
Output voltage	Configurable Typ. 11.45 V ±0.1 V / 5.2 V ±0.1 V [27][28]			
Load capacity	Max. 300 mA			
Sense lines	2, compensation of max. 2x 0.7 V			
Protective measures				
Short-circuit proof	Yes			
Overload-proof	Yes			
Synchronous serial interface				
Signal transmission	RS485 [29]			
Data transfer rate	Depends on the configured encoder type			
Differential voltage [30]				
Minimum	2.0 V			
Maximum	6.0 V			
Max. power consumption per encoder interface	$P_{ENCODER}$ [W] = U_{24V} [V] * ($I_{ENCODER}$ [A] * 0.7) + 0.5 W [31]			
Trigger inputs				
Quantity	2			

Table 16: 8EI1X6MWS10.XXXX-1, 8EI2X2MWS10.XXXX-1, 8EI4X5MWS10.XXXX-1, 8EI8X8MWS10.XXXX-1 - Technical data

Technical data

Order number	8EI1X6MWS10.XXXX-1	8EI2X2MWS10.XXXX-1	8EI4X5MWS10.XXXX-1	8EI8X8MWS10.XXXX-1
Circuit	Sink			
Electrical isolation				
Input - ACOPOS P3	Yes			
Input - Input	Yes			
Input voltage				
Nominal	24 VDC			
Maximum	30 VDC			
Switching threshold				
Low	<5 V			
High	>15 V			
Input current at nominal voltage	7 mA			
Switching delay				
Rising edge	<51 µs			
Falling edge	<52 µs			
Modulation compared to ground potential	Max. ±38 V			
Terminal connection cross section				
Flexible and fine-stranded wires				
With wire end sleeve	0.25 to 2.5 mm²			
Approbation data				
UL/C-UL-US	26 to 12 AWG			
CSA	26 to 12 AWG			
Max. line length	100 m			
Temperature sensor connection				
Quantity	1			
Resistance range	500 Ω to 5 kΩ			
Support				
Motion system				
mapp Motion	5.03.0 and higher			
ACP10/ARNC0	3.13.0 and higher			
Electrical properties				
Energy efficiency (IE classification) [32]				
Power dissipation relative to continuous apparent power [33]	IE2 (10,25) 6.1% IE2 (50,25) 6.1% IE2 (10,50) 6.1% IE2 (50,50) 6.2% IE2 (90,50) 6.3% IE2 (10,100) 6.4% IE2 (50,100) 6.6% IE2 (90,100) 6.7%	IE2 (10,25) 4.6% IE2 (50,25) 4.7% IE2 (10,50) 4.7% IE2 (50,50) 4.8% IE2 (90,50) 4.8% IE2 (10,100) 5% IE2 (50,100) 5.2% IE2 (90,100) 5.3%	IE2 (10,25) 2.5% IE2 (50,25) 2.5% IE2 (10,50) 2.7% IE2 (50,50) 2.8% IE2 (90,50) 2.9% IE2 (10,100) 3.2% IE2 (50,100) 3.4% IE2 (90,100) 3.6%	IE2 (10,25) 1.9% IE2 (50,25) 1.9% IE2 (10,50) 2.1% IE2 (50,50) 2.2% IE2 (90,50) 2.3% IE2 (10,100) 2.6% IE2 (50,100) 2.8% IE2 (90,100) 3.2%
Nominal losses in standby mode	11.8 W			
Operating conditions				
Permissible mounting orientations				
Hanging vertically	Yes			
Standing horizontally	Yes			
Installation elevation above sea level				
Nominal	0 to 500 m			
Maximum	4000 m [34]			
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)			
Overvoltage category per EN 61800-5-1	III			
Degree of protection per EN 60529	IP20 [35]			
Ambient conditions				
Temperature				
Operation				
Minimum	-25°C [36]			
Nominal	5 to 40°C			
Maximum	55°C			
Storage	-25 to 55°C			
Transport	-25 to 70°C			
Relative humidity				
Operation	5 to 85 %, non-condensing	5 to 85%, non-condensing		
Storage	5 to 95%			
Transport	95% at 40°C			

Table 16: 8EI1X6MWS10.XXXX-1, 8EI2X2MWS10.XXXX-1, 8EI4X5MWS10.XXXX-1, 8EI8X8MWS10.XXXX-1 - Technical data

Order number	8EI1X6MWS10.XXXX-1	8EI2X2MWS10.XXXX-1	8EI4X5MWS10.XXXX-1	8EI8X8MWS10.XXXX-1
Mechanical properties				
Dimensions				
Width	66 mm			
Height	290 mm			
Depth				
Wall mounting	258.5 mm (with 8EXA front cover: 261 mm)			
Weight	3.2 kg			

Table 16: 8EI1X6MWS10.XXXX-1, 8EI2X2MWS10.XXXX-1, 8EI4X5MWS10.XXXX-1, 8EI8X8MWS10.XXXX-1 - Technical data

1) Operation on TT and IT power systems and on TN power systems that are not grounded to a star point is only permitted for 8EI servo drives with 8ZELxxxx Rev. E0 and higher. See the device information on the left side cover of the 8EI servo drive. Remove IT jumper X10 before operating in IT networks!
2) Operating the module at a mains input voltage of 24 to 120 VDC is only permitted if this mains input voltage is also specified in the device information on the left-hand side cover (Input: ... 24 - 120 VDC ...).
3) A line filter must be connected.
   CE compliance can only be ensured by connecting an upstream B&R line filter (8B0F...).
   In extreme cases, using line filters from 3rd-party manufacturers can result in irreparable damage to the ACOPOS P3 8EI servo drive.
4) P_{AVG} ... Average continuous power of the module
   I_{AX1} ... RMS value of the current on axis 1
   I_{BR1} ... Nominal current of the motor holding brake for axis 1
   P_{VSLOT} ... Power dissipation of the 8EAC plug-in module
5) Maximum line length between line filter and mains connection on the module.
6) Valid for 230 VAC mains input voltage.
   The sum of the continuous power values on all motor connections and the power of the DC bus connector is not permitted to exceed this value.
7) The continuous power is reduced as a percentage of the continuous current if the continuous current is subject to derating.
8) Starting with mapp Motion V6.2.0, continuous total power monitoring (INVR_TPOW_CONT_LOAD) and peak total power monitoring (INVR_TPOW_PEAK_LOAD) are automatically disabled for a mains input voltage of 24 to 120 VDC.
9) This value applies to unshielded wiring inside a control cabinet.
   Maximum length of the DC bus wiring inside a control cabinet.
10) Current consumption depends on the respective configuration of the ACOPOS P3 8EI servo drive.
    The inrush current of the 24 VDC power supply is not limited by the module.
11) Valid under the following conditions: 325 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
    For DC bus voltages U_ZK < 325 VDC, maximum continuous power P_OUT is calculated as follows: P_OUT = Continuous power per motor connection * U_ZK / 325.
12) Valid under the following conditions: 325 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
13) The temperature specifications refer to the ambient temperature.
14) The module cannot supply the full continuous current at this switching frequency. This unusual value for the ambient temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
15) B&R recommends operating the module at its nominal switching frequency. Operating the module at a higher switching frequency for application-specific reasons reduces the continuous current and increases CPU utilization.
16) Switching frequency 2.5 kHz is only available for 8EI servo drives with 8ZESxxxx Rev. F0 and higher.
17) Only applies when using B&R motor cables and B&R motors.
18) The module's electrical output frequency (SCTRL_SPEED_ACT * MOTOR_POLEPAIRS) is monitored to protect against dual use in accordance with Regulation (EC) 428/2009 | 3A225. If the electrical output frequency of the module exceeds the limit value of 598 Hz uninterrupted for more than 0.5 s, then the current movement is aborted and error 6060 is output ("Power unit: Limit speed exceeded").
19) The sum of the cable lengths of all motor cables connected to this module is not permitted to exceed this value.
20) At values <22.9 V, under voltage monitoring is triggered and the servo drive signals error 6029 or 6055. In this case, the input voltage at connection X2 (24 VDC power supply) is too low and must be increased.
21) During configuration, it is necessary to check if the minimum voltage can be maintained on the holding brake with the intended line length. For the permissible operating voltage range of the holding brake, see the user documentation for the motor being used.
22) There is a connection for external braking resistors. An internal braking resistor is available as an option.
23) OSSD (output signal switching device) signals are used to monitor signal lines for short circuits and cross faults.
24) The encoder type is not predefined from the factory. The encoder type necessary in each case must be configured in Automation Studio.
25) The direction of rotation of the encoder can be displayed on the 8EAD0000.000-1 display module.
26) Maximum encoder cable length l_{max} can be calculated as follows (the maximum permissible encoder cable length of 75 m is not permitted to exceeded):

    $l_{max} = f / I_G * A * 1/(2*\rho)$

    f ... (Output voltage of encoder interface [V] - Min. permissible supply voltage of connected encoder [V]) * 1.1
    I_G ... Max. current consumption of the connected encoder [A].
    A ... Cross section of the power supply wires [mm²]
    ρ ... Specific resistance [Ω mm²/m] (e.g. for copper: ρ = 0.0178)
27) The output voltage is not predefined from the factory (with the exception of encoder types EnDat 2.2, EnDat 3.0 and HIPERFACE DSL). It must be configured in Automation Studio based on the encoder type. If no output voltage is configured, then the encoder will not be supplied by digital multi-encoder interface X4x. Power to the encoder can then be supplied externally.
28) Output voltage 5.2 V is only available under the following conditions:
    - 8EI servo drive with 8ZECxxx revision D0 and higher - see the device information on the left side cover of the 8EI servo drive
    - ACOPOS operating system 3.15.0 and higher (for 8EIxxxxxD... 2-axis modules and 8EIxxxxxT... 3-axis modules)
    - ACOPOS operating system 3.17.0 and higher (for 8EIxxxxxS... 1-axis modules)
29) Except encoder type HIPERFACE DSL.
30) Values valid for clock output and data input. Except encoder type HIPERFACE DSL.
31) $I_{ENCODER}$ ... Current consumption of the encoder
    U_{24V} ... Input voltage on the +24 VDC input of the module

32) The IE classification of the module is based on drive losses. This includes components such as EMC filters, etc. The power dissipation was determined at a switching frequency of 5 kHz (factory setting). Classification is performed at 90% of the frequency and at 100% of the continuous current. When operating the module in connection with an induction motor, the module is only permitted to be operated with a switching frequency of 5 kHz.
33) Continuous apparent power S[VA] = $U_{Mains}[V_{rms}] * I_{Mains}[A_{rms}]$. IE2 notation (a; b) stands respectively for a load point with frequency a (as a percentage of the nominal frequency of the motor) and current b (as a percentage of the continuous current).
34) For operation on phase-grounded/center-grounded delta networks (TT and TN) and IT networks, the value is reduced to 2000 m.
35) The specified degree of protection is only met if either the slot cover is installed on the module or an 8EAC plug-in module is installed and suitable terminals are connected to all connectors and all fans are installed.
36) Only permitted for modules with 8ZEL... Revision E0 and higher. See the device information on the left side cover of the module. During storage or transport, sudden temperature changes may cause condensation or icing in the module. The module is only permitted to be commissioned if it is free of condensation or icing at the time of commissioning.

2.2.6.2 Mains input voltage - 3x 200 to 480 VAC

2.2.6.2.1 Continuous power up to 4 kW (motor connection)

2.2.6.2.1.1 Order data

Order number	Short description	Figure
	Wall mounting	
8EI1X6HWS10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 3x 200-480 VAC, 1.6 A, 1 axis, wall mounting	
8EI2X2HWS10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 3x 200-480 VAC, 2.2 A, 1 axis, wall mounting	
8EI4X5HWS10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 3x 200-480 VAC, 4.5 A, 1 axis, wall mounting	
8EI8X8HWS10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 3x 200-480 VAC, 8.8 A, 1 axis, wall mounting	
	Optional accessories	
	Display modules	
8EAD0000.000-1	Display module, LCD, 128 x 64, black/white, 1x USB 3.0	
	Fan modules	
8EXF100.0000-00	ACOPOS P3 fan module, replacement fan for ACOPOS P3 servo drive single-width (8EI1X6/8EI2X2/8EI4X5/8EI8X8/8EI013/8EI017xxS)	
	Front covers	
8EXA100.0010-00	ACOPOS P3 cover, B&R orange, single-width, suitable for servo drives 8EI1X6xxSxx.xxxx-x / 8EI2X2xxSxx.xxxx-x / 8EI4X5xxSxx.xxxx-x /8EI8X8xxSxx.xxxx-x	
8EXA100.0020-00	ACOPOS P3 cover, B&R dark gray, single-width, suitable for servo drives 8EI1X6xxSxx.xxxx-x / 8EI2X2xxSxx.xxxx-x / 8EI4X5xxSxx.xxxx-x /8EI8X8xxSxx.xxxx-x	
	Line filters passive	
8B0F0160H000.000-1	Line filter, passive, 16 A, 3x 528 VAC, 50/60 Hz, IP20	
8B0F0160H000.100-1	Passive line filter, 16 A, 3x 528 VAC, 50/60 Hz, IP20, specially designed also for operation at 2.5 kHz	
8B0F0300H000.000-1	Line filter, passive, 30 A, 3x 520 VAC, 50/60 Hz, IP20	
8B0F0550H000.000-1	Line filter, passive, 55 A, 3x 520 VAC, 50/60 Hz, IP20	
	Plug-in modules	
8EAC0122.001-1	ACOPOS P3 plug-in module, resolver interface 10 kHz	
8EAC0130.000-1	ACOPOS P3 plug-in module, 8 digital I/O 24 V (4x 400 mA, 4x 100 mA) individually configurable as inputs or outputs, 2 digital I/O 24 V 2 A configurable in pairs as inputs or outputs, order terminal block 8TB0230.221A-00 separately!	
8EAC0150.001-1	ACOPOS P3 plug-in module, digital multi-encoder interface	
8EAC0151.001-1	ACOPOS P3 plug-in module, incremental encoder interface	
8EAC0152.001-1	ACOPOS P3 plug-in module, analog multi-encoder interface	
	Shield component sets	
8SCSE01.0100-00	ACOPOS P3 shield component set: 1x ACOPOS P3 shield mounting plate, 1x 2x M3x6 screws	
8SCSE01.0300-00	ACOPOS P3 shield component set: 1x support plate with 2 grounding clamps 3-6 mm, 1x M4x6 screw	
8SCSE02.0100-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK14	
8SCSE02.0200-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK20	
	Terminal blocks	
8TB2104.2210-00	4-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively	
8TB2104.2210-50	4-pin push-in terminal block, yellow, 1-row, with locking mechanism, pitch: 5.08 mm, label 1: 4 3 2 1	
8TB2204.2210-50	4-pin push-in terminal block, yellow, 2-row, pitch: 5.08 mm, label 1: 4 3 2 1,	
8TB3102.222C-20	2-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	
8TB3103.222A-20	3-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: PE RB- RB+, coding A: 000	
8TB3106.222B-20	6-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: PE L3 L2 L1 DC- DC+, coding B: 000001	
8TB3202.222C-40	2-pin push-in terminal block, 2-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	
8TB3206.222B-40	6-pin push-in terminal block, 2-row, with locking mechanism, pitch: 7.62 mm, label 2: PE L3 L2 L1 DC- DC+, coding B: 000001	

Table 17: 8EI1X6HWS10.XXXX-1, 8EI2X2HWS10.XXXX-1, 8EI4X5HWS10.XXXX-1, 8EI8X8HWS10.XXXX-1 - Order data

Order number	Short description	Figure
8TB3308.222A-00	4+4-pin push-in terminal block 1-row / 2-row, pitch: 7.62 mm, label 2: T- B- T+ B+ PE W V U coding A: 0000	
	Terminal set	
8EZI8X8HS1.2201-0	Klemmensatz für ACOPOS P3 Module 8EI1X6H*S1, 8EI2X2H*S1, 8EI4X5H*S1, 8EI8X8H*S1, 8EI013H*S1, 8EI017H*S1: 1x 8TB2104.2210-00, 1x 8TB2104.2210-50, 1x 8TB3102.222C-20, 1x 8TB3308.222A-00, 1x 8TB3106.222B-20, 1x 8TB3103.222A-20	
8EZI8X8HS1.2202-0	Klemmensatz für ACOPOS P3 Module 8EI*X*H*S10.****-1, 8EI01*H*S10.****-1: 1x 8TB2104.2210-00, 1x 8TB2204.2210-50, 1x 8TB3202.222C-40, 1x 8TB3308.222A-00, 1x 8TB3206.222B-40, 1x 8TB3103.222A-20	

Table 17: 8EI1X6HWS10.XXXX-1, 8EI2X2HWS10.XXXX-1, 8EI4X5HWS10.XXXX-1, 8EI8X8HWS10.XXXX-1 - Order data

Connection	1-row connector	2-row connector
X1	8TB3106.222B-20	8TB3206.222B-40
X2	8TB3102.222C-20	8TB3202.222C-40
X5x	8TB3308.222A-00	
X6	8TB3103.222A-20	
X7	8TB2104.2210-50	8TB2204.2210-50
X8	8TB2104.2210-00	

Table 18: Terminal blocks - Order numbers

2.2.6.2.1.2 Technical data

Order number	8EI1X6HWS10.XXXX-1	8EI2X2HWS10.XXXX-1	8EI4X5HWS10.XXXX-1	8EI8X8HWS10.XXXX-1
General information				
Support				
Dynamic node allocation (DNA)	Yes			
Slots for plug-in modules	1			
Certifications				
CE	Yes			
UKCA	Yes			
UL	cULus E225616 Power conversion equipment			
KC	Yes			
Mains connection				
Network configurations	TT, TN, TN-S, TN-C-S, IT [1]			
Mains input voltage	3x 200 VAC to 480 VAC ±10% 24 to 120 VDC [2]			
Frequency	50 / 60 Hz ±4%			
Installed load	Max. 1.75 kVA	Max. 2.5 kVA	Max. 5 kVA	Max. 10 kVA
Inrush current	Max. 45 A			
Switch-on interval	Typ. 60 s			
Integrated line filter per EN 61800-3, category C3	No [3]			
Terminal connection cross section				
Flexible and fine-stranded wires				
With wire end sleeve	0.25 to 4 mm²			
Approbation data				
UL/C-UL-US	24 to 8 AWG			
CSA	24 to 8 AWG			
Power dissipation at device nominal power without braking resistor	[(40 + 6.9 * P_{AVG} [kW] + 7.5 * I_{AX1} [A] + 0.25 * I_{BR1}^2 [A] + P_{VSLOT}) * 1.1] [W] [4]			
Max. line length	3 m [5]			
DC bus connection				
Continuous power [6]	0.7 kW [7]	1 kW [7]	2 kW [7]	4 kW [7]
Reduction of continuous power depending on mains input voltage [8]				
Mains input voltage <3x 400 VAC	0.7 kW * (Mains input voltage [V] / 400 V)	1 kW * (Mains input voltage [V] / 400 V)	2 kW * (Mains input voltage [V] / 400 V)	4 kW * (Mains input voltage [V] / 400 V)
DC bus capacitance	470 µF			
Terminal connection cross sections				
Flexible and fine-stranded wires				
With wire end sleeves	0.25 to 4 mm²			
Approbation data				
UL/C-UL-US	24 to 8 AWG			
CSA	24 to 8 AWG			
Max. line length	3 m [9]			
24 VDC power supply				
Input voltage	24 VDC ±25%			
Input capacitance	5500 µF			
Current consumption	0.9 A + Current for motor holding brake [10]			

Table 19: 8EI1X6HWS10.XXXX-1, 8EI2X2HWS10.XXXX-1, 8EI4X5HWS10.XXXX-1, 8EI8X8HWS10.XXXX-1 - Technical data

Order number	8EI1X6HWS10.XXXX-1	8EI2X2HWS10.XXXX-1	8EI4X5HWS10.XXXX-1	8EI8X8HWS10.XXXX-1
Terminal connection cross sections				
Flexible and fine-stranded wires				
With wire end sleeves	0.25 to 4 mm²			
Approbation data				
UL/C-UL-US	24 to 8 AWG			
CSA	24 to 8 AWG			
Max. line length	30 m			
Motor connection				
Quantity	1			
Continuous power per motor connection [11]	0.7 kW [7]	1 kW [7]	2 kW [7]	4 kW [7]
Continuous current per motor connection [12]	1.6 A_{eff}	2.2 A_{eff}	4.5 A_{eff}	8.8 A_{eff}
Reduction of continuous current depending on switching frequency [13]				
Switching frequency 5 kHz	No reduction			
Switching frequency 10 kHz	No reduction			
Switching frequency 20 kHz	No reduction			0.105 A/K (starting at 11.2°C) [14]
Reduction of continuous current depending on installation elevation				
Starting at 500 m above sea level	0.16 A_{eff} per 1000 m	0.22 A_{eff} per 1000 m	0.45 A_{eff} per 1000 m	0.88 A_{eff} per 1000 m
Peak current per motor connection	4.5 A_{eff}	6 A_{eff}	12.25 A_{eff}	24 A_{eff}
Peak power output	1.75 kW	2.5 kW	5 kW	10 kW
Nominal switching frequency	5 kHz			
Possible switching frequencies [15]	2.5 / 5 / 10 / 20 kHz [16]			
Insulation stress of the connected motor per IEC TS 60034-25:2004	Limit value curve A [17]			
Protective measures				
Overload protection	Yes			
Short-circuit and ground fault protection	Yes			
Max. output frequency	598 Hz [18]			
Variant				
U, V, W, PE	Connector			
Shield connection	Yes Clamping range of the grounding clamp: 11 to 16 mm			
Terminal connection cross section				
Flexible and fine-stranded wires				
With wire end sleeve	1.5 to 6 mm²			
Approbation data				
UL/C-UL-US	24 to 8 AWG			
CSA	24 to 8 AWG			
Max. motor line length depending on switching frequency				
Switching frequency 5 kHz	75 m [19]			
Switching frequency 10 kHz	38 m [19]			
Switching frequency 20 kHz	19 m [19]			
Motor holding brake connection				
Quantity	1			
Output voltage [20]	Depends on the input voltage on connector X2			
Continuous current per connection	1.3 A			
Max. internal resistance	0.25 Ω			
Extinction potential	Approx. 30 V			
Max. extinction energy per switching operation	1.5 Ws			
Max. switching frequency	0.5 Hz			
Terminal connection cross section				
Flexible and fine-stranded wires				
With wire end sleeve	0.25 to 4 mm²			
Approbation data				
UL/C-UL-US	24 to 8 AWG			
CSA	24 to 8 AWG			
Protective measures				
Overload and short-circuit protection	Yes			
Open-circuit monitoring	Yes			
Undervoltage monitoring	Yes			
Response threshold for open-circuit monitoring	Approx. 30 mA			
Response threshold for undervoltage monitoring	Approx. 23 V			
Max. line length	75 m [21]			

Table 19: 8EI1X6HWS10.XXXX-1, 8EI2X2HWS10.XXXX-1, 8EI4X5HWS10.XXXX-1, 8EI8X8HWS10.XXXX-1 - Technical data

Order number	8EI1X6HWS10.XXXX-1	8EI2X2HWS10.XXXX-1	8EI4X5HWS10.XXXX-1	8EI8X8HWS10.XXXX-1
Braking resistor [22]				
Peak power int./ext.	7 kW / 25 kW			
Continuous power int./ext.	100 W / 2 kW			
Minimum braking resistance (ext.)	25 Ω			
Protective measures				
Overload protection	No			
Short-circuit and ground fault protection	Short-circuit protection: Yes Ground fault protection: No			
Max. line length	3 m			
Fieldbus				
Type	POWERLINK V2 controlled node (CN)			
Variant	2x RJ45, shielded, 2-port hub			
Line length	Max. 100 m between 2 stations (segment length)			
Transfer rate	100 Mbit/s			
Enable inputs				
Quantity	2			
Circuit	Sink			
Electrical isolation				
Input - ACOPOS P3	Yes			
Input - Input	Yes			
Input voltage				
Nominal	24 VDC			
Maximum	30 VDC			
Input current at nominal voltage	Approx. 9 mA			
Switching threshold				
Low	<5 V			
High	>15 V			
Switching delay at nominal input voltage				
Enable 1 → 0, PWM off	2 ms			
Enable 0 → 1, ready for PWM	0.3 ms ACP10 5.16.2 and later: 4.3 ms			
Modulation compared to ground potential	Max. ±38 V			
OSSD signal connections [23]	0.5 ms			
Terminal connection cross sections				
Flexible and fine-stranded wires				
With plastic wire end sleeves	0.25 to 2.5 mm²			
Approbation data				
UL/C-UL-US	26 to 12 AWG			
CSA	26 to 12 AWG			
Max. line length	30 m			
Encoder interfaces				
Quantity	1			
Type	Digital multi-encoder interface, configurable [24]			
Connections	8-pin female Mini I/O connector			
Status indicators	None [25]			
Electrical isolation				
Encoder - ACOPOS P3	No			
Max. encoder cable length	75 m Depends on the cross section of the power supply wires in the encoder cable [26]			
Encoder power supply				
Output voltage	Configurable Typ. 11.45 V ±0.1 V / 5.2 V ±0.1 V [27][28]			
Load capacity	Max. 300 mA			
Sense lines	2, compensation of max. 2x 0.7 V			
Protective measures				
Short-circuit proof	Yes			
Overload-proof	Yes			
Synchronous serial interface				
Signal transmission	RS485 [29]			
Data transfer rate	Depends on the configured encoder type			
Differential voltage [30]				
Minimum	2.0 V			
Maximum	6.0 V			
Max. power consumption per encoder interface	$P_{ENCODER}$ [W] = U_{24V} [V] * ($I_{ENCODER}$ [A] * 0.7) + 0.5 W [31]			
Trigger inputs				
Quantity	2			
Circuit	Sink			
Electrical isolation				
Input - ACOPOS P3	Yes			
Input - Input	Yes			

Table 19: 8EI1X6HWS10.XXXX-1, 8EI2X2HWS10.XXXX-1, 8EI4X5HWS10.XXXX-1, 8EI8X8HWS10.XXXX-1 - Technical data

Order number	8EI1X6HWS10.XXXX-1	8EI2X2HWS10.XXXX-1	8EI4X5HWS10.XXXX-1	8EI8X8HWS10.XXXX-1
Input voltage				
Nominal	24 VDC			
Maximum	30 VDC			
Switching threshold				
Low	<5 V			
High	>15 V			
Input current at nominal voltage	7 mA			
Switching delay				
Rising edge	<51 µs			
Falling edge	<52 µs			
Modulation compared to ground potential	Max. ±38 V			
Terminal connection cross section				
Flexible and fine-stranded wires				
With wire end sleeve	0.25 to 2.5 mm²			
Approbation data				
UL/C-UL-US	26 to 12 AWG			
CSA	26 to 12 AWG			
Max. line length	100 m			
Temperature sensor connection				
Quantity	1			
Resistance range	500 Ω to 5 kΩ			
Support				
Motion system				
mapp Motion	5.03.0 and higher			
ACP10/ARNC0	3.13.0 and higher			
Electrical properties				
Energy efficiency (IE classification) [32]				
Power dissipation relative to continuous apparent power [33]	IE2 (10,25) 4.7% IE2 (50,25) 4.7% IE2 (10,50) 4.7% IE2 (50,50) 4.7% IE2 (90,50) 4.8% IE2 (10,100) 4.9% IE2 (50,100) 5% IE2 (90,100) 5.1%	IE2 (10,25) 3.3% IE2 (50,25) 3.3% IE2 (10,50) 3.5% IE2 (50,50) 3.5% IE2 (90,50) 3.6% IE2 (10,100) 3.8% IE2 (50,100) 3.9% IE2 (90,100) 4.1%	IE2 (10,25) 1.9% IE2 (50,25) 1.9% IE2 (10,50) 2.1% IE2 (50,50) 2.1% IE2 (90,50) 2.2% IE2 (10,100) 2.4% IE2 (50,100) 2.6% IE2 (90,100) 2.7%	IE2 (10,25) 1.5% IE2 (50,25) 1.5% IE2 (10,50) 1.6% IE2 (50,50) 1.7% IE2 (90,50) 1.8% IE2 (10,100) 2% IE2 (50,100) 2.2% IE2 (90,100) 2.4%
Nominal losses in standby mode	11.8 W			
Operating conditions				
Permissible mounting orientations				
Hanging vertically	Yes			
Standing horizontally	Yes			
Installation elevation above sea level				
Nominal	0 to 500 m			
Maximum	4000 m [34]			
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)			
Overvoltage category per EN 61800-5-1	III			
Degree of protection per EN 60529	IP20 [35]			
Ambient conditions				
Temperature				
Operation				
Minimum	-25°C [36]			
Nominal	5 to 40°C			
Maximum	55°C			
Storage	-25 to 55°C			
Transport	-25 to 70°C			
Relative humidity				
Operation	5 to 85%, non-condensing			
Storage	5 to 95%			
Transport	95% at 40°C			
Mechanical properties				
Dimensions				
Width	66 mm			
Height	290 mm			
Depth				
Wall mounting	258.5 mm (with 8EXA front cover: 261 mm)			
Weight	3.2 kg			

Table 19: 8EI1X6HWS10.XXXX-1, 8EI2X2HWS10.XXXX-1, 8EI4X5HWS10.XXXX-1, 8EI8X8HWS10.XXXX-1 - Technical data

1) Operation on TT and IT power systems and on TN power systems that are not grounded to a star point is only permitted for 8EI servo drives with 8ZELxxxx Rev. E0 and higher. See the device information on the left side cover of the 8EI servo drive. Remove IT jumper X10 before operating in IT networks!
2) Operating the module at a mains input voltage of 24 to 120 VDC is only permitted if this mains input voltage is also specified in the device information on the left-hand side cover (Input: ... 24 - 120 VDC ...).

3) A line filter must be connected.
CE compliance can only be ensured by connecting an upstream B&R line filter (8B0F...).
In extreme cases, using line filters from 3rd-party manufacturers can result in irreparable damage to the ACOPOS P3 8EI servo drive.
4) P_{AVG} ... Average continuous power of the module
I_{AX1} ... RMS value of the current on axis 1
I_{BR1} ... Nominal current of the motor holding brake for axis 1
P_{VSLOT} ... Power dissipation of the 8EAC plug-in module
5) Maximum line length between line filter and mains connection on the module.
6) Valid for mains input voltage ≥3x 400 VAC.
The sum of the continuous power values on all motor connections and the power of the DC bus connector is not permitted to exceed this value.
7) The continuous power is reduced as a percentage of the continuous current if the continuous current is subject to derating.
8) Starting with mapp Motion V6.2.0, continuous total power monitoring (INVR_TPOW_CONT_LOAD) and peak total power monitoring (INVR_TPOW_PEAK_LOAD) are automatically disabled for a mains input voltage of 24 to 120 VDC.
9) This value applies to unshielded wiring inside a control cabinet.
Maximum length of the DC bus wiring inside a control cabinet.
10) Current consumption depends on the respective configuration of the ACOPOS P3 8EI servo drive.
The inrush current of the 24 VDC power supply is not limited by the module.
11) Valid under the following conditions: 560 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
For DC bus voltages U_ZK < 560 VDC, maximum continuous power P_OUT is calculated as follows: P_OUT = Continuous power per motor connection * U_ZK / 560.
12) Valid under the following conditions: 560 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
13) The temperature specifications refer to the ambient temperature.
14) The module cannot supply the full continuous current at this switching frequency. This unusual value for the ambient temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
15) B&R recommends operating the module at its nominal switching frequency. Operating the module at a higher switching frequency for application-specific reasons reduces the continuous current and increases CPU utilization.
16) Switching frequency 2.5 kHz is only available for 8EI servo drives with 8ZESxxxx Rev. F0 and higher.
17) Only applies when using B&R motor cables and B&R motors.
18) The module's electrical output frequency (SCTRL_SPEED_ACT * MOTOR_POLEPAIRS) is monitored to protect against dual use in accordance with Regulation (EC) 428/2009 | 3A225. If the electrical output frequency of the module exceeds the limit value of 598 Hz uninterrupted for more than 0.5 s, then the current movement is aborted and error 6060 is output ("Power unit: Limit speed exceeded").
19) The sum of the cable lengths of all motor cables connected to this module is not permitted to exceed this value.
20) At values <22.9 V, under voltage monitoring is triggered and the servo drive signals error 6029 or 6055. In this case, the input voltage at connection X2 (24 VDC power supply) is too low and must be increased.
21) During configuration, it is necessary to check if the minimum voltage can be maintained on the holding brake with the intended line length. For the permissible operating voltage range of the holding brake, see the user documentation for the motor being used.
22) There is a connection for external braking resistors. An internal braking resistor is available as an option.
23) OSSD (output signal switching device) signals are used to monitor signal lines for short circuits and cross faults.
24) The encoder type is not predefined from the factory. The encoder type necessary in each case must be configured in Automation Studio.
25) The direction of rotation of the encoder can be displayed on the 8EAD0000.000-1 display module.
26) Maximum encoder cable length l_{max} can be calculated as follows (the maximum permissible encoder cable length of 75 m is not permitted to be exceeded):

$$l_{max} = f / I_G * A * 1/(2*\rho)$$

f ... (Output voltage of encoder interface [V] - Min. permissible supply voltage of connected encoder [V]) * 1.1
I_G ... Max. current consumption of the connected encoder [A].
A ... Cross section of the power supply wires [mm²]
ρ ... Specific resistance [Ω mm²/m] (e.g. for copper: ρ = 0.0178)
27) The output voltage is not predefined from the factory (with the exception of encoder types EnDat 2.2, EnDat 3.0 and HIPERFACE DSL). It must be configured in Automation Studio based on the encoder type. If no output voltage is configured, then the encoder will not be supplied by digital multi-encoder interface X4x. Power to the encoder can then be supplied externally.
28) Output voltage 5.2 V is only available under the following conditions:
- 8EI servo drive with 8ZECxxx revision D0 and higher - see the device information on the left side cover of the 8EI servo drive
- ACOPOS operating system 3.15.0 and higher (for 8EIxxxxxD... 2-axis modules and 8EIxxxxxT... 3-axis modules)
- ACOPOS operating system 3.17.0 and higher (for 8EIxxxxxS... 1-axis modules)
29) Except encoder type HIPERFACE DSL.
30) Values valid for clock output and data input. Except encoder type HIPERFACE DSL.
31) $I_{ENCODER}$ ... Current consumption of the encoder
U_{24V} ... Input voltage on the +24 VDC input of the module
32) The IE classification of the module is based on drive losses. This includes components such as EMC filters, etc. The power dissipation was determined at a switching frequency of 5 kHz (factory setting). Classification is performed at 90% of the frequency and at 100% of the continuous current. When operating the module in connection with an induction motor, the module is only permitted to be operated with a switching frequency of 5 kHz.
33) Continuous apparent power S[VA] = √3 * $U_{Mains}[V_{rms}]$ * $I_{Mains}[A_{rms}]$. IE2 notation (a; b) stands respectively for a load point with frequency a (as a percentage of the nominal frequency of the motor) and current b (as a percentage of the continuous current).
34) For operation on phase-grounded/center-grounded delta networks (TT and TN) and IT networks, the value is reduced to 2000 m.
35) The specified degree of protection is only met if either the slot cover is installed on the module or an 8EAC plug-in module is installed and suitable terminals are connected to all connectors and all fans are installed.
36) Only permitted for modules with 8ZEL... Revision E0 and higher. See the device information on the left side cover of the module. During storage or transport, sudden temperature changes may cause condensation or icing in the module. The module is only permitted to be commissioned if it is free of condensation or icing at the time of commissioning.

2.2.6.2.2 Continuous power 6.5 kW to 8.5 kW (motor connection)

2.2.6.2.2.1 Order data

Order number	Short description	Figure
	Wall mounting	
8EI013HWS10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 3x 200-480 VAC, 13 A, 1 axis, wall mounting	
8EI017HWS10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 3x 200-480 VAC, 17 A, 1 axis, wall mounting	
	Optional accessories	
	Display modules	
8EAD0000.000-1	Display module, LCD, 128 x 64, black/white, 1x USB 3.0	
	Front covers	
8EXA200.0010-00	ACOPOS P3 dover, B&R orange, single-width, suitable for servo drives 8EI2X2xxDxx.xxxx-x / 8EI2X2xxTxx.xxxx-x / 8EI4X5xxDxx.xxxx-x / 8EI4X5xxTxx.xxxx-x /8EI8X8xxDxx.xxxx-x / 8EI8X8xxTxx.xxxx-x / 8EI013xxSxx.xxxx-x / 8EI017xxSxx.xxxx-x	
8EXA200.0020-00	ACOPOS P3 cover, B&R dark gray, single-width, suitable for servo drives 8EI2X2xxDxx.xxxx-x / 8EI2X2xxTxx.xxxx-x / 8EI4X5xxDxx.xxxx-x / 8EI4X5xxTxx.xxxx-x / 8EI8X8xxDxx.xxxx-x / 8EI8X8xxTxx.xxxx-x / 8EI013xxSxx.xxxx-x / 8EI017xxSxx.xxxx-x	
	Line filters passive	
8B0F0160H000.000-1	Line filter, passive, 16 A, 3x 528 VAC, 50/60 Hz, IP20	
8B0F0300H000.000-1	Line filter, passive, 30 A, 3x 520 VAC, 50/60 Hz, IP20	
8B0F0550H000.000-1	Line filter, passive, 55 A, 3x 520 VAC, 50/60 Hz, IP20	
	Plug-in modules	
8EAC0122.001-1	ACOPOS P3 plug-in module, resolver interface 10 kHz	
8EAC0130.000-1	ACOPOS P3 plug-in module, 8 digital I/O 24 V (4x 400 mA, 4x 100 mA) individually configurable as inputs or outputs, 2 digital I/O 24 V 2 A configurable in pairs as inputs or outputs, order terminal block 8TB0230.221A-00 separately!	
8EAC0150.001-1	ACOPOS P3 plug-in module, digital multi-encoder interface	
8EAC0151.001-1	ACOPOS P3 plug-in module, incremental encoder interface	
8EAC0152.001-1	ACOPOS P3 plug-in module, analog multi-encoder interface	
	Shield component sets	
8SCSE01.0100-00	ACOPOS P3 shield component set: 1x ACOPOS P3 shield mounting plate, 1x 2x M3x6 screws	
8SCSE01.0300-00	ACOPOS P3 shield component set: 1x support plate with 2 grounding clamps 3-6 mm, 1x M4x6 screw	
8SCSE02.0100-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK14	
8SCSE02.0200-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK20	
	Terminal blocks	
8TB2104.2210-00	4-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively	
8TB2104.2210-50	4-pin push-in terminal block, yellow, 1-row, with locking mechanism, pitch: 5.08 mm, label 1: 4 3 2 1	
8TB2204.2210-50	4-pin push-in terminal block, yellow, 2-row, pitch: 5.08 mm, label 1: 4 3 2 1,	
8TB3102.222C-20	2-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	
8TB3103.222A-20	3-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: PE RB- RB+, coding A: 000	
8TB3106.222B-20	6-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: PE L3 L2 L1 DC- DC+, coding B: 000001	
8TB3202.222C-40	2-pin push-in terminal block, 2-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	
8TB3206.222B-40	6-pin push-in terminal block, 2-row, with locking mechanism, pitch: 7.62 mm, label 2: PE L3 L2 L1 DC- DC+, coding B: 000001	
8TB3308.222A-00	4+4-pin push-in terminal block 1-row / 2-row, pitch: 7.62 mm, label 2: T- B- T+ B+ PE W V U coding A: 0000	
	Terminal set	
8EZI8X8HS1.2201-0	Klemmensatz für ACOPOS P3 Module 8EI1X6H*S1, 8EI2X2H*S1, 8EI4X5H*S1, 8EI8X8H*S1, 8EI013H*S1, 8EI017H*S1: 1x 8TB2104.2210-00, 1x 8TB2104.2210-50, 1x 8TB3102.222C-20, 1x 8TB3308.222A-00, 1x 8TB3106.222B-20, 1x 8TB3103.222A-20	
8EZI8X8HS1.2202-0	Klemmensatz für ACOPOS P3 Module 8EI*X*H*S10.****-1, 8EI01*H*S10.****-1: 1x 8TB2104.2210-00, 1x 8TB2204.2210-50, 1x 8TB3202.222C-40, 1x 8TB3308.222A-00, 1x 8TB3206.222B-40, 1x 8TB3103.222A-20	

Table 20: 8EI013HWS10.XXXX-1, 8EI017HWS10.XXXX-1 - Order data

Connection	1-row connector	2-row connector
X1	8TB3106.222B-20	8TB3206.222B-40
X2	8TB3102.222C-20	8TB3202.222C-40
X5x	8TB3308.222A-00	
X6	8TB3103.222A-20	
X7	8TB2104.2210-50	8TB2204.2210-50
X8	8TB2104.2210-00	

Table 21: Terminal blocks - Order numbers

2.2.6.2.2.2 Technical data

Order number	8EI013HWS10.XXXX-1	8EI017HWS10.XXXX-1
General information		
Support		
Dynamic node allocation (DNA)	Yes	
Slots for plug-in modules	1	
Certifications		
CE	Yes	
UKCA	Yes	
UL	cULus E225616 Power conversion equipment	
Mains connection		
Network configurations	TT, TN, TN-S, TN-C-S, IT [1]	
Mains input voltage	3x 200 VAC to 480 VAC ±10%	
Frequency	50 / 60 Hz ±4%	
Installed load	Max. 13.5 kVA	Max. 18 kVA
Inrush current	Max. 50 A	
Switch-on interval	Typically 60 s	
Integrated line filter per EN 61800-3, category C3	No [2]	
Terminal connection cross section		
Flexible and fine-stranded wires		
With wire end sleeve	0.25 to 4 mm²	
Approbation data		
UL/C-UL-US	24 to 8 AWG	
CSA	24 to 8 AWG	
Power dissipation at device nominal power without braking resistor	[37 W + 9.2 V * I_{AX1} + 6.3 W/kW * P_{AVG} + 0.25 Ω * I_{BR1}^2 + P_{VSLOT}] * 1.1 [3]	
Max. line length	3 m [4]	
DC bus connection		
Continuous power [5]	6.5 kW [6]	8.5 kW [6]
Reduction of continuous power depending on mains input voltage		
Mains input voltage <3x 400 VAC	6.5 kW * (Mains input voltage [V] / 400 V)	8.5 kW * (Mains input voltage [V] / 400 V)
DC bus capacitance	940 µF	
Terminal connection cross sections		
Flexible and fine-stranded wires		
With wire end sleeves	0.25 to 4 mm²	
Approbation data		
UL/C-UL-US	24 to 8 AWG	
CSA	24 to 8 AWG	
Max. line length	3 m [7]	
24 VDC power supply		
Input voltage	24 VDC ±25%	
Input capacitance	5500 µF	
Current consumption	1.2 A + Current for motor holding brake [8]	
Terminal connection cross sections		
Flexible and fine-stranded wires		
With wire end sleeves	0.25 to 4 mm²	
Approbation data		
UL/C-UL-US	24 to 8 AWG	
CSA	24 to 8 AWG	
Max. line length	30 m	
Motor connection		
Quantity	1	
Continuous power per motor connection [9]	6.5 kW [6]	8.5 kW [6]
Continuous current per motor connection [9]	13 A_{eff}	17 A_{eff}

Table 22: 8EI013HWS10.XXXX-1, 8EI017HWS10.XXXX-1 - Technical data

Order number	8EI013HWS10.XXXX-1	8EI017HWS10.XXXX-1
Reduction of continuous current depending on ambient temperature		
Mains input voltage: 400 VAC		
Switching frequency 5 kHz	No reduction	0.2 A/K (starting at 40°C) [10]
Switching frequency 10 kHz	0.2 A/K (starting at 30°C) [10]	0.2 A/K (starting at 10°C) [10]
Switching frequency 20 kHz	0.16 A/K (starting at -23°C) [10]	0.16 A/K (starting at -48°C) [10]
Mains input voltage: 480 VAC		
Switching frequency 5 kHz	No reduction	0.2 A/K (starting at 40°C) [10]
Switching frequency 10 kHz	0.17 A/K (starting at 18.5°C) [10]	0.17 A/K (starting at -5°C) [10]
Switching frequency 20 kHz	0.11 A/K (starting at -58.6°C) [10]	0.11 A/K (starting at -95°C) [10]
Reduction of continuous current depending on installation elevation		
Starting at 500 m above sea level	1.3 A_{eff} per 1000 m	1.7 A_{eff} per 1000 m
Peak current per motor connection	32.5 A_{eff}	42.5 A_{eff}
Peak power output	16.25 kW	21.25 kW
Nominal switching frequency	5 kHz	
Possible switching frequencies [11]	2.5 / 5 / 10 / 20 kHz [12]	
Insulation stress of the connected motor per IEC TS 60034-25:2004	Limit value curve A [13]	
Protective measures		
Overload protection	Yes	
Short-circuit and ground fault protection	Yes	
Max. output frequency	598 Hz [14]	
Variant		
U, V, W, PE	Connector	
Shield connection	Yes Clamping range of the grounding clamp: 17 to 30 mm	
Terminal connection cross section		
Flexible and fine-stranded wires		
With wire end sleeve	1.5 to 6 mm²	
Approbation data		
UL/C-UL-US	24 to 8 AWG	
CSA	24 to 8 AWG	
Max. motor line length depending on switching frequency		
Switching frequency 5 kHz	75 m	
Switching frequency 10 kHz	38 m	
Switching frequency 20 kHz	19 m	
Motor holding brake connection		
Quantity	1	
Output voltage [15]	Depends on the input voltage on connector X2	
Continuous current per connection	4 A	
Max. internal resistance	100 mΩ	
Extinction potential	33 V	
Max. extinction energy per switching operation	15 Ws	
Max. switching frequency	0.5 Hz	
Terminal connection cross section		
Flexible and fine-stranded wires		
With wire end sleeve	0.25 to 4 mm²	
Approbation data		
UL/C-UL-US	24 to 8 AWG	
CSA	24 to 8 AWG	
Protective measures		
Overload and short-circuit protection	Yes	
Open-circuit monitoring	Yes	
Undervoltage monitoring	Yes	
Response threshold for open-circuit monitoring	Max. 70 mA [16]	
Response threshold for undervoltage monitoring	Approx. 23 V	
Max. line length	75 m [17]	
Braking resistor [18]		
Peak power int./ext.	14 kW / 25 kW	
Continuous power int./ext.	150 W / 4 kW	
Minimum braking resistance (ext.)	25 Ω	
Protective measures		
Overload protection	No	
Short-circuit and ground fault protection	Short-circuit protection: Yes Ground fault protection: No	
Max. line length	3 m	
Fieldbus		
Type	POWERLINK V2 controlled node (CN)	
Variant	2x RJ45, shielded, 2-port hub	
Line length	Max. 100 m between 2 stations (segment length)	

Table 22: 8EI013HWS10.XXXX-1, 8EI017HWS10.XXXX-1 - Technical data

Technical data

Order number	8EI013HWS10.XXXX-1	8EI017HWS10.XXXX-1
Transfer rate	100 Mbit/s	
Enable inputs		
Quantity	2	
Circuit	Sink	
Electrical isolation		
Input - ACOPOS P3	Yes	
Input - Input	Yes	
Input voltage		
Nominal	24 VDC	
Maximum	30 VDC	
Input current at nominal voltage	Approx. 9 mA	
Switching threshold		
Low	<5 V	
High	>15 V	
Switching delay at nominal input voltage		
Enable 1 → 0, PWM off	2 ms	
Enable 0 → 1, ready for PWM	0.3 ms ACP10 5.16.2 and later: 4.3 ms	
Modulation compared to ground potential	Max. ±38 V	
OSSD signal connections [19]	0.5 ms	
Terminal connection cross sections		
Flexible and fine-stranded wires		
With plastic wire end sleeves	0.25 to 2.5 mm²	
Approbation data		
UL/C-UL-US	26 to 12 AWG	
CSA	26 to 12 AWG	
Max. line length	30 m	
Encoder interfaces		
Quantity	1	
Type	Digital multi-encoder interface, configurable [20]	
Connections	8-pin female Mini I/O connector	
Status indicators	None [21]	
Electrical isolation		
Encoder - ACOPOS P3	No	
Max. encoder cable length	75 m Depends on the cross section of the power supply wires in the encoder cable [22]	
Encoder power supply		
Output voltage	Configurable Typ. 11.45 V ±0.1 V / 5.2 V ±0.1 V [23][24]	
Load capacity	Max. 300 mA	
Sense lines	2, compensation of max. 2x 0.7 V	
Protective measures		
Short-circuit proof	Yes	
Overload-proof	Yes	
Synchronous serial interface		
Signal transmission	RS485 [25]	
Data transfer rate	Depends on the configured encoder type	
Differential voltage [26]		
Minimum	2.0 V	
Maximum	6.0 V	
Max. power consumption per encoder interface	$P_{ENCODER}$ [W] = U_{24V} [V] * ($I_{ENCODER}$ [A] * 0.7) + 0.5 W [27]	
Trigger inputs		
Quantity	2	
Circuit	Sink	
Electrical isolation		
Input - ACOPOS P3	Yes	
Input - Input	Yes	
Input voltage		
Nominal	24 VDC	
Maximum	30 VDC	
Switching threshold		
Low	<5 V	
High	>15 V	
Input current at nominal voltage	7 mA	
Switching delay		
Rising edge	<51 µs	
Falling edge	<52 µs	
Modulation compared to ground potential	Max. ±38 V	

Table 22: 8EI013HWS10.XXXX-1, 8EI017HWS10.XXXX-1 - Technical data

Order number	8EI013HWS10.XXXX-1	8EI017HWS10.XXXX-1
Terminal connection cross section		
Flexible and fine-stranded wires		
With wire end sleeve	0.25 to 2.5 mm²	
Approbation data		
UL/C-UL-US	26 to 12 AWG	
CSA	26 to 12 AWG	
Max. line length	100 m	
Temperature sensor connection		
Quantity	1	
Resistance range	500 Ω to 5 kΩ	
Support		
Motion system		
mapp Motion	5.03.0 and higher	
ACP10/ARNC0	3.17.0 and higher	
Electrical properties		
Energy efficiency (IE classification) [28)]		
Power dissipation relative to continuous apparent power [29)]	IE2 (10,25) 1.2% IE2 (50,25) 1.2% IE2 (10,50) 1.4% IE2 (50,50) 1.4% IE2 (90,50) 1.5% IE2 (10,100) 1.9% IE2 (50,100) 2% IE2 (90,100) 2.3%	IE2 (10,25) 1% IE2 (50,25) 1% IE2 (10,50) 1.2% IE2 (50,50) 1.3% IE2 (90,50) 1.4% IE2 (10,100) 1.7% IE2 (50,100) 1.9% IE2 (90,100) 2.2%
Nominal losses in standby mode	11.8 W	
Operating conditions		
Permissible mounting orientations		
Hanging vertically	Yes	
Standing horizontally	Yes	
Installation elevation above sea level		
Nominal	0 to 500 m	
Maximum	4000 m [30)]	
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)	
Overvoltage category per EN 61800-5-1	III	
Degree of protection per EN 60529	IP20 [31)]	
Ambient conditions		
Temperature		
Operation		
Minimum	-25°C [32)]	
Nominal	5 to 40°C	
Maximum	55°C	
Storage	-25 to 55°C	
Transport	-25 to 70°C	
Relative humidity		
Operation	5 to 85%, non-condensing	
Storage	5 to 95%	
Transport	95% at 40°C	
Mechanical properties		
Dimensions		
Width	66 mm	
Height	374 mm	
Depth		
Wall mounting	258.5 mm (with 8EXA front cover: 261 mm)	
Weight	4 kg	

Table 22: 8EI013HWS10.XXXX-1, 8EI017HWS10.XXXX-1 - Technical data

1) Operation on TT and IT power systems and on TN power systems that are not grounded to a star point is only permitted for 8EI servo drives with 8ZELxxxx Rev. E0 and higher. See the device information on the left side cover of the 8EI servo drive. Remove IT jumper X10 before operating in IT networks!
2) A line filter must be connected.
   CE compliance can only be ensured by connecting an upstream B&R line filter (8B0F...).
   In extreme cases, using line filters from 3rd-party manufacturers can result in irreparable damage to the ACOPOS P3 8EI servo drive.
3) Valid for a switching frequency of 5 kHz and nominal input voltage of 3x 400 VAC. Without losses in the line filter, motor cable and motor.
   P_{AVG} ... Average continuous power of the module
   I_{AX1} ... RMS value of the current on axis 1
   I_{BR1} ... Nominal current of the motor holding brake for axis 1
   P_{VSLOT} ... Power dissipation of the 8EAC plug-in module
4) Maximum line length between line filter and mains connection on the module.
5) Valid for mains input voltage ≥3x 400 VAC.
   The sum of the continuous power values on all motor connections and the power of the DC bus connector is not permitted to exceed this value.
6) The continuous power is reduced as a percentage of the continuous current if the continuous current is subject to derating.
7) This value applies to unshielded wiring inside a control cabinet.
   Maximum length of the DC bus wiring inside a control cabinet.
8) Current consumption depends on the respective configuration of the ACOPOS P3 8EI servo drive.
   The inrush current of the 24 VDC power supply is not limited by the module.
9) Valid under the following conditions: 560 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.

10) The module cannot supply the full continuous current at this switching frequency. This unusual value for the ambient temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
11) B&R recommends operating the module at its nominal switching frequency. Operating the module at a higher switching frequency for application-specific reasons reduces the continuous current and increases CPU utilization.
12) Switching frequency 2.5 kHz is only available for 8EI servo drives with 8ZESxxxx Rev. F0 and higher.
13) Only applies when using B&R motor cables and B&R motors.
14) The module's electrical output frequency (SCTRL_SPEED_ACT * MOTOR_POLEPAIRS) is monitored to protect against dual use in accordance with Regulation (EC) 428/2009 | 3A225. If the electrical output frequency of the module exceeds the limit value of 598 Hz uninterrupted for more than 0.5 s, then the current movement is aborted and error 6060 is output ("Power unit: Limit speed exceeded").
15) At values <22.9 V, under voltage monitoring is triggered and the servo drive signals error 6029 or 6055. In this case, the input voltage at connection X2 (24 VDC power supply) is too low and must be increased.
16) Valid for modules with 8ZEL... starting with revision D0.
17) During configuration, it is necessary to check if the minimum voltage can be maintained on the holding brake with the intended line length. For the permissible operating voltage range of the holding brake, see the user documentation for the motor being used.
18) There is a connection for external braking resistors. An internal braking resistor is available as an option.
19) OSSD (output signal switching device) signals are used to monitor signal lines for short circuits and cross faults.
20) The encoder type is not predefined from the factory. The encoder type necessary in each case must be configured in Automation Studio.
21) The direction of rotation of the encoder can be displayed on the 8EAD0000.000-1 display module.
22) Maximum encoder cable length l_{max} can be calculated as follows (the maximum permissible encoder cable length of 75 m is not permitted to be exceeded):

    $l_{max} = f / I_G * A * 1/(2*\rho)$

    f ... (Output voltage of encoder interface [V] - Min. permissible supply voltage of connected encoder [V]) * 1.1
    I_G ... Max. current consumption of the connected encoder [A].
    A ... Cross section of the power supply wires [mm²]
    ρ ... Specific resistance [Ω mm²/m] (e.g. for copper: ρ = 0.0178)
23) The output voltage is not predefined from the factory (with the exception of encoder types EnDat 2.2, EnDat 3.0 and HIPERFACE DSL). It must be configured in Automation Studio based on the encoder type. If no output voltage is configured, then the encoder will not be supplied by digital multi-encoder interface X4x. Power to the encoder can then be supplied externally.
24) Output voltage 5.2 V is only available under the following conditions:
    - 8EI servo drive with 8ZECxxx revision D0 and higher - see the device information on the left side cover of the 8EI servo drive
    - ACOPOS operating system 3.15.0 and higher (for 8EIxxxxxD... 2-axis modules and 8EIxxxxxT... 3-axis modules)
    - ACOPOS operating system 3.17.0 and higher (for 8EIxxxxxS... 1-axis modules)
25) Except encoder type HIPERFACE DSL.
26) Values valid for clock output and data input. Except encoder type HIPERFACE DSL.
27) $I_{ENCODER}$ ... Current consumption of the encoder
    U_{24V} ... Input voltage on the +24 VDC input of the module
28) The IE classification of the module is based on drive losses. This includes components such as EMC filters, etc. The power dissipation was determined at a switching frequency of 5 kHz (factory setting). Classification is performed at 90% of the frequency and at 100% of the continuous current. When operating the module in connection with an induction motor, the module is only permitted to be operated with a switching frequency of 5 kHz.
29) Continuous apparent power S[VA] = √3 * $U_{Mains}[V_{rms}]$ * $I_{Mains}[A_{rms}]$. IE2 notation (a; b) stands respectively for a load point with frequency a (as a percentage of the nominal frequency of the motor) and current b (as a percentage of the continuous current).
30) For operation on phase-grounded/center-grounded delta networks (TT and TN) and IT networks, the value is reduced to 2000 m.
31) The specified degree of protection is only met if either the slot cover is installed on the module or an 8EAC plug-in module is installed and suitable terminals are connected to all connectors and all fans are installed.
32) Only permitted for modules with 8ZEL... Revision E0 and higher. See the device information on the left side cover of the module. During storage or transport, sudden temperature changes may cause condensation or icing in the module. The module is only permitted to be commissioned if it is free of condensation or icing at the time of commissioning.

2.2.6.2.3 Continuous power 10 kW to 18 kW (motor connection)

2.2.6.2.3.1 Order data

Order number	Short description	Figure
	Wall mounting	
8EI024HWS10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 3x 200-480 VAC, 24 A, 1 axis, wall mounting	
8EI034HWS10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 3x 200-480 VAC, 34 A, 1 axis, wall mounting	
8EI044HWS10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 3x 200-480 VAC, 44 A, 1 axis, wall mounting	
	Optional accessories	
	Display modules	
8EAD0000.000-1	Display module, LCD, 128 x 64, black/white, 1x USB 3.0	
	Fan modules	
8EXF200.0000-00	ACOPOS P3 fan module, replacement fan for ACOPOS P3 servo drive double-width (8EI017xxD/8EI022xxD/8EI024/8EI034/8EI044)	
8EXF300.0000-00	ACOPOS P3 ELKO fan module, replacement fan for ACOPOS P3 servo drive double-width (8EI017xxD/8EI022xxD/8EI024/8EI034/8EI044)	
	Front covers	
8EXA300.0010-00	ACOPOS P3 cover, B&R orange, double-width, suitable for servo drives 8EI017xxDxx.xxxx-x / 8EI022xxDxx.xxxx-x / 8EI024xxSxx.xxxx-x / 8EI034xxSxx.xxxx-x / 8EI044xxSxx.xxxx-x	
8EXA300.0020-00	ACOPOS P3 cover, B&R dark gray, double-width, suitable for servo drives 8EI017xxDxx.xxxx-x / 8EI022xxDxx.xxxx-x / 8EI024xxSxx.xxxx-x / 8EI034xxSxx.xxxx-x / 8EI044xxSxx.xxxx-x	
	Line filters passive	
8B0F0160H000.000-1	Line filter, passive, 16 A, 3x 528 VAC, 50/60 Hz, IP20	
8B0F0300H000.000-1	Line filter, passive, 30 A, 3x 520 VAC, 50/60 Hz, IP20	
8B0F0550H000.000-1	Line filter, passive, 55 A, 3x 520 VAC, 50/60 Hz, IP20	
	Plug-in modules	
8EAC0122.001-1	ACOPOS P3 plug-in module, resolver interface 10 kHz	
8EAC0130.000-1	ACOPOS P3 plug-in module, 8 digital I/O 24 V (4x 400 mA, 4x 100 mA) individually configurable as inputs or outputs, 2 digital I/O 24 V 2 A configurable in pairs as inputs or outputs, order terminal block 8TB0230.221A-00 separately!	
8EAC0150.001-1	ACOPOS P3 plug-in module, digital multi-encoder interface	
8EAC0151.001-1	ACOPOS P3 plug-in module, incremental encoder interface	
8EAC0152.001-1	ACOPOS P3 plug-in module, analog multi-encoder interface	
	Shield component sets	
8SCSE01.0200-00	ACOPOS P3 shield component set: 1x ACOPOS P3 shield mounting plate, 2x 2x M3x6 screws	
8SCSE01.0300-00	ACOPOS P3 shield component set: 1x support plate with 2 grounding clamps 3-6 mm, 1x M4x6 screw	
8SCSE02.0100-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK14	
8SCSE02.0200-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK20	
	Terminal blocks	
8TB2104.2210-00	4-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively	
8TB2104.2210-50	4-pin push-in terminal block, yellow, 1-row, with locking mechanism, pitch: 5.08 mm, label 1: 4 3 2 1	
8TB2104.223L-00	4-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 3: T- T+ B- B+, coding L: 1010	
8TB2204.2210-50	4-pin push-in terminal block, yellow, 2-row, pitch: 5.08 mm, label 1: 4 3 2 1,	
8TB3102.222C-20	2-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	
8TB3202.222C-40	2-pin push-in terminal block, 2-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	
8TB4103.222A-10	3-pin push-in terminal block, one-row, pitch: 10.16 mm, label 2: PE RB- RB+, coding A: 000	
8TB4104.222L-10	4-pin push-in terminal block, 1-row, pitch: 10.16 mm, label 2: PE L3 L2 L1, coding L: 1010	
8TB4104.224G-10	4-pin push-in terminal block, 1-row, pitch: 10.16 mm, label 4: PE W V U, coding G: 0110	
8TB4104.227F-10	4-pin push-in terminal block, 1-row, pitch: 10.16 mm, label 4: DC-, DC-, DC+, DC+ coding F: 0101	

Table 23: 8EI024HWS10.XXXX-1, 8EI034HWS10.XXXX-1, 8EI044HWS10.XXXX-1 - Order data

Order number	Short description	Figure
8TB4204.202L-10	4-pin push-in screw terminal block, two-row, pitch: 10.16 mm, label 2: PE L3 L2 L1, coding L: 1010	
	Terminal set	
8EZI044HS1.2201-0	Klemmensatz für ACOPOS P3 Module 8EI024H*S1, 8EI034H*S1, 8EI044H*S1: 1x 8TB2104.2210-00, 1x 8TB2104.2210-50, 1x 8TB3102.222C-20, 1x 8TB4104.224G-10, 1x 8TB2104.223L-00, 1x 8TB4104.222L-10, 1x 8TB4104.227F-10, 1x 8TB4103.222A-10	
8EZI044HS1.2302-0	Klemmensatz für ACOPOS P3 Module 8EI024H*S1, 8EI034H*S1, 8EI044H*S1: 1x 8TB2104.2210-00, 1x 8TB2204.2210-50, 1x 8TB3202.222C-40, 1x 8TB4104.224G-10, 1x 8TB2104.223L-00, 1x 8TB4103.222A-10, 1x 8TB4104.227F-10, 1x 8TB4204.202L-10	

Table 23: 8EI024HWS10.XXXX-1, 8EI034HWS10.XXXX-1, 8EI044HWS10.XXXX-1 - Order data

Connection	1-row connector	2-row connector
X1	8TB4104.222L-10	8TB4204.202L-10
X2	8TB3102.222C-20	8TB3202.222C-40
X51A	8TB4104.224G-10	
X51B	8TB2104.223L-00	
X6	8TB4103.222A-10	
X7	8TB2104.2210-50	8TB2204.2210-50
X8	8TB2104.2210-00	
X11	8TB4104.227F-10	

Table 24: Terminal blocks - Order numbers

2.2.6.2.3.2 Technical data

Order number	8EI024HWS10.XXXX-1	8EI034HWS10.XXXX-1	8EI044HWS10.XXXX-1
General information			
Support			
Dynamic node allocation (DNA)		Yes	
Slots for plug-in modules		1	
Certifications			
CE		Yes	
UKCA		Yes	
UL		cULus E225616 Power conversion equipment	
Mains connection			
Network configurations		TT, TN, TN-S, TN-C-S, IT [1]	
Mains input voltage		3x 200 VAC to 480 VAC ±10%	
Frequency		50 / 60 Hz ±4%	
Installed load	Max. 18.7 kVA	Max. 26.4 kVA	Max. 30.5 kVA
Inrush current		Max. 100 A	
Switch-on interval		120 s	
Integrated line filter per EN 61800-3, category C3		No [2]	
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve		0.75 to 16 mm²	
Approbation data			
UL/C-UL-US		20 to 4 AWG	
CSA		20 to 4 AWG	
Power dissipation at device nominal power without braking resistor		$[81\ W + 9.7\ V * I_{AX1} + 8.4\ W/kW * P_{AVG} + 0.25\ \Omega * I_{BR1}^2 + P_{VSLOT}] * 1.1$ [3]	
Max. line length		3 m [4]	
DC bus connection			
Continuous power [5]	10 kW [6]	14 kW [6]	18 kW [6]
Reduction of continuous power depending on mains input voltage			
Mains input voltage <3x 400 VAC	10 kW * (Mains input voltage [V] / 400 V)	14 kW * (Mains input voltage [V] / 400 V)	18 kW * (Mains input voltage [V] / 400 V)
DC bus capacitance		1680 µF	
Terminal connection cross sections			
Flexible and fine-stranded wires			
With wire end sleeves		0.75 to 16 mm²	
Approbation data			
UL/C-UL-US		20 to 4 AWG	
CSA		20 to 4 AWG	
Max. line length		3 m [7]	
24 VDC power supply			
Input voltage		24 VDC ±25%	
Input capacitance		5500 µF	

Table 25: 8EI024HWS10.XXXX-1, 8EI034HWS10.XXXX-1, 8EI044HWS10.XXXX-1 - Technical data

Order number	8EI024HWS10.XXXX-1	8EI034HWS10.XXXX-1	8EI044HWS10.XXXX-1
Current consumption	2 A + Current for motor holding brake [8]		
Terminal connection cross sections			
Flexible and fine-stranded wires			
With wire end sleeves	0.25 to 4 mm²		
Approbation data			
UL/C-UL-US	24 to 8 AWG		
CSA	24 to 8 AWG		
Max. line length	30 m		
Motor connection			
Quantity	1		
Continuous power per motor connection [9]	10 kW [6]	14 kW [6]	18 kW [6]
Continuous current per motor connection [9]	24 A_{eff}	34 A_{eff}	44 A_{eff}
Reduction of continuous current depending on ambient temperature			
Mains input voltage: 400 VAC			
Switching frequency 5 kHz	1.6 A/K (starting at 52°C) [10]	1.6 A/K (starting at 46°C) [10]	1.6 A/K (starting at 40°C) [10]
Switching frequency 10 kHz	0.45 A/K (starting at 35°C) [10]	0.45 A/K (starting at 13°C) [10]	0.45 A/K (starting at -9°C) [10]
Switching frequency 20 kHz	0.233 A/K (starting at -26°C) [10]	0.233 A/K (starting at -68°C) [10]	0.233 A/K (starting at -110°C) [10]
Mains input voltage: 480 VAC			
Switching frequency 5 kHz	1.4 A/K (starting at 51°C) [10]	1.4 A/K (starting at 44°C) [10]	1.4 A/K (starting at 37°C) [10]
Switching frequency 10 kHz	0.39 A/K (starting at 31°C) [10]	0.39 A/K (starting at 5°C) [10]	0.39 A/K (starting at -20°C) [10]
Switching frequency 20 kHz	0.22 A/K (starting at -43°C) [10]	0.22 A/K (starting at -88°C) [10]	0.22 A/K (starting at -133°C) [10]
Reduction of continuous current depending on installation elevation			
Starting at 500 m above sea level	2.4 A_{eff} per 1000 m	3.4 A_{eff} per 1000 m	4.4 A_{eff} per 1000 m
Peak current per motor connection	60 A_{eff}	85 A_{eff}	110 A_{eff}
Peak power output	25 kW	35 kW	45 kW
Nominal switching frequency	5 kHz		
Possible switching frequencies [11]	2.5 / 5 / 10 / 20 kHz [12]	2.5 / 5 / 10 / 20 kHz [13]	
Insulation stress of the connected motor per IEC TS 60034-25:2004	Limit value curve A [14]		
Protective measures			
Overload protection	Yes		
Short-circuit and ground fault protection	Yes		
Max. output frequency	598 Hz [15]		
Variant			
U, V, W, PE	Connector		
Shield connection	Yes Clamping range of the grounding clamp: 17 to 30 mm		
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve	0.75 to 16 mm²		
Approbation data			
UL/C-UL-US	20 to 4 AWG		
CSA	20 to 4 AWG		
Max. motor line length depending on switching frequency			
Switching frequency 5 kHz	75 m		
Switching frequency 10 kHz	35 m		
Switching frequency 20 kHz	20 m		
Motor holding brake connection			
Quantity	1		
Output voltage [16]	Depends on the input voltage on connector X2		
Continuous current per connection	6.5 A		
Max. internal resistance	0.25 Ω		
Extinction potential	Approx. 30 V		
Max. extinction energy per switching operation	15 Ws		
Max. switching frequency	0.5 Hz		
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve	0.75 to 16 mm²		
Approbation data			
UL/C-UL-US	20 to 4 AWG		
CSA	20 to 4 AWG		
Protective measures			
Overload and short-circuit protection	Yes		
Open-circuit monitoring	Yes		
Undervoltage monitoring	Yes		
Response threshold for open-circuit monitoring	Approx. 120 mA		
Response threshold for undervoltage monitoring	Approx. 23 V		
Max. line length	75 m [17]		

Table 25: 8EI024HWS10.XXXX-1, 8EI034HWS10.XXXX-1, 8EI044HWS10.XXXX-1 - Technical data

Order number	8EI024HWS10.XXXX-1	8EI034HWS10.XXXX-1	8EI044HWS10.XXXX-1
Braking resistor [18]			
Peak power output	45 kW		
Continuous power	4 kW		
Minimum braking resistance (ext.)	13 Ω		
Protective measures			
Overload protection	No		
Short-circuit and ground fault protection	Short-circuit protection: Yes Ground fault protection: No		
Max. line length	3 m		
Fieldbus			
Type	POWERLINK V2 controlled node (CN)		
Variant	2x RJ45, shielded, 2-port hub		
Line length	Max. 100 m between 2 stations (segment length)		
Transfer rate	100 Mbit/s		
Enable inputs			
Quantity	2		
Circuit	Sink		
Electrical isolation			
Input - ACOPOS P3	Yes		
Input - Input	Yes		
Input voltage			
Nominal	24 VDC		
Maximum	30 VDC		
Input current at nominal voltage	Approx. 9 mA		
Switching threshold			
Low	<5 V		
High	>15 V		
Switching delay at nominal input voltage			
Enable 1 → 0, PWM off	2 ms		
Enable 0 → 1, ready for PWM	0.3 ms ACP10 5.16.2 and later: 4.3 ms		0.3 ms ACP10 5.16.2 and later: 4.3 ms
Modulation compared to ground potential	Max. ±38 V		
OSSD signal connections [19]	0.5 ms		
Terminal connection cross sections			
Flexible and fine-stranded wires			
With plastic wire end sleeves	0.25 to 2.5 mm²		
Approbation data			
UL/C-UL-US	26 to 12 AWG		
CSA	26 to 12 AWG		
Max. line length	30 m		
Encoder interfaces			
Quantity	1		
Type	Digital multi-encoder interface, configurable [20]		
Connections	8-pin female Mini I/O connector		
Status indicators	None [21]		
Electrical isolation			
Encoder - ACOPOS P3	No		
Max. encoder cable length	75 m Depends on the cross section of the power supply wires in the encoder cable [22]		
Encoder power supply			
Output voltage	Configurable Typ. 11.45 V ±0.1 V / 5.2 V ±0.1 V [23][24]		
Load capacity	Max. 300 mA		
Sense lines	2, compensation of max. 2x 0.7 V		
Protective measures			
Short-circuit proof	Yes		
Overload-proof	Yes		
Synchronous serial interface			
Signal transmission	RS485 [25]		
Data transfer rate	Depends on the configured encoder type		
Differential voltage [26]			
Minimum	2.0 V		
Maximum	6.0 V		
Max. power consumption per encoder interface	$P_{ENCODER}$ [W] = U_{24V} [V] * ($I_{ENCODER}$ [A] * 0.7) + 0.5 W [27]		
Trigger inputs			
Quantity	2		
Circuit	Sink		
Electrical isolation			
Input - ACOPOS P3	Yes		
Input - Input	Yes		

Table 25: 8EI024HWS10.XXXX-1, 8EI034HWS10.XXXX-1, 8EI044HWS10.XXXX-1 - Technical data

Order number	8EI024HWS10.XXXX-1	8EI034HWS10.XXXX-1	8EI044HWS10.XXXX-1
Input voltage			
Nominal		24 VDC	
Maximum		30 VDC	
Switching threshold			
Low		<5 V	
High		>15 V	
Input current at nominal voltage		7 mA	
Switching delay			
Rising edge		<51 µs	
Falling edge		<52 µs	
Modulation compared to ground potential		Max. ±38 V	
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve		0.25 to 2.5 mm²	
Approbation data			
UL/C-UL-US		26 to 12 AWG	
CSA		26 to 12 AWG	
Max. line length		100 m	
Temperature sensor connection			
Quantity		1	
Resistance range		500 Ω to 5 kΩ	
Support			
Motion system			
mapp Motion		5.03.0 and higher	
ACP10/ARNC0		3.17.0 and higher	
Electrical properties			
Energy efficiency (IE classification) [28)]			
Power dissipation relative to continuous apparent power [29)]	IE2 (10,25) 1.2% IE2 (50,25) 1.2% IE2 (10,50) 1.4% IE2 (50,50) 1.4% IE2 (90,50) 1.5% IE2 (10,100) 2% IE2 (50,100) 2.2% IE2 (90,100) 2.4%	IE2 (10,25) 1% IE2 (50,25) 1% IE2 (10,50) 1.2% IE2 (50,50) 1.3% IE2 (90,50) 1.4% IE2 (10,100) 1.9% IE2 (50,100) 2.1% IE2 (90,100) 2.4%	IE2 (10,25) 0.9% IE2 (50,25) 0.9% IE2 (10,50) 1.1% IE2 (50,50) 1.2% IE2 (90,50) 1.3% IE2 (10,100) 1.8% IE2 (50,100) 2% IE2 (90,100) 2.4%
Nominal losses in standby mode		15.8 W	
Operating conditions			
Permissible mounting orientations			
Hanging vertically		Yes	
Standing horizontally		Yes	
Installation elevation above sea level			
Nominal		0 to 500 m	
Maximum		4000 m [30)]	
Pollution degree per EN 61800-5-1		2 (non-conductive pollution)	
Overvoltage category per EN 61800-5-1		III	
Degree of protection per EN 60529		IP20 [31)]	
Ambient conditions			
Temperature			
Operation			
Minimum		-25°C [32)]	
Nominal		5 to 40°C	
Maximum		55°C	
Storage		-25 to 55°C	
Transport		-25 to 70°C	
Relative humidity			
Operation		5 to 85%, non-condensing	
Storage		5 to 95%	
Transport		95% at 40°C	
Mechanical properties			
Dimensions			
Width		133 mm	
Height		374 mm	
Depth			
Wall mounting		258.5 mm (with 8EXA front cover: 261 mm)	
Weight		8 kg	

Table 25: 8EI024HWS10.XXXX-1, 8EI034HWS10.XXXX-1, 8EI044HWS10.XXXX-1 - Technical data

1) Operation on TT and IT power systems and on TN power systems that are not grounded to a star point is only permitted for 8EI servo drives with 8ZELxxxx Rev. D0 and higher. See the device information on the left side cover of the 8EI servo drive. Remove IT jumper X10 before operating in IT networks!
2) A line filter must be connected.
CE compliance can only be ensured by connecting an upstream B&R line filter (8B0F...).
In extreme cases, using line filters from 3rd-party manufacturers can result in irreparable damage to the ACOPOS P3 8EI servo drive.

3) Valid for a switching frequency of 5 kHz and nominal input voltage of 3x 400 VAC. Without losses in the line filter, motor cable and motor.
   P_{AVG} ... Average continuous power of the module
   I_{AX1} ... RMS value of the current on axis 1
   I_{BR1} ... Nominal current of the motor holding brake for axis 1
   P_{VSLOT} ... Power dissipation of the 8EAC plug-in module
4) Maximum line length between line filter and mains connection on the module.
5) Valid for mains input voltage ≥3x 400 VAC.
   The sum of the continuous power values on all motor connections and the power of the DC bus connector is not permitted to exceed this value.
6) The continuous power is reduced as a percentage of the continuous current if the continuous current is subject to derating.
7) This value applies to unshielded wiring inside a control cabinet.
   Maximum length of the DC bus wiring inside a control cabinet.
8) Current consumption depends on the respective configuration of the ACOPOS P3 8EI servo drive.
   The inrush current of the 24 VDC power supply is not limited by the module.
9) Valid under the following conditions: 560 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
10) The module cannot supply the full continuous current at this switching frequency. This unusual value for the ambient temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
11) B&R recommends operating the module at its nominal switching frequency. Operating the module at a higher switching frequency for application-specific reasons reduces the continuous current and increases CPU utilization.
12) Switching frequency 2.5 kHz is only available for 8EI servo drives with 8ZESxxxx Rev. D0 and higher.
13) Switching frequency 2.5 kHz is only available for 8EI servo drives with 8ZESxxxx Rev. E0 and higher.
14) Only applies when using B&R motor cables and B&R motors.
15) The module's electrical output frequency (SCTRL_SPEED_ACT * MOTOR_POLEPAIRS) is monitored to protect against dual use in accordance with Regulation (EC) 428/2009 | 3A225. If the electrical output frequency of the module exceeds the limit value of 598 Hz uninterrupted for more than 0.5 s, then the current movement is aborted and error 6060 is output ("Power unit: Limit speed exceeded").
16) At values <22.9 V, under voltage monitoring is triggered and the servo drive signals error 6029 or 6055. In this case, the input voltage at connection X2 (24 VDC power supply) is too low and must be increased.
17) During configuration, it is necessary to check if the minimum voltage can be maintained on the holding brake with the intended line length. For the permissible operating voltage range of the holding brake, see the user documentation for the motor being used.
18) This values apply to an external braking resistor. This module is not equipped with an internal braking resistor.
19) OSSD (output signal switching device) signals are used to monitor signal lines for short circuits and cross faults.
20) The encoder type is not predefined from the factory. The encoder type necessary in each case must be configured in Automation Studio.
21) The direction of rotation of the encoder can be displayed on the 8EAD0000.000-1 display module.
22) Maximum encoder cable length l_{max} can be calculated as follows (the maximum permissible encoder cable length of 75 m is not permitted to exceeded):

    $l_{max} = f / I_G * A * 1/(2*\rho)$

    f ... (Output voltage of encoder interface [V] - Min. permissible supply voltage of connected encoder [V]) * 1.1
    I_G ... Max. current consumption of the connected encoder [A].
    A ... Cross section of the power supply wires [mm²]
    ρ ... Specific resistance [Ω mm²/m] (e.g. for copper: ρ = 0.0178)
23) The output voltage is not predefined from the factory (with the exception of encoder types EnDat 2.2, EnDat 3.0 and HIPERFACE DSL). It must be configured in Automation Studio based on the encoder type. If no output voltage is configured, then the encoder will not be supplied by digital multi-encoder interface X4x. Power to the encoder can then be supplied externally.
24) Output voltage 5.2 V is only available under the following conditions:
    - 8EI servo drive with 8ZECxxx revision D0 and higher - see the device information on the left side cover of the 8EI servo drive
    - ACOPOS operating system 3.15.0 and higher (for 8EIxxxxxD... 2-axis modules and 8EIxxxxxT... 3-axis modules)
    - ACOPOS operating system 3.17.0 and higher (for 8EIxxxxxS... 1-axis modules)
25) Except encoder type HIPERFACE DSL.
26) Values valid for clock output and data input. Except encoder type HIPERFACE DSL.
27) $I_{ENCODER}$ ... Current consumption of the encoder
    U_{24V} ... Input voltage on the +24 VDC input of the module
28) The IE classification of the module is based on drive losses. This includes components such as EMC filters, etc. The power dissipation was determined at a switching frequency of 5 kHz (factory setting). Classification is performed at 90% of the frequency and at 100% of the continuous current. When operating the module in connection with an induction motor, the module is only permitted to be operated with a switching frequency of 5 kHz.
29) Continuous apparent power S[VA] = √3 * $U_{Mains}[V_{rms}]$ * $I_{Mains}[A_{rms}]$. IE2 notation (a; b) stands respectively for a load point with frequency a (as a percentage of the nominal frequency of the motor) and current b (as a percentage of the continuous current).
30) For operation on phase-grounded/center-grounded delta networks (TT and TN) and IT networks, the value is reduced to 2000 m.
31) The specified degree of protection is only met if either the slot cover is installed on the module or an 8EAC plug-in module is installed and suitable terminals are connected to all connectors and all fans are installed.
32) Only permitted for modules with 8ZEL ... Revision D0 and higher. See the device information on the left side cover of the module. During storage or transport, sudden temperature changes may cause condensation or icing in the module. The module is only permitted to be commissioned if it is free of condensation or icing at the time of commissioning.

2.2.7 SafeMOTION 1-axis modules

2.2.7.1 Mains input voltage - 1x 110 to 230 VAC / 3x 200 to 230 VAC

2.2.7.1.1 Continuous power up to 2 kW (motor connection)

2.2.7.1.1.1 Order data

Order number	Short description	Figure
	Wall mounting	
8EI1X6MWSS0.XXXX-1	ACOPOS P3 servo drive, 1x 110-230 VAC, 3x 200-230 VAC, 1.6 A, SafeMOTION, 1 axis, wall mounting	
8EI2X2MWSS0.XXXX-1	ACOPOS P3 servo drive, 1x 110-230 VAC, 3x 200-230 VAC, 2.2 A, SafeMOTION, 1 axis, wall mounting	
8EI4X5MWSS0.XXXX-1	ACOPOS P3 servo drive, 1x 110-230 VAC, 3x 200-230 VAC, 4.5 A, SafeMOTION, 1 axis, wall mounting	
8EI8X8MWSS0.XXXX-1	ACOPOS P3 servo drive, 1x 110-230 VAC, 3x 200-230 VAC, 8.8 A, SafeMOTION, 1 axis, wall mounting	
	Optional accessories	
	Display modules	
8EAD0000.000-1	Display module, LCD, 128 x 64, black/white, 1x USB 3.0	
	Fan modules	
8EXF100.0000-00	ACOPOS P3 fan module, replacement fan for ACOPOS P3 servo drive single-width (8EI1X6/8EI2X2/8EI4X5/ 8EI8X8/8EI013/8EI017xxS)	
	Front covers	
8EXA100.0010-00	ACOPOS P3 cover, B&R orange, single-width, suitable for servo drives 8EI1X6xxSxx.xxxx-x / 8EI2X2xxSxx.xxxx-x / 8EI4X5xxSxx.xxxx-x /8EI8X8xxSxx.xxxx-x	
8EXA100.0020-00	ACOPOS P3 cover, B&R dark gray, single-width, suitable for servo drives 8EI1X6xxSxx.xxxx-x / 8EI2X2xxSxx.xxxx-x / 8EI4X5xxSxx.xxxx-x /8EI8X8xxSxx.xxxx-x	
	Line filters passive	
8B0F0160H000.000-1	Line filter, passive, 16 A, 3x 528 VAC, 50/60 Hz, IP20	
8B0F0160H000.100-1	Passive line filter, 16 A, 3x 528 VAC, 50/60 Hz, IP20, specially designed also for operation at 2.5 kHz	
8B0F0300H000.000-1	Line filter, passive, 30 A, 3x 520 VAC, 50/60 Hz, IP20	
8B0F0550H000.000-1	Line filter, passive, 55 A, 3x 520 VAC, 50/60 Hz, IP20	
	Plug-in modules	
8EAC0122.001-1	ACOPOS P3 plug-in module, resolver interface 10 kHz	
8EAC0130.000-1	ACOPOS P3 plug-in module, 8 digital I/O 24 V (4x 400 mA, 4x 100 mA) individually configurable as inputs or outputs, 2 digital I/O 24 V 2 A configurable in pairs as inputs or outputs, order terminal block 8TB0230.221A-00 separately!	
8EAC0150.001-1	ACOPOS P3 plug-in module, digital multi-encoder interface	
8EAC0151.001-1	ACOPOS P3 plug-in module, incremental encoder interface	
8EAC0152.001-1	ACOPOS P3 plug-in module, analog multi-encoder interface	
	Shield component sets	
8SCSE01.0100-00	ACOPOS P3 shield component set: 1x ACOPOS P3 shield mounting plate, 1x 2x M3x6 screws	
8SCSE02.0100-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK14	
8SCSE02.0200-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK20	
	Terminal blocks	
8TB2104.2210-00	4-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively	
8TB3102.222C-20	2-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	
8TB3103.222A-20	3-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: PE RB- RB+, coding A: 000	
8TB3106.223C-20	6-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 3: PE L3 N(L2) L1 DC- DC+, coding C: 000010	
8TB3202.222C-40	2-pin push-in terminal block, 2-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	
8TB3206.223C-40	6-pin push-in terminal block, 2-row, with locking mechanism, pitch: 7.62 mm, label 3: PE L3 N(L2) L1 DC- DC+, coding C: 000010	
8TB3308.222A-00	4+4-pin push-in terminal block 1-row / 2-row, pitch: 7.62 mm, label 2: T- B- T+ B+ PE W V U coding A: 0000	
	Terminal set	
8EZI8X8MSS.2201-0	Klemmensatz für ACOPOS P3 Module 8EI1X6M*SS, 8EI2X2M*SS, 8EI4X5M*SS, 8EI8X8M*SS, 8EI013M*SS,	

Table 26: 8EI1X6MWSS0.XXXX-1, 8EI2X2MWSS0.XXXX-1, 8EI4X5MWSS0.XXXX-1, 8EI8X8MWSS0.XXXX-1 - Order data

Order number	Short description	Figure
	8EI017M*SS: 1x 8TB2104.2210-00, 1x 8TB3102.222C-20, 1x 8TB3308.222A-00, 1x 8TB3106.223C-20, 1x 8TB3103.222A-20	
8EZI8X8MSS.2202-0	Klemmensatz für ACOPOS P3 Module 8EI1X6M*SS, 8EI2X2M*SS, 8EI4X5M*SS, 8EI8X8M*SS, 8EI013M*SS, 8EI017M*SS: 1x 8TB2104.2210-00, 1x 8TB3202.222C-40, 1x 8TB3308.222A-00, 1x 8TB3206.223C-40, 1x 8TB3103.222A-20	

Table 26: 8EI1X6MWSS0.XXXX-1, 8EI2X2MWSS0.XXXX-1, 8EI4X5MWSS0.XXXX-1, 8EI8X8MWSS0.XXXX-1 - Order data

Connection	1-row connector	2-row connector
X1	8TB3106.223C-20	8TB3206.223C-40
X2	8TB3102.222C-20	8TB3202.222C-40
X5x	8TB3308.222A-00	
X6	8TB3103.222A-20	
X7	8TB2104.2210-50	8TB2204.2210-50
X8	8TB2104.2210-00	

Table 27: Terminal blocks - Order numbers

Information:

Connector X7 does not exist on ACOPOS P3 SafeMOTION servo drives.

2.2.7.1.1.3 Technical data

Order number	8EI1X6MWSS0.XXXX-1	8EI2X2MWSS0.XXXX-1	8EI4X5MWSS0.XXXX-1	8EI8X8MWSS0.XXXX-1
General information				
Support				
Dynamic node allocation (DNA)	Yes			
Slots for plug-in modules	1			
Certifications				
CE	Yes			
UKCA	Yes			
UL	cULus E225616 Power conversion equipment			
KC	Yes			
Mains connection				
Network configurations	TT, TN, TN-S, TN-C-S, IT [1]			
Mains input voltage	1x 110 VAC to 230 VAC ±10% 3x 200 VAC to 230 VAC ±10% 24 to 120 VDC [2]			
Frequency	50 / 60 Hz ±4%			
Installed load	Max. 1 kVA	Max. 1.25 kVA	Max. 2.5 kVA	Max. 5 kVA
Inrush current	Max. 22 A			
Switch-on interval	Typ. 60 s			
Integrated line filter per EN 61800-3, category C3	No [3]			
Terminal connection cross section				
Flexible and fine-stranded wires				
With wire end sleeve	0.25 to 4 mm²			
Approbation data				
UL/C-UL-US	24 to 8 AWG			
CSA	24 to 8 AWG			
Power dissipation at device nominal power without braking resistor	[(30 + 10 * P_{AVG} [kW] + 5.8 * I_{AX1} [A] + 0.25 * I_{BR1}^2 [A]) + P_{VSLOT}) * 1.1] [W] [4]			
Max. line length	3 m [5]			
DC bus connection				
Continuous power [6]	0.4 kW [7]	0.5 kW [7]	1 kW [7]	2 kW [7]
Reduction of continuous power depending on mains input voltage [8]				
Mains input voltage <230 VAC	0.4 kW * (Mains input voltage [V] / 230 V)	0.5 kW * (Mains input voltage [V] / 230 V)	1 kW * (Mains input voltage [V] / 230 V)	2 kW * (Mains input voltage [V] / 230 V)
DC bus capacitance	1880 µF			
Terminal connection cross sections				
Flexible and fine-stranded wires				
With wire end sleeves	0.25 to 4 mm²			
Approbation data				
UL/C-UL-US	24 to 8 AWG			
CSA	24 to 8 AWG			
Max. line length	3 m [9]			
24 VDC power supply				
Input voltage	24 VDC ±25%			
Input capacitance	5500 µF			

Table 28: 8EI1X6MWSS0.XXXX-1, 8EI2X2MWSS0.XXXX-1, 8EI4X5MWSS0.XXXX-1, 8EI8X8MWSS0.XXXX-1 - Technical data

Order number	8EI1X6MWSS0.XXXX-1	8EI2X2MWSS0.XXXX-1	8EI4X5MWSS0.XXXX-1	8EI8X8MWSS0.XXXX-1
Current consumption	0.9 A + Current for motor holding brake [10]			
Terminal connection cross sections				
Flexible and fine-stranded wires				
With wire end sleeves	0.25 to 4 mm²			
Approbation data				
UL/C-UL-US	24 to 8 AWG			
CSA	24 to 8 AWG			
Max. line length	30 m			
Motor connection				
Quantity	1			
Continuous power per motor connection [11]	0.4 kW [7]	0.5 kW [7]	1 kW [7]	2 kW [7]
Continuous current per motor connection [12]	1.6 A_{eff}	2.2 A_{eff}	4.5 A_{eff}	8.8 A_{eff}
Accuracy of the safe current [13]				
Safety function SLT [14]				
SIL 2 / PL d / Cat. 3 [15]	Hardware upgrade 1.10.2.x: 1.485 A Hardware upgrade 1.10.3.0 or later: 1.182 A	Hardware upgrade 1.10.2.x: 1.523 A Hardware upgrade 1.10.3.0 or later: 1.222 A	Hardware upgrade 1.10.2.x: 1.670 A Hardware upgrade 1.10.3.0 or later: 1.375 A	Hardware upgrade 1.10.2.x: 1.947 A Hardware upgrade 1.10.3.0 or later: 1.662 A
SIL 2 / PL d / Cat. 2 [15]	0.509 A	0.539 A	0.655 A	0.871 A
Safety function SBT [14]				
SIL 2 / PL d / Cat. 3 [15]	Hardware upgrade 1.10.2.x: 1.426 A Hardware upgrade 1.10.3.0 or later: 1,119 A	Hardware upgrade 1.10.2.x: 1.441 A Hardware upgrade 1.10.3.0 or later: 1.136 A	Hardware upgrade 1.10.2.x: 1.501 A Hardware upgrade 1.10.3.0 or later: 1.199 A	Hardware upgrade 1.10.2.x: 1.613 A Hardware upgrade 1.10.3.0 or later: 1.317 A
SIL 2 / PL d / Cat. 2 [15]	0.474 A	0.470 A	0.512 A	0.592 A
Reduction of continuous current depending on switching frequency [16]				
Switching frequency 5 kHz	No reduction			
Switching frequency 10 kHz	No reduction			
Switching frequency 20 kHz	No reduction			0.109 A/K (starting at 33.7°C) [17]
Reduction of continuous current depending on installation elevation				
Starting at 500 m above sea level	0.16 A_{eff} per 1000 m	0.22 A_{eff} per 1000 m	0.45 A_{eff} per 1000 m	0.88 A_{eff} per 1000 m
Peak current per motor connection	4.5 A_{eff}	6 A_{eff}	12.25 A_{eff}	24 A_{eff}
Peak power output	1 kW	1.25 kW	2.5 kW	5 kW
Nominal switching frequency	5 kHz			
Possible switching frequencies [18]	2.5 / 5 / 10 / 20 kHz [19]			
Insulation stress of the connected motor per IEC TS 60034-25:2004	Limit value curve A [20]			
Protective measures				
Overload protection	Yes			
Short-circuit and ground fault protection	Yes			
Max. output frequency	598 Hz [21]			
Variant				
U, V, W, PE	Connector			
Shield connection	Yes Clamping range of the grounding clamp: 11 to 16 mm			
Terminal connection cross section				
Flexible and fine-stranded wires				
With wire end sleeve	1.5 to 6 mm²			
Approbation data				
UL/C-UL-US	24 to 8 AWG			
CSA	24 to 8 AWG			
Max. motor line length depending on switching frequency				
Switching frequency 5 kHz	75 m [22]			
Switching frequency 10 kHz	38 m [22]			
Switching frequency 20 kHz	19 m [22]			
Motor holding brake connection				
Quantity	1			
Output voltage [23]	Depends on the input voltage on connector X2			
Continuous current per connection	1.3 A			
Max. internal resistance	0.25 Ω			
Extinction potential	Approx. 30 V			
Max. extinction energy per switching operation	1.5 Ws			
Max. switching frequency	0.5 Hz			

Table 28: 8EI1X6MWSS0.XXXX-1, 8EI2X2MWSS0.XXXX-1, 8EI4X5MWSS0.XXXX-1, 8EI8X8MWSS0.XXXX-1 - Technical data

Order number	8EI1X6MWSS0.XXXX-1	8EI2X2MWSS0.XXXX-1	8EI4X5MWSS0.XXXX-1	8EI8X8MWSS0.XXXX-1
Terminal connection cross section				
Flexible and fine-stranded wires				
With wire end sleeve	0.25 to 4 mm²			
Approbation data				
UL/C-UL-US	24 to 8 AWG			
CSA	24 to 8 AWG			
Protective measures				
Overload and short-circuit protection	Yes			
Open-circuit monitoring	Yes			
Undervoltage monitoring	Yes			
Response threshold for open-circuit monitoring	Approx. 30 mA			
Response threshold for undervoltage monitoring	Approx. 23 V			
Max. breaking current SBC	60 mA			
Max. line length	75 m [24)]			
Braking resistor [25)]				
Peak power int./ext.	1.5 kW / 11 kW			
Continuous power int./ext.	100 W / 970 W			
Minimum braking resistance (ext.)	12 Ω			
Protective measures				
Overload protection	No			
Short-circuit and ground fault protection	Short-circuit protection: Yes Ground fault protection: No			
Max. line length	3 m			
Fieldbus				
Type	POWERLINK V2 controlled node (CN)			
Variant	2x RJ45, shielded, 2-port hub			
Line length	Max. 100 m between 2 stations (segment length)			
Transfer rate	100 Mbit/s			
Encoder interfaces				
Quantity	1			
Type	Digital multi-encoder interface, configurable [26)]			
Connections	8-pin female Mini I/O connector			
Status indicators	None [27)]			
Electrical isolation				
Encoder - ACOPOS P3	No			
Max. encoder cable length	75 m Depends on the cross section of the power supply wires in the encoder cable [28)]			
Encoder power supply				
Output voltage	Configurable Typ. 11.45 V ±0.1 V / 5.2 V ±0.1 V [29)30)]			
Load capacity	Max. 300 mA			
Sense lines	2, compensation of max. 2x 0.7 V			
Protective measures				
Short-circuit proof	Yes			
Overload-proof	Yes			
Synchronous serial interface				
Signal transmission	RS485 [31)]			
Data transfer rate	Depends on the configured encoder type			
Differential voltage [32)]				
Minimum	2.0 V			
Maximum	6.0 V			
Max. power consumption per encoder interface	$P_{ENCODER}$ [W] = U_{24V} [V] * ($I_{ENCODER}$ [A] * 0.7) + 0.5 W [33)]			
Trigger inputs				
Quantity	2			
Circuit	Sink			
Electrical isolation				
Input - ACOPOS P3	Yes			
Input - Input	Yes			
Input voltage				
Nominal	24 VDC			
Maximum	30 VDC			
Switching threshold				
Low	<5 V			
High	>15 V			
Input current at nominal voltage	7 mA			
Switching delay				
Rising edge	<51 µs			
Falling edge	<52 µs			
Modulation compared to ground potential	Max. ±38 V			

Table 28: 8EI1X6MWSS0.XXXX-1, 8EI2X2MWSS0.XXXX-1, 8EI4X5MWSS0.XXXX-1, 8EI8X8MWSS0.XXXX-1 - Technical data

Order number	8EI1X6MWSS0.XXXX-1	8EI2X2MWSS0.XXXX-1	8EI4X5MWSS0.XXXX-1	8EI8X8MWSS0.XXXX-1
Terminal connection cross section				
Flexible and fine-stranded wires				
With wire end sleeve	0.25 to 2.5 mm²			
Approbation data				
UL/C-UL-US	26 to 12 AWG			
CSA	26 to 12 AWG			
Max. line length	100 m			
Temperature sensor connection				
Quantity	1			
Resistance range	500 Ω to 5 kΩ			
Support				
Motion system				
mapp Motion	5.03.0 and higher			
ACP10/ARNC0	3.16.1 and higher			3.16.0 and higher
Electrical properties				
Energy efficiency (IE classification) [34]				
Power dissipation relative to continuous apparent power [35]	IE2 (10,25) 6.1% IE2 (50,25) 6.1% IE2 (10,50) 6.1% IE2 (50,50) 6.2% IE2 (90,50) 6.3% IE2 (10,100) 6.4% IE2 (50,100) 6.6% IE2 (90,100) 6.7%	IE2 (10,25) 4.6% IE2 (50,25) 4.7% IE2 (10,50) 4.7% IE2 (50,50) 4.8% IE2 (90,50) 4.8% IE2 (10,100) 5% IE2 (50,100) 5.2% IE2 (90,100) 5.3%	IE2 (10,25) 2.5% IE2 (50,25) 2.5% IE2 (10,50) 2.7% IE2 (50,50) 2.8% IE2 (90,50) 2.9% IE2 (10,100) 3.2% IE2 (50,100) 3.4% IE2 (90,100) 3.6%	IE2 (10,25) 1.9% IE2 (50,25) 1.9% IE2 (10,50) 2.1% IE2 (50,50) 2.2% IE2 (90,50) 2.3% IE2 (10,100) 2.6% IE2 (50,100) 2.8% IE2 (90,100) 3.2%
Nominal losses in standby mode	11.8 W			
Operating conditions				
Permissible mounting orientations				
Hanging vertically	Yes			
Standing horizontally	Yes			
Installation elevation above sea level				
Nominal	0 to 500 m			
Maximum	4000 m [36]			
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)			
Overvoltage category per EN 61800-5-1	III			
Degree of protection per EN 60529	IP20 [37]			
Ambient conditions				
Temperature				
Operation				
Minimum	-25°C [38]			
Nominal	5 to 40°C			
Maximum	55°C			
Storage	-25 to 55°C			
Transport	-25 to 70°C			
Relative humidity				
Operation	5 to 85%, non-condensing			
Storage	5 to 95%			
Transport	95% at 40°C			
Mechanical properties				
Dimensions				
Width	66 mm			
Height	290 mm			
Depth				
Wall mounting	258.5 mm (with 8EXA front cover: 261 mm)			
Weight	3.2 kg			

Table 28: 8EI1X6MWSS0.XXXX-1, 8EI2X2MWSS0.XXXX-1, 8EI4X5MWSS0.XXXX-1, 8EI8X8MWSS0.XXXX-1 - Technical data

1) Operation on TT and IT power systems and on TN power systems that are not grounded to a star point is only permitted for 8EI servo drives with 8ZELxxxx Rev. E0 and higher. See the device information on the left side cover of the 8EI servo drive. Remove IT jumper X10 before operating in IT networks!
2) Operating the module at a mains input voltage of 24 to 120 VDC is only permitted if this mains input voltage is also specified in the device information on the left-hand side cover (Input: ... 24 - 120 VDC ...).
3) A line filter must be connected.
   CE compliance can only be ensured by connecting an upstream B&R line filter (8B0F...).
   In extreme cases, using line filters from 3rd-party manufacturers can result in irreparable damage to the ACOPOS P3 8EI servo drive.
4) P_{AVG} ... Average continuous power of the module
   I_{AX1} ... RMS value of the current on axis 1
   I_{BR1} ... Nominal current of the motor holding brake for axis 1
   P_{VSLOT} ... Power dissipation of the 8EAC plug-in module
5) Maximum line length between line filter and mains connection on the module.
6) Valid for 230 VAC mains input voltage.
   The sum of the continuous power values on all motor connections and the power of the DC bus connector is not permitted to exceed this value.
7) The continuous power is reduced as a percentage of the continuous current if the continuous current is subject to derating.
8) Starting with mapp Motion V6.2.0, continuous total power monitoring (INVR_TPOW_CONT_LOAD) and peak total power monitoring (INVR_TPOW_PEAK_LOAD) are automatically disabled for a mains input voltage of 24 to 120 VDC.

9) This value applies to unshielded wiring inside a control cabinet.
Maximum length of the DC bus wiring inside a control cabinet.
10) Current consumption depends on the respective configuration of the ACOPOS P3 8EI servo drive.
The inrush current of the 24 VDC power supply is not limited by the module.
11) Valid under the following conditions: 325 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
For DC bus voltages U_ZK < 325 VDC, maximum continuous power P_OUT is calculated as follows: P_OUT = Continuous power per motor connection * U_ZK / 325.
12) Valid under the following conditions: 325 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
13) The accuracy of the safe current is relevant for safety functions SLT and SBT, which are based on the safe current measurement. Safety functions SBT, SLT and SSO are available starting with hardware upgrade 1.10.2.0 and only for 8EI servo drives with 8ZELxxxx revision D0 or later. See the device information on the left side cover of the servo drive.
14) This safety function is certified for ACOPOS P3 per category 3 as well as category 2 of EN ISO 13849. Depending on the desired category, the corresponding accuracy of the safe current and corresponding safety characteristics must be used.
15) These values apply up to the continuous current specified in the technical data (taking into account the respective derating specifications).
16) The temperature specifications refer to the ambient temperature.
17) The module cannot supply the full continuous current at this switching frequency. This unusual value for the ambient temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
18) B&R recommends operating the module at its nominal switching frequency. Operating the module at a higher switching frequency for application-specific reasons reduces the continuous current and increases CPU utilization.
19) Switching frequency 2.5 kHz is only available for 8EI servo drives with 8ZESxxxx Rev. E0 and higher.
20) Only applies when using B&R motor cables and B&R motors.
21) The module's electrical output frequency (SCTRL_SPEED_ACT * MOTOR_POLEPAIRS) is monitored to protect against dual use in accordance with Regulation (EC) 428/2009 | 3A225. If the electrical output frequency of the module exceeds the limit value of 598 Hz uninterrupted for more than 0.5 s, then the current movement is aborted and error 6060 is output ("Power unit: Limit speed exceeded").
22) The sum of the cable lengths of all motor cables connected to this module is not permitted to exceed this value.
23) At values <22.9 V, under voltage monitoring is triggered and the servo drive signals error 6029 or 6055. In this case, the input voltage at connection X2 (24 VDC power supply) is too low and must be increased.
24) During configuration, it is necessary to check if the minimum voltage can be maintained on the holding brake with the intended line length. For the permissible operating voltage range of the holding brake, see the user documentation for the motor being used.
25) There is a connection for external braking resistors. An internal braking resistor is available as an option.
26) The encoder type is not predefined from the factory. The encoder type necessary in each case must be configured in Automation Studio.
27) The direction of rotation of the encoder can be displayed on the 8EAD0000.000-1 display module.
28) Maximum encoder cable length l_{max} can be calculated as follows (the maximum permissible encoder cable length of 75 m is not permitted to exceeded):

$l_{max} = f / I_G * A * 1/(2*\rho)$

f ... (Output voltage of encoder interface [V] - Min. permissible supply voltage of connected encoder [V]) * 1.1
I_G ... Max. current consumption of the connected encoder [A].
A ... Cross section of the power supply wires [mm²]
ρ ... Specific resistance [Ω mm²/m] (e.g. for copper: ρ = 0.0178)
29) The output voltage is not predefined from the factory (with the exception of encoder types EnDat 2.2, EnDat 3.0 and HIPERFACE DSL). It must be configured in Automation Studio based on the encoder type. If no output voltage is configured, then the encoder will not be supplied by digital multi-encoder interface X4x. Power to the encoder can then be supplied externally.
30) Output voltage 5.2 V is only available under the following conditions:
- 8EI servo drive with 8ZECxxx revision D0 and higher - see the device information on the left side cover of the 8EI servo drive
- ACOPOS operating system 3.15.0 and higher (for 8EIxxxxxD... 2-axis modules and 8EIxxxxxT... 3-axis modules)
- ACOPOS operating system 3.17.0 and higher (for 8EIxxxxxS... 1-axis modules)
31) Except encoder type HIPERFACE DSL.
32) Values valid for clock output and data input. Except encoder type HIPERFACE DSL.
33) $I_{ENCODER}$ ... Current consumption of the encoder
U_{24V} ... Input voltage on the +24 VDC input of the module
34) The IE classification of the module is based on drive losses. This includes components such as EMC filters, etc. The power dissipation was determined at a switching frequency of 5 kHz (factory setting). Classification is performed at 90% of the frequency and at 100% of the continuous current. When operating the module in connection with an induction motor, the module is only permitted to be operated with a switching frequency of 5 kHz.
35) Continuous apparent power S[VA] = $U_{Mains}[V_{rms}]$ * $I_{Mains}[A_{rms}]$. IE2 notation (a; b) stands respectively for a load point with frequency a (as a percentage of the nominal frequency of the motor) and current b (as a percentage of the continuous current).
36) For operation on phase-grounded/center-grounded delta networks (TT and TN) and IT networks, the value is reduced to 2000 m.
37) The specified degree of protection is only met if either the slot cover is installed on the module or an 8EAC plug-in module is installed and suitable terminals are connected to all connectors and all fans are installed.
38) Only permitted for modules with 8ZEL... Revision E0 and higher. See the device information on the left side cover of the module. During storage or transport, sudden temperature changes may cause condensation or icing in the module. The module is only permitted to be commissioned if it is free of condensation or icing at the time of commissioning.

2.2.7.2 Mains input voltage - 3x 200 to 480 VAC

2.2.7.2.1 Continuous power up to 4 kW (motor connection)

2.2.7.2.1.1 Order data

Order number	Short description	Figure
	Wall mounting	
8EI1X6HWSS0.XXXX-1	ACOPOS P3 servo drive, 3x 200-480 VAC, 1.6 A, SafeMOTION, 1 axis, wall mounting	
8EI2X2HWSS0.XXXX-1	ACOPOS P3 servo drive, 3x 200-480 VAC, 2.2 A, SafeMOTION, 1 axis, wall mounting	
8EI4X5HWSS0.XXXX-1	ACOPOS P3 servo drive, 3x 200-480 VAC, 4.5 A, SafeMOTION, 1 axis, wall mounting	
8EI8X8HWSS0.XXXX-1	ACOPOS P3 servo drive, 3x 200-480 VAC, 8.8 A, SafeMOTION, 1 axis, wall mounting	
	Optional accessories	
	Display modules	
8EAD0000.000-1	Display module, LCD, 128 x 64, black/white, 1x USB 3.0	
	Fan modules	
8EXF100.0000-00	ACOPOS P3 fan module, replacement fan for ACOPOS P3 servo drive single-width (8EI1X6/8EI2X2/8EI4X5/8EI8X8/8EI013/8EI017xxS)	
	Front covers	
8EXA100.0010-00	ACOPOS P3 cover, B&R orange, single-width, suitable for servo drives 8EI1X6xxSxx.xxxx-x / 8EI2X2xxSxx.xxxx-x / 8EI4X5xxSxx.xxxx-x /8EI8X8xxSxx.xxxx-x	
8EXA100.0020-00	ACOPOS P3 cover, B&R dark gray, single-width, suitable for servo drives 8EI1X6xxSxx.xxxx-x / 8EI2X2xxSxx.xxxx-x / 8EI4X5xxSxx.xxxx-x /8EI8X8xxSxx.xxxx-x	
	Line filters passive	
8B0F0160H000.000-1	Line filter, passive, 16 A, 3x 528 VAC, 50/60 Hz, IP20	
8B0F0160H000.100-1	Passive line filter, 16 A, 3x 528 VAC, 50/60 Hz, IP20, specially designed also for operation at 2.5 kHz	
8B0F0300H000.000-1	Line filter, passive, 30 A, 3x 520 VAC, 50/60 Hz, IP20	
8B0F0550H000.000-1	Line filter, passive, 55 A, 3x 520 VAC, 50/60 Hz, IP20	
	Plug-in modules	
8EAC0122.001-1	ACOPOS P3 plug-in module, resolver interface 10 kHz	
8EAC0130.000-1	ACOPOS P3 plug-in module, 8 digital I/O 24 V (4x 400 mA, 4x 100 mA) individually configurable as inputs or outputs, 2 digital I/O 24 V 2 A configurable in pairs as inputs or outputs, order terminal block 8TB0230.221A-00 separately!	
8EAC0150.001-1	ACOPOS P3 plug-in module, digital multi-encoder interface	
8EAC0151.001-1	ACOPOS P3 plug-in module, incremental encoder interface	
8EAC0152.001-1	ACOPOS P3 plug-in module, analog multi-encoder interface	
	Shield component sets	
8SCSE01.0100-00	ACOPOS P3 shield component set: 1x ACOPOS P3 shield mounting plate, 1x 2x M3x6 screws	
8SCSE02.0100-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK14	
8SCSE02.0200-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK20	
	Terminal blocks	
8TB2104.2210-00	4-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively	
8TB3102.222C-20	2-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	
8TB3103.222A-20	3-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: PE RB- RB+, coding A: 000	
8TB3106.222B-20	6-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: PE L3 L2 L1 DC- DC+, coding B: 000001	
8TB3202.222C-40	2-pin push-in terminal block, 2-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	
8TB3206.222B-40	6-pin push-in terminal block, 2-row, with locking mechanism, pitch: 7.62 mm, label 2: PE L3 L2 L1 DC- DC+, coding B: 000001	
8TB3308.222A-00	4+4-pin push-in terminal block 1-row / 2-row, pitch: 7.62 mm, label 2: T- B- T+ B+ PE W V U coding A: 0000	
	Terminal set	
8EZI8X8HSS.2201-0	Klemmensatz für ACOPOS P3 Module 8EI1X6H*SS, 8EI2X2H*SS, 8EI4X5H*SS, 8EI8X8H*SS, 8EI013H*SS, 8EI017H*SS: 1x 8TB2104.2210-00, 1x 8TB3102.222C-20, 1x 8TB3308.222A-00, 1x 8TB3106.222B-20, 1x 8TB3103.222A-20	
8EZI8X8HSS.2202-0	Klemmensatz für ACOPOS P3 Module 8EI*X*H*SS0.****-1, 8EI01*H*SS0.****-1: 1x 8TB2104.2210-00, 1x 8TB3202.222C-40, 1x 8TB3308.222A-00, 1x 8TB3206.222B-40, 1x 8TB3103.222A-20	

Table 29: 8EI1X6HWSS0.XXXX-1, 8EI2X2HWSS0.XXXX-1, 8EI4X5HWSS0.XXXX-1, 8EI8X8HWSS0.XXXX-1 - Order data

Connection	1-row connector	2-row connector
X1	8TB3106.222B-20	8TB3206.222B-40
X2	8TB3102.222C-20	8TB3202.222C-40
X5x	8TB3308.222A-00	
X6	8TB3103.222A-20	
X7	8TB2104.2210-50	8TB2204.2210-50
X8	8TB2104.2210-00	

Table 30: Terminal blocks - Order numbers

Information:

Connector X7 does not exist on ACOPOS P3 SafeMOTION servo drives.

2.2.7.2.1.3 Technical data

Order number	8EI1X6HWSS0.XXXX-1	8EI2X2HWSS0.XXXX-1	8EI4X5HWSS0.XXXX-1	8EI8X8HWSS0.XXXX-1
General information				
Support				
Dynamic node allocation (DNA)		Yes		
Slots for plug-in modules		1		
Certifications				
CE		Yes		
UKCA		Yes		
UL		cULus E225616 Power conversion equipment		
KC		Yes		
Mains connection				
Network configurations		TT, TN, TN-S, TN-C-S, IT [1]		
Mains input voltage		3x 200 VAC to 480 VAC ±10% 24 to 120 VDC [2]		
Frequency		50 / 60 Hz ±4%		
Installed load	Max. 1.75 kVA	Max. 2.5 kVA	Max. 5 kVA	Max. 10 kVA
Inrush current		Max. 45 A		
Switch-on interval		Typ. 60 s		
Integrated line filter per EN 61800-3, category C3		No [3]		
Terminal connection cross section				
Flexible and fine-stranded wires				
With wire end sleeve		0.25 to 4 mm²		
Approbation data				
UL/C-UL-US		24 to 8 AWG		
CSA		24 to 8 AWG		
Power dissipation at device nominal power without braking resistor		[(40 + 6.9 * P_{AVG} [kW] + 7.5 * I_{AX1} [A] + 0.25 * I_{BR1}^2 [A] + P_{VSLOT}) * 1.1] [W] [4]		
Max. line length		3 m [5]		
DC bus connection				
Continuous power [6]	0.7 kW [7]	1 kW [7]	2 kW [7]	4 kW [7]
Reduction of continuous power depending on mains input voltage [8]				
Mains input voltage <3x 400 VAC	0.7 kW * (Mains input voltage [V] / 400 V)	1 kW * (Mains input voltage [V] / 400 V)	2 kW * (Mains input voltage [V] / 400 V)	4 kW * (Mains input voltage [V] / 400 V)
DC bus capacitance		470 µF		
Terminal connection cross sections				
Flexible and fine-stranded wires				
With wire end sleeves		0.25 to 4 mm²		
Approbation data				
UL/C-UL-US		24 to 8 AWG		
CSA		24 to 8 AWG		
Max. line length		3 m [9]		
24 VDC power supply				
Input voltage		24 VDC ±25%		
Input capacitance		5500 µF		
Current consumption		0.9 A + Current for motor holding brake [10]		
Terminal connection cross sections				
Flexible and fine-stranded wires				
With wire end sleeves		0.25 to 4 mm²		
Approbation data				
UL/C-UL-US		24 to 8 AWG		
CSA		24 to 8 AWG		
Max. line length		30 m		
Motor connection				
Quantity		1		

Table 31: 8EI1X6HWSS0.XXXX-1, 8EI2X2HWSS0.XXXX-1, 8EI4X5HWSS0.XXXX-1, 8EI8X8HWSS0.XXXX-1 - Technical data

Order number	8EI1X6HWSS0.XXXX-1	8EI2X2HWSS0.XXXX-1	8EI4X5HWSS0.XXXX-1	8EI8X8HWSS0.XXXX-1
Continuous power per motor connection [11]	0.7 kW [7]	1 kW [7]	2 kW [7]	4 kW [7]
Continuous current per motor connection [12]	1.6 A_{eff}	2.2 A_{eff}	4.5 A_{eff}	8.8 A_{eff}
Accuracy of the safe current [13]				
Safety function SLT [14]				
SIL 2 / PL d / Cat. 3 [15]	Hardware upgrade 1.10.2.x: 1.485 A Hardware upgrade 1.10.3.0 or later: 1.182 A	Hardware upgrade 1.10.2.x: 1.523 A Hardware upgrade 1.10.3.0 or later: 1.222 A	Hardware upgrade 1.10.2.x: 1.670 A Hardware upgrade 1.10.3.0 or later: 1.375 A	Hardware upgrade 1.10.2.x: 1.947 A Hardware upgrade 1.10.3.0 or later: 1.662 A
SIL 2 / PL d / Cat. 2 [15]	0.509 A	0.539 A	0.655 A	0.871 A
Safety function SBT [14]				
SIL 2 / PL d / Cat. 3 [15]	Hardware upgrade 1.10.2.x: 1.426 A Hardware upgrade 1.10.3.0 or later: 1.119 A	Hardware upgrade 1.10.2.x: 1.441 A Hardware upgrade 1.10.3.0 or later: 1.136 A	Hardware upgrade 1.10.2.x: 1.501 A Hardware upgrade 1.10.3.0 or later: 1.199 A	Hardware upgrade 1.10.2.x: 1.613 A Hardware upgrade 1.10.3.0 or later: 1.317 A
SIL 2 / PL d / Cat. 2 [15]	0.474 A	0.470 A	0.512 A	0.592 A
Reduction of continuous current depending on switching frequency [16]				
Switching frequency 5 kHz	No reduction			
Switching frequency 10 kHz	No reduction			
Switching frequency 20 kHz	No reduction			0.105 A/K (starting at 11.2°C) [17]
Reduction of continuous current depending on installation elevation				
Starting at 500 m above sea level	0.16 A_{eff} per 1000 m	0.22 A_{eff} per 1000 m	0.45 A_{eff} per 1000 m	0.88 A_{eff} per 1000 m
Peak current per motor connection	4.5 A_{eff}	6 A_{eff}	12.25 A_{eff}	24 A_{eff}
Peak power output	1.75 kW	2.5 kW	5 kW	10 kW
Nominal switching frequency	5 kHz			
Possible switching frequencies [18]	2.5 / 5 / 10 / 20 kHz [19]			
Insulation stress of the connected motor per IEC TS 60034-25:2004	Limit value curve A [20]			
Protective measures				
Overload protection	Yes			
Short-circuit and ground fault protection	Yes			
Max. output frequency	598 Hz [21]			
Variant				
U, V, W, PE	Connector			
Shield connection	Yes Clamping range of the grounding clamp: 11 to 16 mm			
Terminal connection cross section				
Flexible and fine-stranded wires				
With wire end sleeve	1.5 to 6 mm²			
Approbation data				
UL/C-UL-US	24 to 8 AWG			
CSA	24 to 8 AWG			
Max. motor line length depending on switching frequency				
Switching frequency 5 kHz	75 m [22]			
Switching frequency 10 kHz	38 m [22]			
Switching frequency 20 kHz	19 m [22]			
Motor holding brake connection				
Quantity	1			
Output voltage [23]	Depends on the input voltage on connector X2			
Continuous current per connection	1.3 A			
Max. internal resistance	0.25 Ω			
Extinction potential	Approx. 30 V			
Max. extinction energy per switching operation	1.5 Ws			
Max. switching frequency	0.5 Hz			
Terminal connection cross section				
Flexible and fine-stranded wires				
With wire end sleeve	0.25 to 4 mm²			
Approbation data				
UL/C-UL-US	24 to 8 AWG			
CSA	24 to 8 AWG			
Protective measures				
Overload and short-circuit protection	Yes			
Open-circuit monitoring	Yes			
Undervoltage monitoring	Yes			
Response threshold for open-circuit monitoring	Approx. 30 mA			

Table 31: 8EI1X6HWSS0.XXXX-1, 8EI2X2HWSS0.XXXX-1, 8EI4X5HWSS0.XXXX-1, 8EI8X8HWSS0.XXXX-1 - Technical data

Technical data

Order number	8EI1X6HWSS0.XXXX-1	8EI2X2HWSS0.XXXX-1	8EI4X5HWSS0.XXXX-1	8EI8X8HWSS0.XXXX-1
Response threshold for undervoltage monitoring	Approx. 23 V			
Max. breaking current SBC	60 mA			
Max. line length	75 m [24]			
Braking resistor [25]				
Peak power int./ext.	7 kW / 25 kW			
Continuous power int./ext.	100 W / 2 kW			
Minimum braking resistance (ext.)	25 Ω			
Protective measures				
Overload protection	No			
Short-circuit and ground fault protection	Short-circuit protection: Yes Ground fault protection: No			
Max. line length	3 m			
Fieldbus				
Type	POWERLINK V2 controlled node (CN)			
Variant	2x RJ45, shielded, 2-port hub			
Line length	Max. 100 m between 2 stations (segment length)			
Transfer rate	100 Mbit/s			
Encoder interfaces				
Quantity	1			
Type	Digital multi-encoder interface, configurable [26]			
Connections	8-pin female Mini I/O connector			
Status indicators	None [27]			
Electrical isolation				
Encoder - ACOPOS P3	No			
Max. encoder cable length	75 m Depends on the cross section of the power supply wires in the encoder cable [28]			
Encoder power supply				
Output voltage	Configurable Typ. 11.45 V ±0.1 V / 5.2 V ±0.1 V [29][30]			
Load capacity	Max. 300 mA			
Sense lines	2, compensation of max. 2x 0.7 V			
Protective measures				
Short-circuit proof	Yes			
Overload-proof	Yes			
Synchronous serial interface				
Signal transmission	RS485 [31]			
Data transfer rate	Depends on the configured encoder type			
Differential voltage [32]				
Minimum	2.0 V			
Maximum	6.0 V			
Max. power consumption per encoder interface	$P_{ENCODER}$ [W] = U_{24V} [V] * ($I_{ENCODER}$ [A] * 0.7) + 0.5 W [33]			
Trigger inputs				
Quantity	2			
Circuit	Sink			
Electrical isolation				
Input - ACOPOS P3	Yes			
Input - Input	Yes			
Input voltage				
Nominal	24 VDC			
Maximum	30 VDC			
Switching threshold				
Low	<5 V			
High	>15 V			
Input current at nominal voltage	7 mA			
Switching delay				
Rising edge	<51 µs			
Falling edge	<52 µs			
Modulation compared to ground potential	Max. ±38 V			
Terminal connection cross section				
Flexible and fine-stranded wires				
With wire end sleeve	0.25 to 2.5 mm²			
Approbation data				
UL/C-UL-US	26 to 12 AWG			
CSA	26 to 12 AWG			
Max. line length	100 m			
Temperature sensor connection				
Quantity	1			
Resistance range	500 Ω to 5 kΩ			

Table 31: 8EI1X6HWSS0.XXXX-1, 8EI2X2HWSS0.XXXX-1, 8EI4X5HWSS0.XXXX-1, 8EI8X8HWSS0.XXXX-1 - Technical data

Order number	8EI1X6HWSS0.XXXX-1	8EI2X2HWSS0.XXXX-1	8EI4X5HWSS0.XXXX-1	8EI8X8HWSS0.XXXX-1
Support				
Motion system				
mapp Motion	5.03.0 and higher			
ACP10/ARNC0	3.16.1 and higher			3.16.0 and higher
Electrical properties				
Energy efficiency (IE classification) [34]				
Power dissipation relative to continuous apparent power [35]	IE2 (10,25) 4.7% IE2 (50,25) 4.7% IE2 (10,50) 4.7% IE2 (50,50) 4.7% IE2 (90,50) 4.8% IE2 (10,100) 4.9% IE2 (50,100) 5% IE2 (90,100) 5.1%	IE2 (10,25) 3.3% IE2 (50,25) 3.3% IE2 (10,50) 3.5% IE2 (50,50) 3.5% IE2 (90,50) 3.6% IE2 (10,100) 3.8% IE2 (50,100) 3.9% IE2 (90,100) 4.1%	IE2 (10,25) 1.9% IE2 (50,25) 1.9% IE2 (10,50) 2.1% IE2 (50,50) 2.1% IE2 (90,50) 2.2% IE2 (10,100) 2.4% IE2 (50,100) 2.6% IE2 (90,100) 2.7%	IE2 (10,25) 1.5% IE2 (50,25) 1.5% IE2 (10,50) 1.6% IE2 (50,50) 1.7% IE2 (90,50) 1.8% IE2 (10,100) 2% IE2 (50,100) 2.2% IE2 (90,100) 2.4%
Nominal losses in standby mode	11.8 W			
Operating conditions				
Permissible mounting orientations				
Hanging vertically	Yes			
Standing horizontally	Yes			
Installation elevation above sea level				
Nominal	0 to 500 m			
Maximum	4000 m [36]			
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)			
Overvoltage category per EN 61800-5-1	III			
Degree of protection per EN 60529	IP20 [37]			
Ambient conditions				
Temperature				
Operation				
Minimum	-25°C [38]			
Nominal	5 to 40°C			
Maximum	55°C			
Storage	-25 to 55°C			
Transport	-25 to 70°C			
Relative humidity				
Operation	5 to 85%, non-condensing			
Storage	5 to 95%			
Transport	95% at 40°C			
Mechanical properties				
Dimensions				
Width	66 mm			
Height	290 mm			
Depth				
Wall mounting	258.5 mm (with 8EXA front cover: 261 mm)			
Weight	3.2 kg			

Table 31: 8EI1X6HWSS0.XXXX-1, 8EI2X2HWSS0.XXXX-1, 8EI4X5HWSS0.XXXX-1, 8EI8X8HWSS0.XXXX-1 - Technical data

1) Operation on TT and IT power systems and on TN power systems that are not grounded to a star point is only permitted for 8EI servo drives with 8ZELxxxx Rev. E0 and higher. See the device information on the left side cover of the 8EI servo drive. Remove IT jumper X10 before operating in IT networks!
2) Operating the module at a mains input voltage of 24 to 120 VDC is only permitted if this mains input voltage is also specified in the device information on the left-hand side cover (Input: ... 24 - 120 VDC ...).
3) A line filter must be connected.
CE compliance can only be ensured by connecting an upstream B&R line filter (8B0F...).
In extreme cases, using line filters from 3rd-party manufacturers can result in irreparable damage to the ACOPOS P3 8EI servo drive.
4) P_{AVG} ... Average continuous power of the module
I_{AX1} ... RMS value of the current on axis 1
I_{BR1} ... Nominal current of the motor holding brake for axis 1
P_{VSLOT} ... Power dissipation of the 8EAC plug-in module
5) Maximum line length between line filter and mains connection on the module.
6) Valid for mains input voltage ≥3x 400 VAC.
The sum of the continuous power values on all motor connections and the power of the DC bus connector is not permitted to exceed this value.
7) The continuous power is reduced as a percentage of the continuous current if the continuous current is subject to derating.
8) Starting with mapp Motion V6.2.0, continuous total power monitoring (INVR_TPOW_CONT_LOAD) and peak total power monitoring (INVR_TPOW_PEAK_LOAD) are automatically disabled for a mains input voltage of 24 to 120 VDC.
9) This value applies to unshielded wiring inside a control cabinet.
Maximum length of the DC bus wiring inside a control cabinet.
10) Current consumption depends on the respective configuration of the ACOPOS P3 8EI servo drive.
The inrush current of the 24 VDC power supply is not limited by the module.
11) Valid under the following conditions: 560 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
For DC bus voltages U_ZK < 560 VDC, maximum continuous power P_OUT is calculated as follows: P_OUT = Continuous power per motor connection * U_ZK / 560.
12) Valid under the following conditions: 560 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.

13) The accuracy of the safe current is relevant for safety functions SLT and SBT, which are based on the safe current measurement. Safety functions SBT, SLT and SSO are available starting with hardware upgrade 1.10.2.0 and only for 8EI servo drives with 8ZELxxxx revision D0 or later. See the device information on the left side cover of the servo drive.
14) This safety function is certified for ACOPOS P3 per category 3 as well as category 2 of EN ISO 13849. Depending on the desired category, the corresponding accuracy of the safe current and corresponding safety characteristics must be used.
15) These values apply up to the continuous current specified in the technical data (taking into account the respective derating specifications).
16) The temperature specifications refer to the ambient temperature.
17) The module cannot supply the full continuous current at this switching frequency. This unusual value for the ambient temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
18) B&R recommends operating the module at its nominal switching frequency. Operating the module at a higher switching frequency for application-specific reasons reduces the continuous current and increases CPU utilization.
19) Switching frequency 2.5 kHz is only available for 8EI servo drives with 8ZESxxxx Rev. E0 and higher.
20) Only applies when using B&R motor cables and B&R motors.
21) The module's electrical output frequency (SCTRL_SPEED_ACT * MOTOR_POLEPAIRS) is monitored to protect against dual use in accordance with Regulation (EC) 428/2009 | 3A225. If the electrical output frequency of the module exceeds the limit value of 598 Hz uninterrupted for more than 0.5 s, then the current movement is aborted and error 6060 is output ("Power unit: Limit speed exceeded").
22) The sum of the cable lengths of all motor cables connected to this module is not permitted to exceed this value.
23) At values <22.9 V, under voltage monitoring is triggered and the servo drive signals error 6029 or 6055. In this case, the input voltage at connection X2 (24 VDC power supply) is too low and must be increased.
24) During configuration, it is necessary to check if the minimum voltage can be maintained on the holding brake with the intended line length. For the permissible operating voltage range of the holding brake, see the user documentation for the motor being used.
25) There is a connection for external braking resistors. An internal braking resistor is available as an option.
26) The encoder type is not predefined from the factory. The encoder type necessary in each case must be configured in Automation Studio.
27) The direction of rotation of the encoder can be displayed on the 8EAD0000.000-1 display module.
28) Maximum encoder cable length l_{max} can be calculated as follows (the maximum permissible encoder cable length of 75 m is not permitted to exceeded):

    $l_{max} = f / I_G * A * 1/(2*\rho)$

    f ... (Output voltage of encoder interface [V] - Min. permissible supply voltage of connected encoder [V]) * 1.1
    I_G ... Max. current consumption of the connected encoder [A].
    A ... Cross section of the power supply wires [mm²]
    ρ ... Specific resistance [Ω mm²/m] (e.g. for copper: ρ = 0.0178)
29) The output voltage is not predefined from the factory (with the exception of encoder types EnDat 2.2, EnDat 3.0 and HIPERFACE DSL). It must be configured in Automation Studio based on the encoder type. If no output voltage is configured, then the encoder will not be supplied by digital multi-encoder interface X4x. Power to the encoder can then be supplied externally.
30) Output voltage 5.2 V is only available under the following conditions:
    - 8EI servo drive with 8ZECxxx revision D0 and higher - see the device information on the left side cover of the 8EI servo drive
    - ACOPOS operating system 3.15.0 and higher (for 8EIxxxxxD... 2-axis modules and 8EIxxxxxT... 3-axis modules)
    - ACOPOS operating system 3.17.0 and higher (for 8EIxxxxxS... 1-axis modules)
31) Except encoder type HIPERFACE DSL.
32) Values valid for clock output and data input. Except encoder type HIPERFACE DSL.
33) $I_{ENCODER}$ ... Current consumption of the encoder
    U_{24V} ... Input voltage on the +24 VDC input of the module
34) The IE classification of the module is based on drive losses. This includes components such as EMC filters, etc. The power dissipation was determined at a switching frequency of 5 kHz (factory setting). Classification is performed at 90% of the frequency and at 100% of the continuous current. When operating the module in connection with an induction motor, the module is only permitted to be operated with a switching frequency of 5 kHz.
35) Continuous apparent power S[VA] = √3 * $U_{Mains}[V_{rms}]$ * $I_{Mains}[A_{rms}]$. IE2 notation (a; b) stands respectively for a load point with frequency a (as a percentage of the nominal frequency of the motor) and current b (as a percentage of the continuous current).
36) For operation on phase-grounded/center-grounded delta networks (TT and TN) and IT networks, the value is reduced to 2000 m.
37) The specified degree of protection is only met if either the slot cover is installed on the module or an 8EAC plug-in module is installed and suitable terminals are connected to all connectors and all fans are installed.
38) Only permitted for modules with 8ZEL... Revision E0 and higher. See the device information on the left side cover of the module. During storage or transport, sudden temperature changes may cause condensation or icing in the module. The module is only permitted to be commissioned if it is free of condensation or icing at the time of commissioning.

2.2.7.2.2 Continuous power 6.5 kW to 8.5 kW (motor connection)

2.2.7.2.2.1 Order data

Order number	Short description	Figure
	Wall mounting	
8EI013HWSS0.XXXX-1	ACOPOS P3 servo drive, 3x 200-480 VAC, 13 A, SafeMOTION, 1 axis, wall mounting	
8EI017HWSS0.XXXX-1	ACOPOS P3 servo drive, 3x 200-480 VAC, 17 A, SafeMOTION, 1 axis, wall mounting	
	Optional accessories	
	Display modules	
8EAD0000.000-1	Display module, LCD, 128 x 64, black/white, 1x USB 3.0	
	Fan modules	
8EXF100.0000-00	ACOPOS P3 fan module, replacement fan for ACOPOS P3 servo drive single-width (8EI1X6/8EI2X2/8EI4X5/8EI8X8/8EI013/8EI017xxS)	
	Front covers	
8EXA200.0010-00	ACOPOS P3 dover, B&R orange, single-width, suitable for servo drives 8EI2X2xxDxx.xxxx-x / 8EI2X2xxTxx.xxxx-x / 8EI4X5xxDxx.xxxx-x / 8EI4X5xxTxx.xxxx-x /8EI8X8xxDxx.xxxx-x / 8EI8X8xxTxx.xxxx-x / 8EI013xxSxx.xxxx-x / 8EI017xxSxx.xxxx-x	
8EXA200.0020-00	ACOPOS P3 cover, B&R dark gray, single-width, suitable for servo drives 8EI2X2xxDxx.xxxx-x / 8EI2X2xxTxx.xxxx-x / 8EI4X5xxDxx.xxxx-x / 8EI4X5xxTxx.xxxx-x / 8EI8X8xxDxx.xxxx-x / 8EI8X8xxTxx.xxxx-x / 8EI013xxSxx.xxxx-x / 8EI017xxSxx.xxxx-x	
	Line filters passive	
8B0F0160H000.000-1	Line filter, passive, 16 A, 3x 528 VAC, 50/60 Hz, IP20	
8B0F0300H000.000-1	Line filter, passive, 30 A, 3x 520 VAC, 50/60 Hz, IP20	
8B0F0550H000.000-1	Line filter, passive, 55 A, 3x 520 VAC, 50/60 Hz, IP20	
	Plug-in modules	
8EAC0122.001-1	ACOPOS P3 plug-in module, resolver interface 10 kHz	
8EAC0130.000-1	ACOPOS P3 plug-in module, 8 digital I/O 24 V (4x 400 mA, 4x 100 mA) individually configurable as inputs or outputs, 2 digital I/O 24 V 2 A configurable in pairs as inputs or outputs, order terminal block 8TB0230.221A-00 separately!	
8EAC0150.001-1	ACOPOS P3 plug-in module, digital multi-encoder interface	
8EAC0151.001-1	ACOPOS P3 plug-in module, incremental encoder interface	
8EAC0152.001-1	ACOPOS P3 plug-in module, analog multi-encoder interface	
	Shield component sets	
8SCSE01.0100-00	ACOPOS P3 shield component set: 1x ACOPOS P3 shield mounting plate, 1x 2x M3x6 screws	
8SCSE02.0100-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK14	
8SCSE02.0200-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK20	
	Terminal blocks	
8TB2104.2210-00	4-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively	
8TB3102.222C-20	2-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	
8TB3103.222A-20	3-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: PE RB- RB+, coding A: 000	
8TB3106.222B-20	6-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: PE L3 L2 L1 DC- DC+, coding B: 000001	
8TB3202.222C-40	2-pin push-in terminal block, 2-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	
8TB3206.222B-40	6-pin push-in terminal block, 2-row, with locking mechanism, pitch: 7.62 mm, label 2: PE L3 L2 L1 DC- DC+, coding B: 000001	
8TB3308.222A-00	4+4-pin push-in terminal block 1-row / 2-row, pitch: 7.62 mm, label 2: T- B- T+ B+ PE W V U coding A: 0000	
	Terminal set	
8EZI8X8HSS.2201-0	Klemmensatz für ACOPOS P3 Module 8EI1X6H*SS, 8EI2X2H*SS, 8EI4X5H*SS, 8EI8X8H*SS, 8EI013H*SS, 8EI017H*SS: 1x 8TB2104.2210-00, 1x 8TB3102.222C-20, 1x 8TB3308.222A-00, 1x 8TB3106.222B-20, 1x 8TB3103.222A-20	
8EZI8X8HSS.2202-0	Klemmensatz für ACOPOS P3 Module 8EI*X*H*SS0.****-1, 8EI01*H*SS0.****-1: 1x 8TB2104.2210-00, 1x 8TB3202.222C-40, 1x 8TB3308.222A-00, 1x 8TB3206.222B-40, 1x 8TB3103.222A-20	

Table 32: 8EI013HWSS0.XXXX-1, 8EI017HWSS0.XXXX-1 - Order data

Connection	1-row connector	2-row connector
X1	8TB3106.222B-20	8TB3206.222B-40
X2	8TB3102.222C-20	8TB3202.222C-40
X5x	8TB3308.222A-00	
X6	8TB3103.222A-20	
X7	8TB2104.2210-50	8TB2204.2210-50
X8	8TB2104.2210-00	

Table 33: Terminal blocks - Order numbers

Information:

Connector X7 does not exist on ACOPOS P3 SafeMOTION servo drives.

2.2.7.2.2.3 Technical data

Order number	8EI013HWSS0.XXXX-1	8EI017HWSS0.XXXX-1
General information		
Support		
Dynamic node allocation (DNA)	Yes	
Slots for plug-in modules	1	
Certifications		
CE	Yes	
UKCA	Yes	
UL	cULus E225616 Power conversion equipment	
Mains connection		
Network configurations	TT, TN, TN-S, TN-C-S, IT [1]	
Mains input voltage	3x 200 VAC to 480 VAC ±10%	
Frequency	50 / 60 Hz ±4%	
Installed load	Max. 13.5 kVA	Max. 18 kVA
Inrush current	Max. 50 A	
Switch-on interval	Typically 60 s	
Integrated line filter per EN 61800-3, category C3	No [2]	
Terminal connection cross section		
Flexible and fine-stranded wires		
With wire end sleeve	0.25 to 4 mm²	
Approbation data		
UL/C-UL-US	24 to 8 AWG	
CSA	24 to 8 AWG	
Power dissipation at device nominal power without braking resistor	[37 W + 9.2 V * I_{AX1} + 6.3 W/kW * P_{AVG} + 0.25 Ω * I_{BR1}^2 + P_{VSLOT}] * 1.1 [3]	
Max. line length	3 m [4]	
DC bus connection		
Continuous power [5]	6.5 kW [6]	8.5 kW [6]
Reduction of continuous power depending on mains input voltage		
Mains input voltage <3x 400 VAC	6.5 kW * (Mains input voltage [V] / 400 V)	8.5 kW * (Mains input voltage [V] / 400 V)
DC bus capacitance	940 µF	
Terminal connection cross sections		
Flexible and fine-stranded wires		
With wire end sleeves	0.25 to 4 mm²	
Approbation data		
UL/C-UL-US	24 to 8 AWG	
CSA	24 to 8 AWG	
Max. line length	3 m [7]	
24 VDC power supply		
Input voltage	24 VDC ±25%	
Input capacitance	5500 µF	
Current consumption	1.2 A + Current for motor holding brake [8]	
Terminal connection cross sections		
Flexible and fine-stranded wires		
With wire end sleeves	0.25 to 4 mm²	
Approbation data		
UL/C-UL-US	24 to 8 AWG	
CSA	24 to 8 AWG	
Max. line length	30 m	
Motor connection		
Quantity	1	
Continuous power per motor connection [9]	6.5 kW [6]	8.5 kW [6]
Continuous current per motor connection [9]	13 A_{eff}	17 A_{eff}

Table 34: 8EI013HWSS0.XXXX-1, 8EI017HWSS0.XXXX-1 - Technical data

Order number	8EI013HWSS0.XXXX-1	8EI017HWSS0.XXXX-1
Accuracy of the safe current [10]		
Safety function SLT [11]		
SIL 2 / PL d / Cat. 3 [12]	Hardware upgrade 1.10.2.x: 3.037 A Hardware upgrade 1.10.3.0 or later: 2.598 A	Hardware upgrade 1.10.2.x: 3.255 A Hardware upgrade 1.10.3.0 or later: 2.825 A
SIL 2 / PL d / Cat. 2 [12]	1.362 A	1.537 A
Safety function SBT [11]		
SIL 2 / PL d / Cat. 3 [12]	Hardware upgrade 1.10.2.x: 2.490 A Hardware upgrade 1.10.3.0 or later: 2.033 A	Hardware upgrade 1.10.2.x: 2.537 A Hardware upgrade 1.10.3.0 or later: 2.085 A
SIL 2 / PL d / Cat. 2 [12]	0.913 A	0.950 A
Reduction of continuous current depending on ambient temperature		
Mains input voltage: 400 VAC		
Switching frequency 5 kHz	No reduction	0.2 A/K (starting at 40°C) [13]
Switching frequency 10 kHz	0.2 A/K (starting at 30°C) [13]	0.2 A/K (starting at 10°C) [13]
Switching frequency 20 kHz	0.16 A/K (starting at -23°C) [13]	0.16 A/K (starting at -48°C) [13]
Mains input voltage: 480 VAC		
Switching frequency 5 kHz	No reduction	0.2 A/K (starting at 40°C) [13]
Switching frequency 10 kHz	0.17 A/K (starting at 18.5°C) [13]	0.17 A/K (starting at -5°C) [13]
Switching frequency 20 kHz	0.11 A/K (starting at -58.6°C) [13]	0.11 A/K (starting at -95°C) [13]
Reduction of continuous current depending on installation elevation		
Starting at 500 m above sea level	1.3 A_{eff} per 1000 m	1.7 A_{eff} per 1000 m
Peak current per motor connection	32.5 A_{eff}	42.5 A_{eff}
Peak power output	16.25 kW	21.25 kW
Nominal switching frequency	5 kHz	
Possible switching frequencies [14]	2.5 / 5 / 10 / 20 kHz [15]	
Insulation stress of the connected motor per IEC TS 60034-25:2004	Limit value curve A [16]	
Protective measures		
Overload protection	Yes	
Short-circuit and ground fault protection	Yes	
Max. output frequency	598 Hz [17]	
Variant		
U, V, W, PE	Connector	
Shield connection	Yes Clamping range of the grounding clamp: 17 to 30 mm	
Terminal connection cross section		
Flexible and fine-stranded wires		
With wire end sleeve	1.5 to 6 mm²	
Approbation data		
UL/C-UL-US	24 to 8 AWG	
CSA	24 to 8 AWG	
Max. motor line length depending on switching frequency		
Switching frequency 5 kHz	75 m	
Switching frequency 10 kHz	38 m	
Switching frequency 20 kHz	19 m	
Motor holding brake connection		
Quantity	1	
Output voltage [18]	Depends on the input voltage on connector X2	
Continuous current per connection	4 A	
Max. internal resistance	100 mΩ	
Extinction potential	33 V	
Max. extinction energy per switching operation	15 Ws	
Max. switching frequency	0.5 Hz	
Terminal connection cross section		
Flexible and fine-stranded wires		
With wire end sleeve	0.25 to 4 mm²	
Approbation data		
UL/C-UL-US	24 to 8 AWG	
CSA	24 to 8 AWG	
Protective measures		
Overload and short-circuit protection	Yes	
Open-circuit monitoring	Yes	
Undervoltage monitoring	Yes	
Response threshold for open-circuit monitoring	Max. 70 mA [19]	
Response threshold for undervoltage monitoring	Approx. 23 V	
Max. breaking current SBC	80 mA	
Max. line length	75 m [20]	
Braking resistor [21]		
Peak power int./ext.	14 kW / 25 kW	
Continuous power int./ext.	150 W / 4 kW	
Minimum braking resistance (ext.)	25 Ω	

Table 34: 8EI013HWSS0.XXXX-1, 8EI017HWSS0.XXXX-1 - Technical data

Technical data

Order number	8EI013HWSS0.XXXX-1	8EI017HWSS0.XXXX-1
Protective measures		
Overload protection	No	
Short-circuit and ground fault protection	Short-circuit protection: Yes Ground fault protection: No	
Max. line length	3 m	
Fieldbus		
Type	POWERLINK V2 controlled node (CN)	
Variant	2x RJ45, shielded, 2-port hub	
Line length	Max. 100 m between 2 stations (segment length)	
Transfer rate	100 Mbit/s	
Encoder interfaces		
Quantity	1	
Type	Digital multi-encoder interface, configurable [22)]	
Connections	8-pin female Mini I/O connector	
Status indicators	None [23)]	
Electrical isolation		
Encoder - ACOPOS P3	No	
Max. encoder cable length	75 m Depends on the cross section of the power supply wires in the encoder cable [24)]	
Encoder power supply		
Output voltage	Configurable Typ. 11.45 V ±0.1 V / 5.2 V ±0.1 V [25)26)]	
Load capacity	Max. 300 mA	
Sense lines	2, compensation of max. 2x 0.7 V	
Protective measures		
Short-circuit proof	Yes	
Overload-proof	Yes	
Synchronous serial interface		
Signal transmission	RS485 [27)]	
Data transfer rate	Depends on the configured encoder type	
Differential voltage [28)]		
Minimum	2.0 V	
Maximum	6.0 V	
Max. power consumption per encoder interface	$P_{ENCODER}$ [W] = U_{24V} [V] * ($I_{ENCODER}$ [A] * 0.7) + 0.5 W [29)]	
Trigger inputs		
Quantity	2	
Circuit	Sink	
Electrical isolation		
Input - ACOPOS P3	Yes	
Input - Input	Yes	
Input voltage		
Nominal	24 VDC	
Maximum	30 VDC	
Switching threshold		
Low	<5 V	
High	>15 V	
Input current at nominal voltage	7 mA	
Switching delay		
Rising edge	<51 µs	
Falling edge	<52 µs	
Modulation compared to ground potential	Max. ±38 V	
Terminal connection cross section		
Flexible and fine-stranded wires		
With wire end sleeve	0.25 to 2.5 mm²	
Approbation data		
UL/C-UL-US	26 to 12 AWG	
CSA	26 to 12 AWG	
Max. line length	100 m	
Temperature sensor connection		
Quantity	1	
Resistance range	500 Ω to 5 kΩ	
Support		
Motion system		
mapp Motion	5.03.0 and higher	
ACP10/ARNC0	5.03.0 and higher	

Table 34: 8EI013HWSS0.XXXX-1, 8EI017HWSS0.XXXX-1 - Technical data

Order number	8EI013HWSS0.XXXX-1	8EI017HWSS0.XXXX-1
Electrical properties		
Energy efficiency (IE classification) [30]		
Power dissipation relative to continuous apparent power [31]	IE2 (10,25) 1.2% IE2 (50,25) 1.2% IE2 (10,50) 1.4% IE2 (50,50) 1.4% IE2 (90,50) 1.5% IE2 (10,100) 1.9% IE2 (50,100) 2% IE2 (90,100) 2.3%	IE2 (10,25) 1% IE2 (50,25) 1% IE2 (10,50) 1.2% IE2 (50,50) 1.3% IE2 (90,50) 1.4% IE2 (10,100) 1.7% IE2 (50,100) 1.9% IE2 (90,100) 2.2%
Nominal losses in standby mode	11.8 W	
Operating conditions		
Permissible mounting orientations		
Hanging vertically	Yes	
Standing horizontally	Yes	
Installation elevation above sea level		
Nominal	0 to 500 m	
Maximum	4000 m [32]	
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)	
Overvoltage category per EN 61800-5-1	III	
Degree of protection per EN 60529	IP20 [33]	
Ambient conditions		
Temperature		
Operation		
Minimum	-25°C [34]	
Nominal	5 to 40°C	
Maximum	55°C	
Storage	-25 to 55°C	
Transport	-25 to 70°C	
Relative humidity		
Operation	5 to 85%, non-condensing	
Storage	5 to 95%	
Transport	95% at 40°C	
Mechanical properties		
Dimensions		
Width	66 mm	
Height	374 mm	
Depth		
Wall mounting	258.5 mm (with 8EXA front cover: 261 mm)	
Weight	4 kg	

Table 34: 8EI013HWSS0.XXXX-1, 8EI017HWSS0.XXXX-1 - Technical data

1) Operation on TT and IT power systems and on TN power systems that are not grounded to a star point is only permitted for 8EI servo drives with 8ZELxxxx Rev. E0 and higher. See the device information on the left side cover of the 8EI servo drive. Remove IT jumper X10 before operating in IT networks!
2) A line filter must be connected.
CE compliance can only be ensured by connecting an upstream B&R line filter (8B0F...).
In extreme cases, using line filters from 3rd-party manufacturers can result in irreparable damage to the ACOPOS P3 8EI servo drive.
3) Valid for a switching frequency of 5 kHz and nominal input voltage of 3x 400 VAC. Without losses in the line filter, motor cable and motor.
P_{AVG} ... Average continuous power of the module
I_{AX1} ... RMS value of the current on axis 1
I_{BR1} ... Nominal current of the motor holding brake for axis 1
P_{VSLOT} ... Power dissipation of the 8EAC plug-in module
4) Maximum line length between line filter and mains connection on the module.
5) Valid for mains input voltage ≥3x 400 VAC.
The sum of the continuous power values on all motor connections and the power of the DC bus connector is not permitted to exceed this value.
6) The continuous power is reduced as a percentage of the continuous current if the continuous current is subject to derating.
7) This value applies to unshielded wiring inside a control cabinet.
Maximum length of the DC bus wiring inside a control cabinet.
8) Current consumption depends on the respective configuration of the ACOPOS P3 8EI servo drive.
The inrush current of the 24 VDC power supply is not limited by the module.
9) Valid under the following conditions: 560 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
10) The accuracy of the safe current is relevant for safety functions SLT and SBT, which are based on the safe current measurement. Safety functions SBT, SLT and SSO are available starting with hardware upgrade 1.10.2.0 and only for 8EI servo drives with 8ZELxxxx revision D0 or later. See the device information on the left side cover of the servo drive.
11) This safety function is certified for ACOPOS P3 per category 3 as well as category 2 of EN ISO 13849. Depending on the desired category, the corresponding accuracy of the safe current and corresponding safety characteristics must be used.
12) These values apply up to the continuous current specified in the technical data (taking into account the respective derating specifications).
13) The module cannot supply the full continuous current at this switching frequency. This unusual value for the ambient temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
14) B&R recommends operating the module at its nominal switching frequency. Operating the module at a higher switching frequency for application-specific reasons reduces the continuous current and increases CPU utilization.
15) Switching frequency 2.5 kHz is only available for 8EI servo drives with 8ZESxxxx Rev. E0 and higher.
16) Only applies when using B&R motor cables and B&R motors.

17) The module's electrical output frequency (SCTRL_SPEED_ACT * MOTOR_POLEPAIRS) is monitored to protect against dual use in accordance with Regulation (EC) 428/2009 | 3A225. If the electrical output frequency of the module exceeds the limit value of 598 Hz uninterrupted for more than 0.5 s, then the current movement is aborted and error 6060 is output ("Power unit: Limit speed exceeded").
18) At values <22.9 V, under voltage monitoring is triggered and the servo drive signals error 6029 or 6055. In this case, the input voltage at connection X2 (24 VDC power supply) is too low and must be increased.
19) Valid for modules with 8ZEL... starting with revision D0.
20) During configuration, it is necessary to check if the minimum voltage can be maintained on the holding brake with the intended line length. For the permissible operating voltage range of the holding brake, see the user documentation for the motor being used.
21) There is a connection for external braking resistors. An internal braking resistor is available as an option.
22) The encoder type is not predefined from the factory. The encoder type necessary in each case must be configured in Automation Studio.
23) The direction of rotation of the encoder can be displayed on the 8EAD0000.000-1 display module.
24) Maximum encoder cable length l_{max} can be calculated as follows (the maximum permissible encoder cable length of 75 m is not permitted to exceeded):

    $l_{max} = f / I_G * A * 1/(2*\rho)$

    f ... (Output voltage of encoder interface [V] - Min. permissible supply voltage of connected encoder [V]) * 1.1
    I_G ... Max. current consumption of the connected encoder [A].
    A ... Cross section of the power supply wires [mm²]
    ρ ... Specific resistance [Ω mm²/m] (e.g. for copper: ρ = 0.0178)
25) The output voltage is not predefined from the factory (with the exception of encoder types EnDat 2.2, EnDat 3.0 and HIPERFACE DSL). It must be configured in Automation Studio based on the encoder type. If no output voltage is configured, then the encoder will not be supplied by digital multi-encoder interface X4x. Power to the encoder can then be supplied externally.
26) Output voltage 5.2 V is only available under the following conditions:
    - 8EI servo drive with 8ZECxxx revision D0 and higher - see the device information on the left side cover of the 8EI servo drive
    - ACOPOS operating system 3.15.0 and higher (for 8EIxxxxxD... 2-axis modules and 8EIxxxxxT... 3-axis modules)
    - ACOPOS operating system 3.17.0 and higher (for 8EIxxxxxS... 1-axis modules)
27) Except encoder type HIPERFACE DSL.
28) Values valid for clock output and data input. Except encoder type HIPERFACE DSL.
29) $I_{ENCODER}$ ... Current consumption of the encoder
    U_{24V} ... Input voltage on the +24 VDC input of the module
30) The IE classification of the module is based on drive losses. This includes components such as EMC filters, etc. The power dissipation was determined at a switching frequency of 5 kHz (factory setting). Classification is performed at 90% of the frequency and at 100% of the continuous current. When operating the module in connection with an induction motor, the module is only permitted to be operated with a switching frequency of 5 kHz.
31) Continuous apparent power S[VA] = √3 * $U_{Mains}[V_{rms}]$ * $I_{Mains}[A_{rms}]$. IE2 notation (a; b) stands respectively for a load point with frequency a (as a percentage of the nominal frequency of the motor) and current b (as a percentage of the continuous current).
32) For operation on phase-grounded/center-grounded delta networks (TT and TN) and IT networks, the value is reduced to 2000 m.
33) The specified degree of protection is only met if either the slot cover is installed on the module or an 8EAC plug-in module is installed and suitable terminals are connected to all connectors and all fans are installed.
34) Only permitted for modules with 8ZEL... Revision E0 and higher. See the device information on the left side cover of the module. During storage or transport, sudden temperature changes may cause condensation or icing in the module. The module is only permitted to be commissioned if it is free of condensation or icing at the time of commissioning.

2.2.7.2.3 Continuous power 10 kW to 18 kW (motor connection)

2.2.7.2.3.1 Order data

Order number	Short description	Figure
	Wall mounting	
8EI024HWSS0.XXXX-1	ACOPOS P3 servo drive, 3x 200-480 VAC, 24 A, SafeMOTION, 1 axis, wall mounting	
8EI034HWSS0.XXXX-1	ACOPOS P3 servo drive, 3x 200-480 VAC, 34 A, SafeMOTION, 1 axis, wall mounting	
8EI044HWSS0.XXXX-1	ACOPOS P3 servo drive, 3x 200-480 VAC, 44 A, SafeMOTION, 1 axis, wall mounting	
	Optional accessories	
	Display modules	
8EAD0000.000-1	Display module, LCD, 128 x 64, black/white, 1x USB 3.0	
	Fan modules	
8EXF200.0000-00	ACOPOS P3 fan module, replacement fan for ACOPOS P3 servo drive double-width (8EI017xxD/8EI022xxD/ 8EI024/8EI034/8EI044)	
8EXF300.0000-00	ACOPOS P3 ELKO fan module, replacement fan for ACOPOS P3 servo drive double-width (8EI017xxD/8EI022xxD/ 8EI024/8EI034/8EI044)	
	Front covers	
8EXA300.0010-00	ACOPOS P3 cover, B&R orange, double-width, suitable for servo drives 8EI017xxDxx.xxxx-x / 8EI022xxDxx.xxxx-x / 8EI024xxSxx.xxxx-x / 8EI034xxSxx.xxxx-x / 8EI044xxSxx.xxxx-x	
8EXA300.0020-00	ACOPOS P3 cover, B&R dark gray, double-width, suitable for servo drives 8EI017xxDxx.xxxx-x / 8EI022xxDxx.xxxx-x / 8EI024xxSxx.xxxx-x / 8EI034xxSxx.xxxx-x / 8EI044xxSxx.xxxx-x	
	Line filters passive	
8B0F0160H000.000-1	Line filter, passive, 16 A, 3x 528 VAC, 50/60 Hz, IP20	
8B0F0300H000.000-1	Line filter, passive, 30 A, 3x 520 VAC, 50/60 Hz, IP20	
8B0F0550H000.000-1	Line filter, passive, 55 A, 3x 520 VAC, 50/60 Hz, IP20	
	Plug-in modules	
8EAC0122.001-1	ACOPOS P3 plug-in module, resolver interface 10 kHz	
8EAC0130.000-1	ACOPOS P3 plug-in module, 8 digital I/O 24 V (4x 400 mA, 4x 100 mA) individually configurable as inputs or outputs, 2 digital I/O 24 V 2 A configurable in pairs as inputs or outputs, order terminal block 8TB0230.221A-00 separately!	
8EAC0150.001-1	ACOPOS P3 plug-in module, digital multi-encoder interface	
8EAC0151.001-1	ACOPOS P3 plug-in module, incremental encoder interface	
8EAC0152.001-1	ACOPOS P3 plug-in module, analog multi-encoder interface	
	Shield component sets	
8SCSE01.0200-00	ACOPOS P3 shield component set: 1x ACOPOS P3 shield mounting plate, 2x 2x M3x6 screws	
8SCSE02.0100-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK14	
8SCSE02.0200-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK20	
	Terminal blocks	
8TB2104.2210-00	4-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively	
8TB2104.223L-00	4-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 3: T- T+ B- B+, coding L: 1010	
8TB3102.222C-20	2-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	
8TB3202.222C-40	2-pin push-in terminal block, 2-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	
8TB4103.222A-10	3-pin push-in terminal block, one-row, pitch: 10.16 mm, label 2: PE RB- RB+, coding A: 000	
8TB4104.222L-10	4-pin push-in terminal block, 1-row, pitch: 10.16 mm, label 2: PE L3 L2 L1, coding L: 1010	
8TB4104.224G-10	4-pin push-in terminal block, 1-row, pitch: 10.16 mm, label 4: PE W V U, coding G: 0110	
8TB4104.227F-10	4-pin push-in terminal block, 1-row, pitch: 10.16 mm, label 4: DC-, DC-, DC+, DC+ coding F: 0101	
8TB4204.202L-10	4-pin push-in screw terminal block, two-row, pitch: 10.16 mm, label 2: PE L3 L2 L1, coding L: 1010	
	Terminal set	
8EZI044HSS.2201-0	Klemmensatz für ACOPOS P3 Module 8EI024H*SS, 8EI034H*SS, 8EI044H*SS: 1x 8TB2104.2210-00, 1x 8TB3102.222C-20, 1x 8TB4104.224G-10, 1x 8TB2104.223L-00,	

Table 35: 8EI024HWSS0.XXXX-1, 8EI034HWSS0.XXXX-1, 8EI044HWSS0.XXXX-1 - Order data

Order number	Short description	Figure
	1x 8TB4104.222L-10, 1x 8TB4104.227F-10, 1x 1x 8TB4103.222A-10	
8EZI044HSS.2302-0	Klemmensatz für ACOPOS P3 Module 8EI0*4**SS0.****-1: 1x 8TB2104.2210-00, 1x 8TB3202.222C-40, 1x 8TB4104.224G-10, 1x 8TB2104.223L-00, 1x 8TB4103.222A-10, 1x 8TB4104.227F-10, 1x 8TB4204.202L-10	

Table 35: 8EI024HWSS0.XXXX-1, 8EI034HWSS0.XXXX-1, 8EI044HWSS0.XXXX-1 - Order data

Connection	1-row connector	2-row connector
X1	8TB4104.222L-10	8TB4204.202L-10
X2	8TB3102.222C-20	8TB3202.222C-40
X51A	8TB4104.224G-10	
X51B	8TB2104.223L-00	
X6	8TB4103.222A-10	
X7	8TB2104.2210-50	8TB2204.2210-50
X8	8TB2104.2210-00	
X11	8TB4104.227F-10	

Table 36: Terminal blocks - Order numbers

Information:

Connector X7 does not exist on ACOPOS P3 SafeMOTION servo drives.

2.2.7.2.3.3 Technical data

Order number	8EI024HWSS0.XXXX-1	8EI034HWSS0.XXXX-1	8EI044HWSS0.XXXX-1
General information			
Support			
Dynamic node allocation (DNA)		Yes	
Slots for plug-in modules		1	
Certifications			
CE		Yes	
UKCA		Yes	
UL		cULus E225616 Power conversion equipment	
Mains connection			
Network configurations		TT, TN, TN-S, TN-C-S, IT [1]	
Mains input voltage		3x 200 VAC to 480 VAC ±10%	
Frequency		50 / 60 Hz ±4%	
Installed load	Max. 18.7 kVA	Max. 26.4 kVA	Max. 30.5 kVA
Inrush current		Max. 100 A	
Switch-on interval		120 s	
Integrated line filter per EN 61800-3, category C3		No [2]	
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve		0.75 to 16 mm²	
Approbation data			
UL/C-UL-US		20 to 4 AWG	
CSA		20 to 4 AWG	
Power dissipation at device nominal power without braking resistor		$[81\ W + 9.7\ V * I_{AX1} + 8.4\ W/kW * P_{AVG} + 0.25\ \Omega * I_{BR1}^2 + P_{VSLOT}] * 1.1$ [3]	
Max. line length		3 m [4]	
DC bus connection			
Continuous power [5]	10 kW [6]	14 kW [6]	18 kW [6]
Reduction of continuous power depending on mains input voltage			
Mains input voltage <3x 400 VAC	10 kW * (Mains input voltage [V] / 400 V)	14 kW * (Mains input voltage [V] / 400 V)	18 kW * (Mains input voltage [V] / 400 V)
DC bus capacitance		1680 µF	
Terminal connection cross sections			
Flexible and fine-stranded wires			
With wire end sleeves		0.75 to 16 mm²	
Approbation data			
UL/C-UL-US		20 to 4 AWG	
CSA		20 to 4 AWG	
Max. line length		3 m [7]	
24 VDC power supply			
Input voltage		24 VDC ±25%	
Input capacitance		5500 µF	
Current consumption		2 A + Current for motor holding brake [8]	

Table 37: 8EI024HWSS0.XXXX-1, 8EI034HWSS0.XXXX-1, 8EI044HWSS0.XXXX-1 - Technical data

Order number	8EI024HWSS0.XXXX-1	8EI034HWSS0.XXXX-1	8EI044HWSS0.XXXX-1
Terminal connection cross sections			
Flexible and fine-stranded wires			
With wire end sleeves		0.25 to 4 mm²	
Approbation data			
UL/C-UL-US		24 to 8 AWG	
CSA		24 to 8 AWG	
Max. line length		30 m	
Motor connection			
Quantity		1	
Continuous power per motor connection [9]	10 kW [6]	14 kW [6]	18 kW [6]
Continuous current per motor connection [9]	24 A_{eff}	34 A_{eff}	44 A_{eff}
Accuracy of the safe current [10]			
Safety function SLT [11]			
SIL 2 / PL d / Cat. 3 [12]	Hardware upgrade 1.10.2.x: 8.450 A Hardware upgrade 1.10.3.0 or later: 6.943 A	Hardware upgrade 1.10.2.x: 9.098 A Hardware upgrade 1.10.3.0 or later: 7.614 A	Hardware upgrade 1.10.2.x: 9.750 A Hardware upgrade 1.10.3.0 or later: 8.286 A
SIL 2 / PL d / Cat. 2 [12]	3.301 A	3.804 A	4.307 A
Safety function SBT [11]			
SIL 2 / PL d / Cat. 3 [12]	Hardware upgrade 1.10.2.x: 7.489 A Hardware upgrade 1.10.3.0 or later: 5.944 A	Hardware upgrade 1.10.2.x: 7.732 A Hardware upgrade 1.10.3.0 or later: 6.196 A	Hardware upgrade 1.10.2.x: 7.975 A Hardware upgrade 1.10.3.0 or later: 6.449 A
SIL 2 / PL d / Cat. 2 [12]	2.498 A	2.666 A	2.834 A
Reduction of continuous current depending on ambient temperature			
Mains input voltage: 400 VAC			
Switching frequency 5 kHz	1.6 A/K (starting at 52°C) [13]	1.6 A/K (starting at 46°C) [13]	1.6 A/K (starting at 40°C) [13]
Switching frequency 10 kHz	0.45 A/K (starting at 35°C) [13]	0.45 A/K (starting at 13°C) [13]	0.45 A/K (starting at -9°C) [13]
Switching frequency 20 kHz	0.233 A/K (starting at -26°C) [13]	0.233 A/K (starting at -68°C) [13]	0.233 A/K (starting at -110°C) [13]
Mains input voltage: 480 VAC			
Switching frequency 5 kHz	1.4 A/K (starting at 51°C) [13]	1.4 A/K (starting at 44°C) [13]	1.4 A/K (starting at 37°C) [13]
Switching frequency 10 kHz	0.39 A/K (starting at 31°C) [13]	0.39 A/K (starting at 5°C) [13]	0.39 A/K (starting at -20°C) [13]
Switching frequency 20 kHz	0.22 A/K (starting at -43°C) [13]	0.22 A/K (starting at -88°C) [13]	0.22 A/K (starting at -133°C) [13]
Reduction of continuous current depending on installation elevation			
Starting at 500 m above sea level	2.4 A_{eff} per 1000 m	3.4 A_{eff} per 1000 m	4.4 A_{eff} per 1000 m
Peak current per motor connection	60 A_{eff}	85 A_{eff}	110 A_{eff}
Peak power output	25 kW	35 kW	45 kW
Nominal switching frequency		5 kHz	
Possible switching frequencies [14]		2.5 / 5 / 10 / 20 kHz [15]	
Insulation stress of the connected motor per IEC TS 60034-25:2004		Limit value curve A [16]	
Protective measures			
Overload protection		Yes	
Short-circuit and ground fault protection		Yes	
Max. output frequency		598 Hz [17]	
Variant			
U, V, W, PE		Connector	
Shield connection		Yes Clamping range of the grounding clamp: 17 to 30 mm	
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve		0.75 to 16 mm²	
Approbation data			
UL/C-UL-US		20 to 4 AWG	
CSA		20 to 4 AWG	
Max. motor line length depending on switching frequency			
Switching frequency 5 kHz		75 m	
Switching frequency 10 kHz		35 m	
Switching frequency 20 kHz		20 m	
Motor holding brake connection			
Quantity		1	
Output voltage [18]		Depends on the input voltage on connector X2	
Continuous current per connection		6.5 A	
Max. internal resistance		0.25 Ω	
Extinction potential		Approx. 30 V	
Max. extinction energy per switching operation		15 Ws	
Max. switching frequency		0.5 Hz	

Table 37: 8EI024HWSS0.XXXX-1, 8EI034HWSS0.XXXX-1, 8EI044HWSS0.XXXX-1 - Technical data

Technical data

Order number	8EI024HWSS0.XXXX-1	8EI034HWSS0.XXXX-1	8EI044HWSS0.XXXX-1
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve	0.75 to 16 mm²		
Approbation data			
UL/C-UL-US	20 to 4 AWG		
CSA	20 to 4 AWG		
Protective measures			
Overload and short-circuit protection	Yes		
Open-circuit monitoring	Yes		
Undervoltage monitoring	Yes		
Response threshold for open-circuit monitoring	Approx. 120 mA		
Response threshold for undervoltage monitoring	Approx. 23 V		
Max. breaking current SBC	200 mA		
Max. line length	75 m [19]		
Braking resistor [20]			
Peak power output	45 kW		
Continuous power	4 kW		
Minimum braking resistance (ext.)	13 Ω		
Protective measures			
Overload protection	No		
Short-circuit and ground fault protection	Short-circuit protection: Yes Ground fault protection: No		
Max. line length	3 m		
Fieldbus			
Type	POWERLINK V2 controlled node (CN)		
Variant	2x RJ45, shielded, 2-port hub		
Line length	Max. 100 m between 2 stations (segment length)		
Transfer rate	100 Mbit/s		
Encoder interfaces			
Quantity	1		
Type	Digital multi-encoder interface, configurable [21]		
Connections	8-pin female Mini I/O connector		
Status indicators	None [22]		
Electrical isolation			
Encoder - ACOPOS P3	No		
Max. encoder cable length	75 m Depends on the cross section of the power supply wires in the encoder cable [23]		
Encoder power supply			
Output voltage	Configurable Typ. 11.45 V ±0.1 V / 5.2 V ±0.1 V [24][25]		
Load capacity	Max. 300 mA		
Sense lines	2, compensation of max. 2x 0.7 V		
Protective measures			
Short-circuit proof	Yes		
Overload-proof	Yes		
Synchronous serial interface			
Signal transmission	RS485 [26]		
Data transfer rate	Depends on the configured encoder type		
Differential voltage [27]			
Minimum	2.0 V		
Maximum	6.0 V		
Max. power consumption per encoder interface	$P_{ENCODER}$ [W] = U_{24V} [V] * ($I_{ENCODER}$ [A] * 0.7) + 0.5 W [28]		
Trigger inputs			
Quantity	2		
Circuit	Sink		
Electrical isolation			
Input - ACOPOS P3	Yes		
Input - Input	Yes		
Input voltage			
Nominal	24 VDC		
Maximum	30 VDC		
Switching threshold			
Low	<5 V		
High	>15 V		
Input current at nominal voltage	7 mA		
Switching delay			
Rising edge	<51 µs		
Falling edge	<52 µs		
Modulation compared to ground potential	Max. ±38 V		

Table 37: 8EI024HWSS0.XXXX-1, 8EI034HWSS0.XXXX-1, 8EI044HWSS0.XXXX-1 - Technical data

Order number	8EI024HWSS0.XXXX-1	8EI034HWSS0.XXXX-1	8EI044HWSS0.XXXX-1
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve		0.25 to 2.5 mm²	
Approbation data			
UL/C-UL-US		26 to 12 AWG	
CSA		26 to 12 AWG	
Max. line length		100 m	
Temperature sensor connection			
Quantity		1	
Resistance range		500 Ω to 5 kΩ	
Support			
Motion system			
mapp Motion		5.03.0 and higher	
ACP10/ARNC0		5.03.0 and higher	
Electrical properties			
Energy efficiency (IE classification) [29]			
Power dissipation relative to continuous apparent power [30]	IE2 (10,25) 1.2% IE2 (50,25) 1.2% IE2 (10,50) 1.4% IE2 (50,50) 1.4% IE2 (90,50) 1.5% IE2 (10,100) 2% IE2 (50,100) 2.2% IE2 (90,100) 2.4%	IE2 (10,25) 1% IE2 (50,25) 1% IE2 (10,50) 1.2% IE2 (50,50) 1.3% IE2 (90,50) 1.4% IE2 (10,100) 1.9% IE2 (50,100) 2.1% IE2 (90,100) 2.4%	IE2 (10,25) 0.9% IE2 (50,25) 0.9% IE2 (10,50) 1.1% IE2 (50,50) 1.2% IE2 (90,50) 1.3% IE2 (10,100) 1.8% IE2 (50,100) 2% IE2 (90,100) 2.4%
Nominal losses in standby mode		15.8 W	
Operating conditions			
Permissible mounting orientations			
Hanging vertically		Yes	
Standing horizontally		Yes	
Installation elevation above sea level			
Nominal		0 to 500 m	
Maximum		4000 m [31]	
Pollution degree per EN 61800-5-1		2 (non-conductive pollution)	
Overvoltage category per EN 61800-5-1		III	
Degree of protection per EN 60529		IP20 [32]	
Ambient conditions			
Temperature			
Operation			
Minimum		-25°C [33]	
Nominal		5 to 40°C	
Maximum		55°C	
Storage		-25 to 55°C	
Transport		-25 to 70°C	
Relative humidity			
Operation		5 to 85%, non-condensing	
Storage		5 to 95%	
Transport		95% at 40°C	
Mechanical properties			
Dimensions			
Width		133 mm	
Height		374 mm	
Depth			
Wall mounting		258.5 mm (with 8EXA front cover: 261 mm)	
Weight		8 kg	

Table 37: 8EI024HWSS0.XXXX-1, 8EI034HWSS0.XXXX-1, 8EI044HWSS0.XXXX-1 - Technical data

1) Operation on TT and IT power systems and on TN power systems that are not grounded to a star point is only permitted for 8EI servo drives with 8ZELxxxx Rev. D0 and higher. See the device information on the left side cover of the 8EI servo drive. Remove IT jumper X10 before operating in IT networks!
2) A line filter must be connected.
   CE compliance can only be ensured by connecting an upstream B&R line filter (8B0F...).
   In extreme cases, using line filters from 3rd-party manufacturers can result in irreparable damage to the ACOPOS P3 8EI servo drive.
3) Valid for a switching frequency of 5 kHz and nominal input voltage of 3x 400 VAC. Without losses in the line filter, motor cable and motor.
   P_{AVG} ... Average continuous power of the module
   I_{AX1} ... RMS value of the current on axis 1
   I_{BR1} ... Nominal current of the motor holding brake for axis 1
   P_{VSLOT} ... Power dissipation of the 8EAC plug-in module
4) Maximum cable length between line filter and mains connection on the module.
5) Valid for mains input voltage ≥3x 400 VAC.
   The sum of the continuous power values on all motor connections and the power of the DC bus connector is not permitted to exceed this value.
6) The continuous power is reduced as a percentage of the continuous current if the continuous current is subject to derating.
7) This value applies to unshielded wiring inside a control cabinet.
   Maximum length of the DC bus wiring inside a control cabinet.
8) Current consumption depends on the respective configuration of the ACOPOS P3 8EI servo drive.
   The inrush current of the 24 VDC power supply is not limited by the module.
9) Valid under the following conditions: 560 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.

10) The accuracy of the safe current is relevant for safety functions SLT and SBT, which are based on the safe current measurement. Safety functions SBT, SLT and SSO are available starting with hardware upgrade 1.10.2.0 and only for 8EI servo drives with 8ZELxxxx revision D0 or later. See the device information on the left side cover of the servo drive.
11) This safety function is certified for ACOPOS P3 per category 3 as well as category 2 of EN ISO 13849. Depending on the desired category, the corresponding accuracy of the safe current and corresponding safety characteristics must be used.
12) These values apply up to the continuous current specified in the technical data (taking into account the respective derating specifications).
13) The module cannot supply the full continuous current at this switching frequency. This unusual value for the ambient temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
14) B&R recommends operating the module at its nominal switching frequency. Operating the module at a higher switching frequency for application-specific reasons reduces the continuous current and increases CPU utilization.
15) Switching frequency 2.5 kHz is only available for 8EI servo drives with 8ZESxxxx Rev. D0 and higher.
16) Only applies when using B&R motor cables and B&R motors.
17) The module's electrical output frequency (SCTRL_SPEED_ACT * MOTOR_POLEPAIRS) is monitored to protect against dual use in accordance with Council Regulation (EC) 428/2009 | 3A225. If the electrical output frequency of the module exceeds the limit value of 598 Hz uninterrupted for more than 0.5 s, then the current movement is aborted and error 6060 is output ("Power unit: Limit speed exceeded").
18) At values <22.9 V, under voltage monitoring is triggered and the servo drive signals error 6029 or 6055. In this case, the input voltage at connection X2 (24 VDC power supply) is too low and must be increased.
19) During configuration, it is necessary to check if the minimum voltage can be maintained on the holding brake with the intended cable length. For the permissible operating voltage range of the holding brake, see the user documentation for the motor being used.
20) This values apply to an external braking resistor. This module is not equipped with an internal braking resistor.
21) The encoder type is not predefined from the factory. The encoder type necessary in each case must be configured in Automation Studio.
22) The direction of rotation of the encoder can be displayed on the 8EAD0000.000-1 display module.
23) Maximum encoder cable length l_{max} can be calculated as follows (the maximum permissible encoder cable length of 75 m is not permitted to exceeded):

    $l_{max} = f / I_G * A * 1/(2*\rho)$

    f ... (Output voltage of encoder interface [V] - Min. permissible supply voltage of connected encoder [V]) * 1.1
    I_G ... Max. current consumption of the connected encoder [A].
    A ... Cross section of the power supply wires [mm²]
    ρ ... Specific resistance [Ω mm²/m] (e.g. for copper: ρ = 0.0178)
24) The output voltage is not predefined from the factory (with the exception of encoder types EnDat 2.2, EnDat 3.0 and HIPERFACE DSL). It must be configured in Automation Studio based on the encoder type. If no output voltage is configured, then the encoder will not be supplied by digital multi-encoder interface X4x. Power to the encoder can then be supplied externally.
25) Output voltage 5.2 V is only available under the following conditions:
    - 8EI servo drive with 8ZECxxx revision D0 and higher - see the device information on the left side cover of the 8EI servo drive
    - ACOPOS operating system 3.15.0 and higher (for 8EIxxxxxD... 2-axis modules and 8EIxxxxxT... 3-axis modules)
    - ACOPOS operating system 3.17.0 and higher (for 8EIxxxxxS... 1-axis modules)
26) Except encoder type HIPERFACE DSL.
27) Values valid for clock output and data input. Except encoder type HIPERFACE DSL.
28) $I_{ENCODER}$ ... Current consumption of the encoder
    U_{24V} ... Input voltage on the +24 VDC input of the module
29) The IE classification of the module is based on drive losses. This includes components such as EMC filters, etc. The power dissipation was determined at a switching frequency of 5 kHz (factory setting). Classification is performed at 90% of the frequency and at 100% of the continuous current. When operating the module in connection with an induction motor, the module is only permitted to be operated with a switching frequency of 5 kHz.
30) Continuous apparent power $S[VA] = \sqrt{3} * U_{Mains}[V_{rms}] * I_{Mains}[A_{rms}]$. IE2 notation (a; b) stands respectively for a load point with frequency a (as a percentage of the nominal frequency of the motor) and current b (as a percentage of the continuous current).
31) For operation on phase-grounded/center-grounded delta networks (TT and TN) and IT networks, the value is reduced to 2000 m.
32) The specified degree of protection is only met if either the slot cover is installed on the module or an 8EAC plug-in module is installed and suitable terminals are connected to all connectors and all fans are installed.
33) Only permitted for modules with 8ZEL ... Revision D0 and higher. See the device information on the left side cover of the module. During storage or transport, sudden temperature changes may cause condensation or icing in the module. The module is only permitted to be commissioned if it is free of condensation or icing at the time of commissioning.

2.2.8 2-axis modules

2.2.8.1 Mains input voltage - 1x 110 to 230 VAC / 3x 200 to 230 VAC

2.2.8.1.1 Continuous power up to 2 kW (motor connection)

2.2.8.1.1.1 Order data

Order number	Short description	Figure
	Wall mounting	
8EI2X2MWD10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 1x 110-230 VAC, 3x 200-230 VAC, 2x 2.2 A, 2 axes, wall mounting	
8EI4X5MWD10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 1x 110-230 VAC, 3x 200-230 VAC, 2x 4.5 A, 2 axes, wall mounting	
8EI8X8MWD10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 1x 110-230 VAC, 3x 200-230 VAC, 2x 8.8 A, 2 axes, wall mounting	
	Optional accessories	
	Display modules	
8EAD0000.000-1	Display module, LCD, 128 x 64, black/white, 1x USB 3.0	
	Fan modules	
8EXF100.0000-00	ACOPOS P3 fan module, replacement fan for ACOPOS P3 servo drive single-width (8EI1X6/8EI2X2/8EI4X5/8EI8X8/8EI013/8EI017xxS)	
	Front covers	
8EXA200.0010-00	ACOPOS P3 dover, B&R orange, single-width, suitable for servo drives 8EI2X2xxDxx.xxxx-x / 8EI2X2xxTxx.xxxx-x / 8EI4X5xxDxx.xxxx-x / 8EI4X5xxTxx.xxxx-x /8EI8X8xxDxx.xxxx-x / 8EI8X8xxTxx.xxxx-x / 8EI013xxSxx.xxxx-x / 8EI017xxSxx.xxxx-x	
8EXA200.0020-00	ACOPOS P3 cover, B&R dark gray, single-width, suitable for servo drives 8EI2X2xxDxx.xxxx-x / 8EI2X2xxTxx.xxxx-x / 8EI4X5xxDxx.xxxx-x / 8EI4X5xxTxx.xxxx-x / 8EI8X8xxDxx.xxxx-x / 8EI8X8xxTxx.xxxx-x / 8EI013xxSxx.xxxx-x / 8EI017xxSxx.xxxx-x	
	Line filters passive	
8B0F0160H000.000-1	Line filter, passive, 16 A, 3x 528 VAC, 50/60 Hz, IP20	
8B0F0160H000.100-1	Passive line filter, 16 A, 3x 528 VAC, 50/60 Hz, IP20, specially designed also for operation at 2.5 kHz	
8B0F0300H000.000-1	Line filter, passive, 30 A, 3x 520 VAC, 50/60 Hz, IP20	
8B0F0550H000.000-1	Line filter, passive, 55 A, 3x 520 VAC, 50/60 Hz, IP20	
	Plug-in modules	
8EAC0122.001-1	ACOPOS P3 plug-in module, resolver interface 10 kHz	
8EAC0122.003-1	ACOPOS P3 plug-in module, 3 resolver interfaces 10 kHz	
8EAC0130.000-1	ACOPOS P3 plug-in module, 8 digital I/O 24 V (4x 400 mA, 4x 100 mA) individually configurable as inputs or outputs, 2 digital I/O 24 V 2 A configurable in pairs as inputs or outputs, order terminal block 8TB0230.221A-00 separately!	
8EAC0150.001-1	ACOPOS P3 plug-in module, digital multi-encoder interface	
8EAC0150.003-1	ACOPOS P3 plug-in module, 3 digital multi-encoder interfaces	
8EAC0151.001-1	ACOPOS P3 plug-in module, incremental encoder interface	
8EAC0151.003-1	ACOPOS P3 plug-in module, 3 incremental encoder interfaces	
8EAC0152.001-1	ACOPOS P3 plug-in module, analog multi-encoder interface	
8EAC0152.003-1	ACOPOS P3 plug-in module, 3 analog multi-encoder interfaces	
	Shield component sets	
8SCSE01.0100-00	ACOPOS P3 shield component set: 1x ACOPOS P3 shield mounting plate, 1x 2x M3x6 screws	
8SCSE01.0300-00	ACOPOS P3 shield component set: 1x support plate with 2 grounding clamps 3-6 mm, 1x M4x6 screw	
8SCSE02.0100-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK14	
8SCSE02.0200-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK20	
	Terminal blocks	
8TB2104.2210-00	4-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively	
8TB2104.2210-50	4-pin push-in terminal block, yellow, 1-row, with locking mechanism, pitch: 5.08 mm, label 1: 4 3 2 1	
8TB2204.2210-50	4-pin push-in terminal block, yellow, 2-row, pitch: 5.08 mm, label 1: 4 3 2 1,	
8TB3102.222C-20	2-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	

Table 38: 8EI2X2MWD10.XXXX-1, 8EI4X5MWD10.XXXX-1, 8EI8X8MWD10.XXXX-1 - Order data

Order number	Short description	Figure
8TB3103.222A-20	3-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: PE RB- RB+, coding A: 000	
8TB3106.223C-20	6-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 3: PE L3 N(L2) L1 DC- DC+, coding C: 000010	
8TB3202.222C-40	2-pin push-in terminal block, 2-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	
8TB3206.223C-40	6-pin push-in terminal block, 2-row, with locking mechanism, pitch: 7.62 mm, label 3: PE L3 N(L2) L1 DC- DC+, coding C: 000010	
8TB3308.222A-00	4+4-pin push-in terminal block 1-row / 2-row, pitch: 7.62 mm, label 2: T- B- T+ B+ PE W V U coding A: 0000	
	Terminal set	
8EZI8X8MT1.2201-0	Klemmensatz für ACOPOS P3 Module 8EI1X6M*D1, 8EI2X2M*D1, 8EI4X5M*D1, 8EI8X8M*D1, 8EI1X6M*T1, 8EI2X2M*T1, 8EI4X5M*T1, 8EI8X8M*T1: 1x 8TB2104.2210-00, 1x 8TB2104.2210-50, 1x 8TB3102.222C-20, 3x 8TB3308.222A-00, 1x 8TB3106.223C-20, 1x 8TB3103.222A-20	
8EZI8X8MT1.2202-0	Klemmensatz für ACOPOS P3 Module 8EI*X*M*D10.****-1, 8EI*X*M*T10.****-1: 1x 8TB2104.2210-00, 1x 8TB2204.2210-50, 1x 8TB3202.222C-40, 3x 8TB3308.222A-00, 1x 8TB3206.223C-40, 1x 8TB3103.222A-20	

Table 38: 8EI2X2MWD10.XXXX-1, 8EI4X5MWD10.XXXX-1, 8EI8X8MWD10.XXXX-1 - Order data

Connection	1-row connector	2-row connector
X1	8TB3106.223C-20	8TB3206.223C-40
X2	8TB3102.222C-20	8TB3202.222C-40
X5x	8TB3308.222A-00	
X6	8TB3103.222A-20	
X7	8TB2104.2210-50	8TB2204.2210-50
X8	8TB2104.2210-00	

Table 39: Terminal blocks - Order numbers

2.2.8.1.1.2 Technical data

Order number	8EI2X2MWD10.XXXX-1	8EI4X5MWD10.XXXX-1	8EI8X8MWD10.XXXX-1
General information			
Support			
Dynamic node allocation (DNA)		Yes	
Slots for plug-in modules		1	
Certifications			
CE		Yes	
UKCA		Yes	
UL		cULus E225616 Power conversion equipment	
KC		Yes	
Mains connection			
Network configurations		TT, TN, TN-S, TN-C-S, IT [1]	
Mains input voltage		1x 110 VAC to 230 VAC ±10% 3x 200 VAC to 230 VAC ±10% 24 to 120 VDC [2]	
Frequency		50 / 60 Hz ±4%	
Installed load	Max. 2.5 kVA	Max. 5 kVA	
Inrush current		Max. 22 A	
Switch-on interval		Typ. 60 s	
Integrated line filter per EN 61800-3, category C3		No [3]	
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve		0.25 to 4 mm²	
Approbation data			
UL/C-UL-US		24 to 8 AWG	
CSA		24 to 8 AWG	
Power dissipation at device nominal power without braking resistor		[(35 + 10 * P_{AVG} [kW] + 5.8 * (I_{AX1} [A] + I_{AX2} [A]) + 0.25 * (I_{BR1}^2 [A] + I_{BR2}^2 [A]) + P_{VSLOT}) * 1.1] [W] [4]	
Max. line length		3 m [5]	
DC bus connection			
Continuous power [6]	1 kW [7]	2 kW [7]	
Reduction of continuous power depending on mains input voltage [8]			
Mains input voltage <230 VAC	1 kW * (Mains input voltage [V] / 230 V)	2 kW * (Mains input voltage [V] / 230 V)	
DC bus capacitance		1880 µF	

Table 40: 8EI2X2MWD10.XXXX-1, 8EI4X5MWD10.XXXX-1, 8EI8X8MWD10.XXXX-1 - Technical data

Order number	8EI2X2MWD10.XXXX-1	8EI4X5MWD10.XXXX-1	8EI8X8MWD10.XXXX-1
Terminal connection cross sections			
Flexible and fine-stranded wires			
With wire end sleeves		0.25 to 4 mm²	
Approbation data			
UL/C-UL-US		24 to 8 AWG	
CSA		24 to 8 AWG	
Max. line length		3 m [9]	
24 VDC power supply			
Input voltage		24 VDC ±25%	
Input capacitance		5500 µF	
Current consumption		1.2 A + Current for motor holding brake [10]	
Terminal connection cross sections			
Flexible and fine-stranded wires			
With wire end sleeves		0.25 to 4 mm²	
Approbation data			
UL/C-UL-US		24 to 8 AWG	
CSA		24 to 8 AWG	
Max. line length		30 m	
Motor connection			
Quantity		2	
Continuous power per motor connection [11]	0.5 / 0.5 kW [7]	1 / 1 kW [7]	2 / 2 kW [12]
Continuous current per motor connection [13]	2.2 / 2.2 A_{eff}	4.5 / 4.5 A_{eff}	8.8 / 8.8 A_{eff}
Reduction of continuous current depending on switching frequency [14]			
Switching frequency 5 kHz		No reduction	
Switching frequency 10 kHz		No reduction	
Switching frequency 20 kHz	No reduction	0.144 A/K (starting at 53.6°C) [15]	0.144 A/K (starting at 23.7°C) [15]
Reduction of continuous current depending on installation elevation			
Starting at 500 m above sea level	0.22 A_{eff} per 1000 m	0.45 A_{eff} per 1000 m	0.88 A_{eff} per 1000 m
Peak current per motor connection	6 / 6 A_{eff}	12.25 / 12.25 A_{eff}	24 / 24 A_{eff}
Peak power output	1.25 kW	2.5 kW	5 kW [16]
Nominal switching frequency		5 kHz	
Possible switching frequencies [17]		2.5 / 5 / 10 / 20 kHz [18]	
Insulation stress of the connected motor per IEC TS 60034-25:2004		Limit value curve A [19]	
Protective measures			
Overload protection		Yes	
Short-circuit and ground fault protection		Yes	
Max. output frequency		598 Hz [20]	
Variant			
U, V, W, PE		Connector	
Shield connection		Yes Clamping range of the grounding clamp: 11 to 16 mm	
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve		1.5 to 6 mm²	
Approbation data			
UL/C-UL-US		24 to 8 AWG	
CSA		24 to 8 AWG	
Max. motor line length depending on switching frequency			
Switching frequency 5 kHz		75 m [21]	
Switching frequency 10 kHz		38 m [21]	
Switching frequency 20 kHz		19 m [21]	
Motor holding brake connection			
Quantity		2	
Output voltage [22]		Depends on the input voltage on connector X2	
Continuous current per connection		1.3 A	
Max. internal resistance		0.25 Ω	
Extinction potential		Approx. 30 V	
Max. extinction energy per switching operation		1.5 Ws	
Max. switching frequency		0.5 Hz	
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve		0.25 to 4 mm²	
Approbation data			
UL/C-UL-US		24 to 8 AWG	
CSA		24 to 8 AWG	
Protective measures			
Overload and short-circuit protection		Yes	
Open-circuit monitoring		Yes	
Undervoltage monitoring		Yes	

Table 40: 8EI2X2MWD10.XXXX-1, 8EI4X5MWD10.XXXX-1, 8EI8X8MWD10.XXXX-1 - Technical data

Technical data

Order number	8EI2X2MWD10.XXXX-1	8EI4X5MWD10.XXXX-1	8EI8X8MWD10.XXXX-1
Response threshold for open-circuit monitoring	Approx. 30 mA		
Response threshold for undervoltage monitoring	Approx. 23 V		
Max. line length	75 m [23]		
Braking resistor [24]			
Peak power int./ext.	1.5 kW / 11 kW		
Continuous power int./ext.	150 W / 970 W		
Minimum braking resistance (ext.)	12 Ω		
Protective measures			
Overload protection	No		
Short-circuit and ground fault protection	Short-circuit protection: Yes Ground fault protection: No		
Max. line length	3 m		
Fieldbus			
Type	POWERLINK V2 controlled node (CN)		
Variant	2x RJ45, shielded, 2-port hub		
Line length	Max. 100 m between 2 stations (segment length)		
Transfer rate	100 Mbit/s		
Enable inputs			
Quantity	2		
Circuit	Sink		
Electrical isolation			
Input - ACOPOS P3	Yes		
Input - Input	Yes		
Input voltage			
Nominal	24 VDC		
Maximum	30 VDC		
Input current at nominal voltage	Approx. 9 mA		
Switching threshold			
Low	<5 V		
High	>15 V		
Switching delay at nominal input voltage			
Enable 1 → 0, PWM off	2 ms		
Enable 0 → 1, ready for PWM	0.3 ms ACP10 5.16.2 and later: 4.3 ms		
Modulation compared to ground potential	Max. ±38 V		
OSSD signal connections [25]	0.5 ms		
Terminal connection cross sections			
Flexible and fine-stranded wires			
With plastic wire end sleeves	0.25 to 2.5 mm²		
Approbation data			
UL/C-UL-US	26 to 12 AWG		
CSA	26 to 12 AWG		
Max. line length	30 m		
Encoder interfaces			
Quantity	2		
Type	Digital multi-encoder interface, configurable [26]		
Connections	8-pin female Mini I/O connector		
Status indicators	None [27]		
Electrical isolation			
Encoder - ACOPOS P3	No		
Max. encoder cable length	75 m Depends on the cross section of the power supply wires in the encoder cable [28]		
Encoder power supply			
Output voltage	Configurable Typ. 11.45 V ±0.1 V / 5.2 V ±0.1 V [29][30]		
Load capacity	Max. 300 mA		
Sense lines	2, compensation of max. 2x 0.7 V		
Protective measures			
Short-circuit proof	Yes		
Overload-proof	Yes		
Synchronous serial interface			
Signal transmission	RS485 [31]		
Data transfer rate	Depends on the configured encoder type		
Differential voltage [32]			
Minimum	2.0 V		
Maximum	6.0 V		
Max. power consumption per encoder interface	$P_{ENCODER}$ [W] = U_{24V} [V] * ($I_{ENCODER}$ [A] * 0.7) + 0.5 W [33]		
Trigger inputs			
Quantity	2		
Circuit	Sink		

Table 40: 8EI2X2MWD10.XXXX-1, 8EI4X5MWD10.XXXX-1, 8EI8X8MWD10.XXXX-1 - Technical data

Order number	8EI2X2MWD10.XXXX-1	8EI4X5MWD10.XXXX-1	8EI8X8MWD10.XXXX-1
Electrical isolation			
Input - ACOPOS P3		Yes	
Input - Input		Yes	
Input voltage			
Nominal		24 VDC	
Maximum		30 VDC	
Switching threshold			
Low		<5 V	
High		>15 V	
Input current at nominal voltage		7 mA	
Switching delay			
Rising edge		<51 µs	
Falling edge		<52 µs	
Modulation compared to ground potential		Max. ±38 V	
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve		0.25 to 2.5 mm²	
Approbation data			
UL/C-UL-US		26 to 12 AWG	
CSA		26 to 12 AWG	
Max. line length		100 m	
Temperature sensor connection			
Quantity		2	
Resistance range		500 Ω to 5 kΩ	
Support			
Motion system			
mapp Motion		5.03.0 and higher	
ACP10/ARNC0		3.11.2 and higher	
Electrical properties			
Energy efficiency (IE classification) [34]			
Power dissipation relative to continuous apparent power [35]	IE2 (10,25) 5.2% IE2 (50,25) 5.3% IE2 (10,50) 5.2% IE2 (50,50) 5.3% IE2 (90,50) 5.4% IE2 (10,100) 5.6% IE2 (50,100) 5.7% IE2 (90,100) 5.9%	IE2 (10,25) 2.8% IE2 (50,25) 2.8% IE2 (10,50) 3% IE2 (50,50) 3.1% IE2 (90,50) 3.2% IE2 (10,100) 3.5% IE2 (50,100) 3.7% IE2 (90,100) 3.9%	IE2 (10,25) 2% IE2 (50,25) 2.1% IE2 (10,50) 2.3% IE2 (50,50) 2.4% IE2 (90,50) 2.5% IE2 (10,100) 2.8% IE2 (50,100) 3% IE2 (90,100) 3.4%
Nominal losses in standby mode		15.4 W	
Operating conditions			
Permissible mounting orientations			
Hanging vertically		Yes	
Standing horizontally		Yes	
Installation elevation above sea level			
Nominal		0 to 500 m	
Maximum		4000 m [36]	
Pollution degree per EN 61800-5-1		2 (non-conductive pollution)	
Overvoltage category per EN 61800-5-1		III	
Degree of protection per EN 60529		IP20 [37]	
Ambient conditions			
Temperature			
Operation			
Minimum		-25°C [38]	
Nominal		5 to 40°C	
Maximum		55°C	
Storage		-25 to 55°C	
Transport		-25 to 70°C	
Relative humidity			
Operation		5 to 85%, non-condensing	
Storage		5 to 95%	
Transport		95% at 40°C	
Mechanical properties			
Dimensions			
Width		66 mm	
Height		374 mm	
Depth			
Wall mounting		258.5 mm (with 8EXA front cover: 261 mm)	
Weight		4 kg	

Table 40: 8EI2X2MWD10.XXXX-1, 8EI4X5MWD10.XXXX-1, 8EI8X8MWD10.XXXX-1 - Technical data

1) Operation on TT and IT power systems and on TN power systems that are not grounded to a star point is only permitted for 8EI servo drives with 8ZELxxxx Rev. E0 and higher. See the device information on the left side cover of the 8EI servo drive. Remove IT jumper X10 before operating in IT networks!
2) Operating the module at a mains input voltage of 24 to 120 VDC is only permitted if this mains input voltage is also specified in the device information on the left-hand side cover (Input: ... 24 - 120 VDC ...).

3) A line filter must be connected.
CE compliance can only be ensured by connecting an upstream B&R line filter (8B0F...).
In extreme cases, using line filters from 3rd-party manufacturers can result in irreparable damage to the ACOPOS P3 8EI servo drive.
4) P_{AVG} ... Average continuous power of the module
I_{AX1}, I_{AX2} ... RMS value of the current on axis 1, axis 2
I_{BR1}, I_{BR2} ... Nominal current of the motor holding brake on axis 1, axis 2
P_{VSLOT} ... Power dissipation of the 8EAC plug-in module
5) Maximum cable length between line filter and mains connection on the module.
6) Valid for 230 VAC mains input voltage.
The sum of the continuous power values on all motor connections and the power of the DC bus connector is not permitted to exceed this value.
7) The continuous power is reduced as a percentage of the continuous current if the continuous current is subject to derating.
8) Starting with mapp Motion V6.2.0, continuous total power monitoring (INVR_TPOW_CONT_LOAD) and peak total power monitoring (INVR_TPOW_PEAK_LOAD) are automatically disabled for a mains input voltage of 24 to 120 VDC.
9) This value applies to unshielded wiring inside a control cabinet.
Maximum length of the DC bus wiring inside a control cabinet.
10) Current consumption depends on the respective configuration of the ACOPOS P3 8EI servo drive.
The inrush current of the 24 VDC power supply is not limited by the module.
11) Valid under the following conditions: 325 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
For DC bus voltages U_ZK < 325 VDC, maximum continuous power P_OUT is calculated as follows: P_OUT = Continuous power per motor connection * U_ZK / 325.
12) The total continuous power of all motor connections is not permitted to exceed 2 kW. The continuous power is reduced as a percentage of the continuous current if the continuous current is subject to derating.
13) Valid under the following conditions: 325 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
14) The temperature specifications refer to the ambient temperature.
15) The module cannot supply the full continuous current at this switching frequency. This unusual value for the ambient temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
16) The total peak power of all motor connections is not permitted to exceed 5 kW.
17) B&R recommends operating the module at its nominal switching frequency. Operating the module at a higher switching frequency for application-specific reasons reduces the continuous current and increases CPU utilization.
18) Switching frequency 2.5 kHz is only available for 8EI servo drives with 8ZESxxxx Rev. E0 and higher.
19) Only applies when using B&R motor cables and B&R motors.
20) The module's electrical output frequency (SCTRL_SPEED_ACT * MOTOR_POLEPAIRS) is monitored to protect against dual use in accordance with Council Regulation (EC) 428/2009 | 3A225. If the electrical output frequency of the module exceeds the limit value of 598 Hz uninterrupted for more than 0.5 s, then the current movement is aborted and error 6060 is output ("Power unit: Limit speed exceeded").
21) The sum of the cable lengths of all motor cables connected to this module is not permitted to exceed this value.
22) At values <22.9 V, under voltage monitoring is triggered and the servo drive signals error 6029 or 6055. In this case, the input voltage at connection X2 (24 VDC power supply) is too low and must be increased.
23) During configuration, it is necessary to check if the minimum voltage can be maintained on the holding brake with the intended cable length. For the permissible operating voltage range of the holding brake, see the user documentation for the motor being used.
24) There is a connection for external braking resistors. An internal braking resistor is available as an option.
25) OSSD (output signal switching device) signals are used to monitor signal lines for short circuits and cross faults.
26) The encoder type is not predefined from the factory. The encoder type necessary in each case must be configured in Automation Studio.
27) The direction of rotation of the encoder can be displayed on the 8EAD0000.000-1 display module.
28) Maximum encoder cable length l_{max} can be calculated as follows (the maximum permissible encoder cable length of 75 m is not permitted to exceeded):

$$l_{max} = f / I_G * A * 1/(2*\rho)$$

f ... (Output voltage of encoder interface [V] - Min. permissible supply voltage of connected encoder [V]) * 1.1
I_G ... Max. current consumption of the connected encoder [A].
A ... Cross section of the power supply wires [mm²]
ρ ... Specific resistance [Ω mm²/m] (e.g. for copper: ρ = 0.0178)
29) The output voltage is not predefined from the factory (with the exception of encoder types EnDat 2.2, EnDat 3.0 and HIPERFACE DSL). It must be configured in Automation Studio based on the encoder type. If no output voltage is configured, then the encoder will not be supplied by digital multi-encoder interface X4x. Power to the encoder can then be supplied externally.
30) Output voltage 5.2 V is only available under the following conditions:
- 8EI servo drive with 8ZECxxx revision D0 and higher - see the device information on the left side cover of the 8EI servo drive
- ACOPOS operating system 3.15.0 and higher (for 8EIxxxxxD... 2-axis modules and 8EIxxxxxT... 3-axis modules)
- ACOPOS operating system 3.17.0 and higher (for 8EIxxxxxS... 1-axis modules)
31) Except encoder type HIPERFACE DSL.
32) Values valid for clock output and data input. Except encoder type HIPERFACE DSL.
33) $I_{ENCODER}$ ... Current consumption of the encoder
U_{24V} ... Input voltage on the +24 VDC input of the module
34) The IE classification of the module is based on drive losses. This includes components such as EMC filters, etc. The power dissipation was determined at a switching frequency of 5 kHz (factory setting). Classification is performed at 90% of the frequency and at 100% of the continuous current. When operating the module in connection with an induction motor, the module is only permitted to be operated with a switching frequency of 5 kHz.
35) Continuous apparent power S[VA] = √3 * UMains[Vrms] * IMains[Arms]. IE2 notation (a,b) stands respectively for a load point with frequency a (as a percentage of the nominal frequency of the motor) and current b (as a percentage of the continuous current).
36) For operation on phase-grounded/center-grounded delta networks (TT and TN) and IT networks, the value is reduced to 2000 m.
37) The specified degree of protection is only met if either the slot cover is installed on the module or an 8EAC plug-in module is installed and suitable terminals are connected to all connectors and all fans are installed.
38) Only permitted for modules with 8ZEL... Revision E0 and higher. See the device information on the left side cover of the module. During storage or transport, sudden temperature changes may cause condensation or icing in the module. The module is only permitted to be commissioned if it is free of condensation or icing at the time of commissioning.

2.2.8.2 Mains input voltage - 3x 200 to 480 VAC

2.2.8.2.1 Continuous power up to 4 kW (motor connection)

2.2.8.2.1.1 Order data

Order number	Short description	Figure
	Wall mounting	
8EI2X2HWD10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 3x 200-480 VAC, 2x 2.2 A, 2 axis, wall mounting	
8EI4X5HWD10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 3x 200-480 VAC, 2x 4.5 A, 2 axis, wall mounting	
8EI8X8HWD10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 3x 200-480 VAC, 2x 8.8 A, 2 axis, wall mounting	
	Optional accessories	
	Display modules	
8EAD0000.000-1	Display module, LCD, 128 x 64, black/white, 1x USB 3.0	
	Fan modules	
8EXF100.0000-00	ACOPOS P3 fan module, replacement fan for ACOPOS P3 servo drive single-width (8EI1X6/8EI2X2/8EI4X5/8EI8X8/8EI013/8EI017xxS)	
	Front covers	
8EXA200.0010-00	ACOPOS P3 dover, B&R orange, single-width, suitable for servo drives 8EI2X2xxDxx.xxxx-x / 8EI2X2xxTxx.xxxx-x / 8EI4X5xxDxx.xxxx-x / 8EI4X5xxTxx.xxxx-x /8EI8X8xxDxx.xxxx-x / 8EI8X8xxTxx.xxxx-x / 8EI013xxSxx.xxxx-x / 8EI017xxSxx.xxxx-x	
8EXA200.0020-00	ACOPOS P3 cover, B&R dark gray, single-width, suitable for servo drives 8EI2X2xxDxx.xxxx-x / 8EI2X2xxTxx.xxxx-x / 8EI4X5xxDxx.xxxx-x / 8EI4X5xxTxx.xxxx-x / 8EI8X8xxDxx.xxxx-x / 8EI8X8xxTxx.xxxx-x / 8EI013xxSxx.xxxx-x / 8EI017xxSxx.xxxx-x	
	Line filters passive	
8B0F0160H000.000-1	Line filter, passive, 16 A, 3x 528 VAC, 50/60 Hz, IP20	
8B0F0160H000.100-1	Passive line filter, 16 A, 3x 528 VAC, 50/60 Hz, IP20, specially designed also for operation at 2.5 kHz	
8B0F0300H000.000-1	Line filter, passive, 30 A, 3x 520 VAC, 50/60 Hz, IP20	
8B0F0550H000.000-1	Line filter, passive, 55 A, 3x 520 VAC, 50/60 Hz, IP20	
	Plug-in modules	
8EAC0122.001-1	ACOPOS P3 plug-in module, resolver interface 10 kHz	
8EAC0122.003-1	ACOPOS P3 plug-in module, 3 resolver interfaces 10 kHz	
8EAC0130.000-1	ACOPOS P3 plug-in module, 8 digital I/O 24 V (4x 400 mA, 4x 100 mA) individually configurable as inputs or outputs, 2 digital I/O 24 V 2 A configurable in pairs as inputs or outputs, order terminal block 8TB0230.221A-00 separately!	
8EAC0150.001-1	ACOPOS P3 plug-in module, digital multi-encoder interface	
8EAC0150.003-1	ACOPOS P3 plug-in module, 3 digital multi-encoder interfaces	
8EAC0151.001-1	ACOPOS P3 plug-in module, incremental encoder interface	
8EAC0151.003-1	ACOPOS P3 plug-in module, 3 incremental encoder interfaces	
8EAC0152.001-1	ACOPOS P3 plug-in module, analog multi-encoder interface	
8EAC0152.003-1	ACOPOS P3 plug-in module, 3 analog multi-encoder interfaces	
	Shield component sets	
8SCSE01.0100-00	ACOPOS P3 shield component set: 1x ACOPOS P3 shield mounting plate, 1x 2x M3x6 screws	
8SCSE01.0300-00	ACOPOS P3 shield component set: 1x support plate with 2 grounding clamps 3-6 mm, 1x M4x6 screw	
8SCSE02.0100-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK14	
8SCSE02.0200-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK20	
	Terminal blocks	
8TB2104.2210-00	4-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively	
8TB2104.2210-50	4-pin push-in terminal block, yellow, 1-row, with locking mechanism, pitch: 5.08 mm, label 1: 4 3 2 1	
8TB2204.2210-50	4-pin push-in terminal block, yellow, 2-row, pitch: 5.08 mm, label 1: 4 3 2 1,	
8TB3102.222C-20	2-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	
8TB3103.222A-20	3-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: PE RB- RB+, coding A: 000	

Table 41: 8EI2X2HWD10.XXXX-1, 8EI4X5HWD10.XXXX-1, 8EI8X8HWD10.XXXX-1 - Order data

Order number	Short description	Figure
8TB3106.222B-20	6-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: PE L3 L2 L1 DC- DC+, coding B: 000001	
8TB3202.222C-40	2-pin push-in terminal block, 2-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	
8TB3206.222B-40	6-pin push-in terminal block, 2-row, with locking mechanism, pitch: 7.62 mm, label 2: PE L3 L2 L1 DC- DC+, coding B: 000001	
8TB3308.222A-00	4+4-pin push-in terminal block 1-row / 2-row, pitch: 7.62 mm, label 2: T- B- T+ B+ PE W V U coding A: 0000	
	Terminal set	
8EZI8X8HT1.2201-0	Klemmensatz für ACOPOS P3 Module 8EI*X*H*D10.****-1, 8EI*X*H*T10.****-1: 1x 8TB2104.2210-00, 1x 8TB2104.2210-50, 1x 8TB3102.222C-20, 3x 8TB3308.222A-00, 1x 8TB3106.222B-20, 1x 8TB3103.222A-20	

Table 41: 8EI2X2HWD10.XXXX-1, 8EI4X5HWD10.XXXX-1, 8EI8X8HWD10.XXXX-1 - Order data

Connection	1-row connector	2-row connector
X1	8TB3106.222B-20	8TB3206.222B-40
X2	8TB3102.222C-20	8TB3202.222C-40
X5x	8TB3308.222A-00	
X6	8TB3103.222A-20	
X7	8TB2104.2210-50	8TB2204.2210-50
X8	8TB2104.2210-00	

Table 42: Terminal blocks - Order numbers

2.2.8.2.1.2 Technical data

Order number	8EI2X2HWD10.XXXX-1	8EI4X5HWD10.XXXX-1	8EI8X8HWD10.XXXX-1
General information			
Support			
Dynamic node allocation (DNA)		Yes	
Slots for plug-in modules		1	
Certifications			
CE		Yes	
UKCA		Yes	
UL		cULus E225616 Power conversion equipment	
KC		Yes	
Mains connection			
Network configurations		TT, TN, TN-S, TN-C-S, IT [1]	
Mains input voltage		3x 200 VAC to 480 VAC ±10% 24 to 120 VDC [2]	
Frequency		50 / 60 Hz ±4%	
Installed load	Max. 5 kVA	Max. 10 kVA	
Inrush current		Max. 45 A	
Switch-on interval		Typ. 60 s	
Integrated line filter per EN 61800-3, category C3		No [3]	
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve		0.25 to 4 mm²	
Approbation data			
UL/C-UL-US		24 to 8 AWG	
CSA		24 to 8 AWG	
Power dissipation at device nominal power without braking resistor		[(50 + 6.9 * P_{AVG} [kW] + 7.5 * (I_{AX1} [A] + I_{AX2} [A]) + 0.25 * (I_{BR1}^2 [A] + I_{BR2}^2 [A]) + P_{VSLOT}) * 1.1] [W] [4]	
Max. line length		3 m [5]	
DC bus connection			
Continuous power [6]	2 kW [7]	4 kW [7]	
Reduction of continuous power depending on mains input voltage [8]			
Mains input voltage <3x 400 VAC	2 kW * (Mains input voltage [V] / 400 V)	4 kW * (Mains input voltage [V] / 400 V)	
DC bus capacitance		470 µF	
Terminal connection cross sections			
Flexible and fine-stranded wires			
With wire end sleeves		0.25 to 4 mm²	
Approbation data			
UL/C-UL-US		24 to 8 AWG	
CSA		24 to 8 AWG	
Max. line length		3 m [9]	

Table 43: 8EI2X2HWD10.XXXX-1, 8EI4X5HWD10.XXXX-1, 8EI8X8HWD10.XXXX-1 - Technical data

Order number	8EI2X2HWD10.XXXX-1	8EI4X5HWD10.XXXX-1	8EI8X8HWD10.XXXX-1
24 VDC power supply			
Input voltage	24 VDC ±25%		
Input capacitance	5500 µF		
Current consumption	1.2 A + Current for motor holding brake [10]		
Terminal connection cross sections			
Flexible and fine-stranded wires			
With wire end sleeves	0.25 to 4 mm²		
Approbation data			
UL/C-UL-US	24 to 8 AWG		
CSA	24 to 8 AWG		
Max. line length	30 m		
Motor connection			
Quantity	2		
Continuous power per motor connection [11]	1 / 1 kW [7]	2 / 2 kW [7]	4 / 4 kW [12]
Continuous current per motor connection [13]	2.2 / 2.2 A_{eff}	4.5 / 4.5 A_{eff}	8.8 / 8.8 A_{eff}
Reduction of continuous current depending on switching frequency [14]			
Switching frequency 5 kHz	No reduction		1.571 A/K (starting at 53.1°C) [15]
Switching frequency 10 kHz	No reduction		0.108 A/K (starting at 29.5°C)
Switching frequency 20 kHz	No reduction	0.091 A/K (starting at 29.4°C) [16]	0.091 A/K (starting at -17.9°C) [16]
Reduction of continuous current depending on installation elevation			
Starting at 500 m above sea level	0.22 A_{eff} per 1000 m	0.45 A_{eff} per 1000 m	0.88 A_{eff} per 1000 m
Peak current per motor connection	6 / 6 A_{eff}	12.25 / 12.25 A_{eff}	24/24 A_{eff}
Peak power output	2.5 kW	5 kW	10 / 10 kW [17]
Nominal switching frequency	5 kHz		
Possible switching frequencies [18]	2.5 / 5 / 10 / 20 kHz [19]		
Insulation stress of the connected motor per IEC TS 60034-25:2004	Limit value curve A [20]		
Protective measures			
Overload protection	Yes		
Short-circuit and ground fault protection	Yes		
Max. output frequency	598 Hz [21]		
Variant			
U, V, W, PE	Connector		
Shield connection	Yes Clamping range of the grounding clamp: 11 to 16 mm		
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve	1.5 to 6 mm²		
Approbation data			
UL/C-UL-US	24 to 8 AWG		
CSA	24 to 8 AWG		
Max. motor line length depending on switching frequency			
Switching frequency 5 kHz	75 m [22]		
Switching frequency 10 kHz	38 m [22]		
Switching frequency 20 kHz	19 m [22]		
Motor holding brake connection			
Quantity	2		
Output voltage [23]	Depends on the input voltage on connector X2		
Continuous current per connection	1.3 A		
Max. internal resistance	0.25 Ω		
Extinction potential	Approx. 30 V		
Max. extinction energy per switching operation	1.5 Ws		
Max. switching frequency	0.5 Hz		
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve	0.25 to 4 mm²		
Approbation data			
UL/C-UL-US	24 to 8 AWG		
CSA	24 to 8 AWG		
Protective measures			
Overload and short-circuit protection	Yes		
Open-circuit monitoring	Yes		
Undervoltage monitoring	Yes		
Response threshold for open-circuit monitoring	Approx. 30 mA		
Response threshold for undervoltage monitoring	Approx. 23 V		
Max. line length	75 m [24]		
Braking resistor [25]			
Peak power int./ext.	7 kW / 25 kW		
Continuous power int./ext.	150 W / 2 kW		

Table 43: 8EI2X2HWD10.XXXX-1, 8EI4X5HWD10.XXXX-1, 8EI8X8HWD10.XXXX-1 - Technical data

Order number	8EI2X2HWD10.XXXX-1	8EI4X5HWD10.XXXX-1	8EI8X8HWD10.XXXX-1
Minimum braking resistance (ext.)	25 Ω		
Protective measures			
Overload protection	No		
Short-circuit and ground fault protection	Short-circuit protection: Yes Ground fault protection: No		
Max. line length	3 m		
Fieldbus			
Type	POWERLINK V2 controlled node (CN)		
Variant	2x RJ45, shielded, 2-port hub		
Line length	Max. 100 m between 2 stations (segment length)		
Transfer rate	100 Mbit/s		
Enable inputs			
Quantity	2		
Circuit	Sink		
Electrical isolation			
Input - ACOPOS P3	Yes		
Input - Input	Yes		
Input voltage			
Nominal	24 VDC		
Maximum	30 VDC		
Input current at nominal voltage	Approx. 9 mA		
Switching threshold			
Low	<5 V		
High	>15 V		
Switching delay at nominal input voltage			
Enable 1 → 0, PWM off	2 ms		
Enable 0 → 1, ready for PWM	0.3 ms ACP10 5.16.2 and later: 4.3 ms		
Modulation compared to ground potential	Max. ±38 V		
OSSD signal connections [26]	0.5 ms		
Terminal connection cross sections			
Flexible and fine-stranded wires			
With plastic wire end sleeves	0.25 to 2.5 mm²		
Approbation data			
UL/C-UL-US	26 to 12 AWG		
CSA	26 to 12 AWG		
Max. line length	30 m		
Encoder interfaces			
Quantity	2		
Type	Digital multi-encoder interface, configurable [27]		
Connections	8-pin female Mini I/O connector		
Status indicators	None [28]		
Electrical isolation			
Encoder - ACOPOS P3	No		
Max. encoder cable length	75 m Depends on the cross section of the power supply wires in the encoder cable [29]		
Encoder power supply			
Output voltage	Configurable Typ. 11.45 V ±0.1 V / 5.2 V ±0.1 V [30][31]		
Load capacity	Max. 300 mA		
Sense lines	2, compensation of max. 2x 0.7 V		
Protective measures			
Short-circuit proof	Yes		
Overload-proof	Yes		
Synchronous serial interface			
Signal transmission	RS485 [32]		
Data transfer rate	Depends on the configured encoder type		
Differential voltage [33]			
Minimum	2.0 V		
Maximum	6.0 V		
Max. power consumption per encoder interface	$P_{ENCODER}$ [W] = U_{24V} [V] * ($I_{ENCODER}$ [A] * 0.7) + 0.5 W [34]		
Trigger inputs			
Quantity	2		
Circuit	Sink		
Electrical isolation			
Input - ACOPOS P3	Yes		
Input - Input	Yes		
Input voltage			
Nominal	24 VDC		
Maximum	30 VDC		
Switching threshold			
Low	<5 V		
High	>15 V		

Table 43: 8EI2X2HWD10.XXXX-1, 8EI4X5HWD10.XXXX-1, 8EI8X8HWD10.XXXX-1 - Technical data

Order number	8EI2X2HWD10.XXXX-1	8EI4X5HWD10.XXXX-1	8EI8X8HWD10.XXXX-1
Input current at nominal voltage		7 mA	
Switching delay			
Rising edge		<51 µs	
Falling edge		<52 µs	
Modulation compared to ground potential		Max. ±38 V	
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve		0.25 to 2.5 mm²	
Approbation data			
UL/C-UL-US		26 to 12 AWG	
CSA		26 to 12 AWG	
Max. line length		100 m	
Temperature sensor connection			
Quantity		2	
Resistance range		500 Ω to 5 kΩ	
Support			
Motion system			
mapp Motion		5.03.0 and higher	
ACP10/ARNC0		3.11.2 and higher	
Electrical properties			
Energy efficiency (IE classification) [35]			
Power dissipation relative to continuous apparent power [36]	IE2 (10,25) 3.6% IE2 (50,25) 3.6% IE2 (10,50) 3.8% IE2 (50,50) 3.8% IE2 (90,50) 3.9% IE2 (10,100) 4.1% IE2 (50,100) 4.2% IE2 (90,100) 4.4%	IE2 (10,25) 2.1% IE2 (50,25) 2.1% IE2 (10,50) 2.2% IE2 (50,50) 2.3% IE2 (90,50) 2.4% IE2 (10,100) 2.6% IE2 (50,100) 2.7% IE2 (90,100) 2.9%	IE2 (10,25) 1.6% IE2 (50,25) 1.6% IE2 (10,50) 1.7% IE2 (50,50) 1.8% IE2 (90,50) 1.9% IE2 (10,100) 2.1% IE2 (50,100) 2.3% IE2 (90,100) 2.6%
Nominal losses in standby mode		15.4 W	
Operating conditions			
Permissible mounting orientations			
Hanging vertically		Yes	
Standing horizontally		Yes	
Installation elevation above sea level			
Nominal		0 to 500 m	
Maximum		4000 m [37]	
Pollution degree per EN 61800-5-1		2 (non-conductive pollution)	
Overvoltage category per EN 61800-5-1		III	
Degree of protection per EN 60529		IP20 [38]	
Ambient conditions			
Temperature			
Operation			
Minimum		-25°C [39]	
Nominal		5 to 40°C	
Maximum		55°C	
Storage		-25 to 55°C	
Transport		-25 to 70°C	
Relative humidity			
Operation		5 to 85%, non-condensing	
Storage		5 to 95%	
Transport		95% at 40°C	
Mechanical properties			
Dimensions			
Width		66 mm	
Height		374 mm	
Depth			
Wall mounting		258.5 mm (with 8EXA front cover: 261 mm)	
Weight		4 kg	

Table 43: 8EI2X2HWD10.XXXX-1, 8EI4X5HWD10.XXXX-1, 8EI8X8HWD10.XXXX-1 - Technical data

1) Operation on TT and IT power systems and on TN power systems that are not grounded to a star point is only permitted for 8EI servo drives with 8ZELxxxx Rev. E0 and higher. See the device information on the left side cover of the 8EI servo drive. Remove IT jumper X10 before operating in IT networks!
2) Operating the module at a mains input voltage of 24 to 120 VDC is only permitted if this mains input voltage is also specified in the device information on the left-hand side cover (Input: ... 24 - 120 VDC ...).
3) A line filter must be connected.
   CE compliance can only be ensured by connecting an upstream B&R line filter (8B0F...).
   In extreme cases, using line filters from 3rd-party manufacturers can result in irreparable damage to the ACOPOS P3 8EI servo drive.
4) P_{AVG} ... Average continuous power of the module
   I_{AX1}, I_{AX2} ... RMS value of the current on axis 1, axis 2
   I_{BR1}, I_{BR2} ... Nominal current of the motor holding brake on axis 1, axis 2
   P_{VSLOT} ... Power dissipation of the 8EAC plug-in module
5) Maximum cable length between line filter and mains connection on the module.
6) Valid for mains input voltage ≥3x 400 VAC.
   The sum of the continuous power values on all motor connections and the power of the DC bus connector is not permitted to exceed this value.

7) The continuous power is reduced as a percentage of the continuous current if the continuous current is subject to derating.
8) Starting with mapp Motion V6.2.0, continuous total power monitoring (INVR_TPOW_CONT_LOAD) and peak total power monitoring (INVR_TPOW_PEAK_LOAD) are automatically disabled for a mains input voltage of 24 to 120 VDC.
9) This value applies to unshielded wiring inside a control cabinet.
Maximum length of the DC bus wiring inside a control cabinet.
10) Current consumption depends on the respective configuration of the ACOPOS P3 8EI servo drive.
The inrush current of the 24 VDC power supply is not limited by the module.
11) Valid under the following conditions: 560 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
For DC bus voltages U_ZK < 560 VDC, maximum continuous power P_OUT is calculated as follows: P_OUT = Continuous power per motor connection * U_ZK / 560.
12) The total continuous power of all motor connections is not permitted to exceed 4 kW. The continuous power is reduced as a percentage of the continuous current if the continuous current is subject to derating.
13) Valid under the following conditions: 560 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
14) The temperature specifications refer to the ambient temperature.
15) Value for the nominal switching frequency.
16) The module cannot supply the full continuous current at this switching frequency. This unusual value for the ambient temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
17) The total peak power of all motor connections is not permitted to exceed 10 kW.
18) B&R recommends operating the module at its nominal switching frequency. Operating the module at a higher switching frequency for application-specific reasons reduces the continuous current and increases CPU utilization.
19) Switching frequency 2.5 kHz is only available for 8EI servo drives with 8ZESxxxx Rev. E0 and higher.
20) Only applies when using B&R motor cables and B&R motors.
21) The module's electrical output frequency (SCTRL_SPEED_ACT * MOTOR_POLEPAIRS) is monitored to protect against dual use in accordance with Council Regulation (EC) 428/2009 | 3A225. If the electrical output frequency of the module exceeds the limit value of 598 Hz uninterrupted for more than 0.5 s, then the current movement is aborted and error 6060 is output ("Power unit: Limit speed exceeded").
22) The sum of the cable lengths of all motor cables connected to this module is not permitted to exceed this value.
23) At values <22.9 V, under voltage monitoring is triggered and the servo drive signals error 6029 or 6055. In this case, the input voltage at connection X2 (24 VDC power supply) is too low and must be increased.
24) During configuration, it is necessary to check if the minimum voltage can be maintained on the holding brake with the intended cable length. For the permissible operating voltage range of the holding brake, see the user documentation for the motor being used.
25) There is a connection for external braking resistors. An internal braking resistor is available as an option.
26) OSSD (output signal switching device) signals are used to monitor signal lines for short circuits and cross faults.
27) The encoder type is not predefined from the factory. The encoder type necessary in each case must be configured in Automation Studio.
28) The direction of rotation of the encoder can be displayed on the 8EAD0000.000-1 display module.
29) Maximum encoder cable length l_{max} can be calculated as follows (the maximum permissible encoder cable length of 75 m is not permitted to be exceeded):

$l_{max} = f / I_G * A * 1/(2*\rho)$

f ... (Output voltage of encoder interface [V] - Min. permissible supply voltage of connected encoder [V]) * 1.1
I_G ... Max. current consumption of the connected encoder [A].
A ... Cross section of the power supply wires [mm²]
ρ ... Specific resistance [Ω mm²/m] (e.g. for copper: ρ = 0.0178)
30) The output voltage is not predefined from the factory (with the exception of encoder types EnDat 2.2, EnDat 3.0 and HIPERFACE DSL). It must be configured in Automation Studio based on the encoder type. If no output voltage is configured, then the encoder will not be supplied by digital multi-encoder interface X4x. Power to the encoder can then be supplied externally.
31) Output voltage 5.2 V is only available under the following conditions:
- 8EI servo drive with 8ZECxxx revision D0 and higher - see the device information on the left side cover of the 8EI servo drive
- ACOPOS operating system 3.15.0 and higher (for 8EIxxxxxD... 2-axis modules and 8EIxxxxxT... 3-axis modules)
- ACOPOS operating system 3.17.0 and higher (for 8EIxxxxxS... 1-axis modules)
32) Except encoder type HIPERFACE DSL.
33) Values valid for clock output and data input. Except encoder type HIPERFACE DSL.
34) $I_{ENCODER}$ ... Current consumption of the encoder
U_{24V} ... Input voltage on the +24 VDC input of the module
35) The IE classification of the module is based on drive losses. This includes components such as EMC filters, etc. The power dissipation was determined at a switching frequency of 5 kHz (factory setting). Classification is performed at 90% of the frequency and at 100% of the continuous current. When operating the module in connection with an induction motor, the module is only permitted to be operated with a switching frequency of 5 kHz.
36) Continuous apparent power S[VA] = √3 * UMains[Vrms] * IMains[Arms]. IE2 notation (a,b) stands respectively for a load point with frequency a (as a percentage of the nominal frequency of the motor) and current b (as a percentage of the continuous current).
37) For operation on phase-grounded/center-grounded delta networks (TT and TN) and IT networks, the value is reduced to 2000 m.
38) The specified degree of protection is only met if either the slot cover is installed on the module or an 8EAC plug-in module is installed and suitable terminals are connected to all connectors and all fans are installed.
39) Only permitted for modules with 8ZEL... Revision E0 and higher. See the device information on the left side cover of the module. During storage or transport, sudden temperature changes may cause condensation or icing in the module. The module is only permitted to be commissioned if it is free of condensation or icing at the time of commissioning.

2.2.8.2.2 Continuous power 2 x 7 kW to 2 x 9 kW (motor connection)

2.2.8.2.2.1 Order data

Order number	Short description	Figure
	Wall mounting	
8EI017HWD10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 3x 200-480 VAC, 2x 17 A, 2 axis, wall mounting	
8EI022HWD10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 3x 200-480 VAC, 2x 22 A, 2 axis, wall mounting	
	Optional accessories	
	Display modules	
8EAD0000.000-1	Display module, LCD, 128 x 64, black/white, 1x USB 3.0	
	Fan modules	
8EXF200.0000-00	ACOPOS P3 fan module, replacement fan for ACOPOS P3 servo drive double-width (8EI017xxD/8EI022xxD/8EI024/8EI034/8EI044)	
8EXF300.0000-00	ACOPOS P3 ELKO fan module, replacement fan for ACOPOS P3 servo drive double-width (8EI017xxD/8EI022xxD/8EI024/8EI034/8EI044)	
	Front covers	
8EXA300.0010-00	ACOPOS P3 cover, B&R orange, double-width, suitable for servo drives 8EI017xxDxx.xxxx-x / 8EI022xxDxx.xxxx-x / 8EI024xxSxx.xxxx-x / 8EI034xxSxx.xxxx-x / 8EI044xxSxx.xxxx-x	
8EXA300.0020-00	ACOPOS P3 cover, B&R dark gray, double-width, suitable for servo drives 8EI017xxDxx.xxxx-x / 8EI022xxDxx.xxxx-x / 8EI024xxSxx.xxxx-x / 8EI034xxSxx.xxxx-x / 8EI044xxSxx.xxxx-x	
	Line filters passive	
8B0F0160H000.000-1	Line filter, passive, 16 A, 3x 528 VAC, 50/60 Hz, IP20	
8B0F0300H000.000-1	Line filter, passive, 30 A, 3x 520 VAC, 50/60 Hz, IP20	
8B0F0550H000.000-1	Line filter, passive, 55 A, 3x 520 VAC, 50/60 Hz, IP20	
	Plug-in modules	
8EAC0122.001-1	ACOPOS P3 plug-in module, resolver interface 10 kHz	
8EAC0122.003-1	ACOPOS P3 plug-in module, 3 resolver interfaces 10 kHz	
8EAC0130.000-1	ACOPOS P3 plug-in module, 8 digital I/O 24 V (4x 400 mA, 4x 100 mA) individually configurable as inputs or outputs, 2 digital I/O 24 V 2 A configurable in pairs as inputs or outputs, order terminal block 8TB0230.221A-00 separately!	
8EAC0150.001-1	ACOPOS P3 plug-in module, digital multi-encoder interface	
8EAC0150.003-1	ACOPOS P3 plug-in module, 3 digital multi-encoder interfaces	
8EAC0151.001-1	ACOPOS P3 plug-in module, incremental encoder interface	
8EAC0151.003-1	ACOPOS P3 plug-in module, 3 incremental encoder interfaces	
8EAC0152.001-1	ACOPOS P3 plug-in module, analog multi-encoder interface	
8EAC0152.003-1	ACOPOS P3 plug-in module, 3 analog multi-encoder interfaces	
	Shield component sets	
8SCSE01.0200-00	ACOPOS P3 shield component set: 1x ACOPOS P3 shield mounting plate, 2x 2x M3x6 screws	
8SCSE01.0300-00	ACOPOS P3 shield component set: 1x support plate with 2 grounding clamps 3-6 mm, 1x M4x6 screw	
8SCSE02.0100-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK14	
8SCSE02.0200-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK20	
	Terminal blocks	
8TB2104.2210-00	4-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively	
8TB2104.2210-50	4-pin push-in terminal block, yellow, 1-row, with locking mechanism, pitch: 5.08 mm, label 1: 4 3 2 1	
8TB2204.2210-50	4-pin push-in terminal block, yellow, 2-row, pitch: 5.08 mm, label 1: 4 3 2 1,	
8TB3102.222C-20	2-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	
8TB3202.222C-40	2-pin push-in terminal block, 2-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	
8TB3308.222A-00	4+4-pin push-in terminal block 1-row / 2-row, pitch: 7.62 mm, label 2: T- B- T+ B+ PE W V U coding A: 0000	
8TB4103.222A-10	3-pin push-in terminal block, one-row, pitch: 10.16 mm, label 2: PE RB- RB+, coding A: 000	
8TB4104.222L-10	4-pin push-in terminal block, 1-row, pitch: 10.16 mm, label 2: PE L3 L2 L1, coding L: 1010	

Table 44: 8EI017HWD10.XXXX-1, 8EI022HWD10.XXXX-1 - Order data

Order number	Short description	Figure
8TB4104.227F-10	4-pin push-in terminal block, 1-row, pitch: 10.16 mm, label 4: DC-, DC-, DC+, DC+ coding F: 0101	
8TB4204.202L-10	4-pin push-in screw terminal block, two-row, pitch: 10.16 mm, label 2: PE L3 L2 L1, coding L: 1010	
	Terminal set	
8EZI022HD1.2201-0	Terminal block set for ACOPOS P3 modules 8EI022H*D1, 8EI017H*D1: 1x 8TB2104.2210-00, 1x 8TB2104.2210-50, 1x 8TB3102.222C-20, 2x 8TB3308.222A-00, 1x 8TB4104.222L-10, 1x 8TB4104.227F-10, 1x 8TB4103.222A-10	
8EZI022HD1.2302-0	Klemmensatz für ACOPOS P3 Module 8EI022**D10.****-1, 8EI017**D10.****-1: 1x 8TB2104.2210-00, 1x 8TB2204.2210-50, 1x 8TB3202.222C-40, 2x 8TB3308.222A-001, 1x 8TB4103.222A-10, 1x 8TB4104.227F-10, 1x 8TB4204.202L-10	

Table 44: 8EI017HWD10.XXXX-1, 8EI022HWD10.XXXX-1 - Order data

Connection	1-row connector	2-row connector
X1	8TB4104.222L-10	8TB4204.202L-10
X2	8TB3102.222C-20	8TB3202.222C-40
X5x	8TB3308.222A-00	
X6	8TB4103.222A-10	
X7	8TB2104.2210-50	8TB2204.2210-50
X8	8TB2104.2210-00	
X11	8TB4104.227F-10	

Table 45: Terminal blocks - Order numbers

2.2.8.2.2.2 Technical data

Order number	8EI017HWD10.XXXX-1	8EI022HWD10.XXXX-1
General information		
Support		
Dynamic node allocation (DNA)	Yes	
Slots for plug-in modules	1	
Certifications		
CE	Yes	
UKCA	Yes	
UL	cULus E225616 Power conversion equipment	
Mains connection		
Network configurations	TT, TN, TN-S, TN-C-S, IT [1]	
Mains input voltage	3x 200 VAC to 480 VAC ±10%	
Frequency	50 / 60 Hz ±4%	
Installed load	Max. 26.4 kVA	Max. 30.5 kVA
Inrush current	100 A	
Switch-on interval	120 s	
Integrated line filter per EN 61800-3, category C3	No [2]	
Terminal connection cross section		
Flexible and fine-stranded wires		
With wire end sleeve	0.75 to 16 mm²	
Approbation data		
UL/C-UL-US	20 to 4 AWG	
CSA	20 to 4 AWG	
Power dissipation at device nominal power without braking resistor	[80 W + 9.1 V * (I_{AX1} + I_{AX2}) + 6.5 W/kW * P_{AVG} + 0.25 Ω * (I_{BR1}^2 + I_{BR2}^2) + P_{VSLOT}] * 1.1 [3]	
Max. line length	3 m [4]	
DC bus connection		
Continuous power [5]	14 kW [6]	18 kW [6]
Reduction of continuous power depending on mains input voltage		
Mains input voltage <3x 400 VAC	14 kW * (Mains input voltage [V] / 400 V)	18 kW * (Mains input voltage [V] / 400 V)
DC bus capacitance	1680 µF	
Terminal connection cross sections		
Flexible and fine-stranded wires		
With wire end sleeves	0.75 to 16 mm²	
Approbation data		
UL/C-UL-US	20 to 4 AWG	
CSA	20 to 4 AWG	
Max. line length	3 m [7]	
24 VDC power supply		
Input voltage	24 VDC ±25%	
Input capacitance	5500 µF	
Current consumption	2.4 A + Current for motor holding brake [8][9]	

Table 46: 8EI017HWD10.XXXX-1, 8EI022HWD10.XXXX-1 - Technical data

Order number	8EI017HWD10.XXXX-1	8EI022HWD10.XXXX-1
Terminal connection cross sections		
Flexible and fine-stranded wires		
With wire end sleeves	0.25 to 4 mm²	
Approbation data		
UL/C-UL-US	24 to 8 AWG	
CSA	24 to 8 AWG	
Max. line length	30 m	
Motor connection		
Quantity	2	
Continuous power per motor connection [10]	7 / 7 kW [6]	9 / 9 kW [6]
Continuous current per motor connection [10]	17 / 17 A_{eff}	22 / 22 A_{eff}
Reduction of continuous current depending on ambient temperature		
Mains input voltage: 400 VAC		
Switching frequency 5 kHz	No reduction [11]	0.333 A/K (starting at 40°C) [11]
Switching frequency 10 kHz	0.195 A/K (starting at 16°C) [11]	0.195 A/K (starting at -9°C) [11]
Switching frequency 20 kHz	0.145 A/K (starting at -59°C) [11]	0.145 A/K (starting at -93°C) [11]
Mains input voltage: 480 VAC		
Switching frequency 5 kHz	0.345 A/K (starting at 44°C) [11]	0.345 A/K (starting at 30°C) [11]
Switching frequency 10 kHz	0.210 A/K (starting at -5°C) [11]	0.210 A/K (starting at -28°C) [11]
Switching frequency 20 kHz	0.145 A/K (starting at -87°C) [11]	0.145 A/K (starting at -121°C) [11]
Reduction of continuous current depending on installation elevation		
Starting at 500 m above sea level	1.7 A_{eff} per 1000 m	2.2 A_{eff} per 1000 m
Peak current per motor connection	42.5 / 42.5 A_{eff}	55 / 55 A_{eff}
Peak power output	17.5 / 17.5 kW	22.5 / 22.5 kW
Nominal switching frequency	5 kHz	
Possible switching frequencies [12]	2.5 / 5 / 10 / 20 kHz [13]	
Insulation stress of the connected motor per IEC TS 60034-25:2004	Limit value curve A [14]	
Protective measures		
Overload protection	Yes	
Short-circuit and ground fault protection	Yes	
Max. output frequency	598 Hz [15]	
Variant		
U, V, W, PE	Connector	
Shield connection	Yes Clamping range of the grounding clamp: 17 to 30 mm	
Terminal connection cross section		
Flexible and fine-stranded wires		
With wire end sleeve	1.5 to 6 mm²	
Approbation data		
UL/C-UL-US	24 to 8 AWG	
CSA	24 to 8 AWG	
Max. motor line length depending on switching frequency		
Switching frequency 5 kHz	75 m [16]	
Switching frequency 10 kHz	75 m [16]	
Switching frequency 20 kHz	30 m [16]	
Motor holding brake connection		
Quantity	2	
Output voltage [17]	Depends on the input voltage on connector X2	
Continuous current per connection	4 A	
Max. internal resistance	0.25 Ω	
Extinction potential	33 V	
Max. extinction energy per switching operation	15 Ws	
Max. switching frequency	0.5 Hz	
Terminal connection cross section		
Flexible and fine-stranded wires		
With wire end sleeve	0.75 to 16 mm²	
Approbation data		
UL/C-UL-US	20 to 4 AWG	
CSA	20 to 4 AWG	
Protective measures		
Overload and short-circuit protection	Yes	
Open-circuit monitoring	Yes	
Undervoltage monitoring	Yes	
Response threshold for open-circuit monitoring	Max. 70 mA [18]	
Response threshold for undervoltage monitoring	Approx. 23 V	
Max. line length	75 m	
Braking resistor [19]		
Peak power output	45 kW	

Table 46: 8EI017HWD10.XXXX-1, 8EI022HWD10.XXXX-1 - Technical data

Order number	8EI017HWD10.XXXX-1	8EI022HWD10.XXXX-1
Continuous power	4 kW	
Minimum braking resistance (ext.)	13 Ω	
Protective measures		
Overload protection	No	
Short-circuit and ground fault protection	Short-circuit protection: Yes Ground fault protection: No	
Max. line length	3 m	
Fieldbus		
Type	POWERLINK V2 controlled node (CN)	
Variant	2x RJ45, shielded, 2-port hub	
Line length	Max. 100 m between 2 stations (segment length)	
Transfer rate	100 Mbit/s	
Enable inputs		
Quantity	2	
Circuit	Sink	
Electrical isolation		
Input - ACOPOS P3	Yes	
Input - Input	Yes	
Input voltage		
Nominal	24 VDC	
Maximum	30 VDC	
Input current at nominal voltage	Approx. 9 mA	
Switching threshold		
Low	<5 V	
High	>15 V	
Switching delay at nominal input voltage		
Enable 1 → 0, PWM off	2 ms	
Enable 0 → 1, ready for PWM	0.3 ms ACP10 5.16.2 and later: 4.3 ms	
Modulation compared to ground potential	Max. ±38 V	
OSSD signal connections [20]	0.5 ms	
Terminal connection cross sections		
Flexible and fine-stranded wires		
With plastic wire end sleeves	0.25 to 2.5 mm²	
Approbation data		
UL/C-UL-US	26 to 12 AWG	
CSA	26 to 12 AWG	
Max. line length	30 m	
Encoder interfaces		
Quantity	2	
Type	Digital multi-encoder interface, configurable [21]	
Connections	8-pin female Mini I/O connector	
Status indicators	None [22]	
Electrical isolation		
Encoder - ACOPOS P3	No	
Max. encoder cable length	75 m Depends on the cross section of the power supply wires in the encoder cable [23]	
Encoder power supply		
Output voltage	Configurable Typ. 11.45 V ±0.1 V / 5.2 V ±0.1 V [24][25]	
Load capacity	Max. 300 mA	
Sense lines	2, compensation of max. 2x 0.7 V	
Protective measures		
Short-circuit proof	Yes	
Overload-proof	Yes	
Synchronous serial interface		
Signal transmission	RS485 [26]	
Data transfer rate	Depends on the configured encoder type	
Differential voltage [27]		
Minimum	2.0 V	
Maximum	6.0 V	
Max. power consumption per encoder interface	$P_{ENCODER}$ [W] = U_{24V} [V] * ($I_{ENCODER}$ [A] * 0.7) + 0.5 W [28]	
Trigger inputs		
Quantity	2	
Circuit	Sink	
Electrical isolation		
Input - ACOPOS P3	Yes	
Input - Input	Yes	
Input voltage		
Nominal	24 VDC	
Maximum	30 VDC	

Table 46: 8EI017HWD10.XXXX-1, 8EI022HWD10.XXXX-1 - Technical data

Order number	8EI017HWD10.XXXX-1	8EI022HWD10.XXXX-1
Switching threshold		
Low	<5 V	
High	>15 V	
Input current at nominal voltage	7 mA	
Switching delay		
Rising edge	<51 µs	
Falling edge	<52 µs	
Modulation compared to ground potential	Max. ±38 V	
Terminal connection cross section		
Flexible and fine-stranded wires		
With wire end sleeve	0.25 to 2.5 mm²	
Approbation data		
UL/C-UL-US	26 to 12 AWG	
CSA	26 to 12 AWG	
Max. line length	100 m	
Temperature sensor connection		
Quantity	2	
Resistance range	500 Ω to 5 kΩ	
Support		
Motion system		
mapp Motion	5.03.0 and higher	
ACP10/ARNC0	3.17.0 and higher	
Electrical properties		
Energy efficiency (IE classification) [29]		
Power dissipation relative to continuous apparent power [30]	IE2 (10,25) 1.4% IE2 (50,25) 1.5% IE2 (10,50) 1.6% IE2 (50,50) 1.7% IE2 (90,50) 1.8% IE2 (10,100) 2.3% IE2 (50,100) 2.4% IE2 (90,100) 2.7%	IE2 (10,25) 1.2% IE2 (50,25) 1.3% IE2 (10,50) 1.5% IE2 (50,50) 1.5% IE2 (90,50) 1.6% IE2 (10,100) 2.1% IE2 (50,100) 2.3% IE2 (90,100) 2.5%
Nominal losses in standby mode	16.3 W	18.5 W
Operating conditions		
Permissible mounting orientations		
Hanging vertically	Yes	
Standing horizontally	Yes	
Installation elevation above sea level		
Nominal	0 to 500 m	
Maximum	4000 m [31]	
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)	
Overvoltage category per EN 61800-5-1	III	
Degree of protection per EN 60529	IP20 [32]	
Ambient conditions		
Temperature		
Operation		
Minimum	-25°C [33]	
Nominal	5 to 40°C	
Maximum	55°C	
Storage	-25 to 55°C	
Transport	-25 to 70°C	
Relative humidity		
Operation	5 to 85%, non-condensing	
Storage	5 to 95%	
Transport	95% at 40°C	
Mechanical properties		
Dimensions		
Width	133 mm	
Height	374 mm	
Depth		
Wall mounting	258.5 mm (with 8EXA front cover: 261 mm)	
Weight	8 kg	

Table 46: 8EI017HWD10.XXXX-1, 8EI022HWD10.XXXX-1 - Technical data

1) Operation on TT and IT power systems and on TN power systems that are not grounded to a star point is only permitted for 8EI servo drives with 8ZELxxxx Rev. E0 and higher. See the device information on the left side cover of the 8EI servo drive. Remove IT jumper X10 before operating in IT networks!
2) A line filter must be connected.
CE compliance can only be ensured by connecting an upstream B&R line filter (8B0F...).
In extreme cases, using line filters from 3rd-party manufacturers can result in irreparable damage to the ACOPOS P3 8EI servo drive.
3) Valid for a switching frequency of 5 kHz and nominal input voltage of 3x 400 VAC. Without losses in the line filter, motor cable and motor.
P_{AVG} ... Average continuous power of the module
I_{AX1} ... RMS value of the current on axis 1

I_{AX2} ... RMS value of the current on axis 2
I_{BR1} ... Nominal current of the motor holding brake for axis 1
I_{BR21} ... Nominal current of the motor holding brake for axis 2
P_{VSLOT} ... Power dissipation of the 8EAC plug-in module

4) Maximum line length between line filter and mains connection on the module.
5) Valid for mains input voltage ≥3x 400 VAC.
The sum of the continuous power values on all motor connections and the power of the DC bus connector is not permitted to exceed this value.
6) The continuous power is reduced as a percentage of the continuous current if the continuous current is subject to derating.
7) This value applies to unshielded wiring inside a control cabinet.
Maximum length of the DC bus wiring inside a control cabinet.
8) Current consumption depends on the respective configuration of the ACOPOS P3 8EI servo drive.
The inrush current of the 24 VDC power supply is not limited by the module.
9) At nominal 24 VDC supply voltage and 20 kHz switching frequency. Without plug-in card.
10) Valid under the following conditions: 560 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
11) The module cannot supply the full continuous current at this switching frequency. This unusual value for the ambient temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
12) B&R recommends operating the module at its nominal switching frequency. Operating the module at a higher switching frequency for application-specific reasons reduces the continuous current and increases CPU utilization.
13) Switching frequency 2.5 kHz is only available for 8EI servo drives with 8ZESxxxx Rev. E0 and higher.
14) Only applies when using B&R motor cables and B&R motors.
15) The module's electrical output frequency (SCTRL_SPEED_ACT * MOTOR_POLEPAIRS) is monitored to protect against dual use in accordance with Regulation (EC) 428/2009 | 3A225. If the electrical output frequency of the module exceeds the limit value of 598 Hz uninterrupted for more than 0.5 s, then the current movement is aborted and error 6060 is output ("Power unit: Limit speed exceeded").
16) The sum of the cable lengths of all motor cables connected to this module is not permitted to exceed this value.
17) At values <22.9 V, under voltage monitoring is triggered and the servo drive signals error 6029 or 6055. In this case, the input voltage at connection X2 (24 VDC power supply) is too low and must be increased.
18) Valid for modules with 8ZEL... starting with revision E0.
19) This values apply to an external braking resistor. This module is not equipped with an internal braking resistor.
20) OSSD (output signal switching device) signals are used to monitor signal lines for short circuits and cross faults.
21) The encoder type is not predefined from the factory. The encoder type necessary in each case must be configured in Automation Studio.
22) The direction of rotation of the encoder can be displayed on the 8EAD0000.000-1 display module.
23) Maximum encoder cable length l_{max} can be calculated as follows (the maximum permissible encoder cable length of 75 m is not permitted to exceeded):

$l_{max} = f / I_G * A * 1/(2*\rho)$

f ... (Output voltage of encoder interface [V] - Min. permissible supply voltage of connected encoder [V]) * 1.1
I_G ... Max. current consumption of the connected encoder [A].
A ... Cross section of the power supply wires [mm²]
ρ ... Specific resistance [Ω mm²/m] (e.g. for copper: ρ = 0.0178)

24) The output voltage is not predefined from the factory (with the exception of encoder types EnDat 2.2, EnDat 3.0 and HIPERFACE DSL). It must be configured in Automation Studio based on the encoder type. If no output voltage is configured, then the encoder will not be supplied by digital multi-encoder interface X4x. Power to the encoder can then be supplied externally.
25) Output voltage 5.2 V is only available under the following conditions:
- 8EI servo drive with 8ZECxxx revision D0 and higher - see the device information on the left side cover of the 8EI servo drive
- ACOPOS operating system 3.15.0 and higher (for 8EIxxxxxD... 2-axis modules and 8EIxxxxxT... 3-axis modules)
- ACOPOS operating system 3.17.0 and higher (for 8EIxxxxxS... 1-axis modules)
26) Except encoder type HIPERFACE DSL.
27) Values valid for clock output and data input. Except encoder type HIPERFACE DSL.
28) $I_{ENCODER}$ ... Current consumption of the encoder
U_{24V} ... Input voltage on the +24 VDC input of the module
29) The IE classification of the module is based on drive losses. This includes components such as EMC filters, etc. The power dissipation was determined at a switching frequency of 5 kHz (factory setting). Classification is performed at 90% of the frequency and at 100% of the continuous current. When operating the module in connection with an induction motor, the module is only permitted to be operated with a switching frequency of 5 kHz.
30) Continuous apparent power S[VA] = √3 * UMains[Vrms] * IMains[Arms]. IE2 notation (a,b) stands respectively for a load point with frequency a (as a percentage of the nominal frequency of the motor) and current b (as a percentage of the continuous current).
31) For operation on phase-grounded/center-grounded delta networks (TT and TN) and IT networks, the value is reduced to 2000 m.
32) The specified degree of protection is only met if either the slot cover is installed on the module or an 8EAC plug-in module is installed and suitable terminals are connected to all connectors and all fans are installed.
33) Only permitted for modules with 8ZEL... Revision E0 and higher. See the device information on the left side cover of the module. During storage or transport, sudden temperature changes may cause condensation or icing in the module. The module is only permitted to be commissioned if it is free of condensation or icing at the time of commissioning.

2.2.9 SafeMOTION 2-axis modules

2.2.9.1 Mains input voltage - 1x 110 to 230 VAC / 3x 200 to 230 VAC

2.2.9.1.1 Continuous power up to 2 kW (motor connection)

2.2.9.1.1.1 Order data

Order number	Short description	Figure
	Wall mounting	
8EI2X2MWDS0.XXXX-1	ACOPOS P3 servo drive , 1x 110-230 VAC, 3x 200-230 VAC, 2x 2.2 A, SafeMOTION, 2 axes, wall mounting	
8EI4X5MWDS0.XXXX-1	ACOPOS P3 servo drive , 1x 110-230 VAC, 3x 200-230 VAC, 2x 4.5 A, SafeMOTION, 2 axes, wall mounting	
8EI8X8MWDS0.XXXX-1	ACOPOS P3 servo drive , 1x 110-230 VAC, 3x 200-230 VAC, 2x 8.8 A, SafeMOTION, 2 axes, wall mounting	
	Optional accessories	
	Display modules	
8EAD0000.000-1	Display module, LCD, 128 x 64, black/white, 1x USB 3.0	
	Fan modules	
8EXF100.0000-00	ACOPOS P3 fan module, replacement fan for ACOPOS P3 servo drive single-width (8EI1X6/8EI2X2/8EI4X5/8EI8X8/8EI013/8EI017xxS)	
	Front covers	
8EXA200.0010-00	ACOPOS P3 dover, B&R orange, single-width, suitable for servo drives 8EI2X2xxDxx.xxxx-x / 8EI2X2xxTxx.xxxx-x / 8EI4X5xxDxx.xxxx-x / 8EI4X5xxTxx.xxxx-x /8EI8X8xxDxx.xxxx-x / 8EI8X8xxTxx.xxxx-x / 8EI013xxSxx.xxxx-x / 8EI017xxSxx.xxxx-x	
8EXA200.0020-00	ACOPOS P3 cover, B&R dark gray, single-width, suitable for servo drives 8EI2X2xxDxx.xxxx-x / 8EI2X2xxTxx.xxxx-x / 8EI4X5xxDxx.xxxx-x / 8EI4X5xxTxx.xxxx-x / 8EI8X8xxDxx.xxxx-x / 8EI8X8xxTxx.xxxx-x / 8EI013xxSxx.xxxx-x / 8EI017xxSxx.xxxx-x	
	Line filters passive	
8B0F0160H000.000-1	Line filter, passive, 16 A, 3x 528 VAC, 50/60 Hz, IP20	
8B0F0160H000.100-1	Passive line filter, 16 A, 3x 528 VAC, 50/60 Hz, IP20, specially designed also for operation at 2.5 kHz	
8B0F0300H000.000-1	Line filter, passive, 30 A, 3x 520 VAC, 50/60 Hz, IP20	
8B0F0550H000.000-1	Line filter, passive, 55 A, 3x 520 VAC, 50/60 Hz, IP20	
	Plug-in modules	
8EAC0122.001-1	ACOPOS P3 plug-in module, resolver interface 10 kHz	
8EAC0122.003-1	ACOPOS P3 plug-in module, 3 resolver interfaces 10 kHz	
8EAC0130.000-1	ACOPOS P3 plug-in module, 8 digital I/O 24 V (4x 400 mA, 4x 100 mA) individually configurable as inputs or outputs, 2 digital I/O 24 V 2 A configurable in pairs as inputs or outputs, order terminal block 8TB0230.221A-00 separately!	
8EAC0150.001-1	ACOPOS P3 plug-in module, digital multi-encoder interface	
8EAC0150.003-1	ACOPOS P3 plug-in module, 3 digital multi-encoder interfaces	
8EAC0151.001-1	ACOPOS P3 plug-in module, incremental encoder interface	
8EAC0151.003-1	ACOPOS P3 plug-in module, 3 incremental encoder interfaces	
8EAC0152.001-1	ACOPOS P3 plug-in module, analog multi-encoder interface	
8EAC0152.003-1	ACOPOS P3 plug-in module, 3 analog multi-encoder interfaces	
	Shield component sets	
8SCSE01.0100-00	ACOPOS P3 shield component set: 1x ACOPOS P3 shield mounting plate, 1x 2x M3x6 screws	
8SCSE02.0100-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK14	
8SCSE02.0200-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK20	
	Terminal blocks	
8TB2104.2210-00	4-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively	
8TB3102.222C-20	2-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	
8TB3103.222A-20	3-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: PE RB- RB+, coding A: 000	
8TB3106.223C-20	6-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 3: PE L3 N(L2) L1 DC- DC+, coding C: 000010	
8TB3202.222C-40	2-pin push-in terminal block, 2-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	

Table 47: 8EI2X2MWDS0.XXXX-1, 8EI4X5MWDS0.XXXX-1, 8EI8X8MWDS0.XXXX-1 - Order data

Order number	Short description	Figure
8TB3206.223C-40	6-pin push-in terminal block, 2-row, with locking mechanism, pitch: 7.62 mm, label 3: PE L3 N(L2) L1 DC- DC+, coding C: 000010	
8TB3308.222A-00	4+4-pin push-in terminal block 1-row / 2-row, pitch: 7.62 mm, label 2: T- B- T+ B+ PE W V U coding A: 0000	
	Terminal set	
8EZI8X8MTS.2201-0	Klemmensatz für ACOPOS P3 Module 8EI*X*M*DS0.****-1, 8EI*X*M*TS0.****-1: 1x 8TB2104.2210-00, 1x 8TB3102.222C-20, 3x 8TB3308.222A-00, 1x 8TB3106.223C-20, 1x 8TB3103.222A-20	
8EZI8X8MTS.2202-0	Klemmensatz für ACOPOS P3 Module 8EI1X6M*DS, 8EI2X2M*DS, 8EI4X5M*DS, 8EI8X8M*DS, 8EI1X6M*TS, 8EI2X2M*TS, 8EI4X5M*TS, 8EI8X8M*TS: 1x 8TB2104.2210-00, 1x 8TB3202.222C-40, 3x 8TB3308.222A-00, 1x 8TB3206.223C-40, 1x 8TB3103.222A-20	

Table 47: 8EI2X2MWDS0.XXXX-1, 8EI4X5MWDS0.XXXX-1, 8EI8X8MWDS0.XXXX-1 - Order data

Connection	1-row connector	2-row connector
X1	8TB3106.223C-20	8TB3206.223C-40
X2	8TB3102.222C-20	8TB3202.222C-40
X5x	8TB3308.222A-00	
X6	8TB3103.222A-20	
X7	8TB2104.2210-50	8TB2204.2210-50
X8	8TB2104.2210-00	

Table 48: Terminal blocks - Order numbers

Information:

Connector X7 does not exist on ACOPOS P3 SafeMOTION servo drives.

2.2.9.1.1.3 Technical data

Order number	8EI2X2MWDS0.XXXX-1	8EI4X5MWDS0.XXXX-1	8EI8X8MWDS0.XXXX-1
General information			
Support			
Dynamic node allocation (DNA)		Yes	
Slots for plug-in modules		1	
Certifications			
CE		Yes	
UKCA		Yes	
UL		cULus E225616 Power conversion equipment	
KC		Yes	
Mains connection			
Network configurations		TT, TN, TN-S, TN-C-S, IT [1]	
Mains input voltage		1x 110 VAC to 230 VAC ±10% 3x 200 VAC to 230 VAC ±10% 24 to 120 VDC [2]	
Frequency		50 / 60 Hz ±4%	
Installed load	Max. 2.5 kVA	Max. 5 kVA	
Inrush current		Max. 22 A	
Switch-on interval		Typ. 60 s	
Integrated line filter per EN 61800-3, category C3		No [3]	
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve		0.25 to 4 mm²	
Approbation data			
UL/C-UL-US		24 to 8 AWG	
CSA		24 to 8 AWG	
Power dissipation at device nominal power without braking resistor		[(35 + 10 * P_{AVG} [kW] + 5.8 * (I_{AX1} [A] + I_{AX2} [A]) + 0.25 * (I_{BR1}^2 [A] + I_{BR2}^2 [A]) + P_{VSLOT}) * 1.1] [W] [4]	
Max. line length		3 m [5]	
DC bus connection			
Continuous power [6]	1 kW [7]	2 kW [7]	
Reduction of continuous power depending on mains input voltage [8]			
Mains input voltage <230 VAC	1 kW * (Mains input voltage [V] / 230 V)	2 kW * (Mains input voltage [V] / 230 V)	
DC bus capacitance		1880 µF	

Table 49: 8EI2X2MWDS0.XXXX-1, 8EI4X5MWDS0.XXXX-1, 8EI8X8MWDS0.XXXX-1 - Technical data

Order number	8EI2X2MWDS0.XXXX-1	8EI4X5MWDS0.XXXX-1	8EI8X8MWDS0.XXXX-1
Terminal connection cross sections			
Flexible and fine-stranded wires			
With wire end sleeves	0.25 to 4 mm²		
Approbation data			
UL/C-UL-US	24 to 8 AWG		
CSA	24 to 8 AWG		
Max. line length	3 m [9]		
24 VDC power supply			
Input voltage	24 VDC ±25%		
Input capacitance	5500 µF		
Current consumption	1.2 A + Current for motor holding brake [10]		
Terminal connection cross sections			
Flexible and fine-stranded wires			
With wire end sleeves	0.25 to 4 mm²		
Approbation data			
UL/C-UL-US	24 to 8 AWG		
CSA	24 to 8 AWG		
Max. line length	30 m		
Motor connection			
Quantity	2		
Continuous power per motor connection [11]	0.5 / 0.5 kW [12]	1 / 1 kW [13]	2 / 2 kW [13]
Continuous current per motor connection [14]	2.2 / 2.2 A_{eff}	4.5 / 4.5 A_{eff}	8.8 / 8.8 A_{eff}
Accuracy of the safe current [15]			
Safety function SLT [16]			
SIL 2 / PL d / Cat. 3 [17]	Hardware upgrade 1.10.2.x: 1.545 A Hardware upgrade 1.10.3.0 or later: 1.244 A	Hardware upgrade 1.10.2.x: 1.714 A Hardware upgrade 1.10.3.0 or later: 1.421 A	Hardware upgrade 1.10.2.x: 2.035 A Hardware upgrade 1.10.3.0 or later: 1.754 A
SIL 2 / PL d / Cat. 2 [17]	0.555 A	0.688 A	0.936 A
Safety function SBT [16]			
SIL 2 / PL d / Cat. 3 [17]	Hardware upgrade 1.10.2.x: 1.441 A Hardware upgrade 1.10.3.0 or later: 1.136 A	Hardware upgrade 1.10.2.x: 1.501 A Hardware upgrade 1.10.3.0 or later: 1.199 A	Hardware upgrade 1.10.2.x: 1.613 A Hardware upgrade 1.10.3.0 or later: 1.317 A
SIL 2 / PL d / Cat. 2 [17]	0.519 A		0.592 A
Reduction of continuous current depending on switching frequency [18]			
Switching frequency 5 kHz	No reduction		
Switching frequency 10 kHz	No reduction		
Switching frequency 20 kHz	No reduction	0.144 A/K (starting at 53.6°C) [19]	0.144 A/K (starting at 23.7°C) [19]
Reduction of continuous current depending on installation elevation			
Starting at 500 m above sea level	0.22 A_{eff} per 1000 m	0.45 A_{eff} per 1000 m	0.88 A_{eff} per 1000 m
Peak current per motor connection	6 / 6 A_{eff}	12.25 / 12.25 A_{eff}	24 / 24 A_{eff}
Peak power output	1.25 kW	2.5 kW	5 kW [20]
Nominal switching frequency	5 kHz		
Possible switching frequencies [21]	2.5 / 5 / 10 / 20 kHz [22]		
Insulation stress of the connected motor per IEC TS 60034-25:2004	Limit value curve A [23]		
Protective measures			
Overload protection	Yes		
Short-circuit and ground fault protection	Yes		
Max. output frequency	598 Hz [24]		
Variant			
U, V, W, PE	Connector		
Shield connection	Yes Clamping range of the grounding clamp: 11 to 16 mm		
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve	1.5 to 6 mm²		
Approbation data			
UL/C-UL-US	24 to 8 AWG		
CSA	24 to 8 AWG		
Max. motor line length depending on switching frequency			
Switching frequency 5 kHz	75 m [25]		
Switching frequency 10 kHz	38 m [25]		
Switching frequency 20 kHz	19 m [25]		
Motor holding brake connection			
Quantity	2		
Output voltage [26]	Depends on the input voltage on connector X2		
Continuous current per connection	1.3 A		
Max. internal resistance	0.25 Ω		
Extinction potential	Approx. 30 V		

Table 49: 8EI2X2MWDS0.XXXX-1, 8EI4X5MWDS0.XXXX-1, 8EI8X8MWDS0.XXXX-1 - Technical data

Order number	8EI2X2MWDS0.XXXX-1	8EI4X5MWDS0.XXXX-1	8EI8X8MWDS0.XXXX-1
Max. extinction energy per switching operation	1.5 Ws		
Max. switching frequency	0.5 Hz		
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve	0.25 to 4 mm²		
Approbation data			
UL/C-UL-US	24 to 8 AWG		
CSA	24 to 8 AWG		
Protective measures			
Overload and short-circuit protection	Yes		
Open-circuit monitoring	Yes		
Undervoltage monitoring	Yes		
Response threshold for open-circuit monitoring	Approx. 30 mA		
Response threshold for undervoltage monitoring	Approx. 23 V		
Max. line length	75 m [27]		
Braking resistor [28]			
Peak power int./ext.	1.5 kW / 11 kW		
Continuous power int./ext.	150 W / 970 W		
Minimum braking resistance (ext.)	12 Ω		
Protective measures			
Overload protection	No		
Short-circuit and ground fault protection	Short-circuit protection: Yes Ground fault protection: No		
Max. line length	3 m		
Fieldbus			
Type	POWERLINK V2 controlled node (CN)		
Variant	2x RJ45, shielded, 2-port hub		
Line length	Max. 100 m between 2 stations (segment length)		
Transfer rate	100 Mbit/s		
Encoder interfaces			
Quantity	2		
Type	Digital multi-encoder interface, configurable [29]		
Connections	8-pin female Mini I/O connector		
Status indicators	None [30]		
Electrical isolation			
Encoder - ACOPOS P3	No		
Max. encoder cable length	75 m Depends on the cross section of the power supply wires in the encoder cable [31]		
Encoder power supply			
Output voltage	Configurable Typ. 11.45 V ±0.1 V / 5.2 V ±0.1 V [32][33]	Configurable Typ. 11.45 V ±0.1 V / 5.2 V ± 0.1 V [32][33]	Configurable Typ. 11.45 V ±0.1 V / 5.2 V ±0.1 V [32][33]
Load capacity	Max. 300 mA		
Sense lines	2, compensation of max. 2x 0.7 V		
Protective measures			
Short-circuit proof	Yes		
Overload-proof	Yes		
Synchronous serial interface			
Signal transmission	RS485 [34]		
Data transfer rate	Depends on the configured encoder type		
Differential voltage [35]			
Minimum	2.0 V		
Maximum	6.0 V		
Max. power consumption per encoder interface	$P_{ENCODER}$ [W] = U_{24V} [V] * ($I_{ENCODER}$ [A] * 0.7) + 0.5 W [36]		
Trigger inputs			
Quantity	2		
Circuit	Sink		
Electrical isolation			
Input - ACOPOS P3	Yes		
Input - Input	Yes		
Input voltage			
Nominal	24 VDC		
Maximum	30 VDC		
Switching threshold			
Low	<5 V		
High	>15 V		
Input current at nominal voltage	7 mA		
Switching delay			
Rising edge	<51 µs		
Falling edge	<52 µs		
Modulation compared to ground potential	Max. ±38 V		

Table 49: 8EI2X2MWDS0.XXXX-1, 8EI4X5MWDS0.XXXX-1, 8EI8X8MWDS0.XXXX-1 - Technical data

Order number	8EI2X2MWDS0.XXXX-1	8EI4X5MWDS0.XXXX-1	8EI8X8MWDS0.XXXX-1
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve		0.25 to 2.5 mm²	
Approbation data			
UL/C-UL-US		26 to 12 AWG	
CSA		26 to 12 AWG	
Max. line length		100 m	
Temperature sensor connection			
Quantity		2	
Resistance range		500 Ω to 5 kΩ	
Support			
Motion system			
mapp Motion		5.03.0 and higher	
ACP10/ARNC0		3.14.1 and higher	
Electrical properties			
Energy efficiency (IE classification) [37]			
Power dissipation relative to continuous apparent power [38]	IE2 (10,25) 5.2% IE2 (50,25) 5.3% IE2 (10,50) 5.2% IE2 (50,50) 5.3% IE2 (90,50) 5.4% IE2 (10,100) 5.6% IE2 (50,100) 5.7% IE2 (90,100) 5.9%	IE2 (10,25) 2.8% IE2 (50,25) 2.8% IE2 (10,50) 3% IE2 (50,50) 3.1% IE2 (90,50) 3.2% IE2 (10,100) 3.5% IE2 (50,100) 3.7% IE2 (90,100) 3.9%	IE2 (10,25) 2% IE2 (50,25) 2.1% IE2 (10,50) 2.3% IE2 (50,50) 2.4% IE2 (90,50) 2.5% IE2 (10,100) 2.8% IE2 (50,100) 3% IE2 (90,100) 3.4%
Nominal losses in standby mode		15.4 W	
Operating conditions			
Permissible mounting orientations			
Hanging vertically		Yes	
Standing horizontally		Yes	
Installation elevation above sea level			
Nominal		0 to 500 m	
Maximum		4000 m [39]	
Pollution degree per EN 61800-5-1		2 (non-conductive pollution)	
Overvoltage category per EN 61800-5-1		III	
Degree of protection per EN 60529		IP20 [40]	
Ambient conditions			
Temperature			
Operation			
Minimum		-25°C [41]	
Nominal		5 to 40°C	
Maximum		55°C	
Storage		-25 to 55°C	
Transport		-25 to 70°C	
Relative humidity			
Operation		5 to 85%, non-condensing	
Storage		5 to 95%	
Transport		95% at 40°C	
Mechanical properties			
Dimensions			
Width		66 mm	
Height		374 mm	
Depth			
Wall mounting		258.5 mm (with 8EXA front cover: 261 mm)	
Weight		4 kg	

Table 49: 8EI2X2MWDS0.XXXX-1, 8EI4X5MWDS0.XXXX-1, 8EI8X8MWDS0.XXXX-1 - Technical data

1) Operation on TT and IT power systems and on TN power systems that are not grounded to a star point is only permitted for 8EI servo drives with 8ZELxxxx Rev. E0 and higher. See the device information on the left side cover of the 8EI servo drive. Remove IT jumper X10 before operating in IT networks!
2) Operating the module at a mains input voltage of 24 to 120 VDC is only permitted if this mains input voltage is also specified in the device information on the left-hand side cover (Input: ... 24 - 120 VDC ...).
3) A line filter must be connected.
   CE compliance can only be ensured by connecting an upstream B&R line filter (8B0F...).
   In extreme cases, using line filters from 3rd-party manufacturers can result in irreparable damage to the ACOPOS P3 8EI servo drive.
4) P_{AVG} ... Average continuous power of the module
   I_{AX1}, I_{AX2} ... RMS value of the current on axis 1, axis 2
   I_{BR1}, I_{BR2} ... Nominal current of the motor holding brake on axis 1, axis 2
   P_{VSLOT} ... Power dissipation of the 8EAC plug-in module
5) Maximum cable length between line filter and mains connection on the module.
6) Valid for 230 VAC mains input voltage.
   The sum of the continuous power values on all motor connections and the power of the DC bus connector is not permitted to exceed this value.
7) The continuous power is reduced as a percentage of the continuous current if the continuous current is subject to derating.
8) Starting with mapp Motion V6.2.0, continuous total power monitoring (INVR_TPOW_CONT_LOAD) and peak total power monitoring (INVR_TPOW_PEAK_LOAD) are automatically disabled for a mains input voltage of 24 to 120 VDC.
9) This value applies to unshielded wiring inside a control cabinet.
   Maximum length of the DC bus wiring inside a control cabinet.

10) Current consumption depends on the respective configuration of the ACOPOS P3 8EI servo drive.
The inrush current of the 24 VDC power supply is not limited by the module.
11) Valid under the following conditions: 325 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
For DC bus voltages U_ZK < 325 VDC, maximum continuous power P_OUT is calculated as follows: P_OUT = Continuous power per motor connection * U_ZK / 325.
12) The total continuous power of all motor connections is not permitted to exceed 1 kW. The continuous power is reduced as a percentage of the continuous current if the continuous current is subject to derating.
13) The total continuous power of all motor connections is not permitted to exceed 2 kW. The continuous power is reduced as a percentage of the continuous current if the continuous current is subject to derating.
14) Valid under the following conditions: 325 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
15) The accuracy of the safe current is relevant for safety functions SLT and SBT, which are based on the safe current measurement. Safety functions SBT, SLT and SSO are available starting with hardware upgrade 1.10.2.0 and only for 8EI servo drives with 8ZELxxxx revision D0 or later. See the device information on the left side cover of the servo drive.
16) This safety function is certified for ACOPOS P3 per category 3 as well as category 2 of EN ISO 13849. Depending on the desired category, the corresponding accuracy of the safe current and corresponding safety characteristics must be used.
17) These values apply up to the continuous current specified in the technical data (taking into account the respective derating specifications).
18) The temperature specifications refer to the ambient temperature.
19) The module cannot supply the full continuous current at this switching frequency. This unusual value for the ambient temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
20) The total peak power of all motor connections is not permitted to exceed 5 kW.
21) B&R recommends operating the module at its nominal switching frequency. Operating the module at a higher switching frequency for application-specific reasons reduces the continuous current and increases CPU utilization.
22) A switching frequency of 20 kHz is not recommended when using safety functions SLT, SBT or SSO since availability problems may occur.
23) Only applies when using B&R motor cables and B&R motors.
24) The module's electrical output frequency (SCTRL_SPEED_ACT * MOTOR_POLEPAIRS) is monitored to protect against dual use in accordance with Council Regulation (EC) 428/2009 | 3A225. If the electrical output frequency of the module exceeds the limit value of 598 Hz uninterrupted for more than 0.5 s, then the current movement is aborted and error 6060 is output ("Power unit: Limit speed exceeded").
25) The sum of the cable lengths of all motor cables connected to this module is not permitted to exceed this value.
26) At values <22.9 V, under voltage monitoring is triggered and the servo drive signals error 6029 or 6055. In this case, the input voltage at connection X2 (24 VDC power supply) is too low and must be increased.
27) During configuration, it is necessary to check if the minimum voltage can be maintained on the holding brake with the intended cable length. For the permissible operating voltage range of the holding brake, see the user documentation for the motor being used.
28) There is a connection for external braking resistors. An internal braking resistor is available as an option.
29) The encoder type is not predefined from the factory. The encoder type necessary in each case must be configured in Automation Studio.
30) The direction of rotation of the encoder can be displayed on the 8EAD0000.000-1 display module.
31) Maximum encoder cable length l_{max} can be calculated as follows (the maximum permissible encoder cable length of 75 m is not permitted to exceeded):

$l_{max} = f / I_G * A * 1/(2*\rho)$

f ... (Output voltage of encoder interface [V] - Min. permissible supply voltage of connected encoder [V]) * 1.1
I_G ... Max. current consumption of the connected encoder [A].
A ... Cross section of the power supply wires [mm²]
ρ ... Specific resistance [Ω mm²/m] (e.g. for copper: ρ = 0.0178)
32) The output voltage is not predefined from the factory (with the exception of encoder types EnDat 2.2, EnDat 3.0 and HIPERFACE DSL). It must be configured in Automation Studio based on the encoder type. If no output voltage is configured, then the encoder will not be supplied by digital multi-encoder interface X4x. Power to the encoder can then be supplied externally.
33) Output voltage 5.2 V is only available under the following conditions:
- 8EI servo drive with 8ZECxxx revision D0 and higher - see the device information on the left side cover of the 8EI servo drive
- ACOPOS operating system 3.15.0 and higher (for 8EIxxxxxD... 2-axis modules and 8EIxxxxxT... 3-axis modules)
- ACOPOS operating system 3.17.0 and higher (for 8EIxxxxxS... 1-axis modules)
34) Except encoder type HIPERFACE DSL.
35) Values valid for clock output and data input. Except encoder type HIPERFACE DSL.
36) $I_{ENCODER}$ ... Current consumption of the encoder
U_{24V} ... Input voltage on the +24 VDC input of the module
37) The IE classification of the module is based on drive losses. This includes components such as EMC filters, etc. The power dissipation was determined at a switching frequency of 5 kHz (factory setting). Classification is performed at 90% of the frequency and at 100% of the continuous current. When operating the module in connection with an induction motor, the module is only permitted to be operated with a switching frequency of 5 kHz.
38) Continuous apparent power S[VA] = √3 * UMains[Vrms] * IMains[Arms]. IE2 notation (a,b) stands respectively for a load point with frequency a (as a percentage of the nominal frequency of the motor) and current b (as a percentage of the continuous current).
39) For operation on phase-grounded/center-grounded delta networks (TT and TN) and IT networks, the value is reduced to 2000 m.
40) The specified degree of protection is only met if either the slot cover is installed on the module or an 8EAC plug-in module is installed and suitable terminals are connected to all connectors and all fans are installed.
41) Only permitted for modules with 8ZEL... Revision E0 and higher. See the device information on the left side cover of the module. During storage or transport, sudden temperature changes may cause condensation or icing in the module. The module is only permitted to be commissioned if it is free of condensation or icing at the time of commissioning.

2.2.9.2 Mains input voltage - 3x 200 to 480 VAC

2.2.9.2.1 Continuous power up to 4 kW (motor connection)

2.2.9.2.1.1 Order data

Order number	Short description	Figure
	Wall mounting	
8EI2X2HWDS0.XXXX-1	ACOPOS P3 servo drive, 3x 200-480 VAC, 2x 2.2 A, SafeMOTION, 2 axes, wall mounting	
8EI4X5HWDS0.XXXX-1	ACOPOS P3 servo drive, 3x 200-480 VAC, 2x 4.5 A, SafeMOTION, 2 axes, wall mounting	
8EI8X8HWDS0.XXXX-1	ACOPOS P3 servo drive, 3x 200-480 VAC, 2x 8.8 A, SafeMOTION, 2 axes, wall mounting	
	Optional accessories	
	Display modules	
8EAD0000.000-1	Display module, LCD, 128 x 64, black/white, 1x USB 3.0	
	Fan modules	
8EXF100.0000-00	ACOPOS P3 fan module, replacement fan for ACOPOS P3 servo drive single-width (8EI1X6/8EI2X2/8EI4X5/8EI8X8/8EI013/8EI017xxS)	
	Front covers	
8EXA200.0010-00	ACOPOS P3 dover, B&R orange, single-width, suitable for servo drives 8EI2X2xxDxx.xxxx-x / 8EI2X2xxTxx.xxxx-x / 8EI4X5xxDxx.xxxx-x / 8EI4X5xxTxx.xxxx-x /8EI8X8xxDxx.xxxx-x / 8EI8X8xxTxx.xxxx-x / 8EI013xxSxx.xxxx-x / 8EI017xxSxx.xxxx-x	
8EXA200.0020-00	ACOPOS P3 cover, B&R dark gray, single-width, suitable for servo drives 8EI2X2xxDxx.xxxx-x / 8EI2X2xxTxx.xxxx-x / 8EI4X5xxDxx.xxxx-x / 8EI4X5xxTxx.xxxx-x / 8EI8X8xxDxx.xxxx-x / 8EI8X8xxTxx.xxxx-x / 8EI013xxSxx.xxxx-x / 8EI017xxSxx.xxxx-x	
	Line filters passive	
8B0F0160H000.000-1	Line filter, passive, 16 A, 3x 528 VAC, 50/60 Hz, IP20	
8B0F0160H000.100-1	Passive line filter, 16 A, 3x 528 VAC, 50/60 Hz, IP20, specially designed also for operation at 2.5 kHz	
8B0F0300H000.000-1	Line filter, passive, 30 A, 3x 520 VAC, 50/60 Hz, IP20	
8B0F0550H000.000-1	Line filter, passive, 55 A, 3x 520 VAC, 50/60 Hz, IP20	
	Plug-in modules	
8EAC0122.001-1	ACOPOS P3 plug-in module, resolver interface 10 kHz	
8EAC0122.003-1	ACOPOS P3 plug-in module, 3 resolver interfaces 10 kHz	
8EAC0130.000-1	ACOPOS P3 plug-in module, 8 digital I/O 24 V (4x 400 mA, 4x 100 mA) individually configurable as inputs or outputs, 2 digital I/O 24 V 2 A configurable in pairs as inputs or outputs, order terminal block 8TB0230.221A-00 separately!	
8EAC0150.001-1	ACOPOS P3 plug-in module, digital multi-encoder interface	
8EAC0150.003-1	ACOPOS P3 plug-in module, 3 digital multi-encoder interfaces	
8EAC0151.001-1	ACOPOS P3 plug-in module, incremental encoder interface	
8EAC0151.003-1	ACOPOS P3 plug-in module, 3 incremental encoder interfaces	
8EAC0152.001-1	ACOPOS P3 plug-in module, analog multi-encoder interface	
8EAC0152.003-1	ACOPOS P3 plug-in module, 3 analog multi-encoder interfaces	
	Shield component sets	
8SCSE01.0100-00	ACOPOS P3 shield component set: 1x ACOPOS P3 shield mounting plate, 1x 2x M3x6 screws	
8SCSE02.0100-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK14	
8SCSE02.0200-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK20	
	Terminal blocks	
8TB2104.2210-00	4-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively	
8TB3102.222C-20	2-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	
8TB3103.222A-20	3-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: PE RB- RB+, coding A: 000	
8TB3106.222B-20	6-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: PE L3 L2 L1 DC- DC+, coding B: 000001	
8TB3202.222C-40	2-pin push-in terminal block, 2-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	
8TB3206.222B-40	6-pin push-in terminal block, 2-row, with locking mechanism, pitch: 7.62 mm, label 2: PE L3 L2 L1 DC- DC+, coding B: 000001	

Table 50: 8EI2X2HWDS0.XXXX-1, 8EI4X5HWDS0.XXXX-1, 8EI8X8HWDS0.XXXX-1 - Order data

Order number	Short description	Figure
8TB3308.222A-00	4+4-pin push-in terminal block 1-row / 2-row, pitch: 7.62 mm, label 2: T- B- T+ B+ PE W V U coding A: 0000	
	Terminal set	
8EZI8X8HTS.2201-0	Klemmensatz für ACOPOS P3 Module 8EI1X6H*DS, 8EI2X2H*DS, 8EI4X5H*DS, 8EI8X8H*DS, 8EI1X6H*TS, 8EI2X2H*TS, 8EI4X5H*TS, 8EI8X8H*TS: 1x 8TB2104.2210-00, 1x 8TB3102.222C-20, 3x 8TB3308.222A-00, 1x 8TB3106.222B-20, 1x 8TB3103.222A-20	
8EZI8X8HTS.2202-0	Klemmensatz für ACOPOS P3 Module 8EI*X*H*DS0.****-1, 8EI*X*H*TS0.****-1: 1x 8TB2104.2210-00, 1x 8TB3202.222C-40, 3x 8TB3308.222A-00, 1x 8TB3206.222B-40, 1x 8TB3103.222A-20	

Table 50: 8EI2X2HWDS0.XXXX-1, 8EI4X5HWDS0.XXXX-1, 8EI8X8HWDS0.XXXX-1 - Order data

Connection	1-row connector	2-row connector
X1	8TB3106.222B-20	8TB3206.222B-40
X2	8TB3102.222C-20	8TB3202.222C-40
X5x	8TB3308.222A-00	
X6	8TB3103.222A-20	
X7	8TB2104.2210-50	8TB2204.2210-50
X8	8TB2104.2210-00	

Table 51: Terminal blocks - Order numbers

Information:

Connector X7 does not exist on ACOPOS P3 SafeMOTION servo drives.

2.2.9.2.1.3 Technical data

Order number	8EI2X2HWDS0.XXXX-1	8EI4X5HWDS0.XXXX-1	8EI8X8HWDS0.XXXX-1
General information			
Support			
Dynamic node allocation (DNA)		Yes	
Slots for plug-in modules		1	
Certifications			
CE		Yes	
UKCA		Yes	
UL		cULus E225616 Power conversion equipment	
KC		Yes	
Mains connection			
Network configurations		TT, TN, TN-S, TN-C-S, IT [1]	
Mains input voltage		3x 200 VAC to 480 VAC ±10% 24 to 120 VDC [2]	
Frequency		50 / 60 Hz ±4%	
Installed load	Max. 5 kVA	Max. 10 kVA	
Inrush current		Max. 45 A	
Switch-on interval		Typ. 60 s	
Integrated line filter per EN 61800-3, category C3		No [3]	
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve		0.25 to 4 mm²	
Approbation data			
UL/C-UL-US		24 to 8 AWG	
CSA		24 to 8 AWG	
Power dissipation at device nominal power without braking resistor		[(50 + 6.9 * P_{AVG} [kW] + 7.5 * (I_{AX1} [A] + I_{AX2} [A]) + 0.25 * (I_{BR1}^2 [A] + I_{BR2}^2 [A]) + P_{VSLOT}) * 1.1] [W] [4]	
Max. line length		3 m [5]	
DC bus connection			
Continuous power [6]	2 kW [7]	4 kW [7]	
Reduction of continuous power depending on mains input voltage [8]			
Mains input voltage <3x 400 VAC	2 kW * (Mains input voltage [V] / 400 V)	4 kW * (Mains input voltage [V] / 400 V)	
DC bus capacitance		470 µF	

Table 52: 8EI2X2HWDS0.XXXX-1, 8EI4X5HWDS0.XXXX-1, 8EI8X8HWDS0.XXXX-1 - Technical data

Order number	8EI2X2HWDS0.XXXX-1	8EI4X5HWDS0.XXXX-1	8EI8X8HWDS0.XXXX-1
Terminal connection cross sections			
Flexible and fine-stranded wires			
With wire end sleeves	0.25 to 4 mm²		
Approbation data			
UL/C-UL-US	24 to 8 AWG		
CSA	24 to 8 AWG		
Max. line length	3 m [9]		
24 VDC power supply			
Input voltage	24 VDC ±25%		
Input capacitance	5500 µF		
Current consumption	1.2 A + Current for motor holding brake [10]		
Terminal connection cross sections			
Flexible and fine-stranded wires			
With wire end sleeves	0.25 to 4 mm²		
Approbation data			
UL/C-UL-US	24 to 8 AWG		
CSA	24 to 8 AWG		
Max. line length	30 m		
Motor connection			
Quantity	2		
Continuous power per motor connection [11]	1 / 1 kW [12]	2 / 2 kW [13]	4 / 4 kW [13]
Continuous current per motor connection [14]	2.2 / 2.2 A_{eff}	4.5 / 4.5 A_{eff}	8.8 / 8.8 A_{eff}
Accuracy of the safe current [15]			
Safety function SLT [16]			
SIL 2 / PL d / Cat. 3 [17]	Hardware upgrade 1.10.2.x: 1.545 A Hardware upgrade 1.10.3.0 or later: 1.244 A	Hardware upgrade 1.10.2.x: 1.714 A Hardware upgrade 1.10.3.0 or later: 1.421 A	Hardware upgrade 1.10.2.x: 2.035 A Hardware upgrade 1.10.3.0 or later: 1.754 A
SIL 2 / PL d / Cat. 2 [17]	0.555 A	0.688 A	0.936 A
Safety function SBT [16]			
SIL 2 / PL d / Cat. 3 [17]	Hardware upgrade 1.10.2.x: 1.441 A Hardware upgrade 1.10.3.0 or later: 1.136 A	Hardware upgrade 1.10.2.x: 1.501 A Hardware upgrade 1.10.3.0 or later: 1.199 A	Hardware upgrade 1.10.2.x: 1.613 A Hardware upgrade 1.10.3.0 or later: 1.317 A
SIL 2 / PL d / Cat. 2 [17]	0.519 A		0.592 A
Reduction of continuous current depending on switching frequency [18]			
Switching frequency 5 kHz	No reduction		1.571 A/K (starting at 53.1°C) [19]
Switching frequency 10 kHz	No reduction		0.108 A/K (starting at 29.5°C)
Switching frequency 20 kHz	No reduction	0.091 A/K (starting at 29.4°C) [20]	0.091 A/K (starting at -17.9°C) [20]
Reduction of continuous current depending on installation elevation			
Starting at 500 m above sea level	0.22 A_{eff} per 1000 m	0.45 A_{eff} per 1000 m	0.88 A_{eff} per 1000 m
Peak current per motor connection	6 / 6 A_{eff}	12.25 / 12.25 A_{eff}	24 / 24 A_{eff}
Peak power output	2.5 kW	5 kW	10 kW [21]
Nominal switching frequency	5 kHz		
Possible switching frequencies [22]	2.5 / 5 / 10 / 20 kHz [23]		
Insulation stress of the connected motor per IEC TS 60034-25:2004	Limit value curve A [24]		
Protective measures			
Overload protection	Yes		
Short-circuit and ground fault protection	Yes		
Max. output frequency	598 Hz [25]		
Variant			
U, V, W, PE	Connector		
Shield connection	Yes Clamping range of the grounding clamp: 11 to 16 mm		
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve	1.5 to 6 mm²		
Approbation data			
UL/C-UL-US	24 to 8 AWG		
CSA	24 to 8 AWG		
Max. motor line length depending on switching frequency			
Switching frequency 5 kHz	75 m [26]		
Switching frequency 10 kHz	38 m [26]		
Switching frequency 20 kHz	19 m [26]		
Motor holding brake connection			
Quantity	2		
Output voltage [27]	Depends on the input voltage on connector X2		
Continuous current per connection	1.3 A		
Max. internal resistance	0.25 Ω		
Extinction potential	Approx. 30 V		

Table 52: 8EI2X2HWDS0.XXXX-1, 8EI4X5HWDS0.XXXX-1, 8EI8X8HWDS0.XXXX-1 - Technical data

Order number	8EI2X2HWDS0.XXXX-1	8EI4X5HWDS0.XXXX-1	8EI8X8HWDS0.XXXX-1
Max. extinction energy per switching operation	1.5 Ws		
Max. switching frequency	0.5 Hz		
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve	0.25 to 4 mm²		
Approbation data			
UL/C-UL-US	24 to 8 AWG		
CSA	24 to 8 AWG		
Protective measures			
Overload and short-circuit protection	Yes		
Open-circuit monitoring	Yes		
Undervoltage monitoring	Yes		
Response threshold for open-circuit monitoring	Approx. 30 mA		
Response threshold for undervoltage monitoring	Approx. 23 V		
Max. line length	75 m [28]		
Braking resistor [29]			
Peak power int./ext.	7 kW / 25 kW		
Continuous power int./ext.	150 W / 2 kW		
Minimum braking resistance (ext.)	25 Ω		
Protective measures			
Overload protection	No		
Short-circuit and ground fault protection	Short-circuit protection: Yes Ground fault protection: No		
Max. line length	3 m		
Fieldbus			
Type	POWERLINK V2 controlled node (CN)		
Variant	2x RJ45, shielded, 2-port hub		
Line length	Max. 100 m between 2 stations (segment length)		
Transfer rate	100 Mbit/s		
Encoder interfaces			
Quantity	2		
Type	Digital multi-encoder interface, configurable [30]		
Connections	8-pin female Mini I/O connector		
Status indicators	None [31]		
Electrical isolation			
Encoder - ACOPOS P3	No		
Max. encoder cable length	75 m Depends on the cross section of the power supply wires in the encoder cable [32]		
Encoder power supply			
Output voltage	Configurable Typ. 11.45 V ±0.1 V / 5.2 V ±0.1 V [33][34]	Configurable Typ. 11.45 V ±0.1 V / 5.2 V ± 0.1 V [33][34]	Configurable Typ. 11.45 V ±0.1 V / 5.2 V ±0.1 V [33][34]
Load capacity	Max. 300 mA		
Sense lines	2, compensation of max. 2x 0.7 V		
Protective measures			
Short-circuit proof	Yes		
Overload-proof	Yes		
Synchronous serial interface			
Signal transmission	RS485 [35]		
Data transfer rate	Depends on the configured encoder type		
Differential voltage [36]			
Minimum	2.0 V		
Maximum	6.0 V		
Max. power consumption per encoder interface	$P_{ENCODER}$ [W] = U_{24V} [V] * ($I_{ENCODER}$ [A] * 0.7) + 0.5 W [37]		
Trigger inputs			
Quantity	2		
Circuit	Sink		
Electrical isolation			
Input - ACOPOS P3	Yes		
Input - Input	Yes		
Input voltage			
Nominal	24 VDC		
Maximum	30 VDC		
Switching threshold			
Low	<5 V		
High	>15 V		
Input current at nominal voltage	7 mA		
Switching delay			
Rising edge	<51 µs		
Falling edge	<52 µs		
Modulation compared to ground potential	Max. ±38 V		

Table 52: 8EI2X2HWDS0.XXXX-1, 8EI4X5HWDS0.XXXX-1, 8EI8X8HWDS0.XXXX-1 - Technical data

Order number	8EI2X2HWDS0.XXXX-1	8EI4X5HWDS0.XXXX-1	8EI8X8HWDS0.XXXX-1
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve		0.25 to 2.5 mm²	
Approbation data			
UL/C-UL-US		26 to 12 AWG	
CSA		26 to 12 AWG	
Max. line length		100 m	
Temperature sensor connection			
Quantity		2	
Resistance range		500 Ω to 5 kΩ	
Support			
Motion system			
mapp Motion		5.03.0 and higher	
ACP10/ARNC0		3.14.1 and higher	
Electrical properties			
Energy efficiency (IE classification) [38]			
Power dissipation relative to continuous apparent power [39]	IE2 (10,25) 3.6% IE2 (50,25) 3.6% IE2 (10,50) 3.8% IE2 (50,50) 3.8% IE2 (90,50) 3.9% IE2 (10,100) 4.1% IE2 (50,100) 4.2% IE2 (90,100) 4.4%	IE2 (10,25) 2.1% IE2 (50,25) 2.1% IE2 (10,50) 2.2% IE2 (50,50) 2.3% IE2 (90,50) 2.4% IE2 (10,100) 2.6% IE2 (50,100) 2.7% IE2 (90,100) 2.9%	IE2 (10,25) 1.6% IE2 (50,25) 1.6% IE2 (10,50) 1.7% IE2 (50,50) 1.8% IE2 (90,50) 1.9% IE2 (10,100) 2.1% IE2 (50,100) 2.3% IE2 (90,100) 2.6%
Nominal losses in standby mode		15.4 W	
Operating conditions			
Permissible mounting orientations			
Hanging vertically		Yes	
Standing horizontally		Yes	
Installation elevation above sea level			
Nominal		0 to 500 m	
Maximum		4000 m [40]	
Pollution degree per EN 61800-5-1		2 (non-conductive pollution)	
Overvoltage category per EN 61800-5-1		III	
Degree of protection per EN 60529		IP20 [41]	
Ambient conditions			
Temperature			
Operation			
Minimum		-25°C [42]	
Nominal		5 to 40°C	
Maximum		55°C	
Storage		-25 to 55°C	
Transport		-25 to 70°C	
Relative humidity			
Operation		5 to 85%, non-condensing	
Storage		5 to 95%	
Transport		95% at 40°C	
Mechanical properties			
Dimensions			
Width		66 mm	
Height		374 mm	
Depth			
Wall mounting		258.5 mm (with 8EXA front cover: 261 mm)	
Weight		4 kg	

Table 52: 8EI2X2HWDS0.XXXX-1, 8EI4X5HWDS0.XXXX-1, 8EI8X8HWDS0.XXXX-1 - Technical data

1) Operation on TT and IT power systems and on TN power systems that are not grounded to a star point is only permitted for 8EI servo drives with 8ZELxxxx Rev. E0 and higher. See the device information on the left side cover of the 8EI servo drive. Remove IT jumper X10 before operating in IT networks!
2) Operating the module at a mains input voltage of 24 to 120 VDC is only permitted if this mains input voltage is also specified in the device information on the left-hand side cover (Input: ... 24 - 120 VDC ...).
3) A line filter must be connected.
   CE compliance can only be ensured by connecting an upstream B&R line filter (8B0F...).
   In extreme cases, using line filters from 3rd-party manufacturers can result in irreparable damage to the ACOPOS P3 8EI servo drive.
4) P_{AVG} ... Average continuous power of the module
   I_{AX1}, I_{AX2} ... RMS value of the current on axis 1, axis 2
   I_{BR1}, I_{BR2} ... Nominal current of the motor holding brake on axis 1, axis 2
   P_{VSLOT} ... Power dissipation of the 8EAC plug-in module
5) Maximum cable length between line filter and mains connection on the module.
6) Valid for mains input voltage ≥3x 400 VAC.
   The sum of the continuous power values on all motor connections and the power of the DC bus connector is not permitted to exceed this value.
7) The continuous power is reduced as a percentage of the continuous current if the continuous current is subject to derating.
8) Starting with mapp Motion V6.2.0, continuous total power monitoring (INVR_TPOW_CONT_LOAD) and peak total power monitoring (INVR_TPOW_PEAK_LOAD) are automatically disabled for a mains input voltage of 24 to 120 VDC.
9) This value applies to unshielded wiring inside a control cabinet.
   Maximum length of the DC bus wiring inside a control cabinet.

10) Current consumption depends on the respective configuration of the ACOPOS P3 8EI servo drive.
The inrush current of the 24 VDC power supply is not limited by the module.
11) Valid under the following conditions: 560 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
For DC bus voltages U_ZK < 560 VDC, maximum continuous power P_OUT is calculated as follows: P_OUT = Continuous power per motor connection * U_ZK / 560.
12) The total continuous power of all motor connections is not permitted to exceed 2 kW. The continuous power is reduced as a percentage of the continuous current if the continuous current is subject to derating.
13) The total continuous power of all motor connections is not permitted to exceed 4 kW. The continuous power is reduced as a percentage of the continuous current if the continuous current is subject to derating.
14) Valid under the following conditions: 560 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
15) The accuracy of the safe current is relevant for safety functions SLT and SBT, which are based on the safe current measurement. Safety functions SBT, SLT and SSO are available starting with hardware upgrade 1.10.2.0 and only for 8EI servo drives with 8ZELxxxx revision D0 or later. See the device information on the left side cover of the servo drive.
16) This safety function is certified for ACOPOS P3 per category 3 as well as category 2 of EN ISO 13849. Depending on the desired category, the corresponding accuracy of the safe current and corresponding safety characteristics must be used.
17) These values apply up to the continuous current specified in the technical data (taking into account the respective derating specifications).
18) The temperature specifications refer to the ambient temperature.
19) Value for the nominal switching frequency.
20) The module cannot supply the full continuous current at this switching frequency. This unusual value for the ambient temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
21) The total peak power of all motor connections is not permitted to exceed 10 kW.
22) B&R recommends operating the module at its nominal switching frequency. Operating the module at a higher switching frequency for application-specific reasons reduces the continuous current and increases CPU utilization.
23) A switching frequency of 20 kHz is not recommended when using safety functions SLT, SBT or SSO since availability problems may occur.
24) Only applies when using B&R motor cables and B&R motors.
25) The module's electrical output frequency (SCTRL_SPEED_ACT * MOTOR_POLEPAIRS) is monitored to protect against dual use in accordance with Council Regulation (EC) 428/2009 | 3A225. If the electrical output frequency of the module exceeds the limit value of 598 Hz uninterrupted for more than 0.5 s, then the current movement is aborted and error 6060 is output ("Power unit: Limit speed exceeded").
26) The sum of the cable lengths of all motor cables connected to this module is not permitted to exceed this value.
27) At values <22.9 V, under voltage monitoring is triggered and the servo drive signals error 6029 or 6055. In this case, the input voltage at connection X2 (24 VDC power supply) is too low and must be increased.
28) During configuration, it is necessary to check if the minimum voltage can be maintained on the holding brake with the intended cable length. For the permissible operating voltage range of the holding brake, see the user documentation for the motor being used.
29) There is a connection for external braking resistors. An internal braking resistor is available as an option.
30) The encoder type is not predefined from the factory. The encoder type necessary in each case must be configured in Automation Studio.
31) The direction of rotation of the encoder can be displayed on the 8EAD0000.000-1 display module.
32) Maximum encoder cable length l_{max} can be calculated as follows (the maximum permissible encoder cable length of 75 m is not permitted to exceeded):

$l_{max} = f / I_G * A * 1/(2*\rho)$

f ... (Output voltage of encoder interface [V] - Min. permissible supply voltage of connected encoder [V]) * 1.1
I_G ... Max. current consumption of the connected encoder [A].
A ... Cross section of the power supply wires [mm²]
ρ ... Specific resistance [Ω mm²/m] (e.g. for copper: ρ = 0.0178)
33) The output voltage is not predefined from the factory (with the exception of encoder types EnDat 2.2, EnDat 3.0 and HIPERFACE DSL). It must be configured in Automation Studio based on the encoder type. If no output voltage is configured, then the encoder will not be supplied by digital multi-encoder interface X4x. Power to the encoder can then be supplied externally.
34) Output voltage 5.2 V is only available under the following conditions:
- 8EI servo drive with 8ZECxxx revision D0 and higher - see the device information on the left side cover of the 8EI servo drive
- ACOPOS operating system 3.15.0 and higher (for 8EIxxxxxD... 2-axis modules and 8EIxxxxxT... 3-axis modules)
- ACOPOS operating system 3.17.0 and higher (for 8EIxxxxxS... 1-axis modules)
35) Except encoder type HIPERFACE DSL.
36) Values valid for clock output and data input. Except encoder type HIPERFACE DSL.
37) $I_{ENCODER}$ ... Current consumption of the encoder
U_{24V} ... Input voltage on the +24 VDC input of the module
38) The IE classification of the module is based on drive losses. This includes components such as EMC filters, etc. The power dissipation was determined at a switching frequency of 5 kHz (factory setting). Classification is performed at 90% of the frequency and at 100% of the continuous current. When operating the module in connection with an induction motor, the module is only permitted to be operated with a switching frequency of 5 kHz.
39) Continuous apparent power S[VA] = √3 * UMains[Vrms] * IMains[Arms]. IE2 notation (a,b) stands respectively for a load point with frequency a (as a percentage of the nominal frequency of the motor) and current b (as a percentage of the continuous current).
40) For operation on phase-grounded/center-grounded delta networks (TT and TN) and IT networks, the value is reduced to 2000 m.
41) The specified degree of protection is only met if either the slot cover is installed on the module or an 8EAC plug-in module is installed and suitable terminals are connected to all connectors and all fans are installed.
42) Only permitted for modules with 8ZEL... Revision E0 and higher. See the device information on the left side cover of the module. During storage or transport, sudden temperature changes may cause condensation or icing in the module. The module is only permitted to be commissioned if it is free of condensation or icing at the time of commissioning.

2.2.9.2.2 Continuous power 2 x 7 kW to 2 x 9 kW (motor connection)

2.2.9.2.2.1 Order data

Order number	Short description	Figure
	Wall mounting	
8EI017HWDS0.XXXX-1	ACOPOS P3 servo drive, 3x200-480 VAC, 2x 17 A, SafeMOTION, 2 axes, wall mounting	
8EI022HWDS0.XXXX-1	ACOPOS P3 servo drive, 3x 200-480 VAC, 2x 22 A, SafeMOTION, 2 axes, wall mounting	
	Optional accessories	
	Display modules	
8EAD0000.000-1	Display module, LCD, 128 x 64, black/white, 1x USB 3.0	
	Fan modules	
8EXF200.0000-00	ACOPOS P3 fan module, replacement fan for ACOPOS P3 servo drive double-width (8EI017xxD/8EI022xxD/ 8EI024/8EI034/8EI044)	
8EXF300.0000-00	ACOPOS P3 ELKO fan module, replacement fan for ACOPOS P3 servo drive double-width (8EI017xxD/8EI022xxD/ 8EI024/8EI034/8EI044)	
	Front covers	
8EXA300.0010-00	ACOPOS P3 cover, B&R orange, double-width, suitable for servo drives 8EI017xxDxx.xxxx-x / 8EI022xxDxx.xxxx-x / 8EI024xxSxx.xxxx-x / 8EI034xxSxx.xxxx-x / 8EI044xxSxx.xxxx-x	
8EXA300.0020-00	ACOPOS P3 cover, B&R dark gray, double-width, suitable for servo drives 8EI017xxDxx.xxxx-x / 8EI022xxDxx.xxxx-x / 8EI024xxSxx.xxxx-x / 8EI034xxSxx.xxxx-x / 8EI044xxSxx.xxxx-x	
	Line filters passive	
8B0F0160H000.000-1	Line filter, passive, 16 A, 3x 528 VAC, 50/60 Hz, IP20	
8B0F0300H000.000-1	Line filter, passive, 30 A, 3x 520 VAC, 50/60 Hz, IP20	
8B0F0550H000.000-1	Line filter, passive, 55 A, 3x 520 VAC, 50/60 Hz, IP20	
	Plug-in modules	
8EAC0122.001-1	ACOPOS P3 plug-in module, resolver interface 10 kHz	
8EAC0122.003-1	ACOPOS P3 plug-in module, 3 resolver interfaces 10 kHz	
8EAC0130.000-1	ACOPOS P3 plug-in module, 8 digital I/O 24 V (4x 400 mA, 4x 100 mA) individually configurable as inputs or outputs, 2 digital I/O 24 V 2 A configurable in pairs as inputs or outputs, order terminal block 8TB0230.221A-00 separately!	
8EAC0150.001-1	ACOPOS P3 plug-in module, digital multi-encoder interface	
8EAC0150.003-1	ACOPOS P3 plug-in module, 3 digital multi-encoder interfaces	
8EAC0151.001-1	ACOPOS P3 plug-in module, incremental encoder interface	
8EAC0151.003-1	ACOPOS P3 plug-in module, 3 incremental encoder interfaces	
8EAC0152.001-1	ACOPOS P3 plug-in module, analog multi-encoder interface	
8EAC0152.003-1	ACOPOS P3 plug-in module, 3 analog multi-encoder interfaces	
	Shield component sets	
8SCSE01.0200-00	ACOPOS P3 shield component set: 1x ACOPOS P3 shield mounting plate, 2x 2x M3x6 screws	
8SCSE02.0100-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK14	
8SCSE02.0200-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK20	
	Terminal blocks	
8TB2104.2210-00	4-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively	
8TB3102.222C-20	2-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	
8TB3202.222C-40	2-pin push-in terminal block, 2-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	
8TB3308.222A-00	4+4-pin push-in terminal block 1-row / 2-row, pitch: 7.62 mm, label 2: T- B- T+ B+ PE W V U coding A: 0000	
8TB4103.222A-10	3-pin push-in terminal block, one-row, pitch: 10.16 mm, label 2: PE RB- RB+, coding A: 000	
8TB4104.222L-10	4-pin push-in terminal block, 1-row, pitch: 10.16 mm, label 2: PE L3 L2 L1, coding L: 1010	
8TB4104.227F-10	4-pin push-in terminal block, 1-row, pitch: 10.16 mm, label 4: DC-, DC-, DC+, DC+ coding F: 0101	
8TB4204.202L-10	4-pin push-in screw terminal block, two-row, pitch: 10.16 mm, label 2: PE L3 L2 L1, coding L: 1010	
	Terminal set	
8EZI022HDS.2201-0	Klemmensatz für ACOPOS P3 Module 8EI022H*DS, 8EI017H*DS: 1x 8TB2104.2210-00, 1x 8TB3102.222C-20, 2x	

Table 53: 8EI017HWDS0.XXXX-1, 8EI022HWDS0.XXXX-1 - Order data

Order number	Short description	Figure
	8TB3308.222A-00, 1x 8TB4104.222L-10, 1x 8TB4104.227F-10, 1x 8TB4103.222A-10	
8EZI022HDS.2302-0	Klemmensatz für ACOPOS P3 Module 8EI022H*DS, 8EI017H*DS: 1x 8TB2104.2210-00, 1x 8TB3202.222C-40, 2x 8TB3308.222A-00, 1x 8TB4103.222A-10, 1x 8TB4104.227F-10, 1x 8TB4204.202L-10	

Table 53: 8EI017HWDS0.XXXX-1, 8EI022HWDS0.XXXX-1 - Order data

Connection	1-row connector	2-row connector
X1	8TB4104.222L-10	8TB4204.202L-10
X2	8TB3102.222C-20	8TB3202.222C-40
X5x	8TB3308.222A-00	
X6	8TB4103.222A-10	
X7	8TB2104.2210-50	8TB2204.2210-50
X8	8TB2104.2210-00	
X11	8TB4104.227F-10	

Table 54: Terminal blocks - Order numbers

Information:

Connector X7 does not exist on ACOPOS P3 SafeMOTION servo drives.

2.2.9.2.2.3 Technical data

Order number	8EI017HWDS0.XXXX-1	8EI022HWDS0.XXXX-1
General information		
Support		
Dynamic node allocation (DNA)	Yes	
Slots for plug-in modules	1	
Certifications		
CE	Yes	
UKCA	Yes	
UL	cULus E225616 Power conversion equipment	
Mains connection		
Network configurations	TT, TN, TN-S, TN-C-S, IT [1]	
Mains input voltage	3x 200 VAC to 480 VAC ±10%	
Frequency	50 / 60 Hz ±4%	
Installed load	Max. 26.4 kVA	Max. 30.5 kVA
Inrush current	100 A	
Switch-on interval	120 s	
Integrated line filter per EN 61800-3, category C3	No [2]	
Terminal connection cross section		
Flexible and fine-stranded wires		
With wire end sleeve	0.75 to 16 mm²	
Approbation data		
UL/C-UL-US	20 to 4 AWG	
CSA	20 to 4 AWG	
Power dissipation at device nominal power without braking resistor	$[80\ W + 9.1\ V * (I_{AX1} + I_{AX2}) + 6.5\ W/kW * P_{AVG} + 0.25\ \Omega * (I_{BR1}^2 + I_{BR2}^2) + P_{VSLOT}] * 1.1$ [3]	
Max. line length	3 m [4]	
DC bus connection		
Continuous power [5]	14 kW [6]	18 kW [6]
Reduction of continuous power depending on mains input voltage		
Mains input voltage <3x 400 VAC	14 kW * (Mains input voltage [V] / 400 V)	18 kW * (Mains input voltage [V] / 400 V)
DC bus capacitance	1680 µF	
Terminal connection cross sections		
Flexible and fine-stranded wires		
With wire end sleeves	0.75 to 16 mm²	
Approbation data		
UL/C-UL-US	20 to 4 AWG	
CSA	20 to 4 AWG	
Max. line length	3 m [7]	
24 VDC power supply		
Input voltage	24 VDC ±25%	
Input capacitance	5500 µF	
Current consumption	2.4 A + Current for motor holding brake [8][9]	

Table 55: 8EI017HWDS0.XXXX-1, 8EI022HWDS0.XXXX-1 - Technical data

Order number	8EI017HWDS0.XXXX-1	8EI022HWDS0.XXXX-1
Terminal connection cross sections		
Flexible and fine-stranded wires		
With wire end sleeves	0.25 to 4 mm²	
Approbation data		
UL/C-UL-US	24 to 8 AWG	
CSA	24 to 8 AWG	
Max. line length	30 m	
Motor connection		
Quantity	2	
Continuous power per motor connection [10]	7 / 7 kW [6]	9 / 9 kW [6]
Continuous current per motor connection [10]	17 / 17 A_{eff}	22 / 22 A_{eff}
Accuracy of the safe current [11]		
Safety function SLT [12]		
SIL 2 / PL d / Cat. 3 [13]	Hardware upgrade 1.10.2.x: 3.030 A Hardware upgrade 1.10.3.0 or later: 2.611 A	Hardware upgrade 1.10.2.x: 3.305 A Hardware upgrade 1.10.3.0 or later: 2.897 A
SIL 2 / PL d / Cat. 2 [13]	1.404 A	1.623 A
Safety function SBT [12]		
SIL 2 / PL d / Cat. 3 [13]	Hardware upgrade 1.10.2.x: 2.308 A Hardware upgrade 1.10.3.0 or later: 1.868 A	Hardware upgrade 1.10.2.x: 2.368 A Hardware upgrade 1.10.3.0 or later: 1.935 A
SIL 2 / PL d / Cat. 2 [13]	0.900 A	
Reduction of continuous current depending on ambient temperature		
Mains input voltage: 400 VAC		
Switching frequency 5 kHz	No reduction	0.333 A/K (starting at 40°C) [14]
Switching frequency 10 kHz	0.195 A/K (starting at 16°C) [14]	0.195 A/K (starting at -9°C) [14]
Switching frequency 20 kHz	0.145 A/K (starting at -59°C) [14]	0.145 A/K (starting at -93°C) [14]
Mains input voltage: 480 VAC		
Switching frequency 5 kHz	0.345 A/K (starting at 44°C) [14]	0.345 A/K (starting at 30°C) [14]
Switching frequency 10 kHz	0.210 A/K (starting at -5°C) [14]	0.210 A/K (starting at -28°C) [14]
Switching frequency 20 kHz	0.145 A/K (starting at -87°C) [14]	0.145 A/K (starting at -121°C) [14]
Reduction of continuous current depending on installation elevation		
Starting at 500 m above sea level	1.7 A_{eff} per 1000 m	2.2 A_{eff} per 1000 m
Peak current per motor connection	42.5 / 42.5 A_{eff}	55 / 55 A_{eff}
Peak power output	17.5 / 17.5 kW	22.5 / 22.5 kW
Nominal switching frequency	5 kHz	
Possible switching frequencies [15]	2.5 / 5 / 10 / 20 kHz [16]	
Insulation stress of the connected motor per IEC TS 60034-25:2004	Limit value curve A [17]	
Protective measures		
Overload protection	Yes	
Short-circuit and ground fault protection	Yes	
Max. output frequency	598 Hz [18]	
Variant		
U, V, W, PE	Connector	
Shield connection	Yes Clamping range of the grounding clamp: 17 to 30 mm	
Terminal connection cross section		
Flexible and fine-stranded wires		
With wire end sleeve	1.5 to 6 mm²	
Approbation data		
UL/C-UL-US	24 to 8 AWG	
CSA	24 to 8 AWG	
Max. motor line length depending on switching frequency		
Switching frequency 5 kHz	75 m [19]	
Switching frequency 10 kHz	75 m [19]	
Switching frequency 20 kHz	30 m [19]	
Motor holding brake connection		
Quantity	2	
Output voltage [20]	Depends on the input voltage on connector X2	
Continuous current per connection	4 A	
Max. internal resistance	0.25 Ω	
Extinction potential	33 V	
Max. extinction energy per switching operation	15 Ws	
Max. switching frequency	0.5 Hz	
Terminal connection cross section		
Flexible and fine-stranded wires		
With wire end sleeve	0.75 to 16 mm²	
Approbation data		
UL/C-UL-US	20 to 4 AWG	
CSA	20 to 4 AWG	

Table 55: 8EI017HWDS0.XXXX-1, 8EI022HWDS0.XXXX-1 - Technical data

Order number	8EI017HWDS0.XXXX-1	8EI022HWDS0.XXXX-1
Protective measures		
Overload and short-circuit protection	Yes	
Open-circuit monitoring	Yes	
Undervoltage monitoring	Yes	
Response threshold for open-circuit monitoring	Max. 70 mA [21]	
Response threshold for undervoltage monitoring	Approx. 23 V	
Max. breaking current SBC	80 mA	
Max. line length	75 m	
Braking resistor [22]		
Peak power output	45 kW	
Continuous power	4 kW	
Minimum braking resistance (ext.)	13 Ω	
Protective measures		
Overload protection	No	
Short-circuit and ground fault protection	Short-circuit protection: Yes Ground fault protection: No	
Max. line length	3 m	
Fieldbus		
Type	POWERLINK V2 controlled node (CN)	
Variant	2x RJ45, shielded, 2-port hub	
Line length	Max. 100 m between 2 stations (segment length)	
Transfer rate	100 Mbit/s	
Encoder interfaces		
Quantity	2	
Type	Digital multi-encoder interface, configurable [23]	
Connections	8-pin female Mini I/O connector	
Status indicators	None [24]	
Electrical isolation		
Encoder - ACOPOS P3	No	
Max. encoder cable length	75 m Depends on the cross section of the power supply wires in the encoder cable [25]	
Encoder power supply		
Output voltage	Configurable Typ. 11.45 V ±0.1 V / 5.2 V ±0.1 V [26][27]	
Load capacity	Max. 300 mA	
Sense lines	2, compensation of max. 2x 0.7 V	
Protective measures		
Short-circuit proof	Yes	
Overload-proof	Yes	
Synchronous serial interface		
Signal transmission	RS485 [28]	
Data transfer rate	Depends on the configured encoder type	
Differential voltage [29]		
Minimum	2.0 V	
Maximum	6.0 V	
Max. power consumption per encoder interface	$P_{ENCODER}$ [W] = U_{24V} [V] * ($I_{ENCODER}$ [A] * 0.7) + 0.5 W [30]	
Trigger inputs		
Quantity	2	
Circuit	Sink	
Electrical isolation		
Input - ACOPOS P3	Yes	
Input - Input	Yes	
Input voltage		
Nominal	24 VDC	
Maximum	30 VDC	
Switching threshold		
Low	<5 V	
High	>15 V	
Input current at nominal voltage	7 mA	
Switching delay		
Rising edge	<51 µs	
Falling edge	<52 µs	
Modulation compared to ground potential	Max. ±38 V	
Terminal connection cross section		
Flexible and fine-stranded wires		
With wire end sleeve	0.25 to 2.5 mm²	
Approbation data		
UL/C-UL-US	26 to 12 AWG	
CSA	26 to 12 AWG	
Max. line length	100 m	
Temperature sensor connection		
Quantity	2	

Table 55: 8EI017HWDS0.XXXX-1, 8EI022HWDS0.XXXX-1 - Technical data

Order number	8EI017HWDS0.XXXX-1	8EI022HWDS0.XXXX-1
Resistance range	500 Ω to 5 kΩ	
Support		
Motion system		
mapp Motion	5.03.0 and higher	
ACP10/ARNC0	5.03.0 and higher	
Electrical properties		
Energy efficiency (IE classification) [31]		
Power dissipation relative to continuous apparent power [32]	IE2 (10,25) 1.4% IE2 (50,25) 1.5% IE2 (10,50) 1.6% IE2 (50,50) 1.7% IE2 (90,50) 1.8% IE2 (10,100) 2.3% IE2 (50,100) 2.4% IE2 (90,100) 2.7%	IE2 (10,25) 1.2% IE2 (50,25) 1.3% IE2 (10,50) 1.5% IE2 (50,50) 1.5% IE2 (90,50) 1.6% IE2 (10,100) 2.1% IE2 (50,100) 2.3% IE2 (90,100) 2.5%
Nominal losses in standby mode	16.3 W	18.5 W
Operating conditions		
Permissible mounting orientations		
Hanging vertically	Yes	
Standing horizontally	Yes	
Installation elevation above sea level		
Nominal	0 to 500 m	
Maximum	4000 m [33]	
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)	
Overvoltage category per EN 61800-5-1	III	
Degree of protection per EN 60529	IP20 [34]	
Ambient conditions		
Temperature		
Operation		
Minimum	-25°C [35]	
Nominal	5 to 40°C	
Maximum	55°C	
Storage	-25 to 55°C	
Transport	-25 to 70°C	
Relative humidity		
Operation	5 to 85%, non-condensing	
Storage	5 to 95%	
Transport	95% at 40°C	
Mechanical properties		
Dimensions		
Width	133 mm	
Height	374 mm	
Depth		
Wall mounting	258.5 mm (with 8EXA front cover: 261 mm)	
Weight	8 kg	

Table 55: 8EI017HWDS0.XXXX-1, 8EI022HWDS0.XXXX-1 - Technical data

1) Operation on TT and IT power systems and on TN power systems that are not grounded to a star point is only permitted for 8EI servo drives with 8ZELxxxx Rev. E0 and higher. See the device information on the left side cover of the 8EI servo drive. Remove IT jumper X10 before operating in IT networks!
2) A line filter must be connected.
   CE compliance can only be ensured by connecting an upstream B&R line filter (8B0F...).
   In extreme cases, using line filters from 3rd-party manufacturers can result in irreparable damage to the ACOPOS P3 8EI servo drive.
3) Valid for a switching frequency of 5 kHz and nominal input voltage of 3x 400 VAC. Without losses in the line filter, motor cable and motor)
   P_{AVG} ... Average continuous power of the module
   I_{AX1} ... RMS value of the current on axis 1
   I_{AX2} ... RMS value of the current on axis 2
   I_{BR1} ... Nominal current of the motor holding brake for axis 1
   I_{BR2} ... Nominal current of the motor holding brake for axis 2
   P_{VSLOT} ... Power dissipation of the 8EAC plug-in module
4) Maximum line length between line filter and mains connection on the module.
5) Valid for mains input voltage ≥3x 400 VAC.
   The sum of the continuous power values on all motor connections and the power of the DC bus connector is not permitted to exceed this value.
6) The continuous power is reduced as a percentage of the continuous current if the continuous current is subject to derating.
7) This value applies to unshielded wiring inside a control cabinet.
   Maximum length of the DC bus wiring inside a control cabinet.
8) Current consumption depends on the respective configuration of the ACOPOS P3 8EI servo drive.
   The inrush current of the 24 VDC power supply is not limited by the module.
9) At nominal 24 VDC supply voltage and 20 kHz switching frequency. Without plug-in card.
10) Valid under the following conditions: 560 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
11) The accuracy of the safe current is relevant for safety functions SLT and SBT, which are based on the safe current measurement. Safety functions SBT, SLT and SSO are available starting with hardware upgrade 1.10.2.0 and only for 8EI servo drives with 8ZELxxxx revision D0 or later. See the device information on the left side cover of the servo drive.
12) This safety function is certified for ACOPOS P3 per category 3 as well as category 2 of EN ISO 13849. Depending on the desired category, the corresponding accuracy of the safe current and corresponding safety characteristics must be used.
13) These values apply up to the continuous current specified in the technical data (taking into account the respective derating specifications).

14) The module cannot supply the full continuous current at this switching frequency. This unusual value for the ambient temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
15) B&R recommends operating the module at its nominal switching frequency. Operating the module at a higher switching frequency for application-specific reasons reduces the continuous current and increases CPU utilization.
16) Switching frequency 2.5 kHz is only available for 8EI servo drives with 8ZESxxxx Rev. E0 and higher.
17) Only applies when using B&R motor cables and B&R motors.
18) The module's electrical output frequency (SCTRL_SPEED_ACT * MOTOR_POLEPAIRS) is monitored to protect against dual use in accordance with Regulation (EC) 428/2009 | 3A225. If the electrical output frequency of the module exceeds the limit value of 598 Hz uninterrupted for more than 0.5 s, then the current movement is aborted and error 6060 is output ("Power unit: Limit speed exceeded").
19) The sum of the cable lengths of all motor cables connected to this module is not permitted to exceed this value.
20) At values <22.9 V, under voltage monitoring is triggered and the servo drive signals error 6029 or 6055. In this case, the input voltage at connection X2 (24 VDC power supply) is too low and must be increased.
21) Valid for modules with 8ZEL... starting with revision E0.
22) This values apply to an external braking resistor. This module is not equipped with an internal braking resistor.
23) The encoder type is not predefined from the factory. The encoder type necessary in each case must be configured in Automation Studio.
24) The direction of rotation of the encoder can be displayed on the 8EAD0000.000-1 display module.
25) Maximum encoder cable length l_{max} can be calculated as follows (the maximum permissible encoder cable length of 75 m is not permitted to exceeded):

    $l_{max} = f / I_G * A * 1/(2*\rho)$

    f ... (Output voltage of encoder interface [V] - Min. permissible supply voltage of connected encoder [V]) * 1.1
    I_G ... Max. current consumption of the connected encoder [A].
    A ... Cross section of the power supply wires [mm^2]
    ρ ... Specific resistance [Ω mm^2/m] (e.g. for copper: ρ = 0.0178)
26) The output voltage is not predefined from the factory (with the exception of encoder types EnDat 2.2, EnDat 3.0 and HIPERFACE DSL). It must be configured in Automation Studio based on the encoder type. If no output voltage is configured, then the encoder will not be supplied by digital multi-encoder interface X4x. Power to the encoder can then be supplied externally.
27) Output voltage 5.2 V is only available under the following conditions:
    - 8EI servo drive with 8ZECxxx revision D0 and higher - see the device information on the left side cover of the 8EI servo drive
    - ACOPOS operating system 3.15.0 and higher (for 8EIxxxxxD... 2-axis modules and 8EIxxxxxT... 3-axis modules)
    - ACOPOS operating system 3.17.0 and higher (for 8EIxxxxxS... 1-axis modules)
28) Except encoder type HIPERFACE DSL.
29) Values valid for clock output and data input. Except encoder type HIPERFACE DSL.
30) $I_{ENCODER}$ ... Current consumption of the encoder
    U_{24V} ... Input voltage on the +24 VDC input of the module
31) The IE classification of the module is based on drive losses. This includes components such as EMC filters, etc. The power dissipation was determined at a switching frequency of 5 kHz (factory setting). Classification is performed at 90% of the frequency and at 100% of the continuous current. When operating the module in connection with an induction motor, the module is only permitted to be operated with a switching frequency of 5 kHz.
32) Continuous apparent power S[VA] = √3 * UMains[Vrms] * IMains[Arms]. IE2 notation (a,b) stands respectively for a load point with frequency a (as a percentage of the nominal frequency of the motor) and current b (as a percentage of the continuous current).
33) For operation on phase-grounded/center-grounded delta networks (TT and TN) and IT networks, the value is reduced to 2000 m.
34) The specified degree of protection is only met if either the slot cover is installed on the module or an 8EAC plug-in module is installed and suitable terminals are connected to all connectors and all fans are installed.
35) Only permitted for modules with 8ZEL... Revision E0 and higher. See the device information on the left side cover of the module. During storage or transport, sudden temperature changes may cause condensation or icing in the module. The module is only permitted to be commissioned if it is free of condensation or icing at the time of commissioning.

2.2.10 3-axis modules

2.2.10.1 Mains input voltage - 1x 110 to 230 VAC / 3x 200 to 230 VAC

2.2.10.1.1 Continuous power up to 2 kW (motor connection)

2.2.10.1.1.1 Order data

Order number	Short description	Figure
	Wall mounting	
8EI2X2MWT10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 1x 110-230 VAC, 3x 200-230 VAC, 3x 2.2 A, 3 axes, wall mounting	
8EI4X5MWT10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 1x 110-230 VAC, 3x 200-230 VAC, 3x 4.5 A, 3 axes, wall mounting	
8EI8X8MWT10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 1x 110-230 VAC, 3x 200-230 VAC, 3x 8.8 A, 3 axes, wall mounting	
	Optional accessories	
	Display modules	
8EAD0000.000-1	Display module, LCD, 128 x 64, black/white, 1x USB 3.0	
	Fan modules	
8EXF100.0000-00	ACOPOS P3 fan module, replacement fan for ACOPOS P3 servo drive single-width (8EI1X6/8EI2X2/8EI4X5/8EI8X8/8EI013/8EI017xxS)	
	Front covers	
8EXA200.0010-00	ACOPOS P3 dover, B&R orange, single-width, suitable for servo drives 8EI2X2xxDxx.xxxx-x / 8EI2X2xxTxx.xxxx-x / 8EI4X5xxDxx.xxxx-x / 8EI4X5xxTxx.xxxx-x /8EI8X8xxDxx.xxxx-x / 8EI8X8xxTxx.xxxx-x / 8EI013xxSxx.xxxx-x / 8EI017xxSxx.xxxx-x	
8EXA200.0020-00	ACOPOS P3 cover, B&R dark gray, single-width, suitable for servo drives 8EI2X2xxDxx.xxxx-x / 8EI2X2xxTxx.xxxx-x / 8EI4X5xxDxx.xxxx-x / 8EI4X5xxTxx.xxxx-x / 8EI8X8xxDxx.xxxx-x / 8EI8X8xxTxx.xxxx-x / 8EI013xxSxx.xxxx-x / 8EI017xxSxx.xxxx-x	
	Line filters passive	
8B0F0160H000.000-1	Line filter, passive, 16 A, 3x 528 VAC, 50/60 Hz, IP20	
8B0F0160H000.100-1	Passive line filter, 16 A, 3x 528 VAC, 50/60 Hz, IP20, specially designed also for operation at 2.5 kHz	
8B0F0300H000.000-1	Line filter, passive, 30 A, 3x 520 VAC, 50/60 Hz, IP20	
8B0F0550H000.000-1	Line filter, passive, 55 A, 3x 520 VAC, 50/60 Hz, IP20	
	Plug-in modules	
8EAC0122.001-1	ACOPOS P3 plug-in module, resolver interface 10 kHz	
8EAC0122.003-1	ACOPOS P3 plug-in module, 3 resolver interfaces 10 kHz	
8EAC0130.000-1	ACOPOS P3 plug-in module, 8 digital I/O 24 V (4x 400 mA, 4x 100 mA) individually configurable as inputs or outputs, 2 digital I/O 24 V 2 A configurable in pairs as inputs or outputs, order terminal block 8TB0230.221A-00 separately!	
8EAC0150.001-1	ACOPOS P3 plug-in module, digital multi-encoder interface	
8EAC0150.003-1	ACOPOS P3 plug-in module, 3 digital multi-encoder interfaces	
8EAC0151.001-1	ACOPOS P3 plug-in module, incremental encoder interface	
8EAC0151.003-1	ACOPOS P3 plug-in module, 3 incremental encoder interfaces	
8EAC0152.001-1	ACOPOS P3 plug-in module, analog multi-encoder interface	
8EAC0152.003-1	ACOPOS P3 plug-in module, 3 analog multi-encoder interfaces	
	Shield component sets	
8SCSE01.0100-00	ACOPOS P3 shield component set: 1x ACOPOS P3 shield mounting plate, 1x 2x M3x6 screws	
8SCSE01.0300-00	ACOPOS P3 shield component set: 1x support plate with 2 grounding clamps 3-6 mm, 1x M4x6 screw	
8SCSE02.0100-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK14	
8SCSE02.0200-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK20	
	Terminal blocks	
8TB2104.2210-00	4-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively	
8TB2104.2210-50	4-pin push-in terminal block, yellow, 1-row, with locking mechanism, pitch: 5.08 mm, label 1: 4 3 2 1	
8TB2204.2210-50	4-pin push-in terminal block, yellow, 2-row, pitch: 5.08 mm, label 1: 4 3 2 1,	
8TB3102.222C-20	2-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	

Table 56: 8EI2X2MWT10.XXXX-1, 8EI4X5MWT10.XXXX-1, 8EI8X8MWT10.XXXX-1 - Order data

Order number	Short description	Figure
8TB3103.222A-20	3-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: PE RB- RB+, coding A: 000	
8TB3106.223C-20	6-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 3: PE L3 N(L2) L1 DC- DC+, coding C: 000010	
8TB3202.222C-40	2-pin push-in terminal block, 2-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	
8TB3206.223C-40	6-pin push-in terminal block, 2-row, with locking mechanism, pitch: 7.62 mm, label 3: PE L3 N(L2) L1 DC- DC+, coding C: 000010	
8TB3308.222A-00	4+4-pin push-in terminal block 1-row / 2-row, pitch: 7.62 mm, label 2: T- B- T+ B+ PE W V U coding A: 0000	
	Terminal set	
8EZI8X8HT1.2201-0	Klemmensatz für ACOPOS P3 Module 8EI*X*H*D10.****-1, 8EI*X*H*T10.****-1: 1x 8TB2104.2210-00, 1x 8TB2104.2210-50, 1x 8TB3102.222C-20, 3x 8TB3308.222A-00, 1x 8TB3106.222B-20, 1x 8TB3103.222A-20	
8EZI8X8MT1.2201-0	Klemmensatz für ACOPOS P3 Module 8EI1X6M*D1, 8EI2X2M*D1, 8EI4X5M*D1, 8EI8X8M*D1, 8EI1X6M*T1, 8EI2X2M*T1, 8EI4X5M*T1, 8EI8X8M*T1: 1x 8TB2104.2210-00, 1x 8TB2104.2210-50, 1x 8TB3102.222C-20, 3x 8TB3308.222A-00, 1x 8TB3106.223C-20, 1x 8TB3103.222A-20	
8EZI8X8MT1.2202-0	Klemmensatz für ACOPOS P3 Module 8EI*X*M*D10.****-1, 8EI*X*M*T10.****-1: 1x 8TB2104.2210-00, 1x 8TB2204.2210-50, 1x 8TB3202.222C-40, 3x 8TB3308.222A-00, 1x 8TB3206.223C-40, 1x 8TB3103.222A-20	

Table 56: 8EI2X2MWT10.XXXX-1, 8EI4X5MWT10.XXXX-1, 8EI8X8MWT10.XXXX-1 - Order data

Connection	1-row connector	2-row connector
X1	8TB3106.223C-20	8TB3206.223C-40
X2	8TB3102.222C-20	8TB3202.222C-40
X5x	8TB3308.222A-00	
X6	8TB3103.222A-20	
X7	8TB2104.2210-50	8TB2204.2210-50
X8	8TB2104.2210-00	

Table 57: Terminal blocks - Order numbers

2.2.10.1.1.2 Technical data

Order number	8EI2X2MWT10.XXXX-1	8EI4X5MWT10.XXXX-1	8EI8X8MWT10.XXXX-1
General information			
Support			
Dynamic node allocation (DNA)		Yes	
Slots for plug-in modules		1	
Certifications			
CE		Yes	
UKCA		Yes	
UL		cULus E225616 Power conversion equipment	
KC		Yes	
Mains connection			
Network configurations		TT, TN, TN-S, TN-C-S, IT [1]	
Mains input voltage		1x 110 VAC to 230 VAC ±10% 3x 200 VAC to 230 VAC ±10% 24 to 120 VDC [2]	
Frequency		50 / 60 Hz ±4%	
Installed load	Max. 3.75 kVA	Max. 5 kVA	
Inrush current		Max. 22 A	
Switch-on interval		Typ. 60 s	
Integrated line filter per EN 61800-3, category C3		No [3]	
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve		0.25 to 4 mm²	
Approbation data			
UL/C-UL-US		24 to 8 AWG	
CSA		24 to 8 AWG	
Power dissipation at device nominal power without braking resistor		[(40 + 10 * P_{AVG} [kW] + 5.8 * (I_{AX1} [A] + I_{AX2} [A] + I_{AX3} [A]) + 0.25 * (I_{BR1}^2 [A] + I_{BR2}^2 [A] + I_{BR3}^2 [A]) + P_{VSLOT}) * 1.1] [W] [4]	
Max. line length		3 m [5]	
DC bus connection			
Continuous power [6]	1.5 kW [7]	2 kW [7]	

Table 58: 8EI2X2MWT10.XXXX-1, 8EI4X5MWT10.XXXX-1, 8EI8X8MWT10.XXXX-1 - Technical data

Order number	8EI2X2MWT10.XXXX-1	8EI4X5MWT10.XXXX-1	8EI8X8MWT10.XXXX-1
Reduction of continuous power depending on mains input voltage [8]			
Mains input voltage <230 VAC	1.5 kW * (Mains input voltage [V] / 230 V)	2 kW * (Mains input voltage [V] / 230 V)	
DC bus capacitance	1880 µF		
Terminal connection cross sections			
Flexible and fine-stranded wires			
With wire end sleeves	0.25 to 4 mm²		
Approbation data			
UL/C-UL-US	24 to 8 AWG		
CSA	24 to 8 AWG		
Max. line length	3 m [9]		
24 VDC power supply			
Input voltage	24 VDC ±25%		
Input capacitance	5500 µF		
Current consumption	1.2 A + Current for motor holding brake [10]		
Terminal connection cross sections			
Flexible and fine-stranded wires			
With wire end sleeves	0.25 to 4 mm²		
Approbation data			
UL/C-UL-US	24 to 8 AWG		
CSA	24 to 8 AWG		
Max. line length	30 m		
Motor connection			
Quantity	3		
Continuous power per motor connection [11]	0.5 / 0.5 / 0.5 kW [7]	1 / 1 / 1 kW [12]	2 / 2 / 2 kW [12]
Continuous current per motor connection [13]	2.2 / 2.2 / 2.2 A_{eff}	4.5 / 4.5 / 4.5 A_{eff}	8.8 / 8.8 / 8.8 A_{eff}
Reduction of continuous current depending on switching frequency [14]			
Switching frequency 5 kHz	No reduction		1.375 A/K (starting at 52.0°C) [15]
Switching frequency 10 kHz	No reduction		0.393 A/K (starting at 45.5°C)
Switching frequency 20 kHz	No reduction	0.120 A/K (starting at 41.9°C) [16]	0.120 A/K (starting at 5.9°C) [16]
Reduction of continuous current depending on installation elevation			
Starting at 500 m above sea level	0.22 A_{eff} per 1000 m	0.45 A_{eff} per 1000 m	0.88 A_{eff} per 1000 m
Peak current per motor connection	6/6/6 A_{eff}	12.25/12.25/12.25 A_{eff}	24 / 24 / 24 A_{eff}
Peak power output	1.25 kW	2.5 kW [17]	5 kW [17]
Nominal switching frequency	5 kHz		
Possible switching frequencies [18]	2.5 / 5 / 10 / 20 kHz [19]		
Insulation stress of the connected motor per IEC TS 60034-25:2004	Limit value curve A [20]		
Protective measures			
Overload protection	Yes		
Short-circuit and ground fault protection	Yes		
Max. output frequency	598 Hz [21]		
Variant			
U, V, W, PE	Connector		
Shield connection	Yes Clamping range of the grounding clamp: 11 to 16 mm		
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve	1.5 to 6 mm²		
Approbation data			
UL/C-UL-US	24 to 8 AWG		
CSA	24 to 8 AWG		
Max. motor line length depending on switching frequency			
Switching frequency 5 kHz	75 m [22]		
Switching frequency 10 kHz	38 m [22]		
Switching frequency 20 kHz	19 m [22]		
Motor holding brake connection			
Quantity	3		
Output voltage [23]	Depends on the input voltage on connector X2		
Continuous current per connection	1.3 A		
Max. internal resistance	0.25 Ω		
Extinction potential	Approx. 30 V		
Max. extinction energy per switching operation	1.5 Ws		
Max. switching frequency	0.5 Hz		

Table 58: 8EI2X2MWT10.XXXX-1, 8EI4X5MWT10.XXXX-1, 8EI8X8MWT10.XXXX-1 - Technical data

Order number	8EI2X2MWT10.XXXX-1	8EI4X5MWT10.XXXX-1	8EI8X8MWT10.XXXX-1
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve	0.25 to 4 mm²		
Approbation data			
UL/C-UL-US	24 to 8 AWG		
CSA	24 to 8 AWG		
Protective measures			
Overload and short-circuit protection	Yes		
Open-circuit monitoring	Yes		
Undervoltage monitoring	Yes		
Response threshold for open-circuit monitoring	Approx. 30 mA		
Response threshold for undervoltage monitoring	Approx. 23 V		
Max. line length	75 m [24]		
Braking resistor [25]			
Peak power int./ext.	1.5 kW / 11 kW		
Continuous power int./ext.	150 W / 970 W		
Minimum braking resistance (ext.)	12 Ω		
Protective measures			
Overload protection	No		
Short-circuit and ground fault protection	Short-circuit protection: Yes Ground fault protection: No		
Max. line length	3 m		
Fieldbus			
Type	POWERLINK V2 controlled node (CN)		
Variant	2x RJ45, shielded, 2-port hub		
Line length	Max. 100 m between 2 stations (segment length)		
Transfer rate	100 Mbit/s		
Enable inputs			
Quantity	2		
Circuit	Sink		
Electrical isolation			
Input - ACOPOS P3	Yes		
Input - Input	Yes		
Input voltage			
Nominal	24 VDC		
Maximum	30 VDC		
Input current at nominal voltage	Approx. 9 mA		
Switching threshold			
Low	<5 V		
High	>15 V		
Switching delay at nominal input voltage			
Enable 1 → 0, PWM off	2 ms		
Enable 0 → 1, ready for PWM	0.3 ms ACP10 5.16.2 and later: 4.3 ms	0.3 ms ACP10 5.16.2 and later: 4.3 ms	
Modulation compared to ground potential	Max. ±38 V		
OSSD signal connections [26]	0.5 ms		
Terminal connection cross sections			
Flexible and fine-stranded wires			
With plastic wire end sleeves	0.25 to 2.5 mm²		
Approbation data			
UL/C-UL-US	26 to 12 AWG		
CSA	26 to 12 AWG		
Max. line length	30 m		
Encoder interfaces			
Quantity	3		
Type	Digital multi-encoder interface, configurable [27]		
Connections	8-pin female Mini I/O connector		
Status indicators	None [28]		
Electrical isolation			
Encoder - ACOPOS P3	No		
Max. encoder cable length	75 m Depends on the cross section of the power supply wires in the encoder cable [29]		
Encoder power supply			
Output voltage	Configurable Typ. 11.45 V ±0.1 V / 5.2 V ±0.1 V [30][31]		
Load capacity	Max. 300 mA		
Sense lines	2, compensation of max. 2x 0.7 V		
Protective measures			
Short-circuit proof	Yes		
Overload-proof	Yes		

Table 58: 8EI2X2MWT10.XXXX-1, 8EI4X5MWT10.XXXX-1, 8EI8X8MWT10.XXXX-1 - Technical data

Order number	8EI2X2MWT10.XXXX-1	8EI4X5MWT10.XXXX-1	8EI8X8MWT10.XXXX-1
Synchronous serial interface			
Signal transmission	RS485 [32]		
Data transfer rate	Depends on the configured encoder type		
Differential voltage [33]			
Minimum	2.0 V		
Maximum	6.0 V		
Max. power consumption per encoder interface	$P_{ENCODER}$ [W] = U_{24V} [V] * ($I_{ENCODER}$ [A] * 0.7) + 0.5 W [34]		
Trigger inputs			
Quantity	2		
Circuit	Sink		
Electrical isolation			
Input - ACOPOS P3	Yes		
Input - Input	Yes		
Input voltage			
Nominal	24 VDC		
Maximum	30 VDC		
Switching threshold			
Low	<5 V		
High	>15 V		
Input current at nominal voltage	7 mA		
Switching delay			
Rising edge	<51 µs		
Falling edge	<52 µs		
Modulation compared to ground potential	Max. ±38 V		
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve	0.25 to 2.5 mm²		
Approbation data			
UL/C-UL-US	26 to 12 AWG		
CSA	26 to 12 AWG		
Max. line length	100 m		
Temperature sensor connection			
Quantity	3		
Resistance range	500 Ω to 5 kΩ		
Support			
Motion system			
mapp Motion	5.03.0 and higher		
ACP10/ARNC0	3.11.2 and higher		3.10.0 and higher
Electrical properties			
Energy efficiency (IE classification) [35]			
Power dissipation relative to continuous apparent power [36]	IE2 (10,25) 5.2% IE2 (50,25) 5.3% IE2 (10,50) 5.2% IE2 (50,50) 5.3% IE2 (90,50) 5.4% IE2 (10,100) 5.6% IE2 (50,100) 5.7% IE2 (90,100) 5.9%	IE2 (10,25) 2.8% IE2 (50,25) 2.8% IE2 (10,50) 3% IE2 (50,50) 3.1% IE2 (90,50) 3.2% IE2 (10,100) 3.5% IE2 (50,100) 3.7% IE2 (90,100) 3.9%	IE2 (10,25) 2% IE2 (50,25) 2.1% IE2 (10,50) 2.3% IE2 (50,50) 2.4% IE2 (90,50) 2.5% IE2 (10,100) 2.8% IE2 (50,100) 3% IE2 (90,100) 3.4%
Nominal losses in standby mode	19 W		
Operating conditions			
Permissible mounting orientations			
Hanging vertically	Yes		
Standing horizontally	Yes		
Installation elevation above sea level			
Nominal	0 to 500 m		
Maximum	4000 m [37]		
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)		
Overvoltage category per EN 61800-5-1	III		
Degree of protection per EN 60529	IP20 [38]		
Ambient conditions			
Temperature			
Operation			
Minimum	-25°C [39]		
Nominal	5 to 40°C		
Maximum	55°C		
Storage	-25 to 55°C		
Transport	-25 to 70°C		
Relative humidity			
Operation	5 to 85%, non-condensing		
Storage	5 to 95%		
Transport	95% at 40°C		

Table 58: 8EI2X2MWT10.XXXX-1, 8EI4X5MWT10.XXXX-1, 8EI8X8MWT10.XXXX-1 - Technical data

Order number	8EI2X2MWT10.XXXX-1	8EI4X5MWT10.XXXX-1	8EI8X8MWT10.XXXX-1
Mechanical properties			
Dimensions			
Width	66 mm		
Height	374 mm		
Depth			
Wall mounting	258.5 mm (with 8EXA front cover: 261 mm)		
Weight	4 kg		

Table 58: 8EI2X2MWT10.XXXX-1, 8EI4X5MWT10.XXXX-1, 8EI8X8MWT10.XXXX-1 - Technical data

1) Operation on TT and IT power systems and on TN power systems that are not grounded to a star point is only permitted for 8EI servo drives with 8ZELxxxx Rev. E0 and higher. See the device information on the left side cover of the 8EI servo drive. Remove IT jumper X10 before operating in IT networks!
2) Operating the module at a mains input voltage of 24 to 120 VDC is only permitted if this mains input voltage is also specified in the device information on the left-hand side cover (Input: ... 24 - 120 VDC ...).
3) A line filter must be connected.
CE compliance can only be ensured by connecting an upstream B&R line filter (8B0F...).
In extreme cases, using line filters from 3rd-party manufacturers can result in irreparable damage to the ACOPOS P3 8EI servo drive.
4) P_{AVG} ... Average continuous power of the module
I_{AX1}, I_{AX2}, I_{AX3} ... RMS value of the current on axis 1, axis 2, axis 3
I_{BR1}, I_{BR2}, I_{BR3} ... Nominal current of the motor holding brake on axis 1, axis 2, axis 3
P_{VSLOT} ... Power dissipation of the 8EAC plug-in module
5) Maximum cable length between line filter and mains connection on the module.
6) Valid for 230 VAC mains input voltage.
The sum of the continuous power values on all motor connections and the power of the DC bus connector is not permitted to exceed this value.
7) The continuous power is reduced as a percentage of the continuous current if the continuous current is subject to derating.
8) Starting with mapp Motion V6.2.0, continuous total power monitoring (INVR_TPOW_CONT_LOAD) and peak total power monitoring (INVR_TPOW_PEAK_LOAD) are automatically disabled for a mains input voltage of 24 to 120 VDC.
9) This value applies to unshielded wiring inside a control cabinet.
Maximum length of the DC bus wiring inside a control cabinet.
10) Current consumption depends on the respective configuration of the ACOPOS P3 8EI servo drive.
The inrush current of the 24 VDC power supply is not limited by the module.
11) Valid under the following conditions: 325 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
For DC bus voltages U_ZK < 325 VDC, maximum continuous power P_OUT is calculated as follows: P_OUT = Continuous power per motor connection * U_ZK / 325.
12) The total continuous power of all motor connections is not permitted to exceed 2 kW. The continuous power is reduced as a percentage of the continuous current if the continuous current is subject to derating.
13) Valid under the following conditions: 325 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
14) The temperature specifications refer to the ambient temperature.
15) Value for the nominal switching frequency.
16) The module cannot supply the full continuous current at this switching frequency. This unusual value for the ambient temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
17) The total peak power of all motor connections is not permitted to exceed 5 kW.
18) B&R recommends operating the module at its nominal switching frequency. Operating the module at a higher switching frequency for application-specific reasons reduces the continuous current and increases CPU utilization.
19) Switching frequency 2.5 kHz is only available for 8EI servo drives with 8ZESxxxx Rev. E0 and higher.
20) Only applies when using B&R motor cables and B&R motors.
21) The module's electrical output frequency (SCTRL_SPEED_ACT * MOTOR_POLEPAIRS) is monitored to protect against dual use in accordance with Council Regulation (EC) 428/2009 | 3A225. If the electrical output frequency of the module exceeds the limit value of 598 Hz uninterrupted for more than 0.5 s, then the current movement is aborted and error 6060 is output ("Power unit: Limit speed exceeded").
22) The sum of the cable lengths of all motor cables connected to this module is not permitted to exceed this value.
23) At values <22.9 V, under voltage monitoring is triggered and the servo drive signals error 6029 or 6055. In this case, the input voltage at connection X2 (24 VDC power supply) is too low and must be increased.
24) During configuration, it is necessary to check if the minimum voltage can be maintained on the holding brake with the intended cable length. For the permissible operating voltage range of the holding brake, see the user documentation for the motor being used.
25) There is a connection for external braking resistors. An internal braking resistor is available as an option.
26) OSSD (output signal switching device) signals are used to monitor signal lines for short circuits and cross faults.
27) The encoder type is not predefined from the factory. The encoder type necessary in each case must be configured in Automation Studio.
28) The direction of rotation of the encoder can be displayed on the 8EAD0000.000-1 display module.
29) Maximum encoder cable length l_{max} can be calculated as follows (the maximum permissible encoder cable length of 75 m is not permitted to exceeded):

$$l_{max} = f / I_G * A * 1/(2*\rho)$$

f ... (Output voltage of encoder interface [V] - Min. permissible supply voltage of connected encoder [V]) * 1.1
I_G ... Max. current consumption of the connected encoder [A].
A ... Cross section of the power supply wires [mm²]
ρ ... Specific resistance [Ω mm²/m] (e.g. for copper: ρ = 0.0178)
30) The output voltage is not predefined from the factory (with the exception of encoder types EnDat 2.2, EnDat 3.0 and HIPERFACE DSL). It must be configured in Automation Studio based on the encoder type. If no output voltage is configured, then the encoder will not be supplied by digital multi-encoder interface X4x. Power to the encoder can then be supplied externally.
31) Output voltage 5.2 V is only available under the following conditions:
- 8EI servo drive with 8ZECxxx revision D0 and higher - see the device information on the left side cover of the 8EI servo drive
- ACOPOS operating system 3.15.0 and higher (for 8EIxxxxxD... 2-axis modules and 8EIxxxxxT... 3-axis modules)
- ACOPOS operating system 3.17.0 and higher (for 8EIxxxxxS... 1-axis modules)
32) Except encoder type HIPERFACE DSL.
33) Values valid for clock output and data input. Except encoder type HIPERFACE DSL.

34) $I_{ENCODER}$ ... Current consumption of the encoder
U_{24V} ... Input voltage on the +24 VDC input of the module
35) The IE classification of the module is based on drive losses. This includes components such as EMC filters, etc. The power dissipation was determined at a switching frequency of 5 kHz (factory setting). Classification is performed at 90% of the frequency and at 100% of the continuous current. When operating the module in connection with an induction motor, the module is only permitted to be operated with a switching frequency of 5 kHz.
36) Continuous apparent power S[VA] = √3 * UMains[Vrms] * IMains[Arms]. IE2 notation (a,b) stands respectively for a load point with frequency a (as a percentage of the nominal frequency of the motor) and current b (as a percentage of the continuous current).
37) For operation on phase-grounded/center-grounded delta networks (TT and TN) and IT networks, the value is reduced to 2000 m.
38) The specified degree of protection is only met if either the slot cover is installed on the module or an 8EAC plug-in module is installed and suitable terminals are connected to all connectors and all fans are installed.
39) Only permitted for modules with 8ZEL... Revision E0 and higher. See the device information on the left side cover of the module. During storage or transport, sudden temperature changes may cause condensation or icing in the module. The module is only permitted to be commissioned if it is free of condensation or icing at the time of commissioning.

2.2.10.2 Mains input voltage - 3x 200 to 480 VAC

2.2.10.2.1 Continuous power up to 4 kW (motor connection)

2.2.10.2.1.1 Order data

Order number	Short description	Figure
	Wall mounting	
8EI2X2HWT10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 3x 200-480 VAC, 3x 2.2 A, 3 axis, wall mounting	
8EI4X5HWT10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 3x 200-480 VAC, 3x 4.5 A, 3 axis, wall mounting	
8EI8X8HWT10.XXXX-1	ACOPOS P3 servo drive, 1 digital multi-standard encoder interface per axis, 3x 200-480 VAC, 3x 8.8 A, 3 axis, wall mounting	
	Optional accessories	
	Display modules	
8EAD0000.000-1	Display module, LCD, 128 x 64, black/white, 1x USB 3.0	
	Fan modules	
8EXF100.0000-00	ACOPOS P3 fan module, replacement fan for ACOPOS P3 servo drive single-width (8EI1X6/8EI2X2/8EI4X5/8EI8X8/8EI013/8EI017xxS)	
	Front covers	
8EXA200.0010-00	ACOPOS P3 dover, B&R orange, single-width, suitable for servo drives 8EI2X2xxDxx.xxxx-x / 8EI2X2xxTxx.xxxx-x / 8EI4X5xxDxx.xxxx-x / 8EI4X5xxTxx.xxxx-x /8EI8X8xxDxx.xxxx-x / 8EI8X8xxTxx.xxxx-x / 8EI013xxSxx.xxxx-x / 8EI017xxSxx.xxxx-x	
8EXA200.0020-00	ACOPOS P3 cover, B&R dark gray, single-width, suitable for servo drives 8EI2X2xxDxx.xxxx-x / 8EI2X2xxTxx.xxxx-x / 8EI4X5xxDxx.xxxx-x / 8EI4X5xxTxx.xxxx-x / 8EI8X8xxDxx.xxxx-x / 8EI8X8xxTxx.xxxx-x / 8EI013xxSxx.xxxx-x / 8EI017xxSxx.xxxx-x	
	Line filters passive	
8B0F0160H000.000-1	Line filter, passive, 16 A, 3x 528 VAC, 50/60 Hz, IP20	
8B0F0160H000.100-1	Passive line filter, 16 A, 3x 528 VAC, 50/60 Hz, IP20, specially designed also for operation at 2.5 kHz	
8B0F0300H000.000-1	Line filter, passive, 30 A, 3x 520 VAC, 50/60 Hz, IP20	
8B0F0550H000.000-1	Line filter, passive, 55 A, 3x 520 VAC, 50/60 Hz, IP20	
	Plug-in modules	
8EAC0122.001-1	ACOPOS P3 plug-in module, resolver interface 10 kHz	
8EAC0122.003-1	ACOPOS P3 plug-in module, 3 resolver interfaces 10 kHz	
8EAC0130.000-1	ACOPOS P3 plug-in module, 8 digital I/O 24 V (4x 400 mA, 4x 100 mA) individually configurable as inputs or outputs, 2 digital I/O 24 V 2 A configurable in pairs as inputs or outputs, order terminal block 8TB0230.221A-00 separately!	
8EAC0150.001-1	ACOPOS P3 plug-in module, digital multi-encoder interface	
8EAC0150.003-1	ACOPOS P3 plug-in module, 3 digital multi-encoder interfaces	
8EAC0151.001-1	ACOPOS P3 plug-in module, incremental encoder interface	
8EAC0151.003-1	ACOPOS P3 plug-in module, 3 incremental encoder interfaces	
8EAC0152.001-1	ACOPOS P3 plug-in module, analog multi-encoder interface	
8EAC0152.003-1	ACOPOS P3 plug-in module, 3 analog multi-encoder interfaces	
	Shield component sets	
8SCSE01.0100-00	ACOPOS P3 shield component set: 1x ACOPOS P3 shield mounting plate, 1x 2x M3x6 screws	
8SCSE01.0300-00	ACOPOS P3 shield component set: 1x support plate with 2 grounding clamps 3-6 mm, 1x M4x6 screw	
8SCSE02.0100-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK14	
8SCSE02.0200-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK20	
	Terminal blocks	
8TB2104.2210-00	4-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively	
8TB2104.2210-50	4-pin push-in terminal block, yellow, 1-row, with locking mechanism, pitch: 5.08 mm, label 1: 4 3 2 1	
8TB2204.2210-50	4-pin push-in terminal block, yellow, 2-row, pitch: 5.08 mm, label 1: 4 3 2 1,	
8TB3102.222C-20	2-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	
8TB3103.222A-20	3-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: PE RB- RB+, coding A: 000	

Table 59: 8EI2X2HWT10.XXXX-1, 8EI4X5HWT10.XXXX-1, 8EI8X8HWT10.XXXX-1 - Order data

Order number	Short description	Figure
8TB3106.222B-20	6-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: PE L3 L2 L1 DC- DC+, coding B: 000001	
8TB3202.222C-40	2-pin push-in terminal block, 2-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	
8TB3206.222B-40	6-pin push-in terminal block, 2-row, with locking mechanism, pitch: 7.62 mm, label 2: PE L3 L2 L1 DC- DC+, coding B: 000001	
8TB3308.222A-00	4+4-pin push-in terminal block 1-row / 2-row, pitch: 7.62 mm, label 2: T- B- T+ B+ PE W V U coding A: 0000	
	Terminal set	
8EZI8X8HT1.2201-0	Klemmensatz für ACOPOS P3 Module 8EI*X*H*D10.****-1, 8EI*X*H*T10.****-1: 1x 8TB2104.2210-00, 1x 8TB2104.2210-50, 1x 8TB3102.222C-20, 3x 8TB3308.222A-00, 1x 8TB3106.222B-20, 1x 8TB3103.222A-20	
8EZI8X8HT1.2202-0	Klemmensatz für ACOPOS P3 Module 8EI*X*H*D10.****-1, 8EI*X*H*T10.****-1: 1x 8TB2104.2210-00, 1x 8TB2204.2210-50, 1x 8TB3202.222C-40, 3x 8TB3308.222A-00, 1x 8TB3206.222B-40, 1x 8TB3103.222A-20	
8EZI8X8MT1.2201-0	Klemmensatz für ACOPOS P3 Module 8EI1X6M*D1, 8EI2X2M*D1, 8EI4X5M*D1, 8EI8X8M*D1, 8EI1X6M*T1, 8EI2X2M*T1, 8EI4X5M*T1, 8EI8X8M*T1: 1x 8TB2104.2210-00, 1x 8TB2104.2210-50, 1x 8TB3102.222C-20, 3x 8TB3308.222A-00, 1x 8TB3106.223C-20, 1x 8TB3103.222A-20	

Table 59: 8EI2X2HWT10.XXXX-1, 8EI4X5HWT10.XXXX-1, 8EI8X8HWT10.XXXX-1 - Order data

Connection	1-row connector	2-row connector
X1	8TB3106.222B-20	8TB3206.222B-40
X2	8TB3102.222C-20	8TB3202.222C-40
X5x	8TB3308.222A-00	
X6	8TB3103.222A-20	
X7	8TB2104.2210-50	8TB2204.2210-50
X8	8TB2104.2210-00	

Table 60: Terminal blocks - Order numbers

2.2.10.2.1.2 Technical data

Order number	8EI2X2HWT10.XXXX-1	8EI4X5HWT10.XXXX-1	8EI8X8HWT10.XXXX-1
General information			
Support			
Dynamic node allocation (DNA)		Yes	
Slots for plug-in modules		1	
Certifications			
CE		Yes	
UKCA		Yes	
UL		cULus E225616 Power conversion equipment	
KC		Yes	
Mains connection			
Network configurations		TT, TN, TN-S, TN-C-S, IT [1]	
Mains input voltage		3x 200 VAC to 480 VAC ±10% 24 to 120 VDC [2]	
Frequency		50 / 60 Hz ±4%	
Installed load	Max. 7.5 kVA	Max. 10 kVA	
Inrush current		Max. 45 A	
Switch-on interval		Typ. 60 s	
Integrated line filter per EN 61800-3, category C3		No [3]	
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve		0.25 to 4 mm²	
Approbation data			
UL/C-UL-US		24 to 8 AWG	
CSA		24 to 8 AWG	
Power dissipation at device nominal power without braking resistor		[(60 + 6.9 * P_{AVG} [kW] + 7.5 * (I_{AX1} [A] + I_{AX2} [A] + I_{AX3} [A]) + 0.25 * (I_{BR1}^2 [A] + I_{BR2}^2 [A] + I_{BR3}^2 [A]) + P_{VSLOT}) * 1.1] [W] [4]	
Max. line length	3 m [5]	3 m [6]	
DC bus connection			
Continuous power [7]	3 kW [8]	4 kW [8]	
Reduction of continuous power depending on mains input voltage [9]			
Mains input voltage <3x 400 VAC	3 kW * (Mains input voltage [V] / 400 V)	4 kW * (Mains input voltage [V] / 400 V)	
DC bus capacitance		470 µF	

Table 61: 8EI2X2HWT10.XXXX-1, 8EI4X5HWT10.XXXX-1, 8EI8X8HWT10.XXXX-1 - Technical data

Order number	8EI2X2HWT10.XXXX-1	8EI4X5HWT10.XXXX-1	8EI8X8HWT10.XXXX-1
Terminal connection cross sections			
Flexible and fine-stranded wires			
With wire end sleeves	0.25 to 4 mm²		
Approbation data			
UL/C-UL-US	24 to 8 AWG		
CSA	24 to 8 AWG		
Max. line length	3 m [10]		
24 VDC power supply			
Input voltage	24 VDC ±25%		
Input capacitance	5500 µF		
Current consumption	1.2 A + Current for motor holding brake [11]		
Terminal connection cross sections			
Flexible and fine-stranded wires			
With wire end sleeves	0.25 to 4 mm²		
Approbation data			
UL/C-UL-US	24 to 8 AWG		
CSA	24 to 8 AWG		
Max. line length	30 m		
Motor connection			
Quantity	3		
Continuous power per motor connection [12]	1 / 1 / 1 kW [8]	2 / 2 / 2 kW [13]	4 / 4 / 4 kW [13]
Continuous current per motor connection [14]	2.2 / 2.2 / 2.2 A_{eff}	4.5 / 4.5 / 4.5 A_{eff}	8.8 / 8.8 / 8.8 A_{eff}
Reduction of continuous current depending on switching frequency [15]			
Switching frequency 5 kHz	No reduction		0.373 A/K (starting at 45.2°C) [16]
Switching frequency 10 kHz	No reduction	0.154 A/K (starting at 46.5°C)	0.154 A/K (starting at 18.5°C)
Switching frequency 20 kHz	0.075 A/K (starting at 37.1°C) [17]	0.075 A/K (starting at 6.4°C) [17]	0.075 A/K (starting at -50.9°C) [17]
Reduction of continuous current depending on installation elevation			
Starting at 500 m above sea level	0.22 A_{eff} per 1000 m	0.45 A_{eff} per 1000 m	0.88 A_{eff} per 1000 m
Peak current per motor connection	6 / 6 / 6 A_{eff}	12.25/12.25/12.25 A_{eff}	24 / 24 / 24 A_{eff}
Peak power output	2.5 / 2.5 / 2.5 kW [18]	5 kW [19]	10 kW [19]
Nominal switching frequency	5 kHz		
Possible switching frequencies [20]	2.5 / 5 / 10 / 20 kHz [21]		
Insulation stress of the connected motor per IEC TS 60034-25:2004	Limit value curve A [22]		
Protective measures			
Overload protection	Yes		
Short-circuit and ground fault protection	Yes		
Max. output frequency	598 Hz [23]	598 Hz [24]	
Variant			
U, V, W, PE	Connector		
Shield connection	Yes Clamping range of the grounding clamp: 11 to 16 mm		
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve	1.5 to 6 mm²		
Approbation data			
UL/C-UL-US	24 to 8 AWG		
CSA	24 to 8 AWG		
Max. motor line length depending on switching frequency			
Switching frequency 5 kHz	75 m [25]		
Switching frequency 10 kHz	38 m [25]		
Switching frequency 20 kHz	19 m [25]		
Motor holding brake connection			
Quantity	3		
Output voltage [26]	Depends on the input voltage on connector X2		
Continuous current per connection	1.3 A		
Max. internal resistance	0.25 Ω		
Extinction potential	Approx. 30 V		
Max. extinction energy per switching operation	1.5 Ws		
Max. switching frequency	0.5 Hz		
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve	0.25 to 4 mm²		
Approbation data			
UL/C-UL-US	24 to 8 AWG		
CSA	24 to 8 AWG		
Protective measures			
Overload and short-circuit protection	Yes		
Open-circuit monitoring	Yes		
Undervoltage monitoring	Yes		

Table 61: 8EI2X2HWT10.XXXX-1, 8EI4X5HWT10.XXXX-1, 8EI8X8HWT10.XXXX-1 - Technical data

Order number	8EI2X2HWT10.XXXX-1	8EI4X5HWT10.XXXX-1	8EI8X8HWT10.XXXX-1
Response threshold for open-circuit monitoring	Approx. 30 mA		
Response threshold for undervoltage monitoring	Approx. 23 V		
Max. line length	75 m [27)]	75 m [28)]	
Braking resistor [29)]			
Peak power int./ext.	7 kW / 25 kW		
Continuous power int./ext.	150 W / 2 kW		
Minimum braking resistance (ext.)	25 Ω		
Protective measures			
Overload protection	No		
Short-circuit and ground fault protection	Short-circuit protection: Yes Ground fault protection: No		
Max. line length	3 m		
Fieldbus			
Type	POWERLINK V2 controlled node (CN)		
Variant	2x RJ45, shielded, 2-port hub		
Line length	Max. 100 m between 2 stations (segment length)		
Transfer rate	100 Mbit/s		
Enable inputs			
Quantity	2		
Circuit	Sink		
Electrical isolation			
Input - ACOPOS P3	Yes		
Input - Input	Yes		
Input voltage			
Nominal	24 VDC		
Maximum	30 VDC		
Input current at nominal voltage	Approx. 9 mA		
Switching threshold			
Low	<5 V		
High	>15 V		
Switching delay at nominal input voltage			
Enable 1 → 0, PWM off	2 ms		
Enable 0 → 1, ready for PWM	0.3 ms ACP10 5.16.2 and later: 4.3 ms		
Modulation compared to ground potential	Max. ±38 V		
OSSD signal connections [30)]	0.5 ms		
Terminal connection cross sections			
Flexible and fine-stranded wires			
With plastic wire end sleeves	0.25 to 2.5 mm²		
Approbation data			
UL/C-UL-US	26 to 12 AWG		
CSA	26 to 12 AWG		
Max. line length	30 m		
Encoder interfaces			
Quantity	3		
Type	Digital multi-encoder interface, configurable [31)]		
Connections	8-pin female Mini I/O connector		
Status indicators	None [32)]		
Electrical isolation			
Encoder - ACOPOS P3	No		
Max. encoder cable length	75 m Depends on the cross section of the power supply wires in the encoder cable [33)]		
Encoder power supply			
Output voltage	Configurable Typ. 11.45 V ±0.1 V / 5.2 V ±0.1 V [34)35)]		
Load capacity	Max. 300 mA		
Sense lines	2, compensation of max. 2x 0.7 V		
Protective measures			
Short-circuit proof	Yes		
Overload-proof	Yes		
Synchronous serial interface			
Signal transmission	RS485 [36)]		
Data transfer rate	Depends on the configured encoder type		
Differential voltage [37)]			
Minimum	2.0 V		
Maximum	6.0 V		
Max. power consumption per encoder interface	$P_{ENCODER}$ [W] = U_{24V} [V] * ($I_{ENCODER}$ [A] * 0.7) + 0.5 W [38)]		
Trigger inputs			
Quantity	2		
Circuit	Sink		

Table 61: 8EI2X2HWT10.XXXX-1, 8EI4X5HWT10.XXXX-1, 8EI8X8HWT10.XXXX-1 - Technical data

Order number	8EI2X2HWT10.XXXX-1	8EI4X5HWT10.XXXX-1	8EI8X8HWT10.XXXX-1
Electrical isolation			
Input - ACOPOS P3		Yes	
Input - Input		Yes	
Input voltage			
Nominal		24 VDC	
Maximum		30 VDC	
Switching threshold			
Low		<5 V	
High		>15 V	
Input current at nominal voltage		7 mA	
Switching delay			
Rising edge		<51 µs	
Falling edge		<52 µs	
Modulation compared to ground potential		Max. ±38 V	
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve		0.25 to 2.5 mm²	
Approbation data			
UL/C-UL-US		26 to 12 AWG	
CSA		26 to 12 AWG	
Max. line length		100 m	
Temperature sensor connection			
Quantity		3	
Resistance range		500 Ω to 5 kΩ	
Support			
Motion system			
mapp Motion		5.03.0 and higher	
ACP10/ARNC0		3.11.2 and higher	
Electrical properties			
Energy efficiency (IE classification) [39]			
Power dissipation relative to continuous apparent power [40]	IE2 (10,25) 3.6% IE2 (50,25) 3.6% IE2 (10,50) 3.8% IE2 (50,50) 3.8% IE2 (90,50) 3.9% IE2 (10,100) 4.1% IE2 (50,100) 4.2% IE2 (90,100) 4.4%	IE2 (10,25) 2.1% IE2 (50,25) 2.1% IE2 (10,50) 2.2% IE2 (50,50) 2.3% IE2 (90,50) 2.4% IE2 (10,100) 2.6% IE2 (50,100) 2.7% IE2 (90,100) 2.9%	IE2 (10,25) 1.6% IE2 (50,25) 1.6% IE2 (10,50) 1.7% IE2 (50,50) 1.8% IE2 (90,50) 1.9% IE2 (10,100) 2.1% IE2 (50,100) 2.3% IE2 (90,100) 2.6%
Nominal losses in standby mode		19 W	
Operating conditions			
Permissible mounting orientations			
Hanging vertically		Yes	
Standing horizontally		Yes	
Installation elevation above sea level			
Nominal		0 to 500 m	
Maximum		4000 m [41]	
Pollution degree per EN 61800-5-1		2 (non-conductive pollution)	
Overvoltage category per EN 61800-5-1		III	
Degree of protection per EN 60529		IP20 [42]	
Ambient conditions			
Temperature			
Operation			
Minimum		-25°C [43]	
Nominal		5 to 40°C	
Maximum		55°C	
Storage		-25 to 55°C	
Transport		-25 to 70°C	
Relative humidity			
Operation		5 to 85%, non-condensing	
Storage		5 to 95%	
Transport		95% at 40°C	
Mechanical properties			
Dimensions			
Width		66 mm	
Height		374 mm	
Depth			
Wall mounting		258.5 mm (with 8EXA front cover: 261 mm)	
Weight		4 kg	

Table 61: 8EI2X2HWT10.XXXX-1, 8EI4X5HWT10.XXXX-1, 8EI8X8HWT10.XXXX-1 - Technical data

1) Operation on TT and IT power systems and on TN power systems that are not grounded to a star point is only permitted for 8EI servo drives with 8ZELxxxx Rev. E0 and higher. See the device information on the left side cover of the 8EI servo drive. Remove IT jumper X10 before operating in IT networks!
2) Operating the module at a mains input voltage of 24 to 120 VDC is only permitted if this mains input voltage is also specified in the device information on the left-hand side cover (Input: ... 24 - 120 VDC ...).

3) A line filter must be connected.
CE compliance can only be ensured by connecting an upstream B&R line filter (8B0F...).
In extreme cases, using line filters from 3rd-party manufacturers can result in irreparable damage to the ACOPOS P3 8EI servo drive.
4) P_{AVG} ... Average continuous power of the module
I_{AX1}, I_{AX2}, I_{AX3} ... RMS value of the current on axis 1, axis 2, axis 3
I_{BR1}, I_{BR2}, I_{BR3} ... Nominal current of the motor holding brake on axis 1, axis 2, axis 3
P_{VSLOT} ... Power dissipation of the 8EAC plug-in module
5) Maximum line length between line filter and mains connection on the module.
6) Maximum cable length between line filter and mains connection on the module.
7) Valid for mains input voltage ≥3x 400 VAC.
The sum of the continuous power values on all motor connections and the power of the DC bus connector is not permitted to exceed this value.
8) The continuous power is reduced as a percentage of the continuous current if the continuous current is subject to derating.
9) Starting with mapp Motion V6.2.0, continuous total power monitoring (INVR_TPOW_CONT_LOAD) and peak total power monitoring (INVR_TPOW_PEAK_LOAD) are automatically disabled for a mains input voltage of 24 to 120 VDC.
10) This value applies to unshielded wiring inside a control cabinet.
Maximum length of the DC bus wiring inside a control cabinet.
11) Current consumption depends on the respective configuration of the ACOPOS P3 8EI servo drive.
The inrush current of the 24 VDC power supply is not limited by the module.
12) Valid under the following conditions: 560 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
For DC bus voltages U_ZK < 560 VDC, maximum continuous power P_OUT is calculated as follows: P_OUT = Continuous power per motor connection * U_ZK / 560.
13) The total continuous power of all motor connections is not permitted to exceed 4 kW. The continuous power is reduced as a percentage of the continuous current if the continuous current is subject to derating.
14) Valid under the following conditions: 560 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
15) The temperature specifications refer to the ambient temperature.
16) Value for the nominal switching frequency.
17) The module cannot supply the full continuous current at this switching frequency. This unusual value for the ambient temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
18) The total peak power of all motor connections is not permitted to exceed 5 kW.
19) The total peak power of all motor connections is not permitted to exceed 10 kW.
20) B&R recommends operating the module at its nominal switching frequency. Operating the module at a higher switching frequency for application-specific reasons reduces the continuous current and increases CPU utilization.
21) Switching frequency 2.5 kHz is only available for 8EI servo drives with 8ZESxxxx Rev. E0 and higher.
22) Only applies when using B&R motor cables and B&R motors.
23) The module's electrical output frequency (SCTRL_SPEED_ACT * MOTOR_POLEPAIRS) is monitored to protect against dual use in accordance with Regulation (EC) 428/2009 | 3A225. If the electrical output frequency of the module exceeds the limit value of 598 Hz uninterrupted for more than 0.5 s, then the current movement is aborted and error 6060 is output ("Power unit: Limit speed exceeded").
24) The module's electrical output frequency (SCTRL_SPEED_ACT * MOTOR_POLEPAIRS) is monitored to protect against dual use in accordance with Council Regulation (EC) 428/2009 | 3A225. If the electrical output frequency of the module exceeds the limit value of 598 Hz uninterrupted for more than 0.5 s, then the current movement is aborted and error 6060 is output ("Power unit: Limit speed exceeded").
25) The sum of the cable lengths of all motor cables connected to this module is not permitted to exceed this value.
26) At values <22.9 V, under voltage monitoring is triggered and the servo drive signals error 6029 or 6055. In this case, the input voltage at connection X2 (24 VDC power supply) is too low and must be increased.
27) During configuration, it is necessary to check if the minimum voltage can be maintained on the holding brake with the intended line length. For the permissible operating voltage range of the holding brake, see the user documentation for the motor being used.
28) During configuration, it is necessary to check if the minimum voltage can be maintained on the holding brake with the intended cable length. For the permissible operating voltage range of the holding brake, see the user documentation for the motor being used.
29) There is a connection for external braking resistors. An internal braking resistor is available as an option.
30) Output signal switching device (OSSD) signals are used for monitoring signal lines for short circuits and cross faults.
31) The encoder type is not predefined from the factory. The encoder type necessary in each case must be configured in Automation Studio.
32) The direction of rotation of the encoder can be displayed on the 8EAD0000.000-1 display module.
33) Maximum encoder cable length l_{max} can be calculated as follows (the maximum permissible encoder cable length of 75 m is not permitted to exceeded):

$$l_{max} = f / I_G * A * 1/(2*\rho)$$

f ... (Output voltage of encoder interface [V] - Min. permissible supply voltage of connected encoder [V]) * 1.1
I_G ... Max. current consumption of the connected encoder [A].
A ... Cross section of the power supply wires [mm²]
ρ ... Specific resistance [Ω mm²/m] (e.g. for copper: ρ = 0.0178)
34) The output voltage is not predefined from the factory (with the exception of encoder types EnDat 2.2, EnDat 3.0 and HIPERFACE DSL). It must be configured in Automation Studio based on the encoder type. If no output voltage is configured, then the encoder will not be supplied by digital multi-encoder interface X4x. Power to the encoder can then be supplied externally.
35) Output voltage 5.2 V is only available under the following conditions:
- 8EI servo drive with 8ZECxxx revision D0 and higher - see the device information on the left side cover of the 8EI servo drive
- ACOPOS operating system 3.15.0 and higher (for 8EIxxxxxD... 2-axis modules and 8EIxxxxxT... 3-axis modules)
- ACOPOS operating system 3.17.0 and higher (for 8EIxxxxxS... 1-axis modules)
36) Except encoder type HIPERFACE DSL.
37) Values valid for clock output and data input. Except encoder type HIPERFACE DSL.
38) $I_{ENCODER}$ ... Current consumption of the encoder
U_{24V} ... Input voltage on the +24 VDC input of the module
39) The IE classification of the module is based on drive losses. This includes components such as EMC filters, etc. The power dissipation was determined at a switching frequency of 5 kHz (factory setting). Classification is performed at 90% of the frequency and at 100% of the continuous current. When operating the module in connection with an induction motor, the module is only permitted to be operated with a switching frequency of 5 kHz.
40) Continuous apparent power S[VA] = √3 * UMains[Vrms] * IMains[Arms]. IE2 notation (a,b) stands respectively for a load point with frequency a (as a percentage of the nominal frequency of the motor) and current b (as a percentage of the continuous current).
41) For operation on phase-grounded/center-grounded delta networks (TT and TN) and IT networks, the value is reduced to 2000 m.

42) The specified degree of protection is only met if either the slot cover is installed on the module or an 8EAC plug-in module is installed and suitable terminals are connected to all connectors and all fans are installed.
43) Only permitted for modules with 8ZEL... Revision E0 and higher. See the device information on the left side cover of the module. During storage or transport, sudden temperature changes may cause condensation or icing in the module. The module is only permitted to be commissioned if it is free of condensation or icing at the time of commissioning.

2.2.11 SafeMOTION 3-axis modules

2.2.11.1 Mains input voltage - 1x 110 to 230 VAC / 3x 200 to 230 VAC

2.2.11.1.1 Continuous power up to 2 kW (motor connection)

2.2.11.1.1.1 Order data

Order number	Short description	Figure
	Wall mounting	
8EI2X2MWTS0.XXXX-1	ACOPOS P3 servo drive , 1x 110-230 VAC, 3x 200-230 VAC, 3x 2.2 A, SafeMOTION, 3 axes, wall mounting	
8EI4X5MWTS0.XXXX-1	ACOPOS P3 servo drive , 1x 110-230 VAC, 3x 200-230 VAC, 3x 4.5 A, SafeMOTION, 3 axes, wall mounting	
8EI8X8MWTS0.XXXX-1	ACOPOS P3 servo drive , 1x 110-230 VAC, 3x 200-230 VAC, 3x 8.8 A, SafeMOTION, 3 axes, wall mounting	
	Optional accessories	
	Display modules	
8EAD0000.000-1	Display module, LCD, 128 x 64, black/white, 1x USB 3.0	
	Fan modules	
8EXF100.0000-00	ACOPOS P3 fan module, replacement fan for ACOPOS P3 servo drive single-width (8EI1X6/8EI2X2/8EI4X5/8EI8X8/8EI013/8EI017xxS)	
	Front covers	
8EXA200.0010-00	ACOPOS P3 dover, B&R orange, single-width, suitable for servo drives 8EI2X2xxDxx.xxxx-x / 8EI2X2xxTxx.xxxx-x / 8EI4X5xxDxx.xxxx-x / 8EI4X5xxTxx.xxxx-x /8EI8X8xxDxx.xxxx-x / 8EI8X8xxTxx.xxxx-x / 8EI013xxSxx.xxxx-x / 8EI017xxSxx.xxxx-x	
8EXA200.0020-00	ACOPOS P3 cover, B&R dark gray, single-width, suitable for servo drives 8EI2X2xxDxx.xxxx-x / 8EI2X2xxTxx.xxxx-x / 8EI4X5xxDxx.xxxx-x / 8EI4X5xxTxx.xxxx-x / 8EI8X8xxDxx.xxxx-x / 8EI8X8xxTxx.xxxx-x / 8EI013xxSxx.xxxx-x / 8EI017xxSxx.xxxx-x	
	Line filters passive	
8B0F0160H000.000-1	Line filter, passive, 16 A, 3x 528 VAC, 50/60 Hz, IP20	
8B0F0160H000.100-1	Passive line filter, 16 A, 3x 528 VAC, 50/60 Hz, IP20, specially designed also for operation at 2.5 kHz	
8B0F0300H000.000-1	Line filter, passive, 30 A, 3x 520 VAC, 50/60 Hz, IP20	
8B0F0550H000.000-1	Line filter, passive, 55 A, 3x 520 VAC, 50/60 Hz, IP20	
	Plug-in modules	
8EAC0122.001-1	ACOPOS P3 plug-in module, resolver interface 10 kHz	
8EAC0122.003-1	ACOPOS P3 plug-in module, 3 resolver interfaces 10 kHz	
8EAC0130.000-1	ACOPOS P3 plug-in module, 8 digital I/O 24 V (4x 400 mA, 4x 100 mA) individually configurable as inputs or outputs, 2 digital I/O 24 V 2 A configurable in pairs as inputs or outputs, order terminal block 8TB0230.221A-00 separately!	
8EAC0150.001-1	ACOPOS P3 plug-in module, digital multi-encoder interface	
8EAC0150.003-1	ACOPOS P3 plug-in module, 3 digital multi-encoder interfaces	
8EAC0151.001-1	ACOPOS P3 plug-in module, incremental encoder interface	
8EAC0151.003-1	ACOPOS P3 plug-in module, 3 incremental encoder interfaces	
8EAC0152.001-1	ACOPOS P3 plug-in module, analog multi-encoder interface	
8EAC0152.003-1	ACOPOS P3 plug-in module, 3 analog multi-encoder interfaces	
	Shield component sets	
8SCSE01.0100-00	ACOPOS P3 shield component set: 1x ACOPOS P3 shield mounting plate, 1x 2x M3x6 screws	
8SCSE02.0100-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK14	
8SCSE02.0200-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK20	
	Terminal blocks	
8TB2104.2210-00	4-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively	
8TB3102.222C-20	2-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	
8TB3103.222A-20	3-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: PE RB- RB+, coding A: 000	
8TB3106.223C-20	6-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 3: PE L3 N(L2) L1 DC- DC+, coding C: 000010	
8TB3202.222C-40	2-pin push-in terminal block, 2-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	

Table 62: 8EI2X2MWTS0.XXXX-1, 8EI4X5MWTS0.XXXX-1, 8EI8X8MWTS0.XXXX-1 - Order data

Order number	Short description	Figure
8TB3206.223C-40	6-pin push-in terminal block, 2-row, with locking mechanism, pitch: 7.62 mm, label 3: PE L3 N(L2) L1 DC- DC+, coding C: 000010	
8TB3308.222A-00	4+4-pin push-in terminal block 1-row / 2-row, pitch: 7.62 mm, label 2: T- B- T+ B+ PE W V U coding A: 0000	
	Terminal set	
8EZI8X8MTS.2201-0	Klemmensatz für ACOPOS P3 Module 8EI*X*M*DS0.****-1, 8EI*X*M*TS0.****-1: 1x 8TB2104.2210-00, 1x 8TB3102.222C-20, 3x 8TB3308.222A-00, 1x 8TB3106.223C-20, 1x 8TB3103.222A-20	
8EZI8X8MTS.2202-0	Klemmensatz für ACOPOS P3 Module 8EI1X6M*DS, 8EI2X2M*DS, 8EI4X5M*DS, 8EI8X8M*DS, 8EI1X6M*TS, 8EI2X2M*TS, 8EI4X5M*TS, 8EI8X8M*TS: 1x 8TB2104.2210-00, 1x 8TB3202.222C-40, 3x 8TB3308.222A-00, 1x 8TB3206.223C-40, 1x 8TB3103.222A-20	

Table 62: 8EI2X2MWTS0.XXXX-1, 8EI4X5MWTS0.XXXX-1, 8EI8X8MWTS0.XXXX-1 - Order data

Connection	1-row connector	2-row connector
X1	8TB3106.223C-20	8TB3206.223C-40
X2	8TB3102.222C-20	8TB3202.222C-40
X5x	8TB3308.222A-00	
X6	8TB3103.222A-20	
X7	8TB2104.2210-50	8TB2204.2210-50
X8	8TB2104.2210-00	

Table 63: Terminal blocks - Order numbers

Information:

Connector X7 does <u>not</u> exist on ACOPOS P3 SafeMOTION servo drives.

2.2.11.1.1.3 Technical data

Order number	8EI2X2MWTS0.XXXX-1	8EI4X5MWTS0.XXXX-1	8EI8X8MWTS0.XXXX-1
General information			
Support			
Dynamic node allocation (DNA)		Yes	
Slots for plug-in modules		1	
Certifications			
CE		Yes	
UKCA		Yes	
UL		cULus E225616 Power conversion equipment	
KC		Yes	
Mains connection			
Network configurations		TT, TN, TN-S, TN-C-S, IT [1]	
Mains input voltage		1x 110 VAC to 230 VAC ±10% 3x 200 VAC to 230 VAC ±10% 24 to 120 VDC [2]	
Frequency		50 / 60 Hz ±4%	
Installed load	Max. 3.75 kVA	Max. 5 kVA	
Inrush current		Max. 22 A	
Switch-on interval		Typ. 60 s	
Integrated line filter per EN 61800-3, category C3		No [3]	
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve		0.25 to 4 mm²	
Approbation data			
UL/C-UL-US		24 to 8 AWG	
CSA		24 to 8 AWG	
Power dissipation at device nominal power without braking resistor		[(40 + 10 * P_{AVG} [kW] + 5.8 * (I_{AX1} [A] + I_{AX2} [A] + I_{AX3} [A]) + 0.25 * (I_{BR1}^2 [A] + I_{BR2}^2 [A] + I_{BR3}^2 [A]) + P_{VSLOT}) * 1.1] [W] [4]	
Max. line length		3 m [5]	
DC bus connection			
Continuous power [6]	1.5 kW [7]	2 kW [7]	
Reduction of continuous power depending on mains input voltage [8]			
Mains input voltage <230 VAC	1.5 kW * (Mains input voltage [V] / 230 V)	2 kW * (Mains input voltage [V] / 230 V)	
DC bus capacitance		1880 µF	

Table 64: 8EI2X2MWTS0.XXXX-1, 8EI4X5MWTS0.XXXX-1, 8EI8X8MWTS0.XXXX-1 - Technical data

Order number	8EI2X2MWTS0.XXXX-1	8EI4X5MWTS0.XXXX-1	8EI8X8MWTS0.XXXX-1
Terminal connection cross sections			
Flexible and fine-stranded wires			
With wire end sleeves	0.25 to 4 mm²		
Approbation data			
UL/C-UL-US	24 to 8 AWG		
CSA	24 to 8 AWG		
Max. line length	3 m [9]		
24 VDC power supply			
Input voltage	24 VDC ±25%		
Input capacitance	5500 µF		
Current consumption	1.2 A + Current for motor holding brake [10]		
Terminal connection cross sections			
Flexible and fine-stranded wires			
With wire end sleeves	0.25 to 4 mm²		
Approbation data			
UL/C-UL-US	24 to 8 AWG		
CSA	24 to 8 AWG		
Max. line length	30 m		
Motor connection			
Quantity	3		
Continuous power per motor connection [11]	0.5 / 0.5 / 0.5 kW [12]	1 / 1 / 1 kW [13]	2 / 2 / 2 kW [13]
Continuous current per motor connection [14]	2.2 / 2.2 / 2.2 A_{eff}	4.5 / 4.5 / 4.5 A_{eff}	8.8 / 8.8 / 8.8 A_{eff}
Accuracy of the safe current [15]			
Safety function SLT [16]			
SIL 2 / PL d / Cat. 3 [17]	Hardware upgrade 1.10.2.x: 1.545 A Hardware upgrade 1.10.3.0 or later: 1.244 A	Hardware upgrade 1.10.2.x: 1.714 A Hardware upgrade 1.10.3.0 or later: 1.421 A	Hardware upgrade 1.10.2.x: 2.035 A Hardware upgrade 1.10.3.0 or later: 1.754 A
SIL 2 / PL d / Cat. 2 [17]	0.555 A	0.688 A	0.936 A
Safety function SBT [16]			
SIL 2 / PL d / Cat. 3 [17]	Hardware upgrade 1.10.2.x: 1.441 A Hardware upgrade 1.10.3.0 or later: 1.136 A	Hardware upgrade 1.10.2.x: 1.501 A Hardware upgrade 1.10.3.0 or later: 1.199 A	Hardware upgrade 1.10.2.x: 1.613 A Hardware upgrade 1.10.3.0 or later: 1.317 A
SIL 2 / PL d / Cat. 2 [17]	0.519 A		0.592 A
Reduction of continuous current depending on switching frequency [18]			
Switching frequency 5 kHz	No reduction		1.375 A/K (starting at 52.0°C) [19]
Switching frequency 10 kHz	No reduction		0.393 A/K (starting at 45.5°C)
Switching frequency 20 kHz	No reduction	0.120 A/K (starting at 41.9°C) [20]	0.120 A/K (starting at 5.9°C) [20]
Reduction of continuous current depending on installation elevation			
Starting at 500 m above sea level	0.22 A_{eff} per 1000 m	0.45 A_{eff} per 1000 m	0.88 A_{eff} per 1000 m
Peak current per motor connection	6 / 6 / 6 A_{eff}	12.25 / 12.25 / 12.25 A_{eff}	24 / 24 / 24 A_{eff}
Peak power output	1.25 kW	2.5 kW [21]	5 kW [21]
Nominal switching frequency	5 kHz		
Possible switching frequencies [22]	2.5 / 5 / 10 / 20 kHz [23]		
Insulation stress of the connected motor per IEC TS 60034-25:2004	Limit value curve A [24]		
Protective measures			
Overload protection	Yes		
Short-circuit and ground fault protection	Yes		
Max. output frequency	598 Hz [25]		
Variant			
U, V, W, PE	Connector		
Shield connection	Yes Clamping range of the grounding clamp: 11 to 16 mm		
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve	1.5 to 6 mm²		
Approbation data			
UL/C-UL-US	24 to 8 AWG		
CSA	24 to 8 AWG		
Max. motor line length depending on switching frequency			
Switching frequency 5 kHz	75 m [26]		
Switching frequency 10 kHz	38 m [26]		
Switching frequency 20 kHz	19 m [26]		
Motor holding brake connection			
Quantity	3		
Output voltage [27]	Depends on the input voltage on connector X2		
Continuous current per connection	1.3 A		
Max. internal resistance	0.25 Ω		
Extinction potential	Approx. 30 V		

Table 64: 8EI2X2MWTS0.XXXX-1, 8EI4X5MWTS0.XXXX-1, 8EI8X8MWTS0.XXXX-1 - Technical data

Order number	8EI2X2MWTS0.XXXX-1	8EI4X5MWTS0.XXXX-1	8EI8X8MWTS0.XXXX-1
Max. extinction energy per switching operation	1.5 Ws		
Max. switching frequency	0.5 Hz		
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve	0.25 to 4 mm²		
Approbation data			
UL/C-UL-US	24 to 8 AWG		
CSA	24 to 8 AWG		
Protective measures			
Overload and short-circuit protection	Yes		
Open-circuit monitoring	Yes		
Undervoltage monitoring	Yes		
Response threshold for open-circuit monitoring	Approx. 30 mA		
Response threshold for undervoltage monitoring	Approx. 23 V		
Max. line length	75 m [28]		
Braking resistor [29]			
Peak power int./ext.	1.5 kW / 11 kW		
Continuous power int./ext.	150 W / 970 W		
Minimum braking resistance (ext.)	12 Ω		
Protective measures			
Overload protection	No		
Short-circuit and ground fault protection	Short-circuit protection: Yes Ground fault protection: No		
Max. line length	3 m		
Fieldbus			
Type	POWERLINK V2 controlled node (CN)		
Variant	2x RJ45, shielded, 2-port hub		
Line length	Max. 100 m between 2 stations (segment length)		
Transfer rate	100 Mbit/s		
Encoder interfaces			
Quantity	3		
Type	Digital multi-encoder interface, configurable [30]		
Connections	8-pin female Mini I/O connector		
Status indicators	None [31]		
Electrical isolation			
Encoder - ACOPOS P3	No		
Max. encoder cable length	75 m Depends on the cross section of the power supply wires in the encoder cable [32]		
Encoder power supply			
Output voltage	Configurable Typ. 11.45 V ±0.1 V / 5.2 V ±0.1 V [33][34]	Configurable Typ. 11.45 V ±0.1 V / 5.2 V ± 0.1 V [33][34]	Configurable Typ. 11.45 V ±0.1 V / 5.2 V ±0.1 V [33][34]
Load capacity	Max. 300 mA		
Sense lines	2, compensation of max. 2x 0.7 V		
Protective measures			
Short-circuit proof	Yes		
Overload-proof	Yes		
Synchronous serial interface			
Signal transmission	RS485 [35]		
Data transfer rate	Depends on the configured encoder type		
Differential voltage [36]			
Minimum	2.0 V		
Maximum	6.0 V		
Max. power consumption per encoder interface	$P_{ENCODER}$ [W] = U_{24V} [V] * ($I_{ENCODER}$ [A] * 0.7) + 0.5 W [37]		
Trigger inputs			
Quantity	2		
Circuit	Sink		
Electrical isolation			
Input - ACOPOS P3	Yes		
Input - Input	Yes		
Input voltage			
Nominal	24 VDC		
Maximum	30 VDC		
Switching threshold			
Low	<5 V		
High	>15 V		
Input current at nominal voltage	7 mA		
Switching delay			
Rising edge	<51 µs		
Falling edge	<52 µs		
Modulation compared to ground potential	Max. ±38 V		

Table 64: 8EI2X2MWTS0.XXXX-1, 8EI4X5MWTS0.XXXX-1, 8EI8X8MWTS0.XXXX-1 - Technical data

Order number	8EI2X2MWTS0.XXXX-1	8EI4X5MWTS0.XXXX-1	8EI8X8MWTS0.XXXX-1
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve		0.25 to 2.5 mm²	
Approbation data			
UL/C-UL-US		26 to 12 AWG	
CSA		26 to 12 AWG	
Max. line length		100 m	
Temperature sensor connection			
Quantity		3	
Resistance range		500 Ω to 5 kΩ	
Support			
Motion system			
mapp Motion		5.03.0 and higher	
ACP10/ARNC0	3.14.1 and higher		3.14.0 and higher
Electrical properties			
Energy efficiency (IE classification) [38]			
Power dissipation relative to continuous apparent power [39]	IE2 (10,25) 5.2% IE2 (50,25) 5.3% IE2 (10,50) 5.2% IE2 (50,50) 5.3% IE2 (90,50) 5.4% IE2 (10,100) 5.6% IE2 (50,100) 5.7% IE2 (90,100) 5.9%	IE2 (10,25) 2.8% IE2 (50,25) 2.8% IE2 (10,50) 3% IE2 (50,50) 3.1% IE2 (90,50) 3.2% IE2 (10,100) 3.5% IE2 (50,100) 3.7% IE2 (90,100) 3.9%	IE2 (10,25) 2% IE2 (50,25) 2.1% IE2 (10,50) 2.3% IE2 (50,50) 2.4% IE2 (90,50) 2.5% IE2 (10,100) 2.8% IE2 (50,100) 3% IE2 (90,100) 3.4%
Nominal losses in standby mode		19 W	
Operating conditions			
Permissible mounting orientations			
Hanging vertically		Yes	
Standing horizontally		Yes	
Installation elevation above sea level			
Nominal		0 to 500 m	
Maximum		4000 m [40]	
Pollution degree per EN 61800-5-1		2 (non-conductive pollution)	
Overvoltage category per EN 61800-5-1		III	
Degree of protection per EN 60529		IP20 [41]	
Ambient conditions			
Temperature			
Operation			
Minimum		-25°C [42]	
Nominal		5 to 40°C	
Maximum		55°C	
Storage		-25 to 55°C	
Transport		-25 to 70°C	
Relative humidity			
Operation		5 to 85%, non-condensing	
Storage		5 to 95%	
Transport		95% at 40°C	
Mechanical properties			
Dimensions			
Width		66 mm	
Height		374 mm	
Depth			
Wall mounting		258.5 mm (with 8EXA front cover: 261 mm)	
Weight		4 kg	

Table 64: 8EI2X2MWTS0.XXXX-1, 8EI4X5MWTS0.XXXX-1, 8EI8X8MWTS0.XXXX-1 - Technical data

1) Operation on TT and IT power systems and on TN power systems that are not grounded to a star point is only permitted for 8EI servo drives with 8ZELxxxx Rev. E0 and higher. See the device information on the left side cover of the 8EI servo drive. Remove IT jumper X10 before operating in IT networks!
2) Operating the module at a mains input voltage of 24 to 120 VDC is only permitted if this mains input voltage is also specified in the device information on the left-hand side cover (Input: ... 24 - 120 VDC ...).
3) A line filter must be connected.
   CE compliance can only be ensured by connecting an upstream B&R line filter (8B0F...).
   In extreme cases, using line filters from 3rd-party manufacturers can result in irreparable damage to the ACOPOS P3 8EI servo drive.
4) P_{AVG} ... Average continuous power of the module
   I_{AX1}, I_{AX2}, I_{AX3} ... RMS value of the current on axis 1, axis 2, axis 3
   I_{BR1}, I_{BR2}, I_{BR3} ... Nominal current of the motor holding brake on axis 1, axis 2, axis 3
   P_{VSLOT} ... Power dissipation of the 8EAC plug-in module
5) Maximum cable length between line filter and mains connection on the module.
6) Valid for 230 VAC mains input voltage.
   The sum of the continuous power values on all motor connections and the power of the DC bus connector is not permitted to exceed this value.
7) The continuous power is reduced as a percentage of the continuous current if the continuous current is subject to derating.
8) Starting with mapp Motion V6.2.0, continuous total power monitoring (INVR_TPOW_CONT_LOAD) and peak total power monitoring (INVR_TPOW_PEAK_LOAD) are automatically disabled for a mains input voltage of 24 to 120 VDC.
9) This value applies to unshielded wiring inside a control cabinet.
   Maximum length of the DC bus wiring inside a control cabinet.

10) Current consumption depends on the respective configuration of the ACOPOS P3 8EI servo drive.
The inrush current of the 24 VDC power supply is not limited by the module.
11) Valid under the following conditions: 325 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
For DC bus voltages U_ZK < 325 VDC, maximum continuous power P_OUT is calculated as follows: P_OUT = Continuous power per motor connection * U_ZK / 325.
12) The total continuous power of all motor connections is not permitted to exceed 1.5 kW. The continuous power is reduced as a percentage of the continuous current if the continuous current is subject to derating.
13) The total continuous power of all motor connections is not permitted to exceed 2 kW. The continuous power is reduced as a percentage of the continuous current if the continuous current is subject to derating.
14) Valid under the following conditions: 325 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
15) The accuracy of the safe current is relevant for safety functions SLT and SBT, which are based on the safe current measurement. Safety functions SBT, SLT and SSO are available starting with hardware upgrade 1.10.2.0 and only for 8EI servo drives with 8ZELxxxx revision D0 or later. See the device information on the left side cover of the servo drive.
16) This safety function is certified for ACOPOS P3 per category 3 as well as category 2 of EN ISO 13849. Depending on the desired category, the corresponding accuracy of the safe current and corresponding safety characteristics must be used.
17) These values apply up to the continuous current specified in the technical data (taking into account the respective derating specifications).
18) The temperature specifications refer to the ambient temperature.
19) Value for the nominal switching frequency.
20) The module cannot supply the full continuous current at this switching frequency. This unusual value for the ambient temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
21) The total peak power of all motor connections is not permitted to exceed 5 kW.
22) B&R recommends operating the module at its nominal switching frequency. Operating the module at a higher switching frequency for application-specific reasons reduces the continuous current and increases CPU utilization.
23) A switching frequency of 20 kHz is not recommended when using safety functions SLT, SBT or SSO since availability problems may occur.
24) Only applies when using B&R motor cables and B&R motors.
25) The module's electrical output frequency (SCTRL_SPEED_ACT * MOTOR_POLEPAIRS) is monitored to protect against dual use in accordance with Council Regulation (EC) 428/2009 | 3A225. If the electrical output frequency of the module exceeds the limit value of 598 Hz uninterrupted for more than 0.5 s, then the current movement is aborted and error 6060 is output ("Power unit: Limit speed exceeded").
26) The sum of the cable lengths of all motor cables connected to this module is not permitted to exceed this value.
27) At values <22.9 V, under voltage monitoring is triggered and the servo drive signals error 6029 or 6055. In this case, the input voltage at connection X2 (24 VDC power supply) is too low and must be increased.
28) During configuration, it is necessary to check if the minimum voltage can be maintained on the holding brake with the intended cable length. For the permissible operating voltage range of the holding brake, see the user documentation for the motor being used.
29) There is a connection for external braking resistors. An internal braking resistor is available as an option.
30) The encoder type is not predefined from the factory. The encoder type necessary in each case must be configured in Automation Studio.
31) The direction of rotation of the encoder can be displayed on the 8EAD0000.000-1 display module.
32) Maximum encoder cable length l_{max} can be calculated as follows (the maximum permissible encoder cable length of 75 m is not permitted to exceeded):

$l_{max} = f / I_G * A * 1/(2*\rho)$

f ... (Output voltage of encoder interface [V] - Min. permissible supply voltage of connected encoder [V]) * 1.1
I_G ... Max. current consumption of the connected encoder [A].
A ... Cross section of the power supply wires [mm²]
ρ ... Specific resistance [Ω mm²/m] (e.g. for copper: ρ = 0.0178)
33) The output voltage is not predefined from the factory (with the exception of encoder types EnDat 2.2, EnDat 3.0 and HIPERFACE DSL). It must be configured in Automation Studio based on the encoder type. If no output voltage is configured, then the encoder will not be supplied by digital multi-encoder interface X4x. Power to the encoder can then be supplied externally.
34) Output voltage 5.2 V is only available under the following conditions:
- 8EI servo drive with 8ZECxxx revision D0 and higher - see the device information on the left side cover of the 8EI servo drive
- ACOPOS operating system 3.15.0 and higher (for 8EIxxxxxD... 2-axis modules and 8EIxxxxxT... 3-axis modules)
- ACOPOS operating system 3.17.0 and higher (for 8EIxxxxxS... 1-axis modules)
35) Except encoder type HIPERFACE DSL.
36) Values valid for clock output and data input. Except encoder type HIPERFACE DSL.
37) $I_{ENCODER}$ ... Current consumption of the encoder
U_{24V} ... Input voltage on the +24 VDC input of the module
38) The IE classification of the module is based on drive losses. This includes components such as EMC filters, etc. The power dissipation was determined at a switching frequency of 5 kHz (factory setting). Classification is performed at 90% of the frequency and at 100% of the continuous current. When operating the module in connection with an induction motor, the module is only permitted to be operated with a switching frequency of 5 kHz.
39) Continuous apparent power S[VA] = √3 * UMains[Vrms] * IMains[Arms]. IE2 notation (a,b) stands respectively for a load point with frequency a (as a percentage of the nominal frequency of the motor) and current b (as a percentage of the continuous current).
40) For operation on phase-grounded/center-grounded delta networks (TT and TN) and IT networks, the value is reduced to 2000 m.
41) The specified degree of protection is only met if either the slot cover is installed on the module or an 8EAC plug-in module is installed and suitable terminals are connected to all connectors and all fans are installed.
42) Only permitted for modules with 8ZEL... Revision E0 and higher. See the device information on the left side cover of the module. During storage or transport, sudden temperature changes may cause condensation or icing in the module. The module is only permitted to be commissioned if it is free of condensation or icing at the time of commissioning.

2.2.11.2 Mains input voltage - 3x 200 to 480 VAC

2.2.11.2.1 Continuous power up to 4 kW (motor connection)

2.2.11.2.1.1 Order data

Order number	Short description	Figure
	Wall mounting	
8EI2X2HWTS0.XXXX-1	ACOPOS P3 servo drive, 3x 200-480 VAC, 3x 2.2 A, SafeMOTION, 3 axes, wall mounting	
8EI4X5HWTS0.XXXX-1	ACOPOS P3 servo drive, 3x 200-480 VAC, 3x 4.5 A, SafeMOTION, 3 axes, wall mounting	
8EI8X8HWTS0.XXXX-1	ACOPOS P3 servo drive, 3x 200-480 VAC, 3x 8.8 A, SafeMOTION, 3 axes, wall mounting	
	Optional accessories	
	Display modules	
8EAD0000.000-1	Display module, LCD, 128 x 64, black/white, 1x USB 3.0	
	Fan modules	
8EXF100.0000-00	ACOPOS P3 fan module, replacement fan for ACOPOS P3 servo drive single-width (8EI1X6/8EI2X2/8EI4X5/8EI8X8/8EI013/8EI017xxS)	
	Front covers	
8EXA200.0010-00	ACOPOS P3 dover, B&R orange, single-width, suitable for servo drives 8EI2X2xxDxx.xxxx-x / 8EI2X2xxTxx.xxxx-x / 8EI4X5xxDxx.xxxx-x / 8EI4X5xxTxx.xxxx-x /8EI8X8xxDxx.xxxx-x / 8EI8X8xxTxx.xxxx-x / 8EI013xxSxx.xxxx-x / 8EI017xxSxx.xxxx-x	
8EXA200.0020-00	ACOPOS P3 cover, B&R dark gray, single-width, suitable for servo drives 8EI2X2xxDxx.xxxx-x / 8EI2X2xxTxx.xxxx-x / 8EI4X5xxDxx.xxxx-x / 8EI4X5xxTxx.xxxx-x / 8EI8X8xxDxx.xxxx-x / 8EI8X8xxTxx.xxxx-x / 8EI013xxSxx.xxxx-x / 8EI017xxSxx.xxxx-x	
	Line filters passive	
8B0F0160H000.000-1	Line filter, passive, 16 A, 3x 528 VAC, 50/60 Hz, IP20	
8B0F0160H000.100-1	Passive line filter, 16 A, 3x 528 VAC, 50/60 Hz, IP20, specially designed also for operation at 2.5 kHz	
8B0F0300H000.000-1	Line filter, passive, 30 A, 3x 520 VAC, 50/60 Hz, IP20	
8B0F0550H000.000-1	Line filter, passive, 55 A, 3x 520 VAC, 50/60 Hz, IP20	
	Plug-in modules	
8EAC0122.001-1	ACOPOS P3 plug-in module, resolver interface 10 kHz	
8EAC0122.003-1	ACOPOS P3 plug-in module, 3 resolver interfaces 10 kHz	
8EAC0130.000-1	ACOPOS P3 plug-in module, 8 digital I/O 24 V (4x 400 mA, 4x 100 mA) individually configurable as inputs or outputs, 2 digital I/O 24 V 2 A configurable in pairs as inputs or outputs, order terminal block 8TB0230.221A-00 separately!	
8EAC0150.001-1	ACOPOS P3 plug-in module, digital multi-encoder interface	
8EAC0150.003-1	ACOPOS P3 plug-in module, 3 digital multi-encoder interfaces	
8EAC0151.001-1	ACOPOS P3 plug-in module, incremental encoder interface	
8EAC0151.003-1	ACOPOS P3 plug-in module, 3 incremental encoder interfaces	
8EAC0152.001-1	ACOPOS P3 plug-in module, analog multi-encoder interface	
8EAC0152.003-1	ACOPOS P3 plug-in module, 3 analog multi-encoder interfaces	
	Shield component sets	
8SCSE01.0100-00	ACOPOS P3 shield component set: 1x ACOPOS P3 shield mounting plate, 1x 2x M3x6 screws	
8SCSE02.0100-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK14	
8SCSE02.0200-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK20	
	Terminal blocks	
8TB2104.2210-00	4-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively	
8TB3102.222C-20	2-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	
8TB3103.222A-20	3-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: PE RB- RB+, coding A: 000	
8TB3106.222B-20	6-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: PE L3 L2 L1 DC- DC+, coding B: 000001	
8TB3202.222C-40	2-pin push-in terminal block, 2-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	
8TB3206.222B-40	6-pin push-in terminal block, 2-row, with locking mechanism, pitch: 7.62 mm, label 2: PE L3 L2 L1 DC- DC+, coding B: 000001	

Table 65: 8EI2X2HWTS0.XXXX-1, 8EI4X5HWTS0.XXXX-1, 8EI8X8HWTS0.XXXX-1 - Order data

Order number	Short description	Figure
8TB3308.222A-00	4+4-pin push-in terminal block 1-row / 2-row, pitch: 7.62 mm, label 2: T- B- T+ B+ PE W V U coding A: 0000	
	Terminal set	
8EZI8X8HTS.2201-0	Klemmensatz für ACOPOS P3 Module 8EI1X6H*DS, 8EI2X2H*DS, 8EI4X5H*DS, 8EI8X8H*DS, 8EI1X6H*TS, 8EI2X2H*TS, 8EI4X5H*TS, 8EI8X8H*TS: 1x 8TB2104.2210-00, 1x 8TB3102.222C-20, 3x 8TB3308.222A-00, 1x 8TB3106.222B-20, 1x 8TB3103.222A-20	
8EZI8X8HTS.2202-0	Klemmensatz für ACOPOS P3 Module 8EI*X*H*DS0.****-1, 8EI*X*H*TS0.****-1: 1x 8TB2104.2210-00, 1x 8TB3202.222C-40, 3x 8TB3308.222A-00, 1x 8TB3206.222B-40, 1x 8TB3103.222A-20	

Table 65: 8EI2X2HWTS0.XXXX-1, 8EI4X5HWTS0.XXXX-1, 8EI8X8HWTS0.XXXX-1 - Order data

Connection	1-row connector	2-row connector
X1	8TB3106.222B-20	8TB3206.222B-40
X2	8TB3102.222C-20	8TB3202.222C-40
X5x	8TB3308.222A-00	
X6	8TB3103.222A-20	
X7	8TB2104.2210-50	8TB2204.2210-50
X8	8TB2104.2210-00	

Table 66: Terminal blocks - Order numbers

Information:

Connector X7 does not exist on ACOPOS P3 SafeMOTION servo drives.

2.2.11.2.1.3 Technical data

Order number	8EI2X2HWTS0.XXXX-1	8EI4X5HWTS0.XXXX-1	8EI8X8HWTS0.XXXX-1
General information			
Support			
Dynamic node allocation (DNA)		Yes	
Slots for plug-in modules		1	
Certifications			
CE		Yes	
UKCA		Yes	
UL		cULus E225616 Power conversion equipment	
KC		Yes	
Mains connection			
Network configurations		TT, TN, TN-S, TN-C-S, IT [1]	
Mains input voltage		3x 200 VAC to 480 VAC ±10% 24 to 120 VDC [2]	
Frequency		50 / 60 Hz ±4%	
Installed load	Max. 7.5 kVA	Max. 10 kVA	
Inrush current		Max. 45 A	
Switch-on interval		Typ. 60 s	
Integrated line filter per EN 61800-3, category C3		No [3]	
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve		0.25 to 4 mm²	
Approbation data			
UL/C-UL-US		24 to 8 AWG	
CSA		24 to 8 AWG	
Power dissipation at device nominal power without braking resistor		[(60 + 6.9 * P_{AVG} [kW] + 7.5 * (I_{AX1} [A] + I_{AX2} [A] + I_{AX3} [A]) + 0.25 * (I_{BR1}^2 [A] + I_{BR2}^2 [A] + I_{BR3}^2 [A]) + P_{VSLOT}) * 1.1] [W] [4]	
Max. line length		3 m [5]	
DC bus connection			
Continuous power [6]	3 kW [7]	4 kW [7]	
Reduction of continuous power depending on mains input voltage [8]			
Mains input voltage <3x 400 VAC	3 kW * (Mains input voltage [V] / 400 V)	4 kW * (Mains input voltage [V] / 400 V)	
DC bus capacitance		470 µF	

Table 67: 8EI2X2HWTS0.XXXX-1, 8EI4X5HWTS0.XXXX-1, 8EI8X8HWTS0.XXXX-1 - Technical data

Order number	8EI2X2HWTS0.XXXX-1	8EI4X5HWTS0.XXXX-1	8EI8X8HWTS0.XXXX-1
Terminal connection cross sections			
Flexible and fine-stranded wires			
With wire end sleeves	0.25 to 4 mm²		
Approbation data			
UL/C-UL-US	24 to 8 AWG		
CSA	24 to 8 AWG		
Max. line length	3 m [9]		
24 VDC power supply			
Input voltage	24 VDC ±25%		
Input capacitance	5500 µF		
Current consumption	1.2 A + Current for motor holding brake [10]		
Terminal connection cross sections			
Flexible and fine-stranded wires			
With wire end sleeves	0.25 to 4 mm²		
Approbation data			
UL/C-UL-US	24 to 8 AWG		
CSA	24 to 8 AWG		
Max. line length	30 m		
Motor connection			
Quantity	3		
Continuous power per motor connection [11]	1 / 1 / 1 kW [12]	2 / 2 / 2 kW [13]	4 / 4 / 4 kW [13]
Continuous current per motor connection [14]	2.2 / 2.2 / 2.2 A_{eff}	4.5 / 4.5 / 4.5 A_{eff}	8.8 / 8.8 / 8.8 A_{eff}
Accuracy of the safe current [15]			
Safety function SLT [16]			
SIL 2 / PL d / Cat. 3 [17]	Hardware upgrade 1.10.2.x: 1.545 A Hardware upgrade 1.10.3.0 or later: 1.244 A	Hardware upgrade 1.10.2.x: 1.714 A Hardware upgrade 1.10.3.0 or later: 1.421 A	Hardware upgrade 1.10.2.x: 2.035 A Hardware upgrade 1.10.3.0 or later: 1.754 A
SIL 2 / PL d / Cat. 2 [17]	0.555 A	0.688 A	0.936 A
Safety function SBT [16]			
SIL 2 / PL d / Cat. 3 [17]	Hardware upgrade 1.10.2.x: 1.441 A Hardware upgrade 1.10.3.0 or later: 1.136 A	Hardware upgrade 1.10.2.x: 1.501 A Hardware upgrade 1.10.3.0 or later: 1.199 A	Hardware upgrade 1.10.2.x: 1.613 A Hardware upgrade 1.10.3.0 or later: 1.317 A
SIL 2 / PL d / Cat. 2 [17]	0.519 A		0.592 A
Reduction of continuous current depending on switching frequency [18]			
Switching frequency 5 kHz	No reduction		0.373 A/K (starting at 45.2°C) [19]
Switching frequency 10 kHz	No reduction	0.154 A/K (starting at 46.5°C)	0.154 A/K (starting at 18.5°C)
Switching frequency 20 kHz	0.075 A/K (starting at 37.1°C) [20]	0.075 A/K (starting at 6.4°C) [20]	0.075 A/K (starting at -50.9°C) [20]
Reduction of continuous current depending on installation elevation			
Starting at 500 m above sea level	0.22 A_{eff} per 1000 m	0.45 A_{eff} per 1000 m	0.88 A_{eff} per 1000 m
Peak current per motor connection	6 / 6 / 6 A_{eff}	12.25 / 12.25 / 12.25 A_{eff}	24 / 24 / 24 A_{eff}
Peak power output	2.5 kW	5 kW [21]	10 kW [21]
Nominal switching frequency	5 kHz		
Possible switching frequencies [22]	2.5 / 5 / 10 / 20 kHz [23]		
Insulation stress of the connected motor per IEC TS 60034-25:2004	Limit value curve A [24]		
Protective measures			
Overload protection	Yes		
Short-circuit and ground fault protection	Yes		
Max. output frequency	598 Hz [25]		
Variant			
U, V, W, PE	Connector		
Shield connection	Yes Clamping range of the grounding clamp: 11 to 16 mm		
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve	1.5 to 6 mm²		
Approbation data			
UL/C-UL-US	24 to 8 AWG		
CSA	24 to 8 AWG		
Max. motor line length depending on switching frequency			
Switching frequency 5 kHz	75 m [26]		
Switching frequency 10 kHz	38 m [26]		
Switching frequency 20 kHz	19 m [26]		
Motor holding brake connection			
Quantity	3		
Output voltage [27]	Depends on the input voltage on connector X2		

Table 67: 8EI2X2HWTS0.XXXX-1, 8EI4X5HWTS0.XXXX-1, 8EI8X8HWTS0.XXXX-1 - Technical data

Order number	8EI2X2HWTS0.XXXX-1	8EI4X5HWTS0.XXXX-1	8EI8X8HWTS0.XXXX-1
Continuous current per connection	1.3 A		
Max. internal resistance	0.25 Ω		
Extinction potential	Approx. 30 V		
Max. extinction energy per switching operation	1.5 Ws		
Max. switching frequency	0.5 Hz		
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve	0.25 to 4 mm²		
Approbation data			
UL/C-UL-US	24 to 8 AWG		
CSA	24 to 8 AWG		
Protective measures			
Overload and short-circuit protection	Yes		
Open-circuit monitoring	Yes		
Undervoltage monitoring	Yes		
Response threshold for open-circuit monitoring	Approx. 30 mA		
Response threshold for undervoltage monitoring	Approx. 23 V		
Max. line length	75 m [28]		
Braking resistor [29]			
Peak power int./ext.	7 kW / 25 kW		
Continuous power int./ext.	150 W / 2 kW		
Minimum braking resistance (ext.)	25 Ω		
Protective measures			
Overload protection	No		
Short-circuit and ground fault protection	Short-circuit protection: Yes Ground fault protection: No		
Max. line length	3 m		
Fieldbus			
Type	POWERLINK V2 controlled node (CN)		
Variant	2x RJ45, shielded, 2-port hub		
Line length	Max. 100 m between 2 stations (segment length)		
Transfer rate	100 Mbit/s		
Encoder interfaces			
Quantity	3		
Type	Digital multi-encoder interface, configurable [30]		
Connections	8-pin female Mini I/O connector		
Status indicators	None [31]		
Electrical isolation			
Encoder - ACOPOS P3	No		
Max. encoder cable length	75 m Depends on the cross section of the power supply wires in the encoder cable [32]		
Encoder power supply			
Output voltage	Configurable Typ. 11.45 V ±0.1 V / 5.2 V ± 0.1 V [33][34]		Configurable Typ. 11.45 V ±0.1 V / 5.2 V ±0.1 V [33][34]
Load capacity	Max. 300 mA		
Sense lines	2, compensation of max. 2x 0.7 V		
Protective measures			
Short-circuit proof	Yes		
Overload-proof	Yes		
Synchronous serial interface			
Signal transmission	RS485 [35]		
Data transfer rate	Depends on the configured encoder type		
Differential voltage [36]			
Minimum	2.0 V		
Maximum	6.0 V		
Max. power consumption per encoder interface	$P_{ENCODER}$ [W] = U_{24V} [V] * ($I_{ENCODER}$ [A] * 0.7) + 0.5 W [37]		
Trigger inputs			
Quantity	2		
Circuit	Sink		
Electrical isolation			
Input - ACOPOS P3	Yes		
Input - Input	Yes		
Input voltage			
Nominal	24 VDC		
Maximum	30 VDC		
Switching threshold			
Low	<5 V		
High	>15 V		
Input current at nominal voltage	7 mA		

Table 67: 8EI2X2HWTS0.XXXX-1, 8EI4X5HWTS0.XXXX-1, 8EI8X8HWTS0.XXXX-1 - Technical data

Order number	8EI2X2HWTS0.XXXX-1	8EI4X5HWTS0.XXXX-1	8EI8X8HWTS0.XXXX-1
Switching delay			
Rising edge		<51 µs	
Falling edge		<52 µs	
Modulation compared to ground potential		Max. ±38 V	
Terminal connection cross section			
Flexible and fine-stranded wires			
With wire end sleeve		0.25 to 2.5 mm²	
Approbation data			
UL/C-UL-US		26 to 12 AWG	
CSA		26 to 12 AWG	
Max. line length		100 m	
Temperature sensor connection			
Quantity		3	
Resistance range		500 Ω to 5 kΩ	
Support			
Motion system			
mapp Motion		5.03.0 and higher	
ACP10/ARNC0	3.14.1 and higher		3.14.0 and higher
Electrical properties			
Energy efficiency (IE classification) [38]			
Power dissipation relative to continuous apparent power [39]	IE2 (10,25) 3.6% IE2 (50,25) 3.6% IE2 (10,50) 3.8% IE2 (50,50) 3.8% IE2 (90,50) 3.9% IE2 (10,100) 4.1% IE2 (50,100) 4.2% IE2 (90,100) 4.4%	IE2 (10,25) 2.1% IE2 (50,25) 2.1% IE2 (10,50) 2.2% IE2 (50,50) 2.3% IE2 (90,50) 2.4% IE2 (10,100) 2.6% IE2 (50,100) 2.7% IE2 (90,100) 2.9%	IE2 (10,25) 1.6% IE2 (50,25) 1.6% IE2 (10,50) 1.7% IE2 (50,50) 1.8% IE2 (90,50) 1.9% IE2 (10,100) 2.1% IE2 (50,100) 2.3% IE2 (90,100) 2.6%
Nominal losses in standby mode		19 W	
Operating conditions			
Permissible mounting orientations			
Hanging vertically		Yes	
Standing horizontally		Yes	
Installation elevation above sea level			
Nominal		0 to 500 m	
Maximum		4000 m [40]	
Pollution degree per EN 61800-5-1		2 (non-conductive pollution)	
Overvoltage category per EN 61800-5-1		III	
Degree of protection per EN 60529		IP20 [41]	
Ambient conditions			
Temperature			
Operation			
Minimum		-25°C [42]	
Nominal		5 to 40°C	
Maximum		55°C	
Storage		-25 to 55°C	
Transport		-25 to 70°C	
Relative humidity			
Operation		5 to 85%, non-condensing	
Storage		5 to 95%	
Transport		95% at 40°C	
Mechanical properties			
Dimensions			
Width		66 mm	
Height		374 mm	
Depth			
Wall mounting		258.5 mm (with 8EXA front cover: 261 mm)	
Weight		4 kg	

Table 67: 8EI2X2HWTS0.XXXX-1, 8EI4X5HWTS0.XXXX-1, 8EI8X8HWTS0.XXXX-1 - Technical data

1) Operation on TT and IT power systems and on TN power systems that are not grounded to a star point is only permitted for 8EI servo drives with 8ZELxxxx Rev. E0 and higher. See the device information on the left side cover of the 8EI servo drive. Remove IT jumper X10 before operating in IT networks!
2) Operating the module at a mains input voltage of 24 to 120 VDC is only permitted if this mains input voltage is also specified in the device information on the left-hand side cover (Input: ... 24 - 120 VDC ...).
3) A line filter must be connected.
   CE compliance can only be ensured by connecting an upstream B&R line filter (8B0F...).
   In extreme cases, using line filters from 3rd-party manufacturers can result in irreparable damage to the ACOPOS P3 8EI servo drive.
4) P_{AVG} ... Average continuous power of the module
   I_{AX1}, I_{AX2}, I_{AX3} ... RMS value of the current on axis 1, axis 2, axis 3
   I_{BR1}, I_{BR2}, I_{BR3} ... Nominal current of the motor holding brake on axis 1, axis 2, axis 3
   P_{VSLOT} ... Power dissipation of the 8EAC plug-in module
5) Maximum cable length between line filter and mains connection on the module.
6) Valid for mains input voltage ≥3x 400 VAC.
   The sum of the continuous power values on all motor connections and the power of the DC bus connector is not permitted to exceed this value.
7) The continuous power is reduced as a percentage of the continuous current if the continuous current is subject to derating.

8) Starting with mapp Motion V6.2.0, continuous total power monitoring (INVR_TPOW_CONT_LOAD) and peak total power monitoring (INVR_TPOW_PEAK_LOAD) are automatically disabled for a mains input voltage of 24 to 120 VDC.
9) This value applies to unshielded wiring inside a control cabinet.
Maximum length of the DC bus wiring inside a control cabinet.
10) Current consumption depends on the respective configuration of the ACOPOS P3 8EI servo drive.
The inrush current of the 24 VDC power supply is not limited by the module.
11) Valid under the following conditions: 560 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
For DC bus voltages U_ZK < 560 VDC, maximum continuous power P_OUT is calculated as follows: P_OUT = Continuous power per motor connection * U_ZK / 560.
12) The total continuous power of all motor connections is not permitted to exceed 3 kW. The continuous power is reduced as a percentage of the continuous current if the continuous current is subject to derating.
13) The total continuous power of all motor connections is not permitted to exceed 4 kW. The continuous power is reduced as a percentage of the continuous current if the continuous current is subject to derating.
14) Valid under the following conditions: 560 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
15) The accuracy of the safe current is relevant for safety functions SLT and SBT, which are based on the safe current measurement. Safety functions SBT, SLT and SSO are available starting with hardware upgrade 1.10.2.0 and only for 8EI servo drives with 8ZELxxxx revision D0 or later. See the device information on the left side cover of the servo drive.
16) This safety function is certified for ACOPOS P3 per category 3 as well as category 2 of EN ISO 13849. Depending on the desired category, the corresponding accuracy of the safe current and corresponding safety characteristics must be used.
17) These values apply up to the continuous current specified in the technical data (taking into account the respective derating specifications).
18) The temperature specifications refer to the ambient temperature.
19) Value for the nominal switching frequency.
20) The module cannot supply the full continuous current at this switching frequency. This unusual value for the ambient temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
21) The total peak power of all motor connections is not permitted to exceed 10 kW.
22) B&R recommends operating the module at its nominal switching frequency. Operating the module at a higher switching frequency for application-specific reasons reduces the continuous current and increases CPU utilization.
23) A switching frequency of 20 kHz is not recommended when using safety functions SLT, SBT or SSO since availability problems may occur.
24) Only applies when using B&R motor cables and B&R motors.
25) The module's electrical output frequency (SCTRL_SPEED_ACT * MOTOR_POLEPAIRS) is monitored to protect against dual use in accordance with Council Regulation (EC) 428/2009 | 3A225. If the electrical output frequency of the module exceeds the limit value of 598 Hz uninterrupted for more than 0.5 s, then the current movement is aborted and error 6060 is output ("Power unit: Limit speed exceeded").
26) The sum of the cable lengths of all motor cables connected to this module is not permitted to exceed this value.
27) At values <22.9 V, under voltage monitoring is triggered and the servo drive signals error 6029 or 6055. In this case, the input voltage at connection X2 (24 VDC power supply) is too low and must be increased.
28) During configuration, it is necessary to check if the minimum voltage can be maintained on the holding brake with the intended cable length. For the permissible operating voltage range of the holding brake, see the user documentation for the motor being used.
29) There is a connection for external braking resistors. An internal braking resistor is available as an option.
30) The encoder type is not predefined from the factory. The encoder type necessary in each case must be configured in Automation Studio.
31) The direction of rotation of the encoder can be displayed on the 8EAD0000.000-1 display module.
32) Maximum encoder cable length l_{max} can be calculated as follows (the maximum permissible encoder cable length of 75 m is not permitted to exceeded):

$l_{max} = f / I_G * A * 1/(2*\rho)$

f ... (Output voltage of encoder interface [V] - Min. permissible supply voltage of connected encoder [V]) * 1.1
I_G ... Max. current consumption of the connected encoder [A].
A ... Cross section of the power supply wires [mm²]
ρ ... Specific resistance [Ω mm²/m] (e.g. for copper: ρ = 0.0178)
33) The output voltage is not predefined from the factory (with the exception of encoder types EnDat 2.2, EnDat 3.0 and HIPERFACE DSL). It must be configured in Automation Studio based on the encoder type. If no output voltage is configured, then the encoder will not be supplied by digital multi-encoder interface X4x. Power to the encoder can then be supplied externally.
34) Output voltage 5.2 V is only available under the following conditions:
- 8EI servo drive with 8ZECxxx revision D0 and higher - see the device information on the left side cover of the 8EI servo drive
- ACOPOS operating system 3.15.0 and higher (for 8EIxxxxxD... 2-axis modules and 8EIxxxxxT... 3-axis modules)
- ACOPOS operating system 3.17.0 and higher (for 8EIxxxxxS... 1-axis modules)
35) Except encoder type HIPERFACE DSL.
36) Values valid for clock output and data input. Except encoder type HIPERFACE DSL.
37) $I_{ENCODER}$ ... Current consumption of the encoder
U_{24V} ... Input voltage on the +24 VDC input of the module
38) The IE classification of the module is based on drive losses. This includes components such as EMC filters, etc. The power dissipation was determined at a switching frequency of 5 kHz (factory setting). Classification is performed at 90% of the frequency and at 100% of the continuous current. When operating the module in connection with an induction motor, the module is only permitted to be operated with a switching frequency of 5 kHz.
39) Continuous apparent power S[VA] = √3 * UMains[Vrms] * IMains[Arms]. IE2 notation (a,b) stands respectively for a load point with frequency a (as a percentage of the nominal frequency of the motor) and current b (as a percentage of the continuous current).
40) For operation on phase-grounded/center-grounded delta networks (TT and TN) and IT networks, the value is reduced to 2000 m.
41) The specified degree of protection is only met if either the slot cover is installed on the module or an 8EAC plug-in module is installed and suitable terminals are connected to all connectors and all fans are installed.
42) Only permitted for modules with 8ZEL... Revision E0 and higher. See the device information on the left side cover of the module. During storage or transport, sudden temperature changes may cause condensation or icing in the module. The module is only permitted to be commissioned if it is free of condensation or icing at the time of commissioning.

2.2.12 Wiring

2.2.12.1 Pinout overview

2.2.12.1.1 1-axis modules

8EI1X6MWS10.xxxx-1, 8EI2X2MWS10.xxxx-1, 8EI4X5MWS10.xxxx-1, 8EI8X8MWS10.xxxx-1

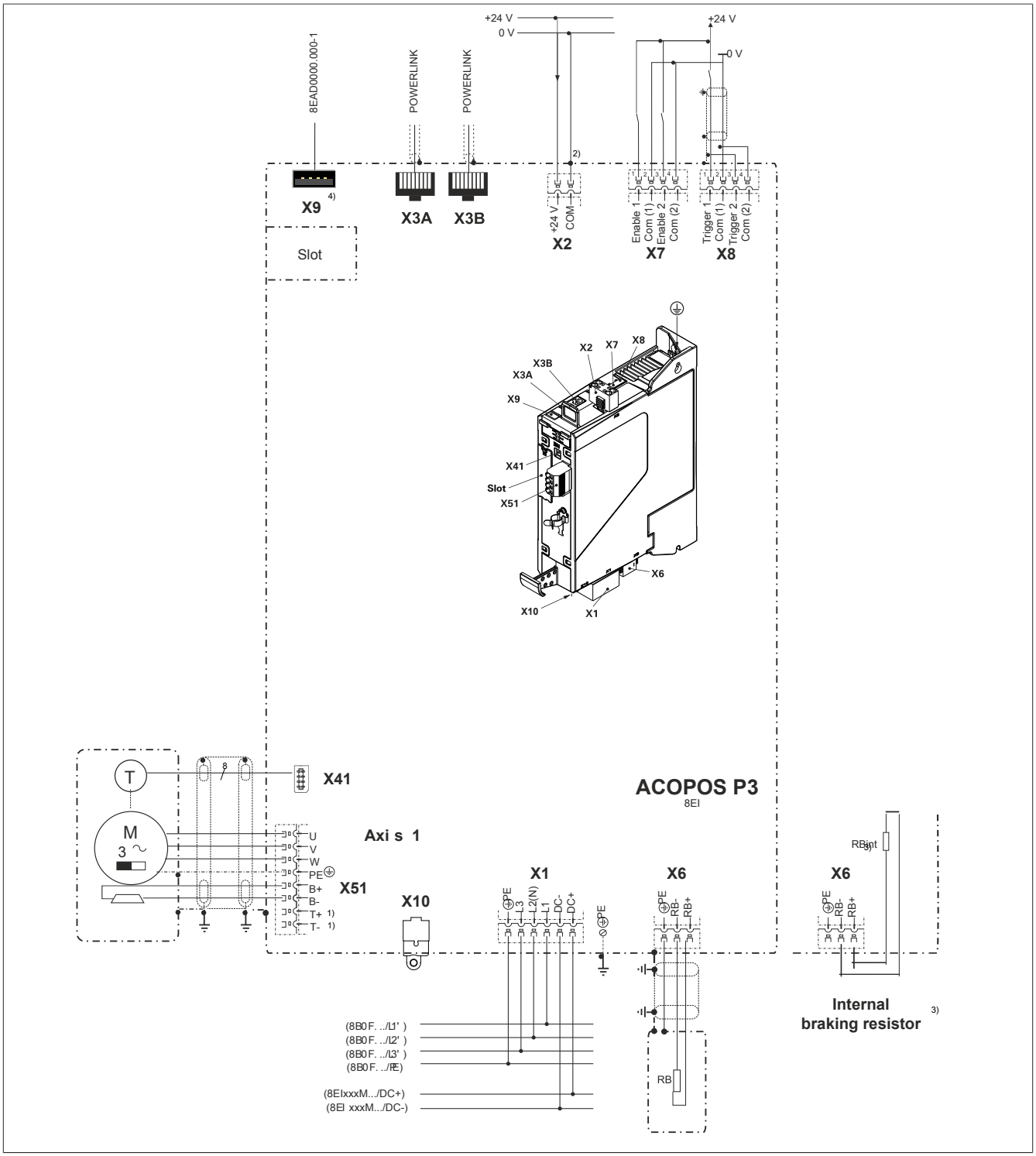


Figure 3: Mains input voltage - 1x 110 to 230 VAC / 3x 200 to 230 VAC

1) A temperature sensor does not need to be connected when using 8ECHxxx hybrid motor cables since the motor temperature is transferred digitally.
2) The COM connection on connector X2 must be grounded to achieve a defined relationship between the signal ground and ground potential!
3) Internal braking resistor RBint is optional and must be selected when configuring the 8EI servo drive. It is not possible to retrofit an internal braking resistor!
4) Only 8EAD0000.000-1 display modules are permitted to be connected to connector X9!

8EI1X6HWS10.xxxx-1, 8EI2X2HWS10.xxxx-1, 8EI4X5HWS10.xxxx-1, 8EI8X8HWS10.xxxx-1

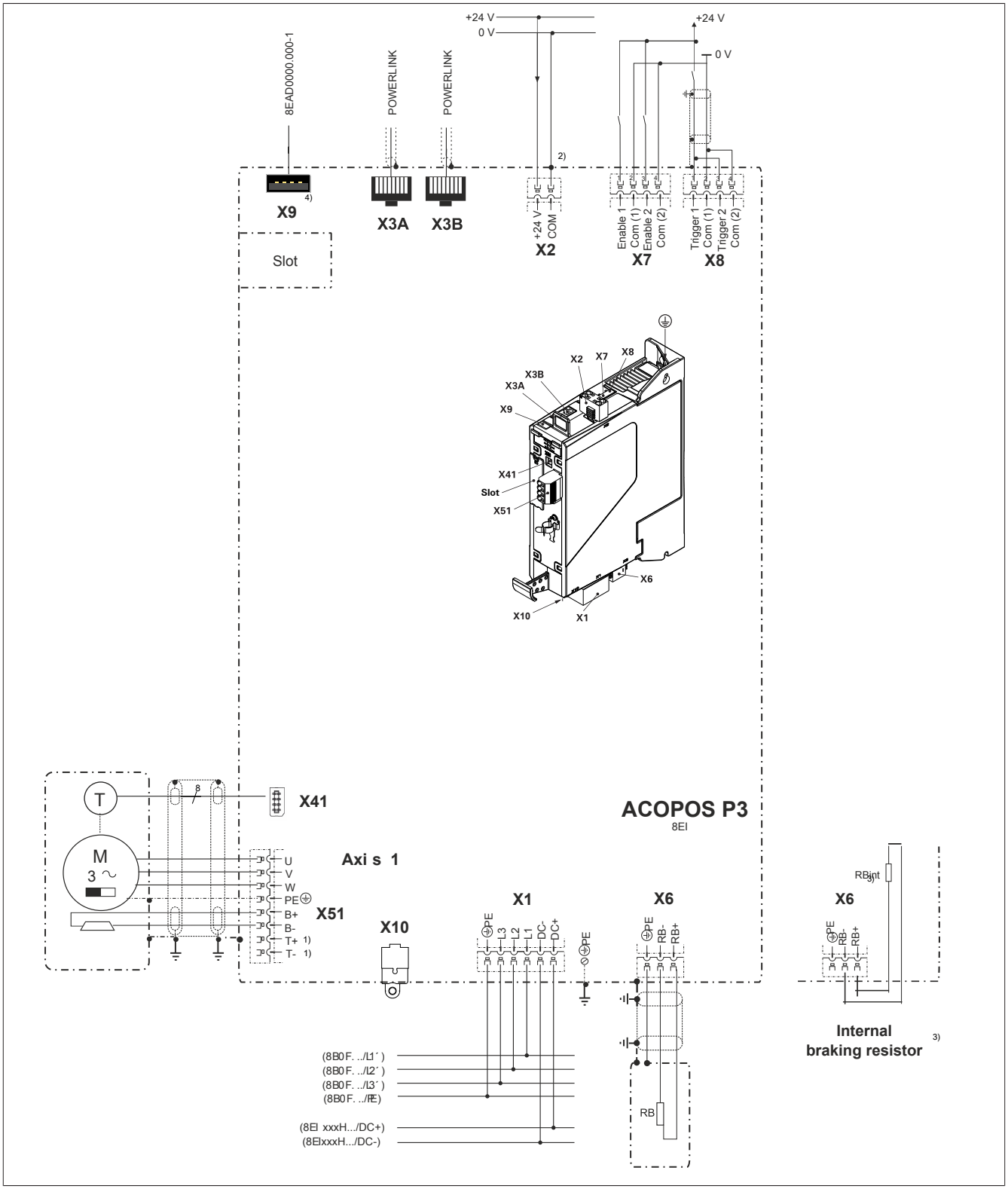


Figure 4: Mains input voltage - 3x 200 to 480 VAC

1) A temperature sensor does not need to be connected when using 8ECHxxx hybrid motor cables since the motor temperature is transferred digitally.
2) The COM connection on connector X2 must be grounded to achieve a defined relationship between the signal ground and ground potential!
3) Internal braking resistor RBint is optional and must be selected when configuring the 8EI servo drive. It is not possible to retrofit an internal brake resistor!
4) Only 8EAD0000.000-1 display modules are permitted to be connected to connector X9!

8EI013HWS10.xxxx-1, 8EI017HWS10.xxxx-1

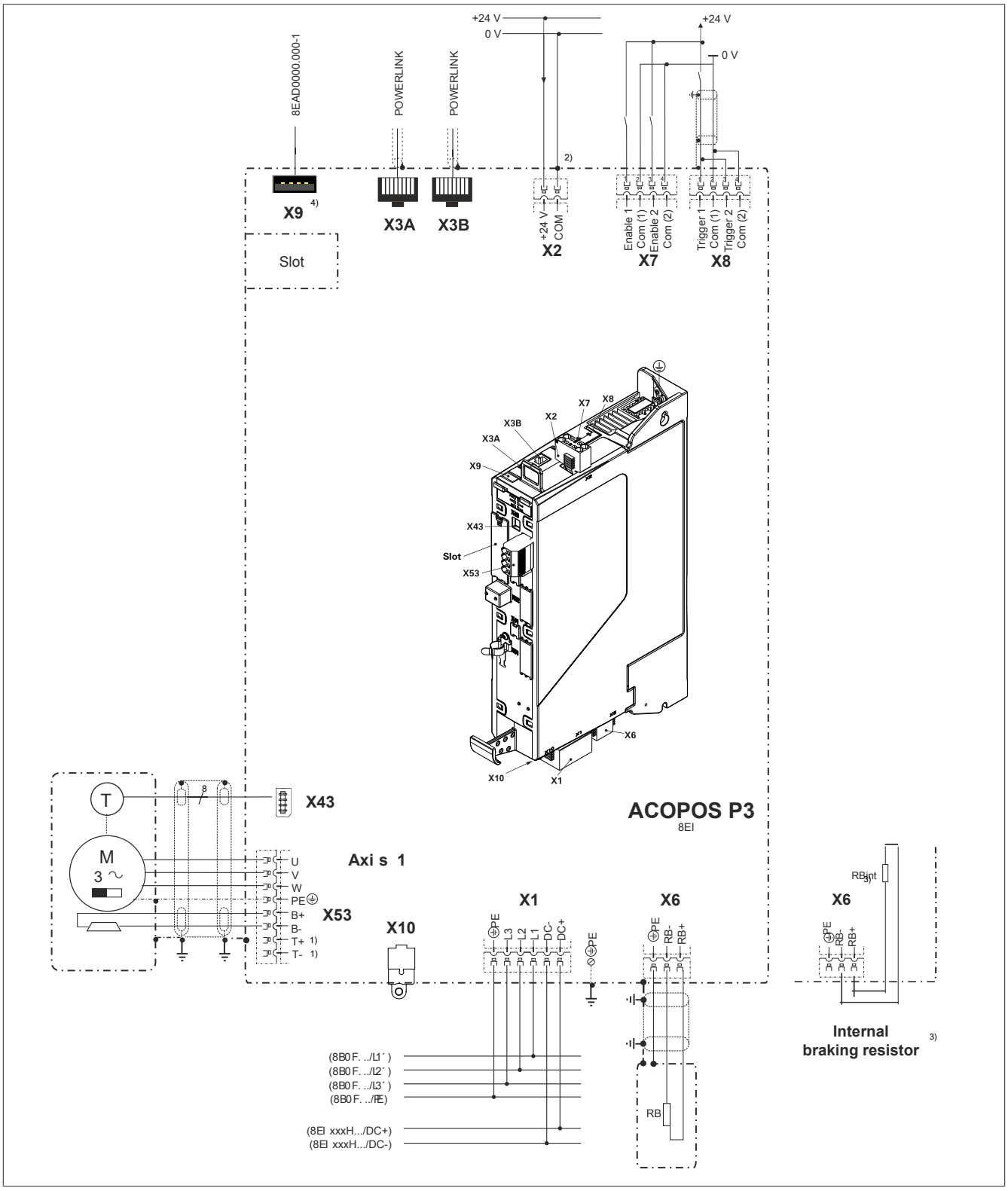


Figure 5: Mains input voltage - 3x 200 to 480 VAC

1) A temperature sensor does not need to be connected when using 8ECHxxx hybrid motor cables since the motor temperature is transferred digitally.
2) The COM connection on connector X2 must be grounded to achieve a defined relationship between the signal ground and ground potential!
3) Internal braking resistor RBint is optional and must be selected when configuring the 8EI servo drive. It is not possible to retrofit an internal brake resistor!
4) Only 8EAD0000.000-1 display modules are permitted to be connected to connector X9!

8EI024HWS10.xxxx-1, 8EI034HWS10.xxxx-1, 8EI044HWS10.xxxx-1

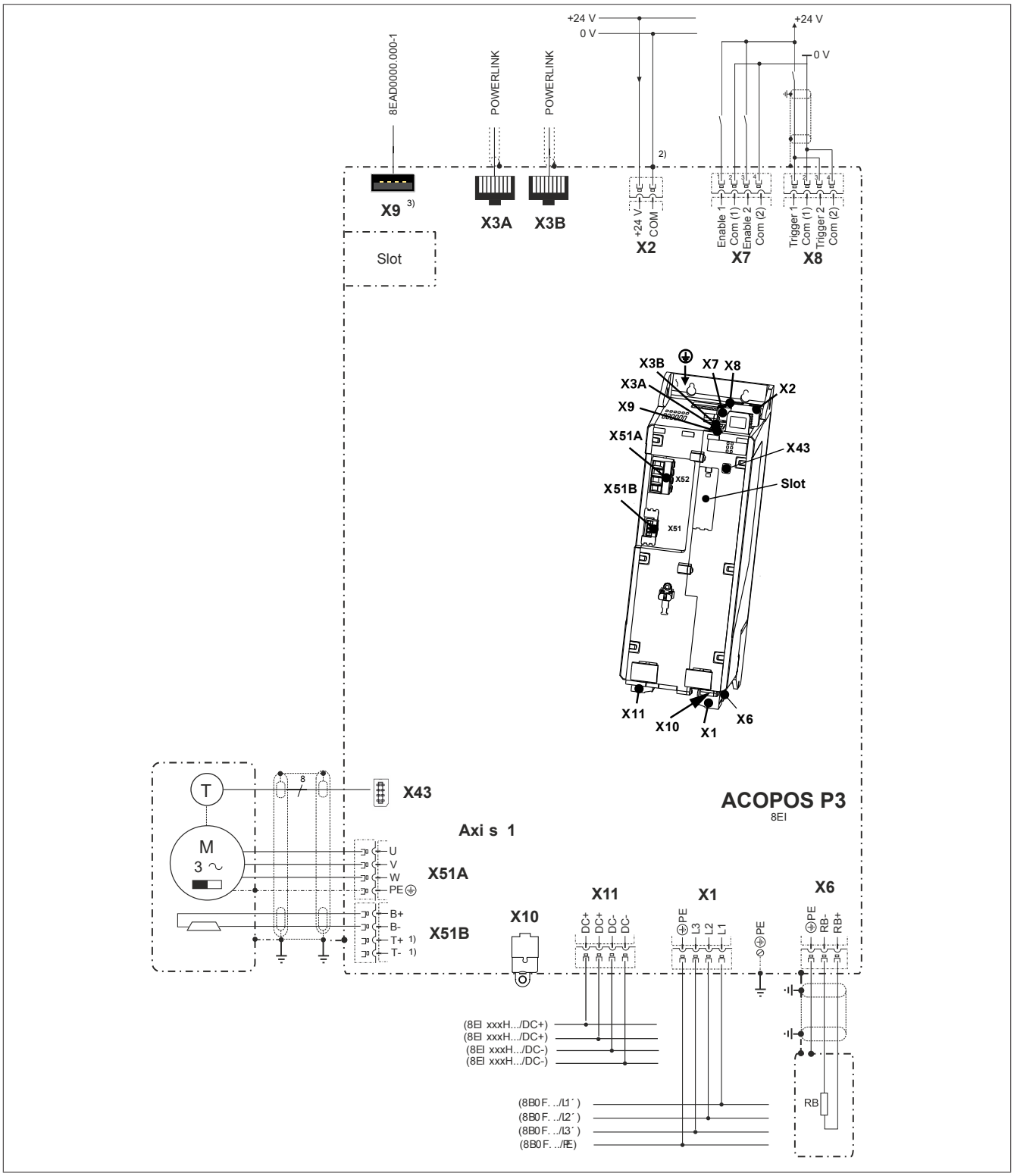


Figure 6: Mains input voltage - 3x 200 to 480 VAC

1) A temperature sensor does not need to be connected when using 8ECHxxx hybrid motor cables since the motor temperature is transferred digitally.
2) The COM connection on connector X2 must be grounded to achieve a defined relationship between the signal ground and ground potential!
3) Only 8EAD0000.000-1 display modules are permitted to be connected to connector X9!

2.2.12.1.2 SafeMOTION 1-axis modules

8EI1X6MWSS0.xxxx-1, 8EI2X2MWSS0.xxxx-1, 8EI4X5MWSS0.xxxx-1, 8EI8X8MWSS0.xxxx-1

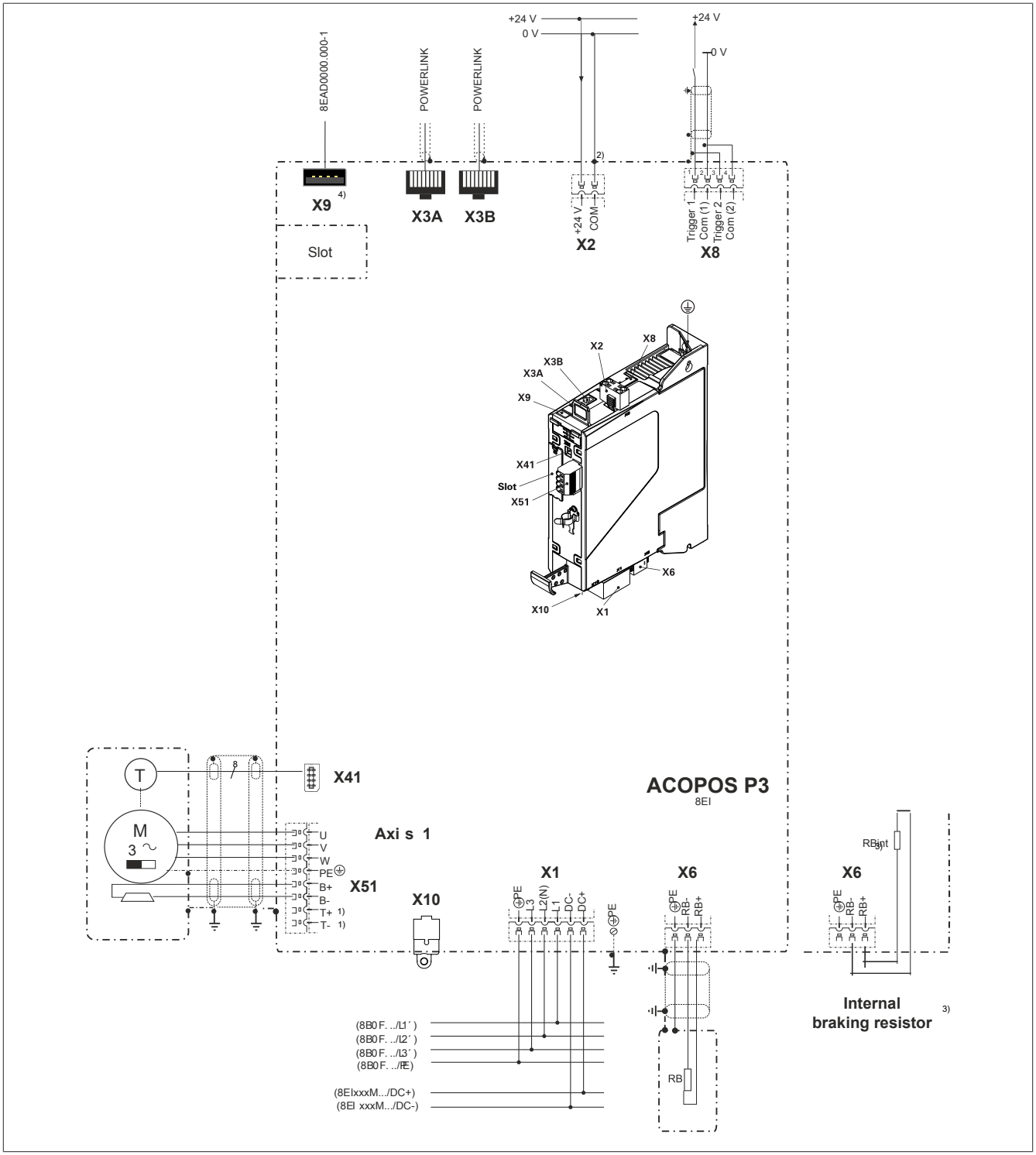


Figure 7: Mains input voltage - 1x 110 to 230 VAC / 3x 200 to 230 VAC

1) A temperature sensor does not need to be connected when using 8ECHxxx hybrid motor cables since the motor temperature is transferred digitally.
2) The COM connection on connector X2 must be grounded to achieve a defined relationship between the signal ground and ground potential!
3) Internal braking resistor RBint is optional and must be selected when configuring the 8EI servo drive. It is not possible to retrofit a braking resistor!
4) Only 8EAD0000.000-1 display modules are permitted to be connected to connector X9!

8EI1X6HWSS0.xxxx-1, 8EI2X2HWSS0.xxxx-1, 8EI4X5HWSS0.xxxx-1, 8EI8X8HWSS0.xxxx-1

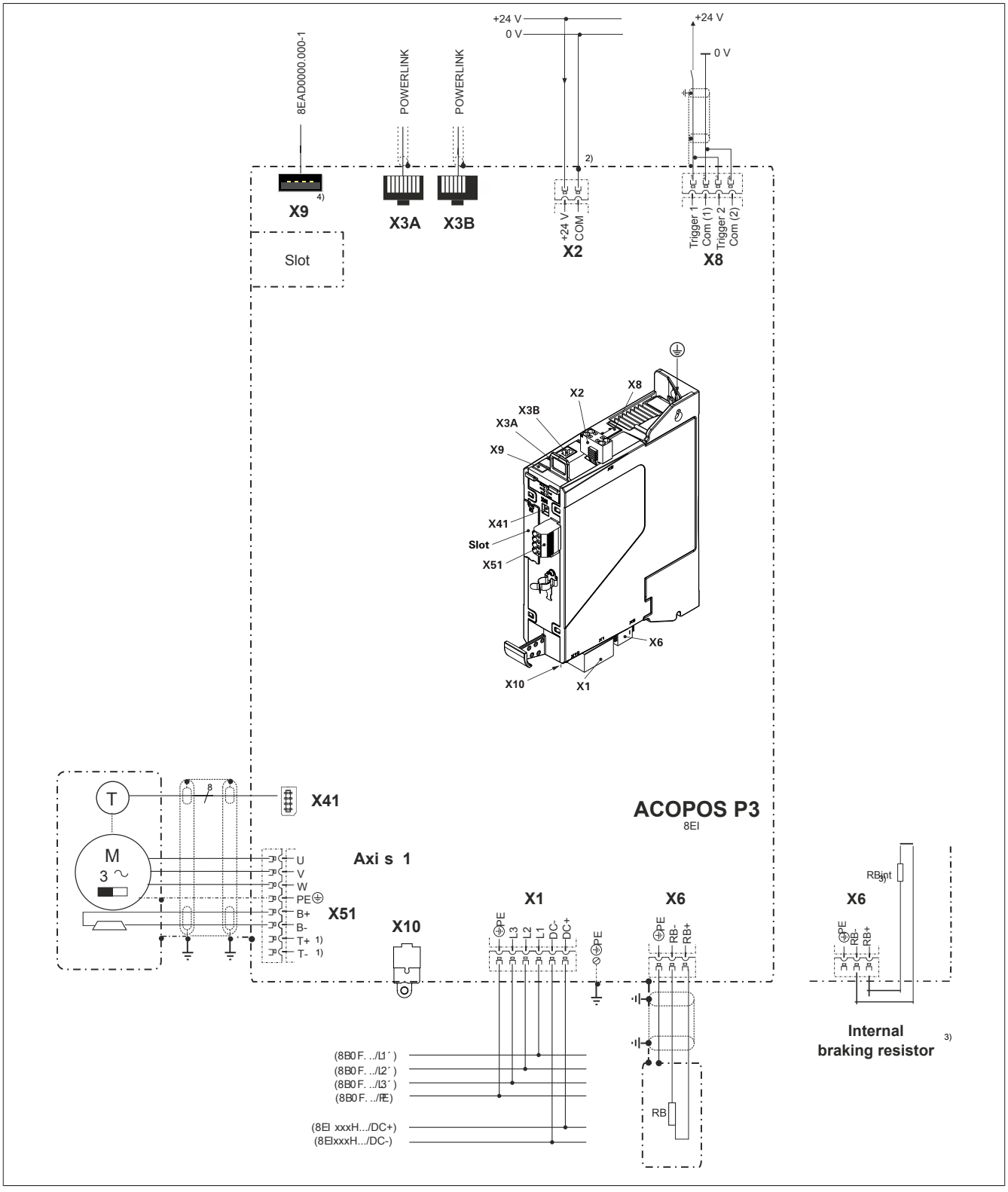


Figure 8: Mains input voltage - 3x 200 to 480 VAC

1) A temperature sensor does not need to be connected when using 8ECHxxx hybrid motor cables since the motor temperature is transferred digitally.
2) The COM connection on connector X2 must be grounded to achieve a defined relationship between the signal ground and ground potential!
3) Internal braking resistor RBint is optional and must be selected when configuring the 8EI servo drive. It is not possible to retrofit an internal braking resistor!
4) Only 8EAD0000.000-1 display modules are permitted to be connected to connector X9!

8EI013HWSS0.xxxx-1, 8EI017HWSS0.xxxx-1

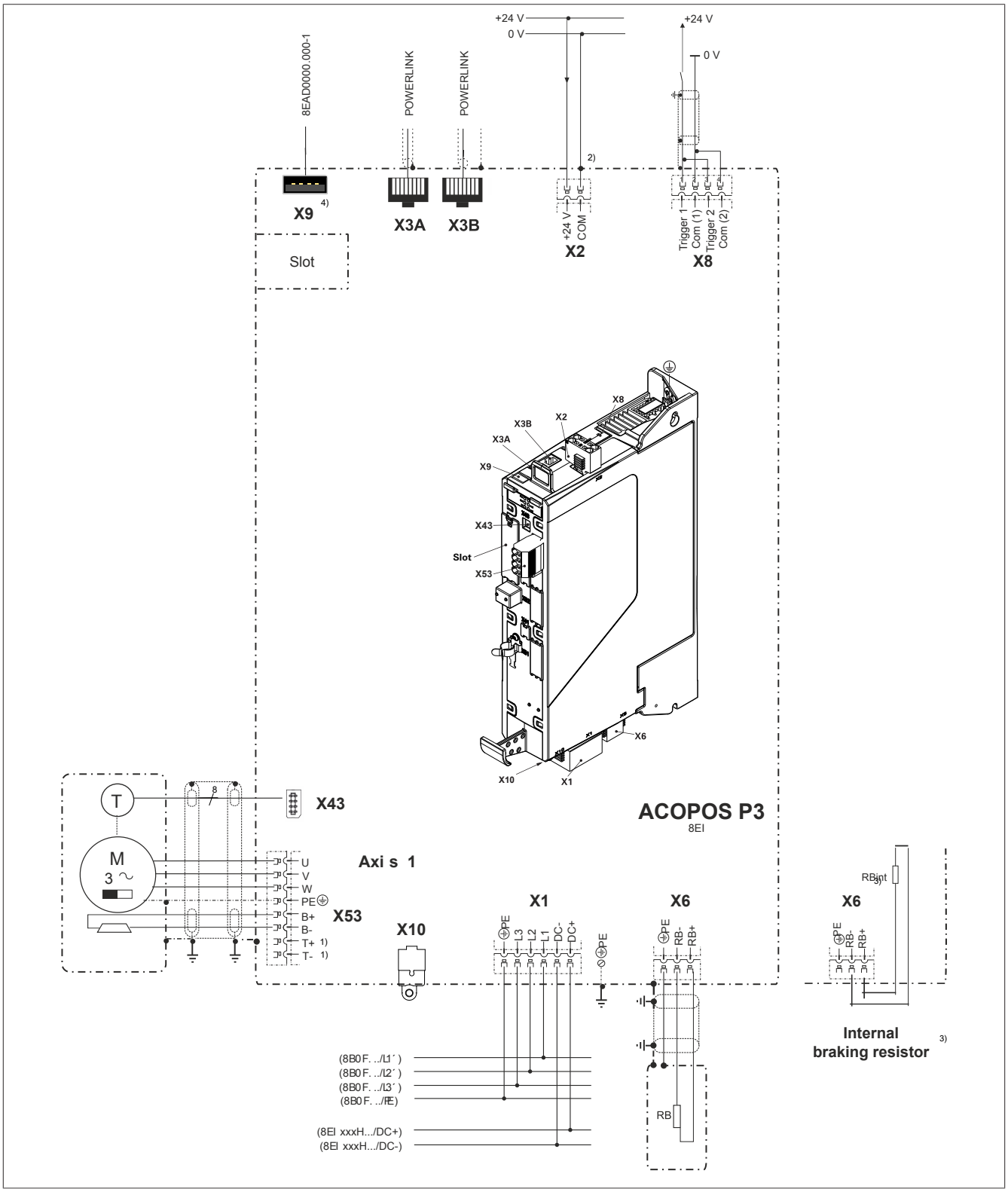


Figure 9: Mains input voltage - 3x 200 to 480 VAC

1) A temperature sensor does not need to be connected when using 8ECHxxx hybrid motor cables since the motor temperature is transferred digitally.
2) The COM connection on connector X2 must be grounded to achieve a defined relationship between the signal ground and ground potential!
3) Internal braking resistor RBint is optional and must be selected when configuring the 8EI servo drive. It is not possible to retrofit an internal braking resistor!
4) Only 8EAD0000.000-1 display modules are permitted to be connected to connector X9!

8EI024HWSS0.xxxx-1, 8EI034HWSS0.xxxx-1, 8EI044HWSS0.xxxx-1

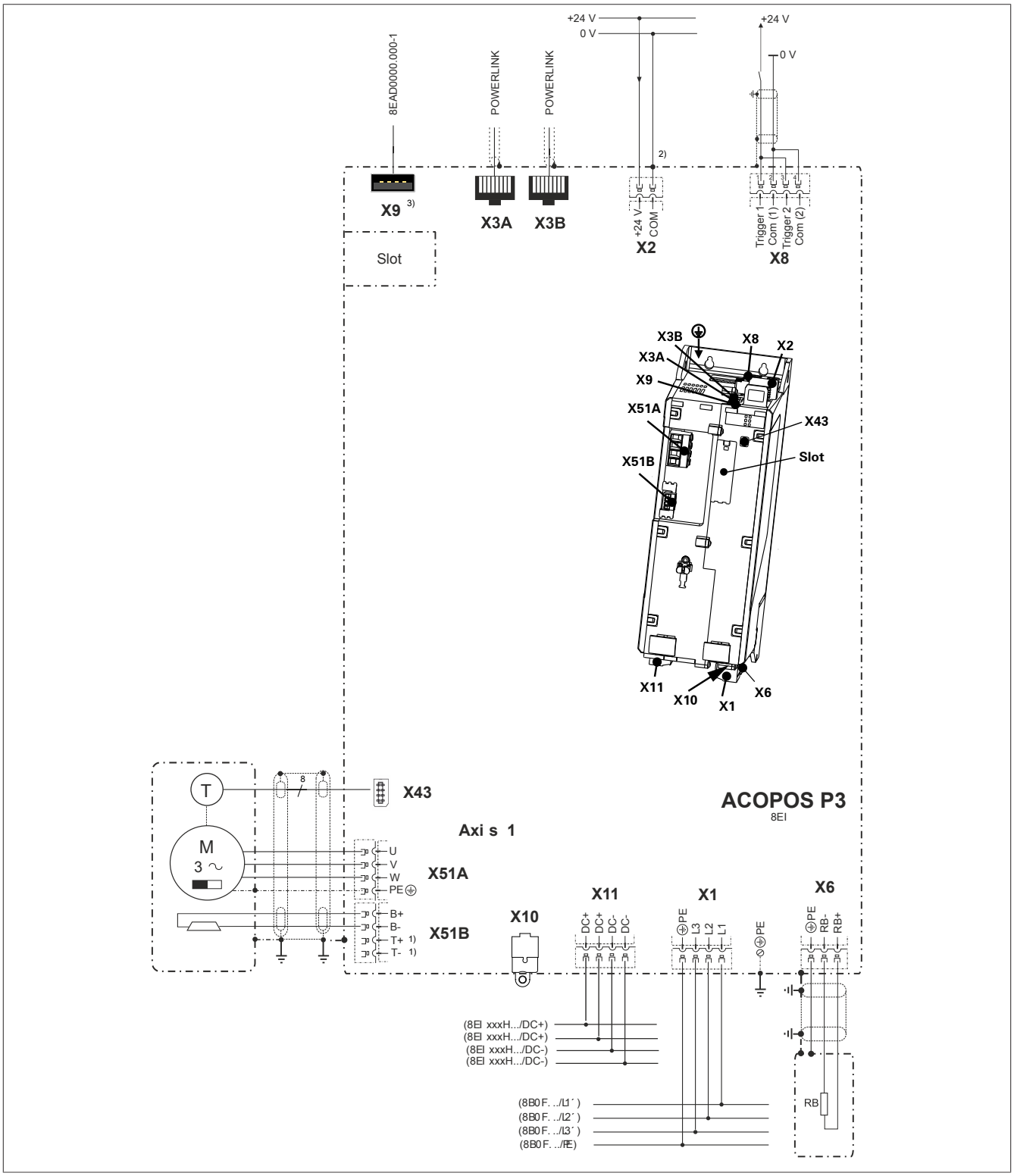


Figure 10: Mains input voltage - 3x 200 to 480 VAC

1) A temperature sensor does not need to be connected when using 8ECHxxx hybrid motor cables since the motor temperature is transferred digitally.
2) The COM connection on connector X2 must be grounded to achieve a defined relationship between the signal ground and ground potential!
3) Only 8EAD0000.000-1 display modules are permitted to be connected to connector X9!

2.2.12.1.3 2-axis modules

8EI2X2MWD10.xxxx-1, 8EI4X5MWD10.xxxx-1, 8EI8X8MWD10.xxxx-1

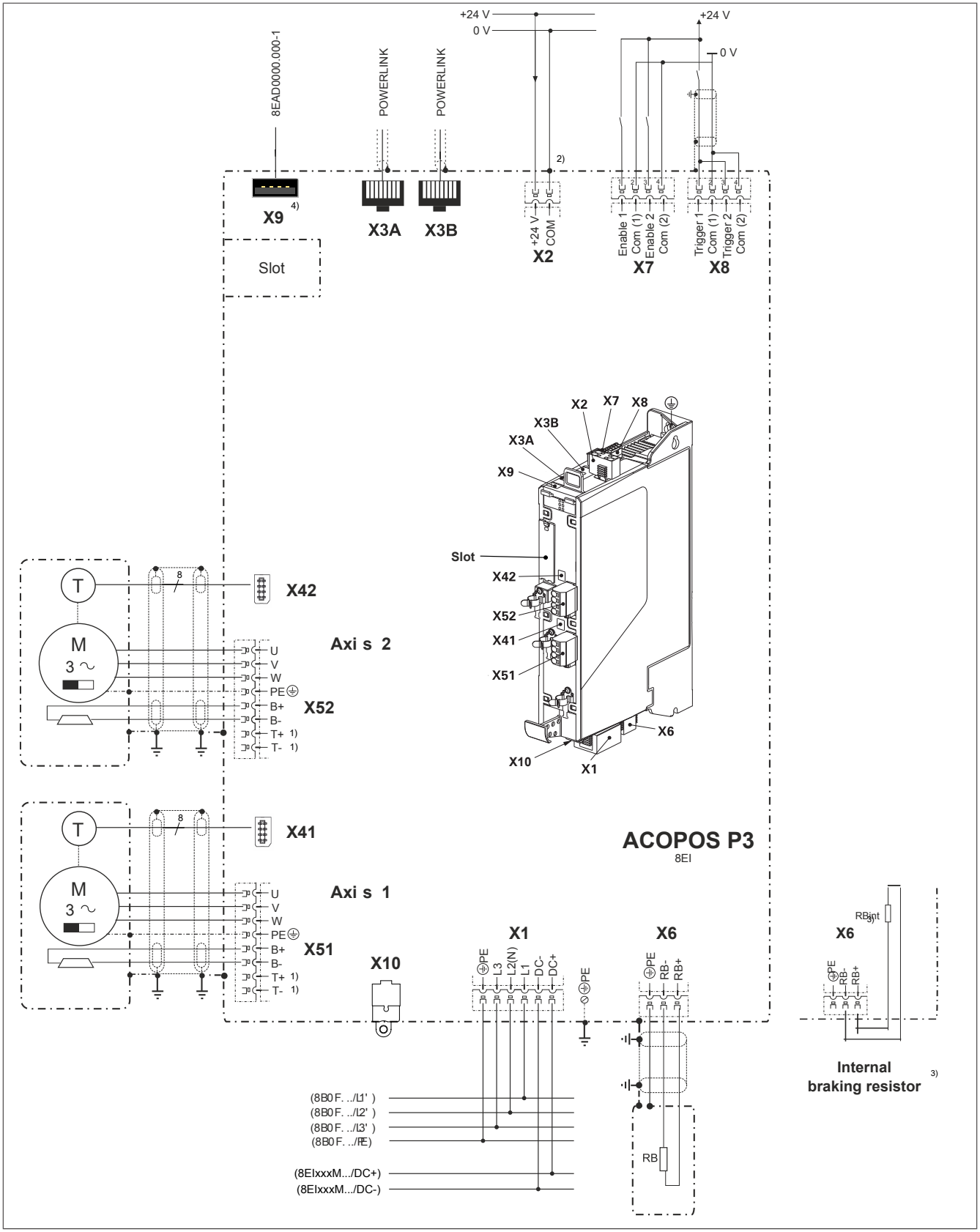


Figure 11: Mains input voltage - 1x 110 to 230 VAC / 3x 200 to 230 VAC

1) A temperature sensor does not need to be connected when using 8ECHxxx hybrid motor cables since the motor temperature is transferred digitally.
2) The COM connection on connector X2 must be grounded to achieve a defined relationship between the signal ground and ground potential!
3) Internal braking resistor RBint is optional and must be selected when configuring the 8EI servo drive. It is not possible to retrofit an internal braking resistor!
4) Only 8EAD0000.000-1 display modules are permitted to be connected to connector X9!

8EI2X2HWD10.xxxx-1, 8EI4X5HWD10.xxxx-1, 8EI8X8HWD10.xxxx-1

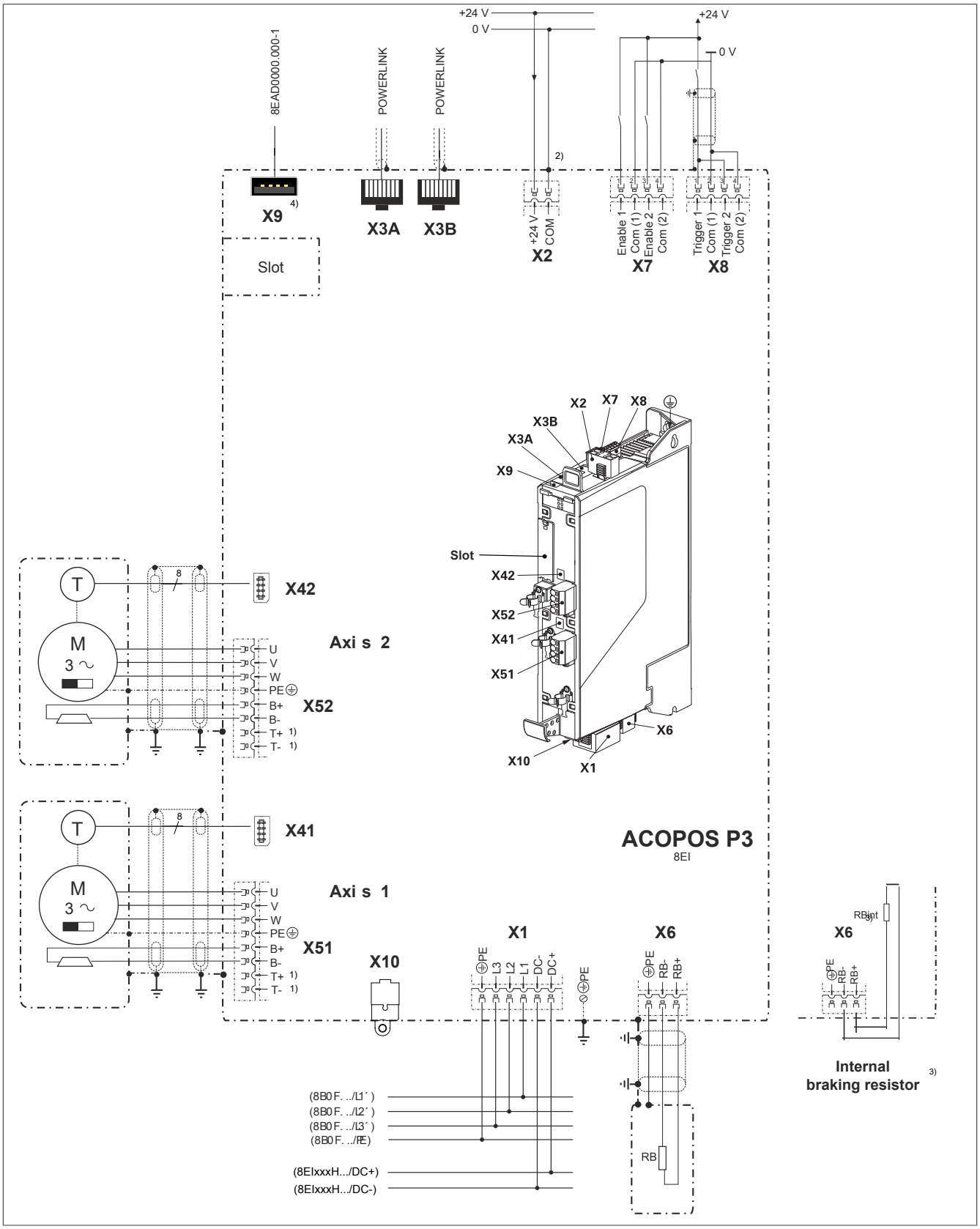


Figure 12: Mains input voltage - 3x 200 to 480 VAC

1) A temperature sensor does not need to be connected when using 8ECHxxx hybrid motor cables since the motor temperature is transferred digitally.
2) The COM connection on connector X2 must be grounded to achieve a defined relationship between the signal ground and ground potential!
3) Internal braking resistor RBint is optional and must be selected when configuring the 8EI servo drive. It is not possible to retrofit an internal brake resistor!
4) Only 8EAD0000.000-1 display modules are permitted to be connected to connector X9!

8EI017HWD10.xxxx-1, 8EI022HWD10.xxxx-1

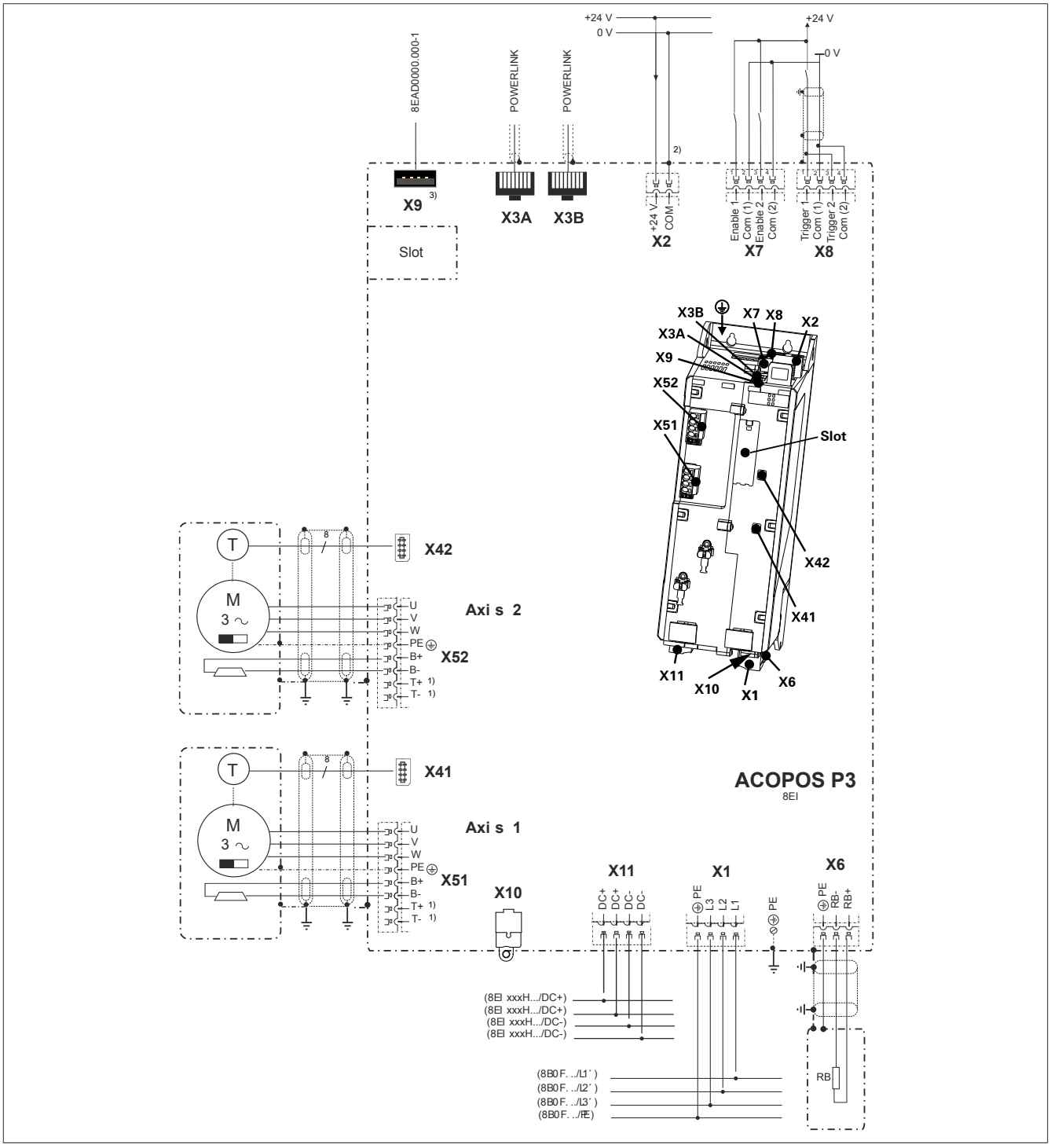


Figure 13: Mains input voltage - 3x 200 to 480 VAC

1) A temperature sensor does not need to be connected when using 8ECHxxx hybrid motor cables since the motor temperature is transferred digitally.
2) The COM connection on connector X2 must be grounded to achieve a defined relationship between the signal ground and ground potential!
3) Only 8EAD0000.000-1 display modules are permitted to be connected to connector X9!

2.2.12.1.4 SafeMOTION 2-axis modules

8EI2X2MWDS0.xxxx-1, 8EI4X5MWDS0.xxxx-1, 8EI8X8MWDS0.xxxx-1

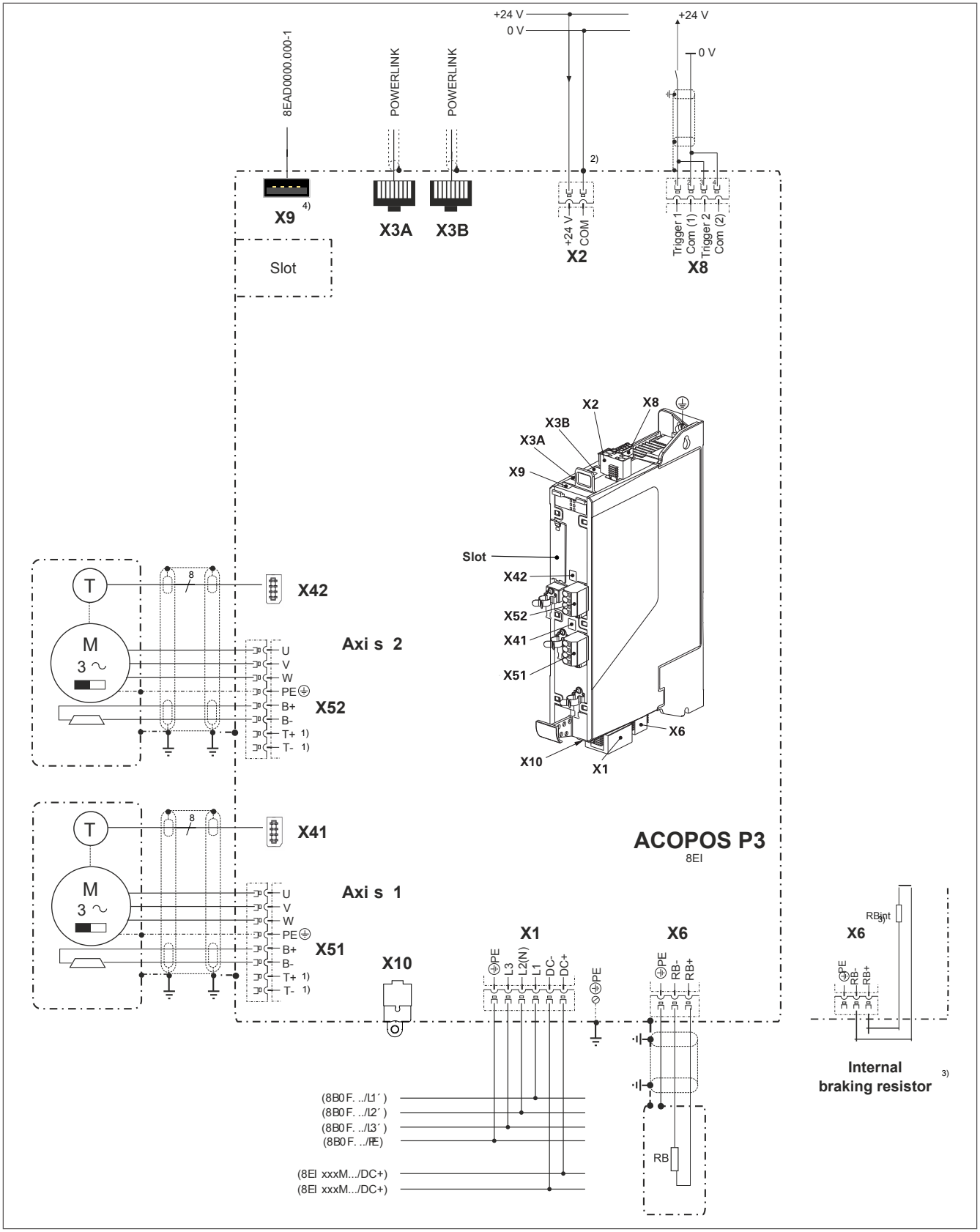


Figure 14: Mains input voltage - 1x 110 to 230 VAC / 3x 200 to 230 VAC

1) A temperature sensor does not need to be connected when using 8ECHxxx hybrid motor cables since the motor temperature is transferred digitally.
2) The COM connection on connector X2 must be grounded to achieve a defined relationship between the signal ground and ground potential!
3) Internal braking resistor RBint is optional and must be selected when configuring the 8EI servo drive. It is not possible to retrofit an internal braking resistor!
4) Only 8EAD0000.000-1 display modules are permitted to be connected to connector X9!

8EI2X2HWDS0.xxxx-1, 8EI4X5HWDS0.xxxx-1, 8EI8X8HWDS0.xxxx-1

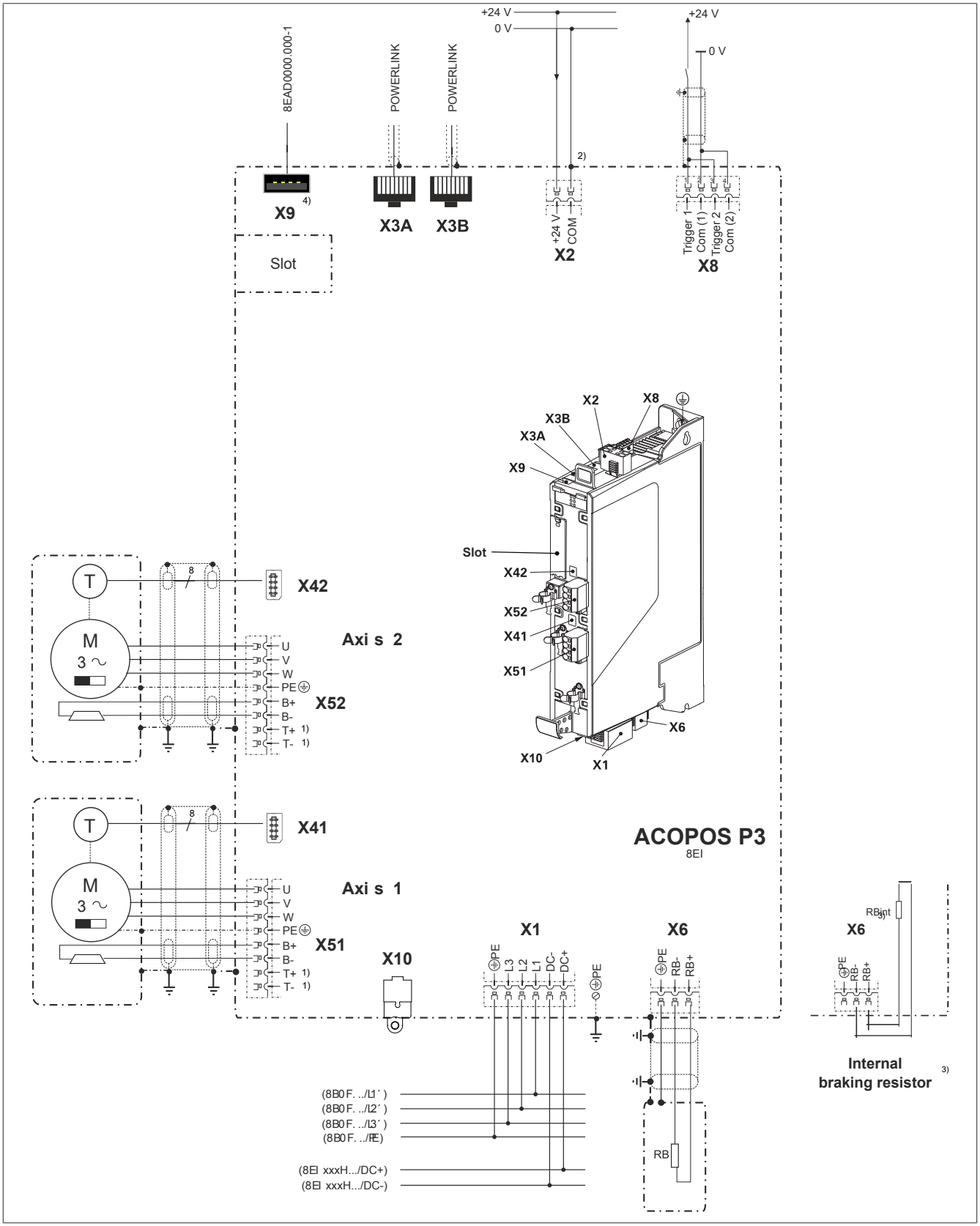


Figure 15: Mains input voltage - 3x 200 to 480 VAC

1) A temperature sensor does not need to be connected when using 8ECHxxx hybrid motor cables since the motor temperature is transferred digitally.
2) The COM connection on connector X2 must be grounded to achieve a defined relationship between the signal ground and ground potential!
3) Internal braking resistor RBint is optional and must be selected when configuring the 8EI servo drive. It is not possible to retrofit an internal braking resistor!
4) Only 8EAD0000.000-1 display modules are permitted to be connected to connector X9!

8EI017HWDS0.xxxx-1, 8EI022HWDS0.xxxx-1

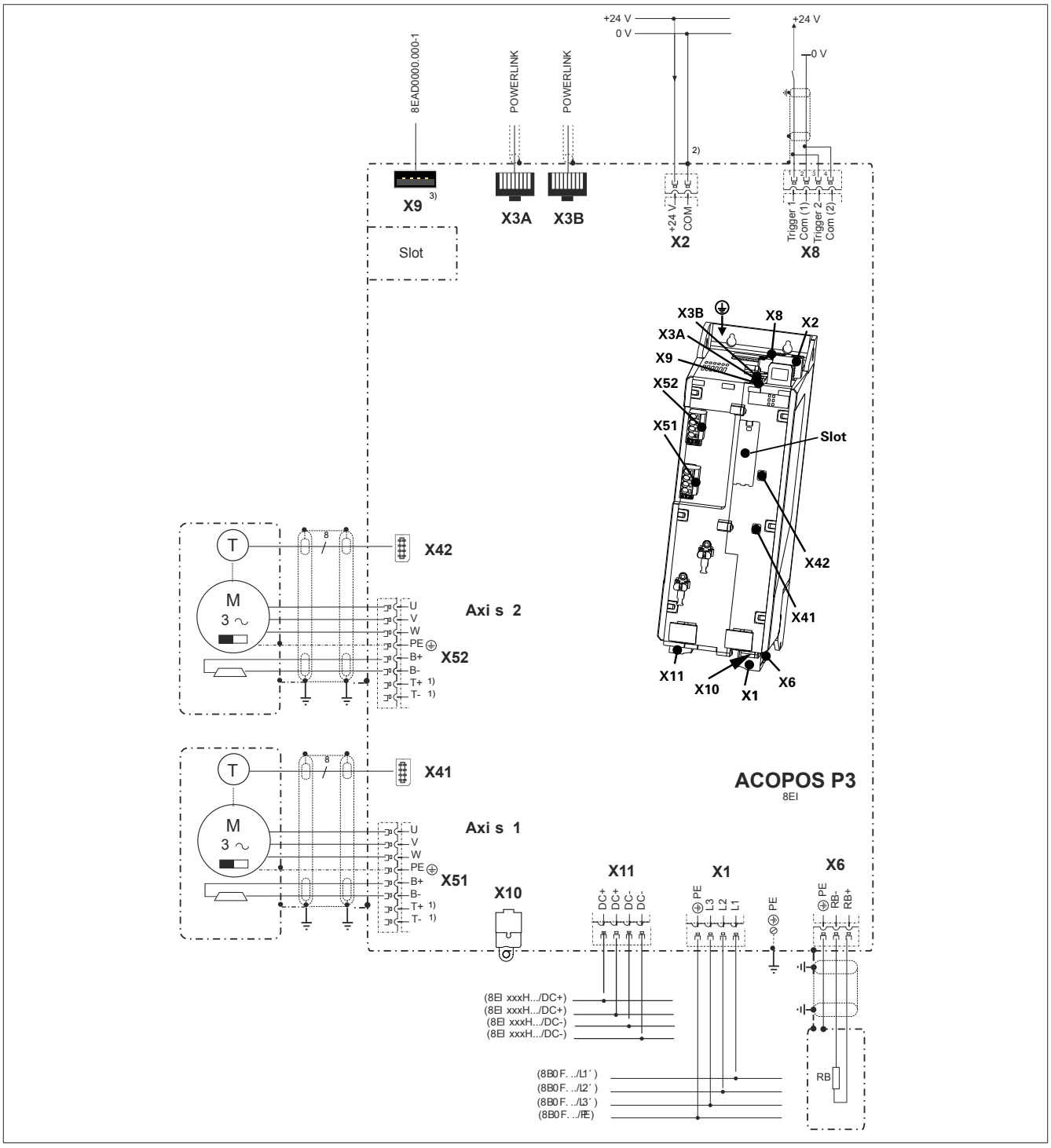


Figure 16: Mains input voltage - 3x 200 to 480 VAC

1) A temperature sensor does not need to be connected when using 8ECHxxx hybrid motor cables since the motor temperature is transferred digitally.
2) The COM connection on connector X2 must be grounded to achieve a defined relationship between the signal ground and ground potential!
3) Only 8EAD0000.000-1 display modules are permitted to be connected to connector X9!

2.2.12.1.5 3-axis modules

8EI2X2MWT10.xxxx-1, 8EI4X5MWT10.xxxx-1, 8EI8X8MWT10.xxxx-1

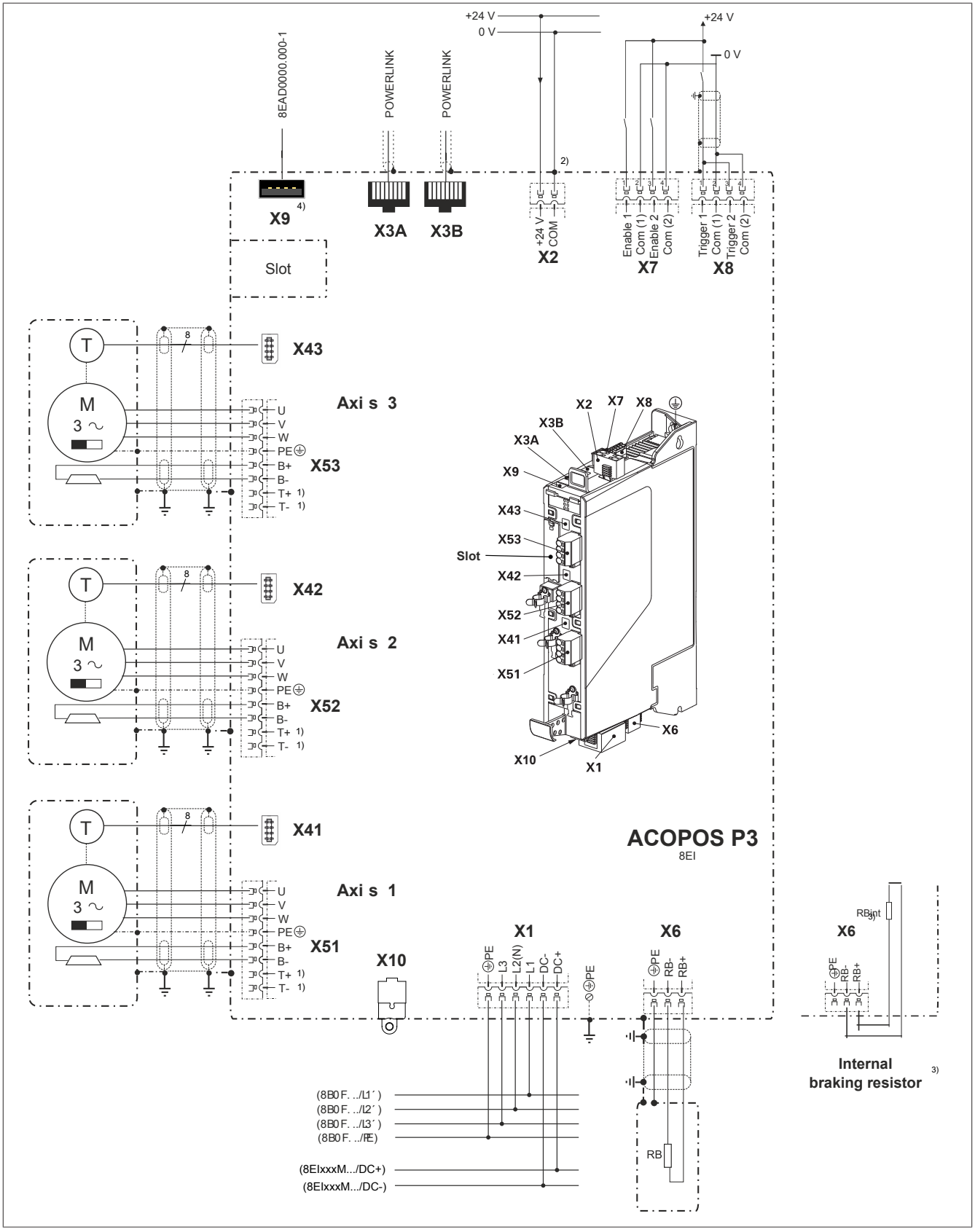


Figure 17: Mains input voltage - 1x 110 to 230 VAC / 3x 200 to 230 VAC

1) A temperature sensor does not need to be connected when using 8ECHxxx hybrid motor cables since the motor temperature is transferred digitally.
2) The COM connection on connector X2 must be grounded to achieve a defined relationship between the signal ground and ground potential!
3) Internal braking resistor RBint is optional and must be selected when configuring the 8EI servo drive. It is not possible to retrofit an internal brake resistor!
4) Only 8EAD0000.000-1 display modules are permitted to be connected to connector X9!

8EI2X2HWT10.xxxx-1, 8EI4X5HWT10.xxxx-1, 8EI8X8HWT10.xxxx-1

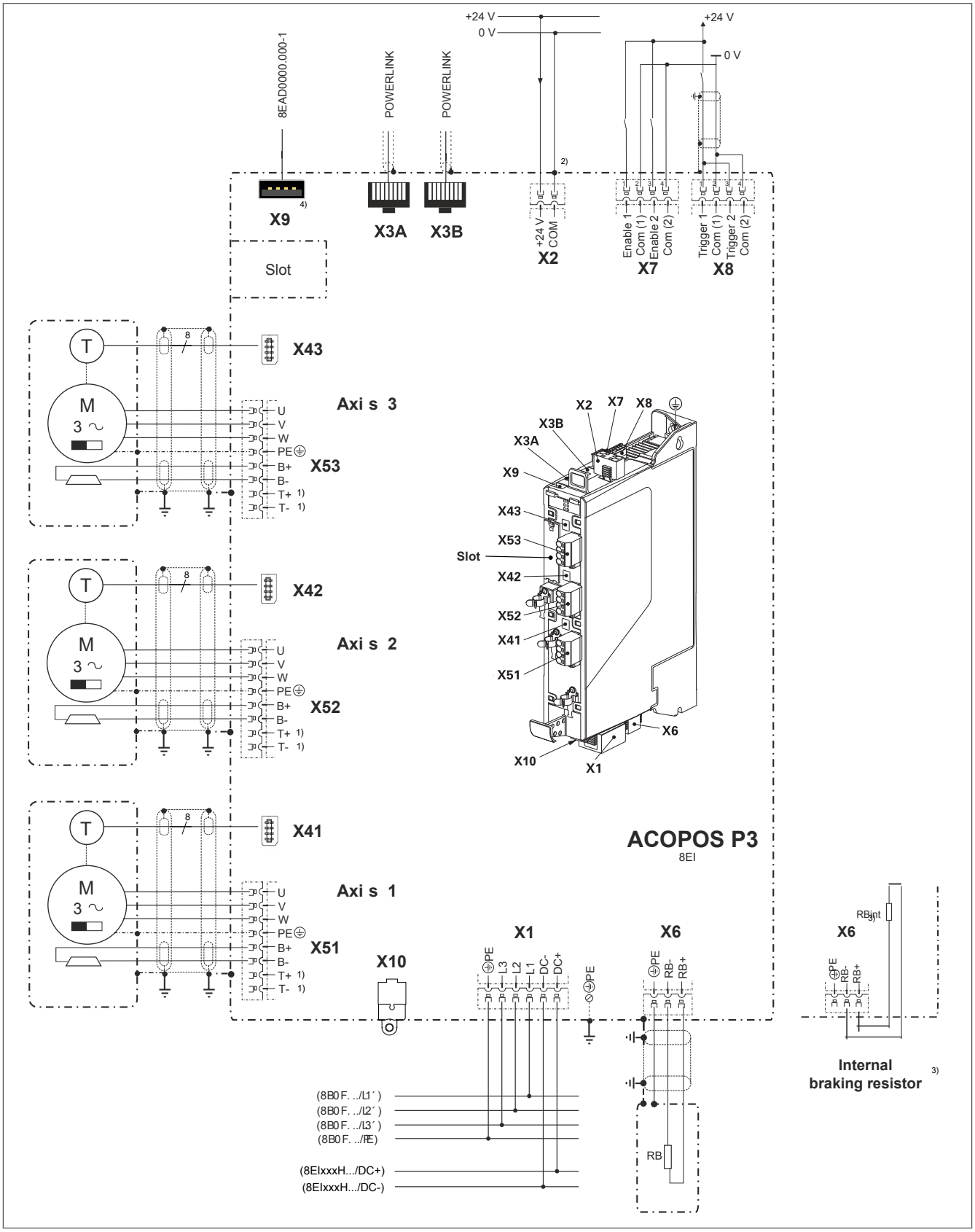


Figure 18: Mains input voltage - 3x 200 to 480 VAC

1) A temperature sensor does not need to be connected when using 8ECHxxx hybrid motor cables since the motor temperature is transferred digitally.
2) The COM connection on connector X2 must be grounded to achieve a defined relationship between the signal ground and ground potential!
3) Internal braking resistor RBint is optional and must be selected when configuring the 8EI servo drive. It is not possible to retrofit an internal brake resistor!
4) Only 8EAD0000.000-1 display modules are permitted to be connected to connector X9!

2.2.12.1.6 SafeMOTION 3-axis modules

8EI2X2MWTS0.xxxx-1, 8EI4X5MWTS0.xxxx-1, 8EI8X8MWTS0.xxxx-1

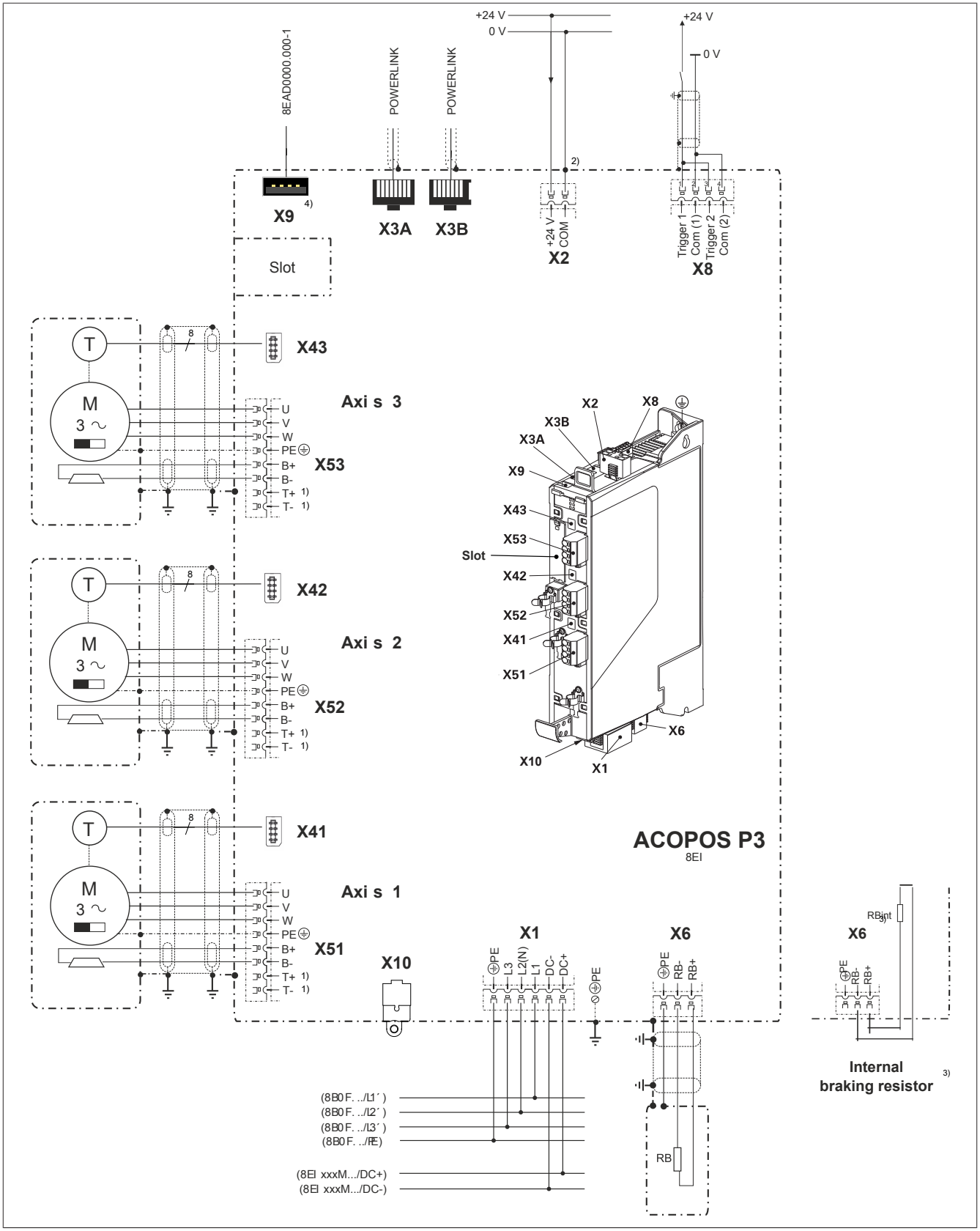


Figure 19: Mains input voltage - 1x 110 to 230 VAC / 3x 200 to 230 VAC

1) A temperature sensor does not need to be connected when using 8ECHxxx hybrid motor cables since the motor temperature is transferred digitally.
2) The COM connection on connector X2 must be grounded to achieve a defined relationship between the signal ground and ground potential!
3) Internal braking resistor RBint is optional and must be selected when configuring the 8EI servo drive. It is not possible to retrofit a braking resistor!
4) Only 8EAD0000.000-1 display modules are permitted to be connected to connector X9!

8EI2X2HWTS0.xxxx-1, 8EI4X5HWTS0.xxxx-1, 8EI8X8HWTS0.xxxx-1

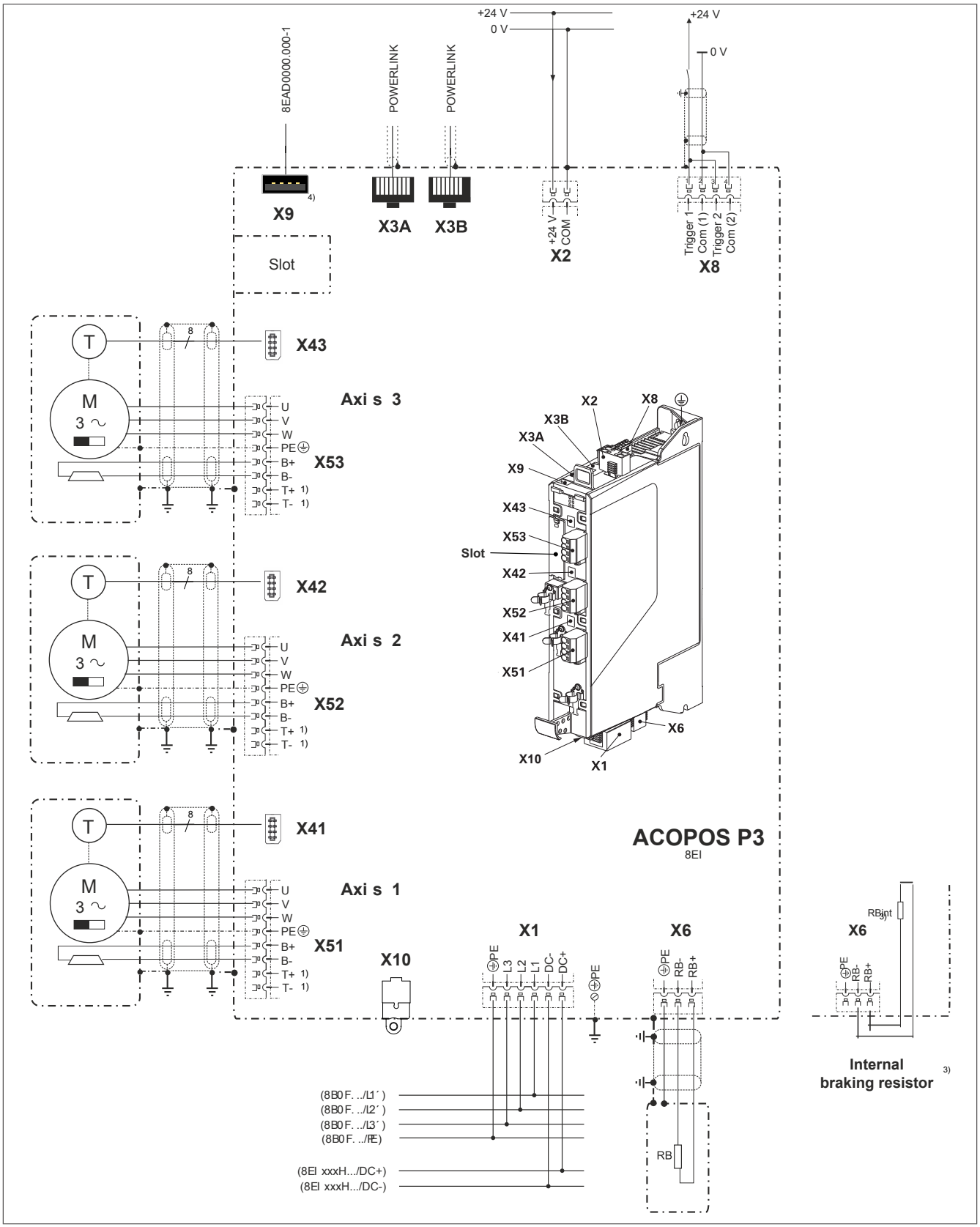


Figure 20: Mains input voltage - 3x 200 to 480 VAC

1) A temperature sensor does not need to be connected when using 8ECHxxx hybrid motor cables since the motor temperature is transferred digitally.
2) The COM connection on connector X2 must be grounded to achieve a defined relationship between the signal ground and ground potential!
3) Internal braking resistor RBint is optional and must be selected when configuring the 8EI servo drive. It is not possible to retrofit an internal braking resistor!
4) Only 8EAD0000.000-1 display modules are permitted to be connected to connector X9!

2.2.12.2 Connector X1 - Pinout

2.2.12.2.1 8EI1X6MWS.../8EI2X2MWx.../8EI4X5MWX.../8EI8X8MWx...

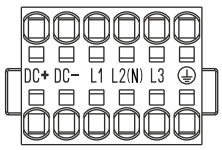
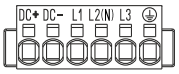
X1		Name	Function
 8TB3206.223C-40	 8TB3106.223C-20	DC+	DC bus connection DC+
		DC-	DC bus connection DC-
		L1	Mains connection L1
		L2(N)	Mains connection L2(N)
		L3	Mains connection L3
		PE	Protective ground conductor

Table 68: Connector X1 - Pinout

Warning!

Only DC bus circuits of 8EI servo drives with the same supply voltage range are permitted to be connected.

Notice!

The max. permissible mains voltage for 8EIxxxM... servo drives is 230 VAC!
Connecting to mains voltages > 230 VAC will result in irreparable damage to the servo drive!

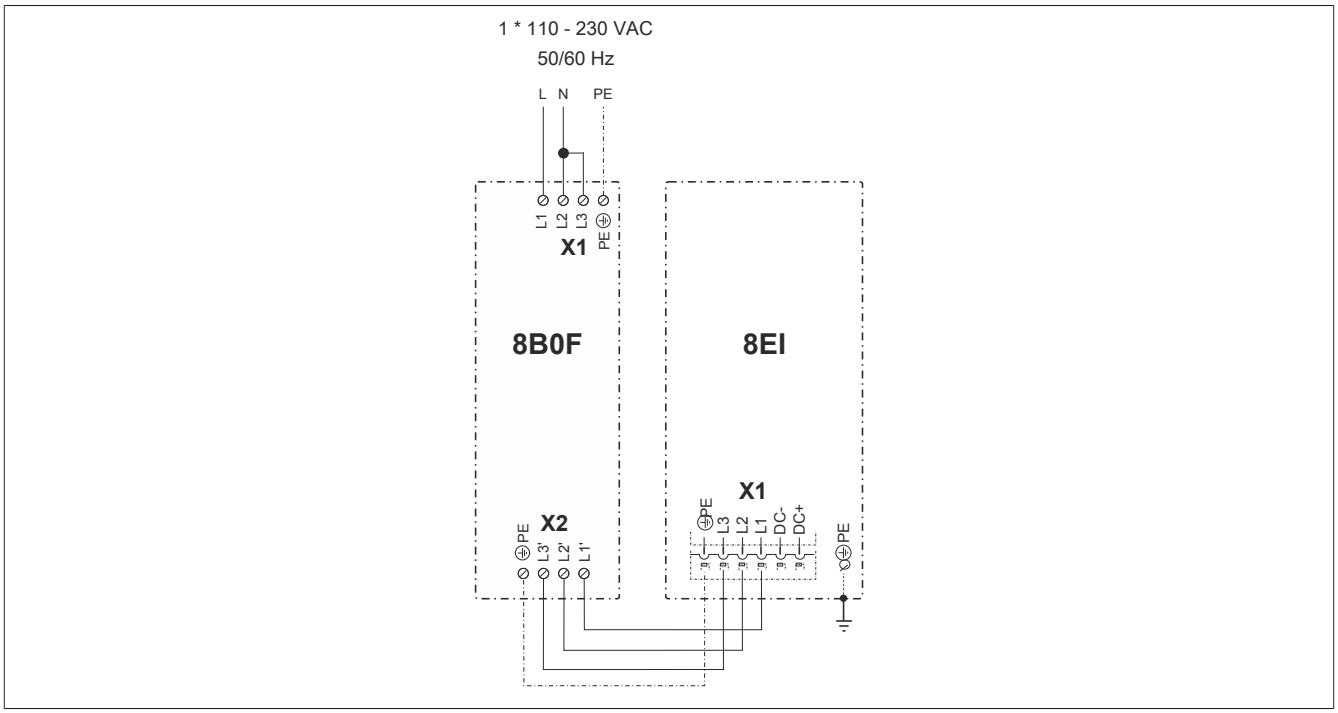


Figure 21: Mains connection 1x 110 - 230 VAC

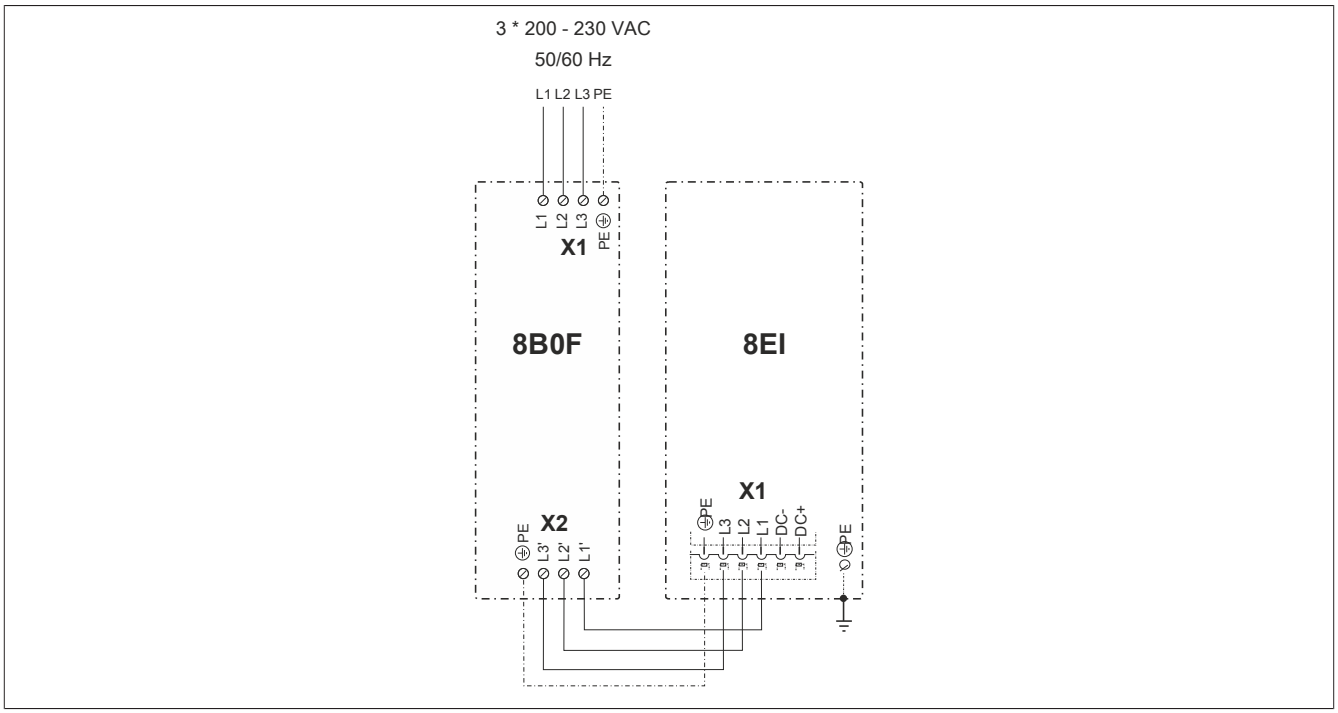


Figure 22: Mains connection 3x 200 - 230 VAC

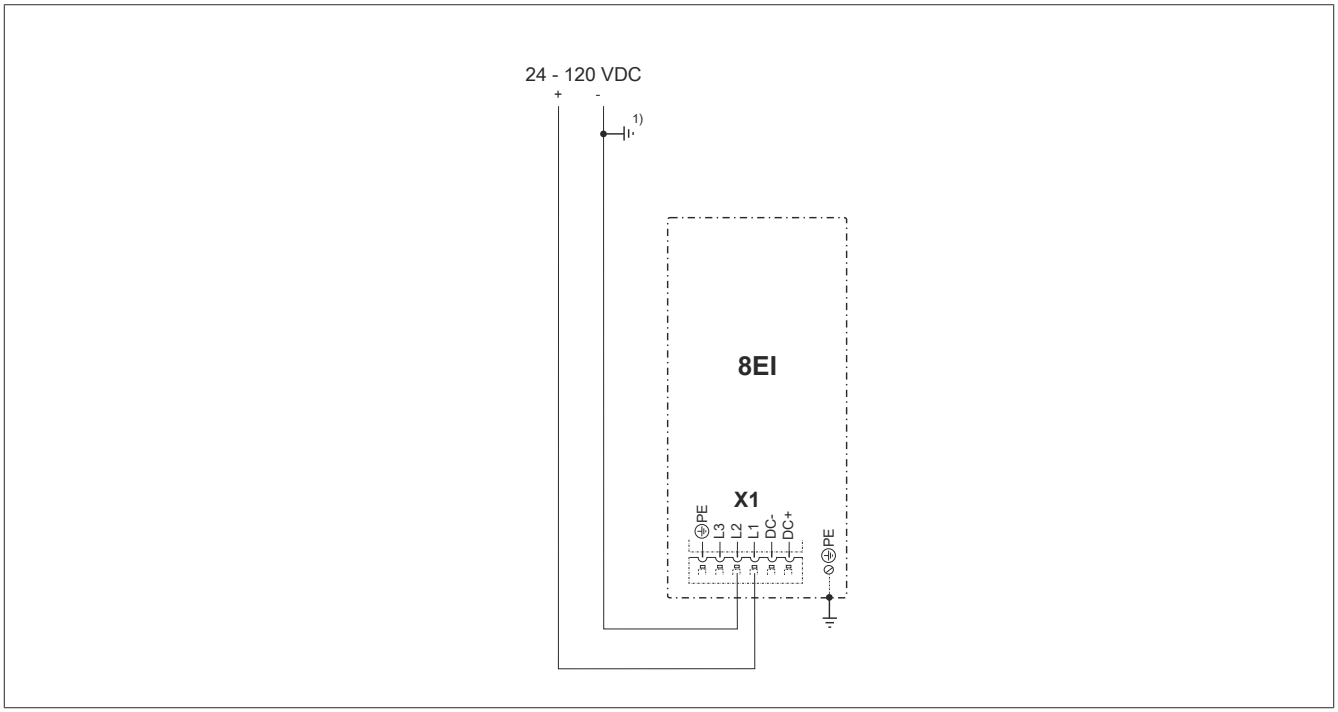


Figure 23: Mains connection 24 - 120 VDC

1) For DC sources whose DC_IN-(0V) potential is not already at ground potential, the ground connection from DC_IN- can be made to the X1/PE connection on the ACOPOS P3 servo drive.

Information:

Operating the module at a mains input voltage of 24 to 120 VDC is only permitted if this mains input voltage is also specified in the device information on the left-hand side cover (Input: ... 24 - 120 VDC ...).

2.2.12.2.2 8EI1X6HWS.../8EI2X2HWx.../8EI4X5HWx.../8EI8X8HWx.../8EI013HWS.../8EI017HWx...

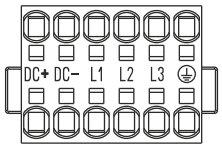
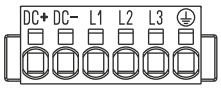
X1		Description	Function
 8TB3206.222B-40	 8TB3106.222B-20	DC+	DC bus connection DC+
		DC-	DC bus connection DC-
		L1	Mains connection L1
		L2	Mains connection L2
		L3	Mains connection L3
		PE	Protective ground conductor

Table 69: Connector X1 - Pinout

Warning!

Only DC bus circuits of 8EI servo drives with the same supply voltage range are permitted to be connected.

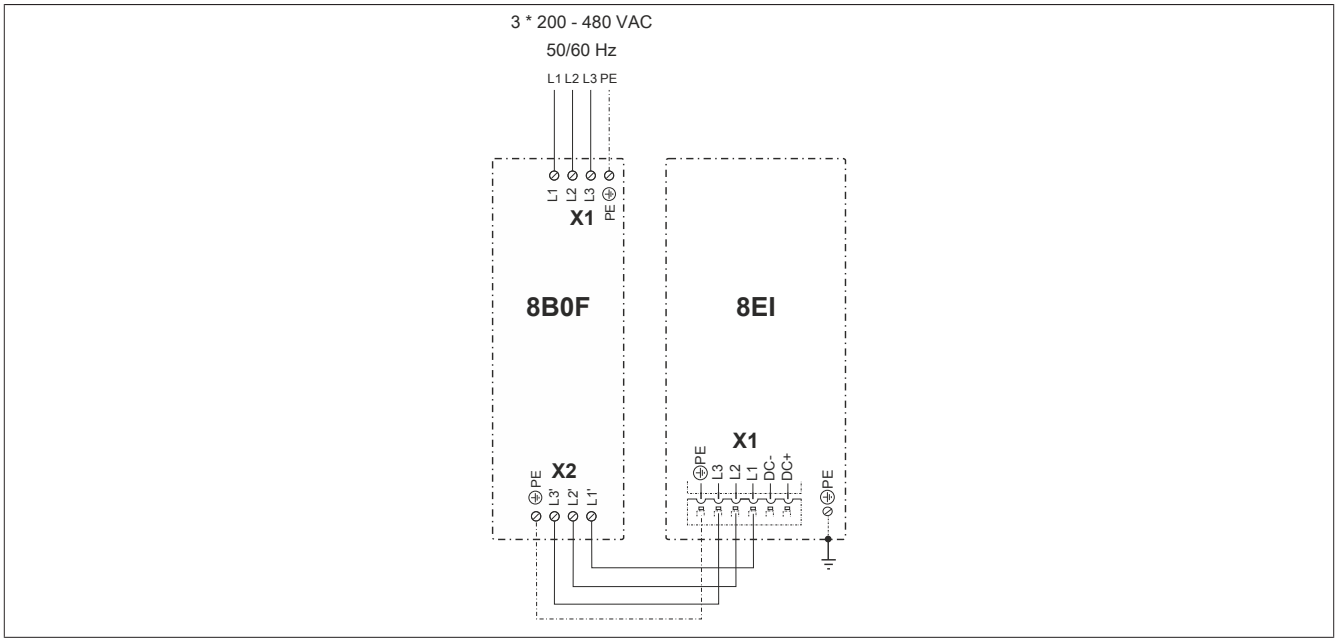


Figure 24: Mains connection 3x 200 - 480 VAC

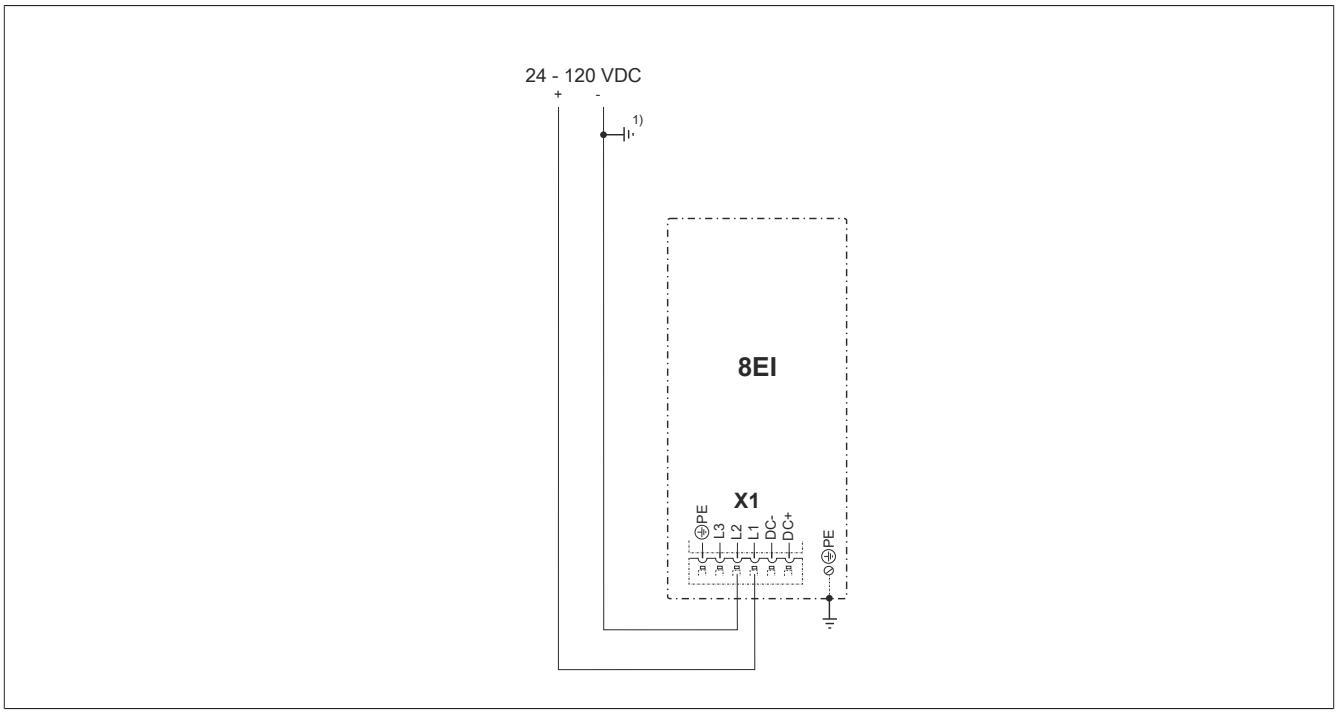


Figure 25: Mains connection 24 - 120 VDC (not for 8EI013HWS10.xxxx-1 and 8EI017HWx10.xxxx-1)

1) For DC sources whose DC_IN-(0V) potential is not already at ground potential, the ground connection from DC_IN- can be made to the X1/PE connection on the ACOPOS P3 servo drive.

Information:

Operating the module at a mains input voltage of 24 to 120 VDC is only permitted if this mains input voltage is also specified in the device information on the left-hand side cover (Input: ... 24 - 120 VDC ...).

2.2.12.2.3 8EI024HWS.../8EI034HWS.../8EI044HWS.../8EI0xxHWD...

The X1 connector is never permitted to be connected to the mains.

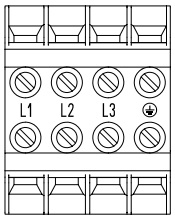
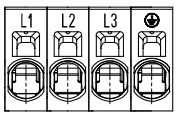
X1	Description	Function
 8TB4204.202L-10  8TB4104.222L-10	L1	DC bus connection DC-
	L2	DC bus connection DC-
	L3	DC bus connection DC-
	PE	Protective ground conductor
		Tightening torque for the terminal screws [Nm]: 1.7 to 1.8 (two-row connectors only)

Table 70: Connector X1 - Pinout

Information:

Strain relief is required for the cable when using the 2-row connector.

Danger!

During operation, the contacts of connector X1 carry a high voltage if connector X11 is connected. Touching one of these contacts can result in a life-threatening electric shock. This could result in death or severe injury.

For this reason, terminal block 8TB3106.222B-20, 8TB3106.223C-20, 8TB3206.222B-40, 8TB3206.223C-40, 8TB4104.222L-10 or 8TB4204.202L-10 must always be connected to connector X1 during operation.

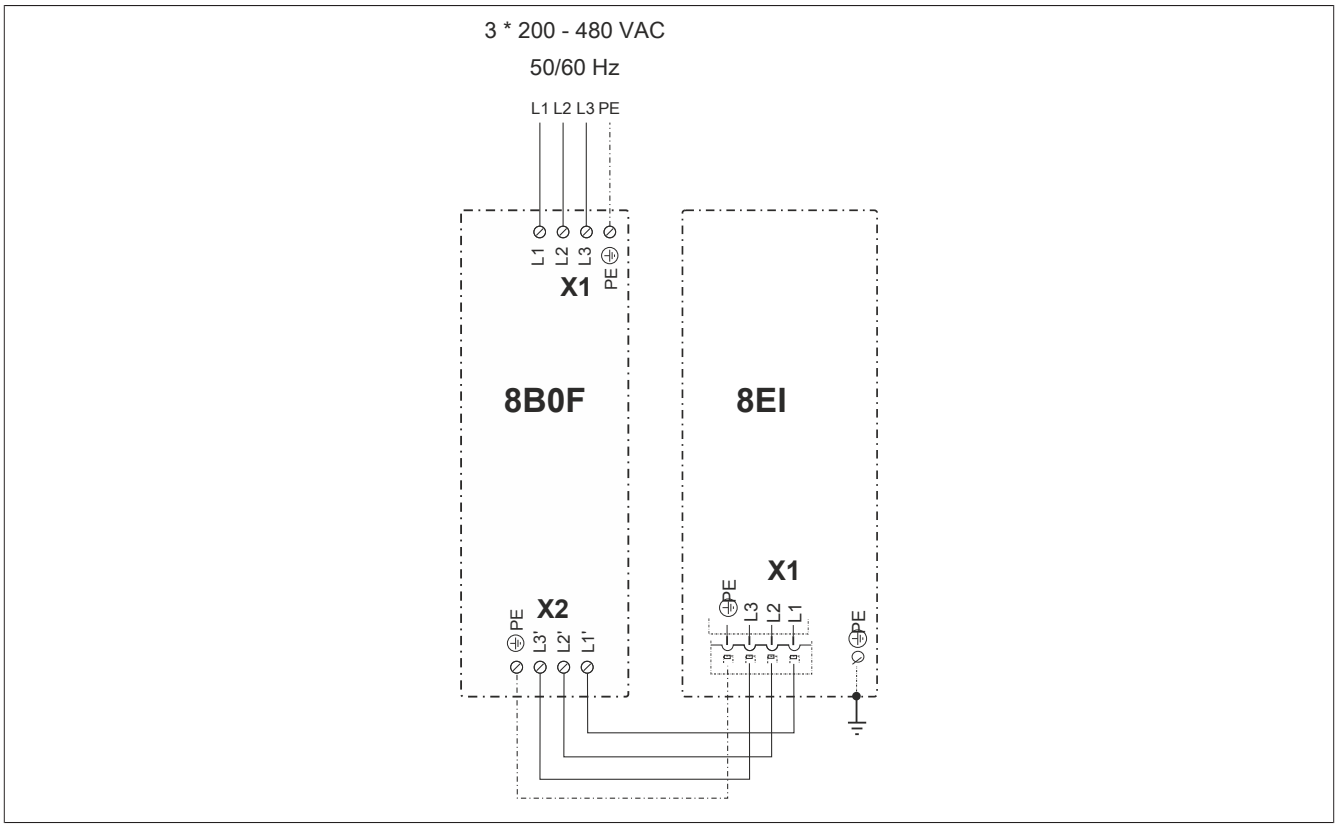


Figure 26: Mains connection 3x 200 - 480 VAC

2.2.12.3 Connector X2 - Pinout

X2		Name	Function
 8TB3202.222C-40	 8TB3102.222C-20	COM	0 V power supply
		24 V	+24 V power supply

Table 71: Connector X2 - Pinout

2.2.12.4 Connectors X3A, X3B - Pinout

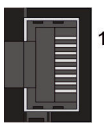
X3A, X3B	Pin	Name	Function
	1	RXD	Receive signal
	2	RXD\	Receive signal inverted
	3	TXD	Transmit signal
	4	Shield	Shield
	5	Shield	Shield
	6	TXD\	Transmit signal inverted
	7	Shield	Shield
	8	Shield	Shield

Table 72: X3A, X3B connectors - Pinout

2.2.12.5 Connector X4x (digital multi-encoder interface) - Pinout

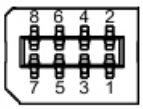
X4x	Pin	Name	Function depending on configured encoder type					
			EnDat 2.2	SSI	BiSS	T-Format	HIPERFACE DSL	EnDat 3.0
	1	U+	Encoder power supply +				---	
	2	T	Clock output			---	---	
	3	---	---	Sense input +5 V [1]		---	HIPERFACE DSL	Encoder power supply / Signal +
	4	T\	Clock output inverted			---	---	
	5	---	---	Sense input 0 V [1]		---	HIPERFACE DSL inverted	Encoder power supply / Signal 0 V
	6	D	Data				---	
	7	COM	Encoder power supply 0 V				---	
	8	D\	Data inverted				---	

Table 73: Connector X4x - Pinout

1) Only if the encoder supply voltage (5 V) is configured accordingly.

2.2.12.5.1 Input/Output circuit diagram

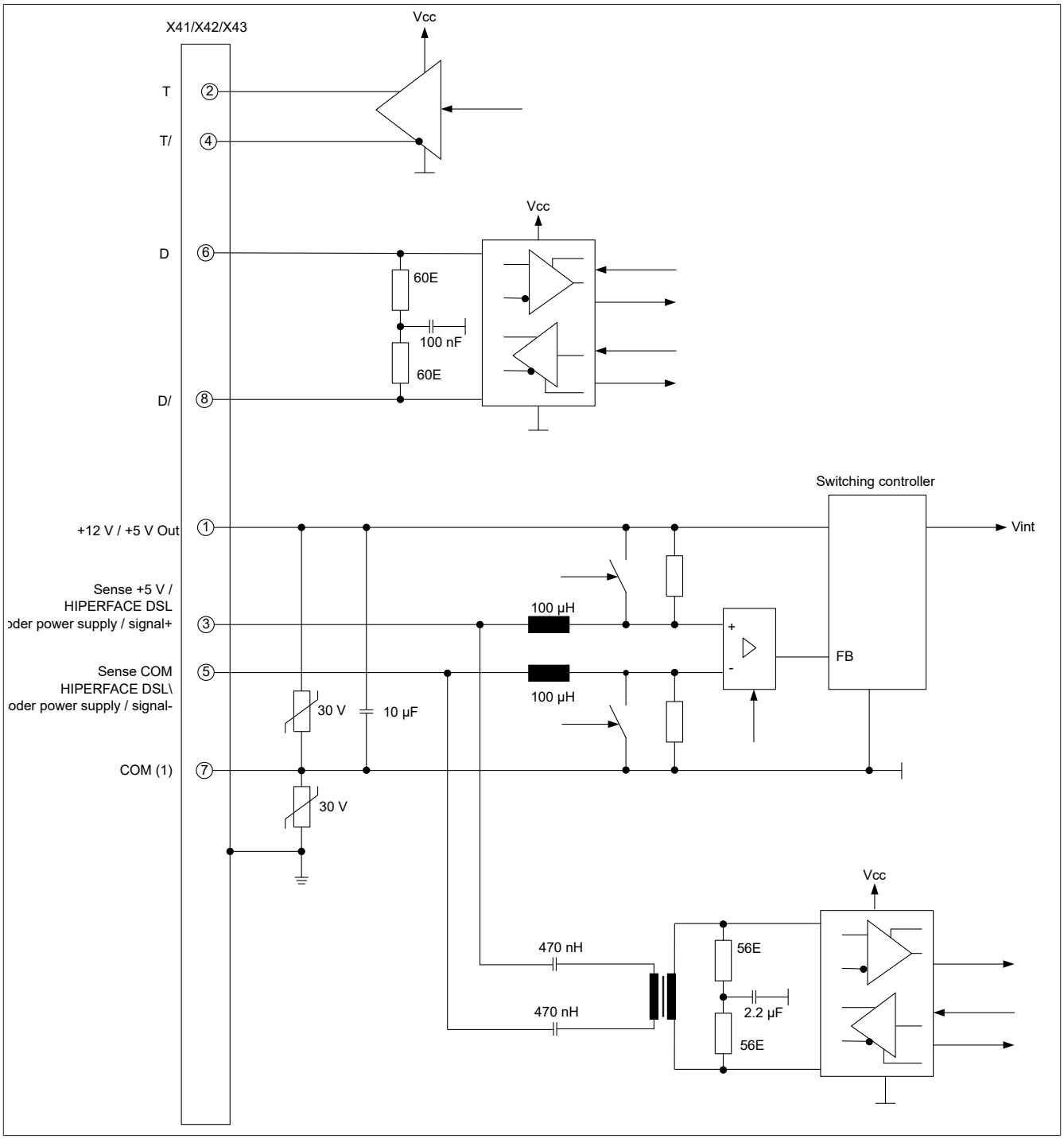


Figure 27: X4x (digital multi-encoder interface) - Input/Output circuit diagram

2.2.12.6 Connector X5x - Pinout

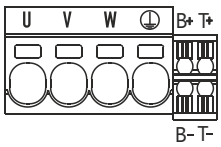
X5x	Name	Function
 8TB3308.222A-00	B+	Brake +
	B-	Brake -
	T+	Temperature sensor + [1]
	T-	Temperature sensor - [1]
	PE	Protective ground conductor
	U	Motor connection U
	V	Motor connection V
	W	Motor connection W

Table 74: Connector X5x - Pinout

1) A temperature sensor does not need to be connected when using a hybrid motor cable solution since the motor temperature is transferred digitally.

Danger!

The connections for the motor temperature sensors and the motor holding brake are safely isolated circuits. As a result, only devices or components that have at least safe isolation per IEC 60364-4-41 or EN 61800-5-1 are permitted to be connected to these connections.

Information:

B&R recommends wiring the ACOPOS P3 X5x motor connectors in the following order:

1. **X51**
2. **X52**

Caution!

If B+ and B- are swapped when connecting the permanent magnet holding brakes, then the brakes cannot be opened! ACOPOS P3 servo drive modules cannot determine if a holding brake is connected with reverse polarity!

2.2.12.7 Connector X51A - Pinout

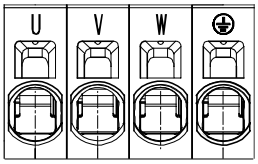
X51A	Description	Function
 8TB4104.224G-10	PE	Protective ground conductor
	U	Motor connection U
	V	Motor connection V
	W	Motor connection W

Table 75: Connector X51A - Pinout

2.2.12.8 Connector X51B - Pinout

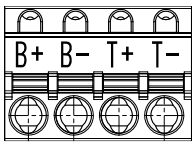
X51B	Description	Function
 8TB2104.223L-00	B+	Brake +
	B-	Brake -
	T+	Temperature sensor + [1]
	T-	Temperature sensor - [1]

Table 76: Connector X51B - Pinout

1) A temperature sensor does not have to be connected when using the module's internal EnDat 2.2 encoder connection since the motor temperature is transmitted digitally via the X4x encoder connection (e.g. when using 8ECH hybrid motor cables).

Danger!

The connections for the motor temperature sensors and the motor holding brake are safely isolated circuits. As a result, only devices or components that have at least safe isolation per IEC 60364-4-41 or EN 61800-5-1 are permitted to be connected to these connections.

Caution!

If B+ and B- are swapped when connecting the permanent magnet holding brakes, then the brakes cannot be opened! ACOPOS P3 servo drive modules cannot determine if a holding brake is connected with reverse polarity!

2.2.12.9 Connector X6 - Pinout

2.2.12.9.1 8EI1X6xWS10.xxxx-1, 8EI2X2xWx10.xxxx-1, 8EI4X5xWx10.xxxx-1 8EI8X8xWx10.xxxx-1, 8EI01xHWS10.xxxx-1

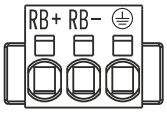
X6	Name	Function
 8TB3103.222A-20	PE	Protective ground conductor
	RB-	Braking resistor -
	RB+	Braking resistor +

Table 77: Connector X6 - Pinout

Danger!

During operation, the contacts of connector X6 carry dangerous voltages greater than 60 VDC. Touching one of these contacts can result in a life-threatening electric shock. This could result in death or severe injury.

For this reason, terminal block 8TB3103.222A-20 or 8TB4103.222A-10 must always be connected to connector X6 during operation.

2.2.12.9.2 8EI024HWS10.xxxx-1, 8EI034HWS10.xxxx-1, 8EI044HWS10.xxxx-1, 8EI0xxHWD10.xxxx-1

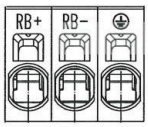
X6	Description	Function
 8TB4103.222A-10	PE	Protective ground conductor
	RB-	Braking resistor -
	RB+	Braking resistor +

Table 78: Connector X6 - Pinout

Danger!

During operation, the contacts of connector X6 carry dangerous voltages greater than 60 VDC. Touching one of these contacts can result in a life-threatening electric shock. This could result in death or severe injury.

For this reason, terminal block 8TB3103.222A-20 or 8TB4103.222A-10 must always be connected to connector X6 during operation.

2.2.12.10 Connector X7 - Pinout

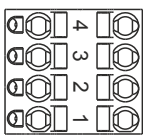
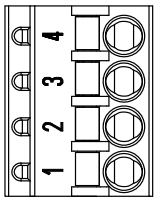
X7		Pin	Name	Function
 8TB2204.2210-50	 8TB2104.2210-50	1	Enable 1	Enable 1
		2	COM (1)	Enable 1 0 V
		3	Enable 2	Enable 2
		4	COM (2)	Enable 2 0 V

Table 79: Connector X7 - Pinout

Information:

Connector X7 does not exist on ACOPOS P3 SafeMOTION 8EIxxxxxxSx... servo drives.

2.2.12.11 Connector X8 - Pinout

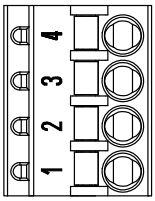
X8	Pin	Name	Function
 8TB2104.2210-00	1	Trigger 1	Trigger 1
	2	COM (1)	Trigger 1 0 V
	3	Trigger 2	Trigger 2
	4	COM (2)	Trigger 2 0 V

Table 80: Connector X8 - Pinout

2.2.12.11.1 Input/Output circuit diagram

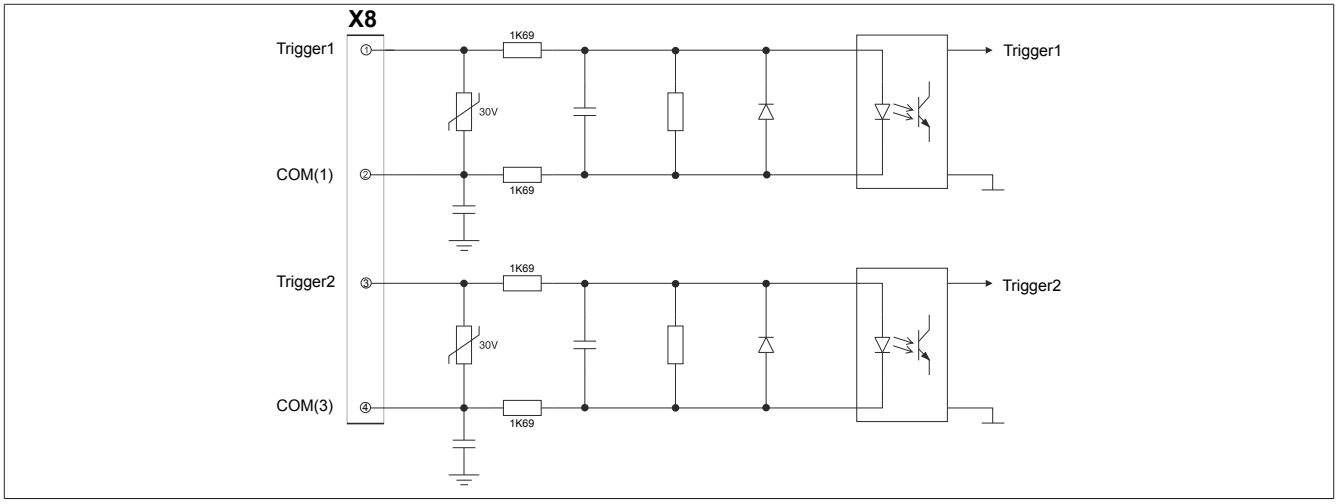


Figure 28: X8 (trigger) - Input/Output circuit diagram

2.2.12.12 IT jumper X10

Caution!

Remove IT jumper X10 before using the 8EI servo drive in IT power systems!

Procedure

1) Loosen and remove the locking screw on IT jumper X10.
2) Pull IT jumper X10 out of the 8EI servo drive.

2.2.12.13 Connector X11 - Pinout

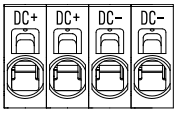
X11	Description	Function
 8TB4104.227F-10	DC+	DC bus connection DC+
	DC+	DC bus connection DC+
	DC-	DC bus connection DC-
	DC-	DC bus connection DC-

Table 81: Connector X11 - Pinout

Danger!

During operation, the contacts of connector X11 carry dangerous voltages greater than 60 VDC. Touching one of these contacts can result in a life-threatening electric shock. This could result in death or severe injury.

For this reason, terminal block 8TB4104.227F-10 must always be connected to connector X11 during operation.

Warning!

Only DC bus circuits of 8EI servo drives with the same supply voltage range are permitted to be connected.

2.2.13 Setting the POWERLINK node number

ACOPOS P3 8EI servo drives do not have node number switches and are delivered with the node number set to 0.

There are 2 ways to set the node number:

- Setting with dynamic node allocation (DNA) in Automation Studio
- Setting with the 8EAD0000.000-1 display module

Information:

If an ACOPOS P3 8EI servo drive is supplied with 24 VDC and its node number is set to 0, then LED "PLK" is lit solid red.

Information:

Node numbers in the range 001 to 239 are permitted.

Node number 000 and in the range 240 to 255 are reserved and not permitted.

Information:

A node number set using the 8EAD0000.000-1 display module is only applied the next time the 24 VDC power supply of the ACOPOS P3 8E1 servo drive is switched back on.

Setting with dynamic node allocation (DNA)

Information:

The node number of the first ACOPOS P3 8EI servo drive in an ACOPOS P3 drive system can only be set using DNA if it is connected via POWERLINK directly to the controller or another POWERLINK-capable module (in DNA mode) that can switch hub ports (e.g. X20BC...).

If this is not the case, the node number of the first ACOPOS P3 8EI servo drive in an ACOPOS P3 drive system can only be set using the 8EAD000.0000-00 display module.

Information:

Setting the node number using DNA only works on ACOPOS P3 8EI servo drives with node number 0 (factory setting).

See also section "Dynamic node allocation (DNA)" in Automation Help.

Setting with the 8EAD0000.000-1 display module

See "Node number" on page 235.

2.3 Accessories

2.3.1 8B0F passive line filters

Caution!

Only use 8B0F line filters in combination with drive systems with a switching frequency ≥5 kHz, with the exception of filter 8B0F016H*.100-1, which has been specially designed for operation at 2.5 kHz!

If drive systems with a switching frequency <5 kHz are operated on unsuitable 8B0F line filters, this can result in non-compliance with the EMC limit values and to a reduced service life of the line filter.

Line filter 8B0F016H*.100-1 is only permitted to be used with devices with a continuous power ≤ 4 kW.

Caution!

The use of 8B0F line filters in IT power systems is not permitted!

2.3.1.1 Order data

Order number	Short description	Figure
	Line filters passive	
8B0F0160H000.000-1	Line filter, passive, 16 A, 3x 528 VAC, 50/60 Hz, IP20	
8B0F0160H000.100-1	Passive line filter, 16 A, 3x 528 VAC, 50/60 Hz, IP20, specially designed also for operation at 2.5 kHz	
8B0F0300H000.000-1	Line filter, passive, 30 A, 3x 520 VAC, 50/60 Hz, IP20	
8B0F0550H000.000-1	Line filter, passive, 55 A, 3x 520 VAC, 50/60 Hz, IP20	

Table 82: 8B0F0160H000.000-1, 8B0F0160H000.100-1, 8B0F0300H000.000-1, 8B0F0550H000.000-1 - Order data

Assignment to the servo drive

1)	8B0F0160H000.x00-1	8B0F0300H000.x00-1	8B0F0550H000.x00-1
8EI1X6...	x		
8EI2X2...	x		
8EI4X5...	x		
8EI8X8...	x		
8EI013HxS…		x	
8EI017HxS…		x	
8EI017HxD			x
8EI022H…			x
8EI024H…			x
8EI034H…			x
8EI044H…			x

Table 83: Assignment to the servo drive

1) Recommended filters for a single device.

2.3.1.2 Technical data

Order number	8B0F0160H000.000-1	8B0F0160H000.100-1	8B0F0300H000.000-1	8B0F0550H000.000-1
General information				
Cooling and mounting type	Wall mounting			
Certifications				
CE	Yes	In preparation	Yes	
UKCA	Yes	-	Yes	
UL	cULus E225616 Power conversion equipment	-		
UL	-		cULus E225616 Power conversion equipment	
KC	-		Yes	
Mains connection				
Permissible network configurations	TT, TN [1]			
Mains input voltage	Max. 3x 528 VAC		Max. 3x 520 VAC	
Frequency	Max. 60 Hz		0 to 60 Hz	
Continuous current	16 A_{eff} [2]		30 A_{eff} [3]	55 A_{eff} [3]
Peak current	24 A_{eff} (<1 min), 1x/h		45 A_{eff} (<1 min), 1x/h	82.5 A_{eff} (<1 min), 1x/h
Reduction of continuous current depending on ambient temperature				
Starting at 50°C	No reduction	I = 16 A*sqrt((100°C -Tamb) / 50°C)	0.308 A/K	0.565 A/K
Reduction of continuous current depending on installation elevation				
Starting at 1000 m above sea level	-		1.5 A_{eff} per 1000 m	2.75 A_{eff} per 1000 m
Starting at 2000 m above sea level	15 A up to 3000 m 14.2 A up to 4000 m		-	
Power dissipation [4]	6.1 W		11.8 W	25.9 W
Line filter per EN 61800-3, category C3 [5]	Yes			
Variant				
L1, L2, L3 and L1´, L2´, L3´	Terminals			
PE	M5 threaded bolt			M6 threaded bolt
Shield connection				
On mains	No			
On device	No			
Terminal connection cross section				
Flexible and fine-stranded wires				
With wire end sleeve	0.25 to 6 mm²	0.25 mm² to 6 mm²	Max. 10 mm²	Max. 16 mm²
Approbation data				
UL/C-UL-US	28 to 8 AWG		8 AWG	4 AWG
CSA	28 to 8 AWG		8 AWG	4 AWG
Electrical properties				
Discharge capacitance	0.4 µF	0.54 µF [6]	0.4 µF	
Leakage current [7]	33 mA [8]	47.3 mA [9][10]	33 mA [8]	
Operating conditions				
Permissible mounting orientations				
Hanging vertically	Yes			
Horizontal, face up	Yes			
Standing horizontally	Yes		No	
Installation elevation above sea level				
Nominal	0 to 2000 m		0 to 1000 m	
Maximum [11]	4000 m			
Pollution degree per EN 61800-5-1	PD 3 per EN 61800-5-1 and IEC 60664-1		In preparation	
Overvoltage category per IEC 60950	III		II	
Overvoltage category per EN 61800-5-1	III per EN 60664-1	-		
Degree of protection per EN 60529	IP20			
Ambient conditions				
Temperature				
Operation				
Nominal	5 to 40°C	5 to 50°C	5 to 40°C	
Maximum	55°C			
Storage	-25 to 55°C			
Transport	-25 to 70°C			
Relative humidity				
Operation	5 to 85%			
Storage	5 to 95%			
Transport	Max. 95% at 40°C			
Mechanical properties				
Vibration and shock	3M1 per IEC 60721-3-3	-		

Table 84: 8B0F0160H000.000-1, 8B0F0160H000.100-1, 8B0F0300H000.000-1, 8B0F0550H000.000-1 - Technical data

Technical data

Order number	8B0F0160H000.000-1	8B0F0160H000.100-1	8B0F0300H000.000-1	8B0F0550H000.000-1
Dimensions				
Width	45 mm		50 mm	85 mm
Height	263.8 mm		270 mm	250 mm
Depth	70 mm		85 mm	90 mm
Weight	0.85 kg	0.87 kg	1.2 kg	2 kg

Table 84: 8B0F0160H000.000-1, 8B0F0160H000.100-1, 8B0F0300H000.000-1, 8B0F0550H000.000-1 - Technical data

1) TT and TN power systems are commonly referred to as "Delta/Wye with grounded wye neutral" in the USA.
2) Valid under the following conditions: 3x 528 VAC mains input voltage, 50°C ambient temperature, cos phi = 0.8.
   The exact value depends on the application.
3) Valid under the following conditions: 3x 480 VAC mains input voltage, 50°C ambient temperature, cos phi = 0.8.
   The exact value depends on the application.
4) Valid under the following conditions: 25°C ambient temperature, frequency 50 Hz.
5) Limit values from EN 61800-3 C3 (second environment).
6) To simplify the design, the converted capacity on the DC bus is specified here.
7) Valid under the following conditions: 3x 400 VAC mains input voltage, 50 Hz frequency.
   NOTE: Increased leakage currents may occur when switching on the mains (short-term single-phase or two-phase operation resulting from contact bounce in the line contactor) due to higher-frequency leakage currents occurring during operation with long motor cables or strong imbalances of the three-phase system. Observe the information in section "Dimensioning" in the drive system user's manual!
8) Value valid for 2% mains asymmetry per EN 50160. The value is 36.8 mA for 3% mains asymmetry per EN 61800-3.
9) Value valid for 2% mains asymmetry per EN 50160. The value is 51.05 mA for 3% mains asymmetry per EN 61800-3.
10) Ideal leakage current according to IEC 60939-1: 6.1 mA.
11) Continuous operation at an installation elevation of 2000 m to 4000 m above sea level is possible taking the specified reduction of continuous current into account. Requirements that go beyond this must be arranged with B&R.

2.3.1.3 Wiring

2.3.1.3.1 8B0F line filters - Pinout overview

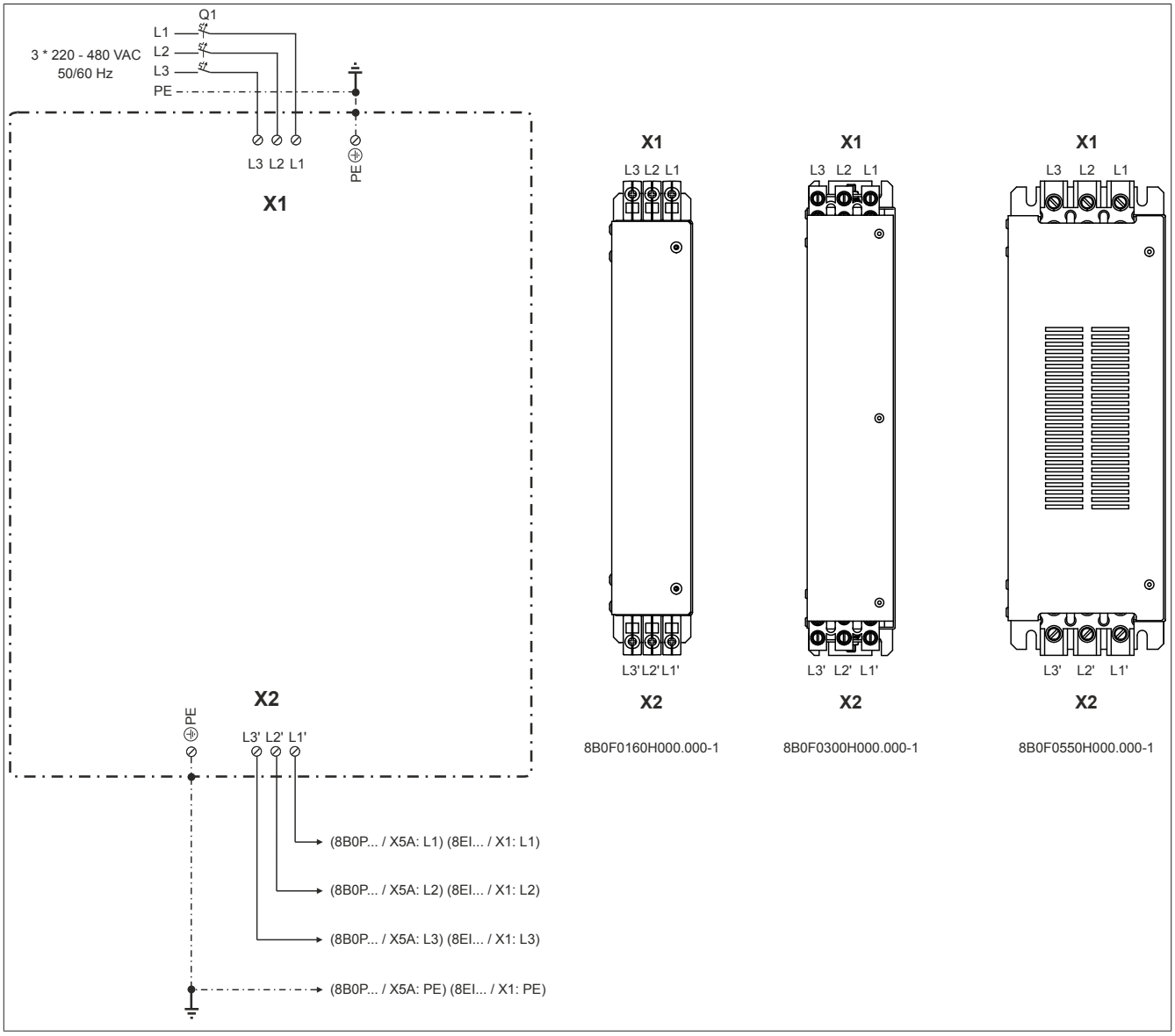


Figure 29: 8B0F0160H000.x00-1, 8B0F0300H000.000-1, 8B0F0550H000.000-1 - Pinout overview

2.3.1.3.1.1 8B0F0160H000.x00-1 - Pinout

X1 - Pinout

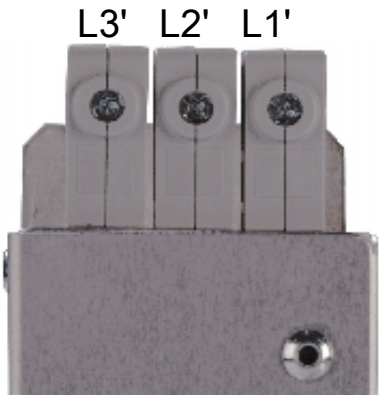
X1	Name	Function
	L1	Mains connection L1 (mains side)
	L2	Mains connection L2 (mains side)
	L3	Mains connection L3 (mains side)
Terminal connection cross section		
Flexible and fine stranded conductors with wire end sleeves UL/cULus CSA	0.25-6 mm² 28-8 AWG 28-8 AWG	
Tightening torque of the terminal screws	1.0-1.2 Nm	

Table 85: Connector X1 - Pinout

X2 - Pinout

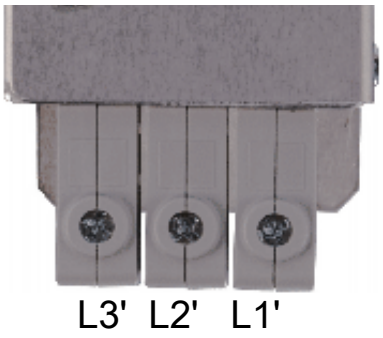
X2	Name	Function
	L1'	Mains connection L1 (load side)
	L2'	Mains connection L2 (load side)
	L3'	Mains connection L3 (load side)
Terminal connection cross section		
Flexible and fine stranded conductors with wire end sleeves UL/cULus CSA	0.25 - 6 mm² 28 - 8 AWG 28 - 8 AWG	
Tightening torque of the terminal screws	1.0 - 1.2 Nm	

Table 86: Connector X2 - Pinout

2.3.1.3.1.2 8B0F0300H000.000-1 - Pinout

X1 - Pinout

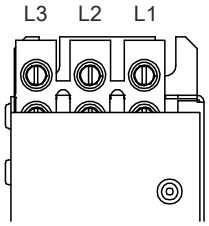
X1	Description	Function
	L1	Mains connection L1 (mains side)
	L2	Mains connection L2 (mains side)
	L3	Mains connection L3 (mains side)
Terminal connection cross section		
Flexible and fine-stranded wires with wire end sleeve UL/cULus CSA		Max. 10 mm² 8 8
Tightening torque of the terminal screws		Revision D0: 0.9 to 1 Nm Revision < D0: 1.9 to 2.2 Nm

Table 87: X1 - Pinout

X2 - Pinout

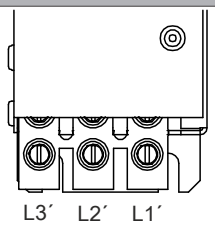
X2	Description	Function
	L1'	Mains connection L1 (load side)
	L2'	Mains connection L2 (load side)
	L3'	Mains connection L3 (load side)
Terminal connection cross section		
Flexible and fine-stranded wires with wire end sleeve UL/cULus CSA		Max. 10 mm² 8 8
Tightening torque of the terminal screws		Revision D0: 0.9 to 1 Nm Revision < D0: 1.9 to 2.2 Nm

Table 88: X2 - Pinout

2.3.1.3.1.3 8B0F0550H000.000-1 - Pinout

X1 - Pinout

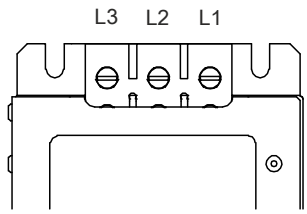
X1	Description	Function
	L1	Mains connection L1 (mains side)
	L2	Mains connection L2 (mains side)
	L3	Mains connection L3 (mains side)
Terminal connection cross section		
Flexible and fine stranded conductors with wire end sleeves UL/cULus CSA		Max. 16 mm² 4 4
Tightening torque of the terminal screws		Revision D0: 1.8 to 1.9 Nm Revision < D0: 1.9 to 2.2 Nm

Table 89: X1 - Pinout

X2 - Pinout

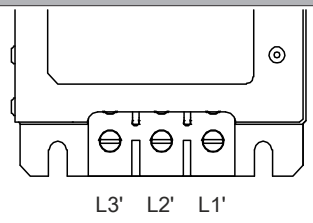
X2	Description	Function
	L1'	Mains connection L1 (load side)
	L2'	Mains connection L2 (load side)
	L3'	Mains connection L3 (load side)
Terminal connection cross section		
Flexible and fine-stranded wires with wire end sleeve UL/cULus CSA	Max. 16 mm² 4 4	
Tightening torque of the terminal screws	Revision D0: 1.8 to 1.9 Nm Revision < D0: 1.9 to 2.2 Nm	

Table 90: X2 - Pinout

2.3.1.3.1.4 Protective ground connection (PE) (power system and load side)

The protective ground conductor is secured to the M5 threaded bolt provided for this purpose using a cable lug.

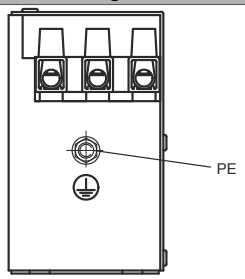
Figure	Pin	Description	Function
	---	PE	Protective ground conductor
Terminal cross section	**[mm²]**		**AWG**
Cable lug for threaded bolt	0.25 - 16		23 - 5
Tightening torque of the terminal screws [Nm]:	2.2 Nm		

Table 91: Protective ground connection (PE) 8B0F

Danger!

Before switching on the power supply, it must be ensured that the housing of the line filter is properly connected to ground potential (PE rail). The ground connection must be established even when testing the line filter or operating it for a short time!

2.3.1.3.1.5 Input/Output circuit diagram

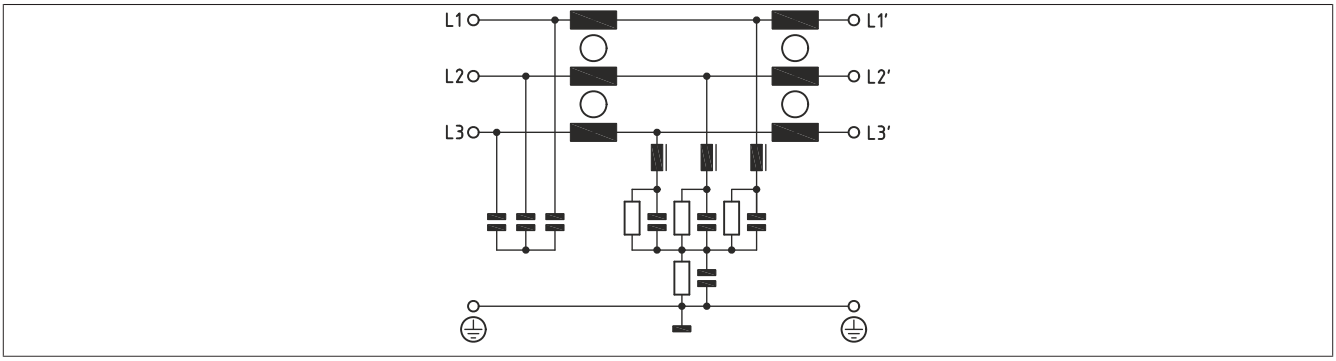


Figure 30: 8B0F - Input/Output circuit diagram

2.3.2 8EF passive line filters

Caution!

Use 8EF line filters only in combination with drive systems with a switching frequency ≥5 kHz!

If drive systems with a switching frequency <5 kHz are operated on 8EF line filters, this can result in non-compliance with the EMC limit values and to a reduced service life of the line filter.

Caution!

The use of 8EF line filters in IT power systems is not permitted!

2.3.2.1 8EF0160H300.1-1

2.3.2.1.1 General information

Passive line filter 8EF0160H300.1-1 is characterized by very low leakage currents. This makes it possible to implement compact ACOPOS P3 topologies with ACOPOS P3 8EI servo drives with a nominal current of up to 8.8 A per axis and fuse protection with a 30 mA RCD[3]. The leakage current is only 11.5 mA even when the system is switched on/off. [4]

Danger!

Where a residual current protective device (RCD) is used for protection in case of direct or indirect contact, only a type B RCD (AC/DC-sensitive per IEC 60755) is permitted for the mains connection of the ACOPOS P3 servo drive.

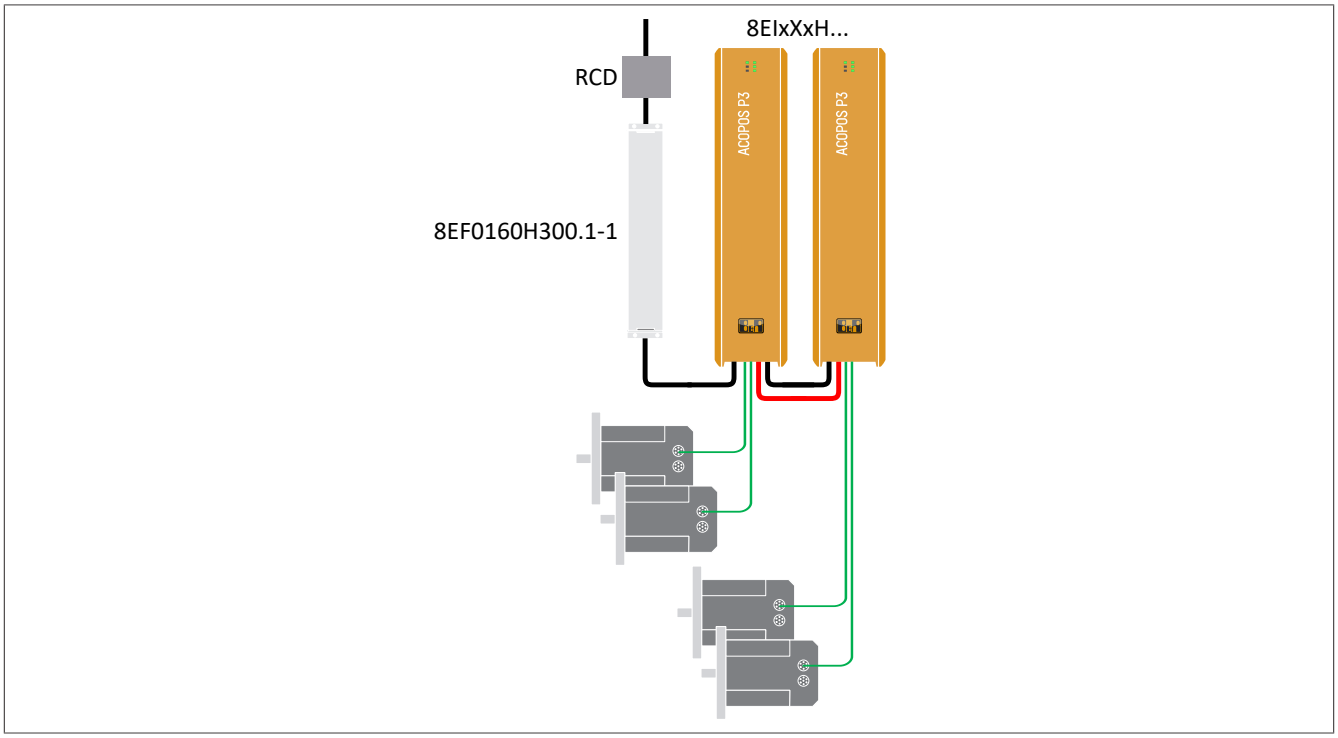


Figure 31: Example topology with line filter 8EF0160H300.1-1

Mains connection - Wiring
DC bus wiring
Motor cable 8ECM/8CCM

[3] All-current sensitive, 4-pin residual-current circuit breaker F 204 from ABB can be used, for example.
[4] 3x480 VAC, 50 Hz, 2 isolated phases.

Requirements

- IT jumper X10 must be removed from all ACOPOS P3 8EI servo drives. This reduces the leakage current of the 8EI servo drive to 0 mA; the leakage current is then determined by the line filter.
- All ACOPOS P3 8EI servo drives must be operated with the same switching frequency.
- The wiring between the ACOPOS P3 and line filter must be twisted and as short as possible. The total length of the wiring between the line filter and ACOPOS P3 is not permitted to exceed 3 m.
- The DC bus circuits of all ACOPOS P3 8EI servo drives must be connected.

Caution!

The total permissible length of all B&R motor / hybrid motor cables per 8EF0160H300.1-1 line filter is limited to the following values, depending on the switching frequency of the ACOPOS P3 8EI servo drives:

- **Switching frequency 5 kHz: 12 m[5)].**
- **Switching frequency 10 kHz: 8 m**
- **Switching frequency 20 kHz: 4 m**

Exceeding the permissible values can result in irreparable damage to line filter 8EF0160H300.1-1!

2.3.2.1.2 Order data

Order number	Short description	Figure
8EF0160H300.1-1	Passive line filter, 16 A, 3x 480 VAC, 50/60 Hz, IP20, low leakage	

Table 92: 8EF0160H300.1-1 - Order data

2.3.2.1.3 Technical data

Order number	8EF0160H300.1-1
General information	
Cooling and mounting type	Wall mounting
Certifications	
CE	Yes
UKCA	Yes
UL	UR E493879
Mains connection	
Permissible network configurations	TT, TN [1)]
Mains input voltage [2)]	1x 110 - 230 VAC ±10% 3x 200 - 480 VAC ±10%
Frequency	50/60 Hz ±5%
SCCR	5 kA
Mains fuse protection	Max. 45 A (gG per IEC 60269-1 or class J non-delayed per UL 248-8) Max. 36 A (class J time-delayed per UL 248-8) Max. 32 A (LS per IEC 60947-2 characteristic C or UL 489)
Continuous current	16 A_{eff} [3)]
Peak current	24 A_{eff}
Reduction of continuous current depending on ambient temperature	
Starting at 50°C	0.32 A_{eff}/K

Table 93: 8EF0160H300.1-1 - Technical data

[5)] For mains voltages of 1x / 3x 230 VAC, the total permissible length is 20 m

Order number	8EF0160H300.1-1
Reduction of continuous current depending on installation elevation	
Starting at 1000 m above sea level	0.8 A_{eff} per 1000 m
Power dissipation [4]	Typ. 10.8 W
Line filter per EN 61800-3, category C3	Yes
Variant	
L1, L2, L3 and L1´, L2´, L3´	Terminals
PE	M5 threaded bolt
Shield connection	
On mains	No
On device	No
Terminal connection cross section	
Flexible and fine-stranded wires	
With wire end sleeve	0.5 to 6 mm² 20 - 8 AWG
Electrical properties	
Discharge capacitance	0.1 µF
Leakage current [5]	1.95 mA
Operating conditions	
Permissible mounting orientations	
Hanging vertically	Yes
Horizontal, face up	Yes
Standing horizontally	No
Installation elevation above sea level	
Nominal	0 to 1000 m
Maximum [6]	4000 m
Pollution degree per IEC 60664-1	2
Overvoltage category per IEC 60939-3	II
Degree of protection per EN 60529	IP20
Ambient conditions	
Temperature	
Operation	
Nominal	-25 to 40°C
Maximum [7]	55°C
Storage	-25 to 55°C
Transport	-25 to 70°C
Relative humidity [8]	
Operation	Max. 93%, non-condensing
Storage	Max. 93%, non-condensing
Transport	Max. 93%, non-condensing
Mechanical properties	
Dimensions	
Width	55 mm
Height	230 mm
Depth	160 mm
Weight	1.5 kg

Table 93: 8EF0160H300.1-1 - Technical data

1) TT and TN power systems are commonly referred to as "Delta/Wye with grounded wye neutral" in the USA.
2) For wiring for single-phase power supply, see section "Wiring".
3) Valid under the following conditions: 3x 480 VAC mains input voltage, 50°C ambient temperature, cos phi = 0.8.
The exact value depends on the application.
4) Valid under the following conditions: 25°C ambient temperature, frequency 50 Hz.
5) Valid under the following conditions: 3x 400 VAC mains input voltage, 50 Hz frequency.
NOTE: Increased leakage currents may occur when switching on the mains (short-term single-phase or two-phase operation resulting from contact bounce in the line contactor) due to higher-frequency leakage currents occurring during operation with long motor cables or strong imbalances of the three-phase system. Observe the information in section "Dimensioning" in the drive system user's manual!
6) Continuous operation at an installation elevation of 1000 m to 4,000 m above sea level is possible taking the specified reduction of continuous current into account.
7) Continuous operation at an ambient temperature of 40°C to max. 55°C is possible taking the specified reduction of continuous torque into account, but this results in premature aging of components.
8) Specifications per IEC 60068-1.

2.3.2.1.4 Dimension diagram and installation dimensions

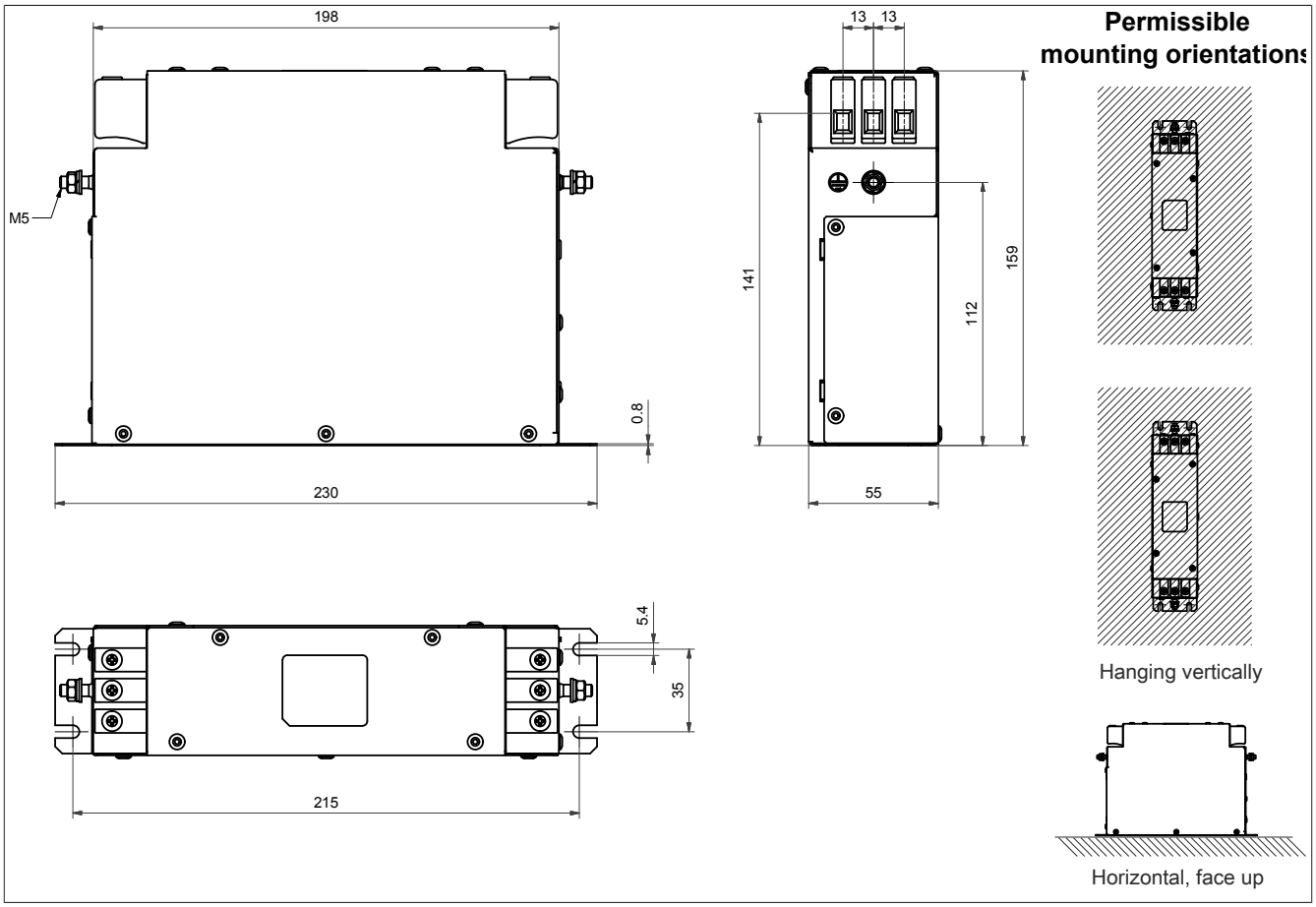


Figure 32: 8EF0160H300.1-1 - Dimension diagram and installation dimensions

2.3.2.1.5 Wiring

2.3.2.1.5.1 Pinout overview

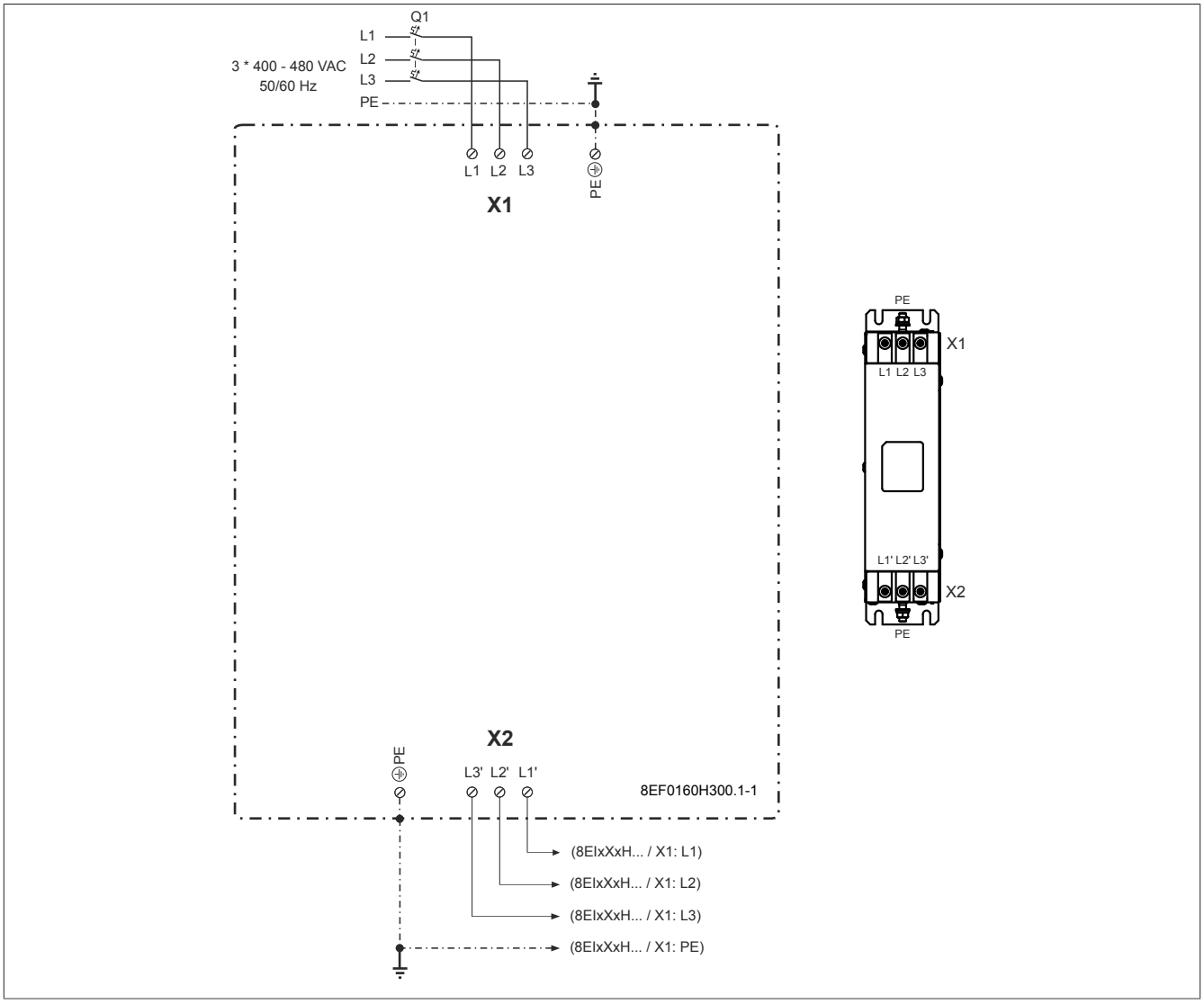


Figure 33: 8EF0160H300.1-1 - Pinout overview

2.3.2.1.5.2 X1 - Pinout

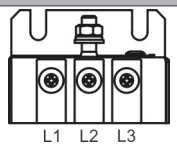
X1	Name	Function
	L1	Mains connection L1 (mains side)
	L2	Mains connection L2 (mains side)
	L3	Mains connection L3 (mains side)
Terminal connection cross section		
Flexible and fine stranded conductors with wire end sleeves	0.5 to 6 mm² 20 - 8 AWG	
Tightening torque of the terminal screws	1 to 1.2 Nm	

Table 94: X1 terminals - Pinout

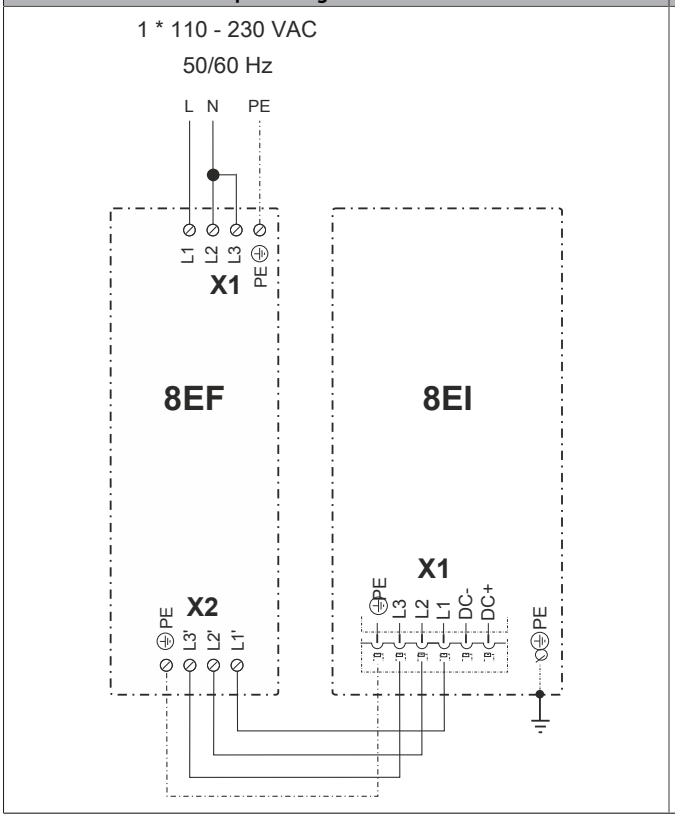
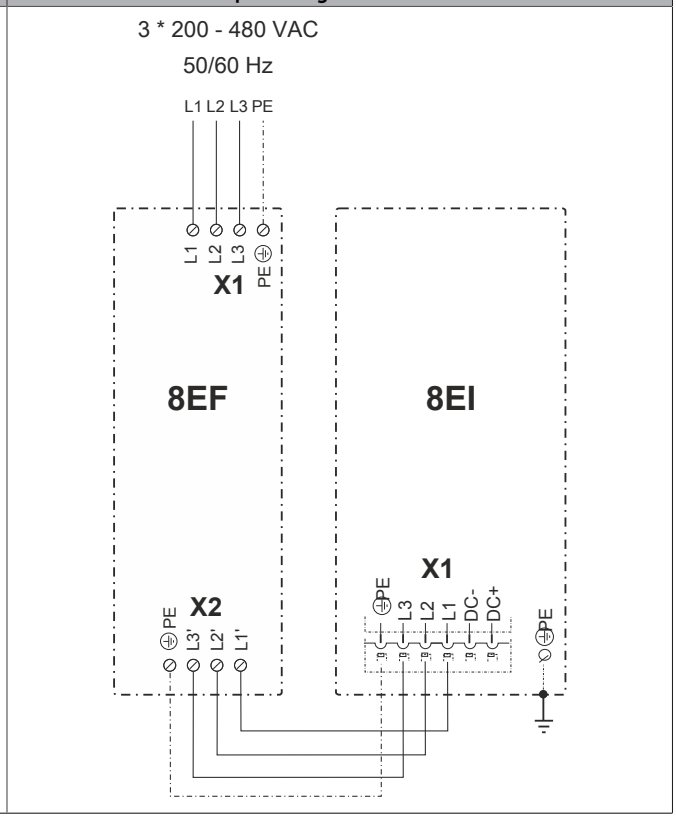
Mains input voltage - 1x 110 to 230 VAC	Mains input voltage - 3x 200 to 480 VAC
	

Table 95: Mains connection design

2.3.2.1.5.3 X2 - Pinout

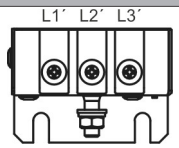
X2	Name	Function
	L1'	Mains connection L1 (load side)
	L2'	Mains connection L2 (load side)
	L3'	Mains connection L3 (load side)
Terminal connection cross section		
Flexible and fine stranded conductors with wire end sleeves	0.5 to 6 mm² 20 - 8 AWG	
Tightening torque of the terminal screws	1 to 1.2 Nm	

Table 96: X2 terminals - Pinout

2.3.2.1.5.4 Protective ground connection (PE) (mains and load sides)

The protective ground conductor is secured to the threaded bolt provided for this purpose using a cable lug.

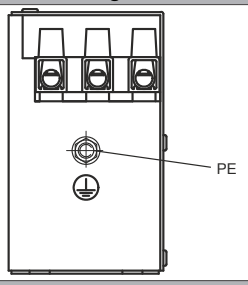
Figure	Pin	Name	Function
	---	PE	Protective ground conductor
Terminal cross section	**[mm²]**		**AWG**
Cable lug for threaded bolt	0.25 - 16		23 - 5
Tightening torque	2 to 2.2 Nm		

Table 97: Protective ground connection (PE) 8EF0160H300.1-1

Danger!

Before switching on the power supply, it must be ensured that the housing of the line filter is properly connected to ground potential (PE rail). Ground connections must also be made if the line filter is only connected for testing purposes or only operated for a short time!

2.3.2.1.5.5 Input/Output circuit diagram

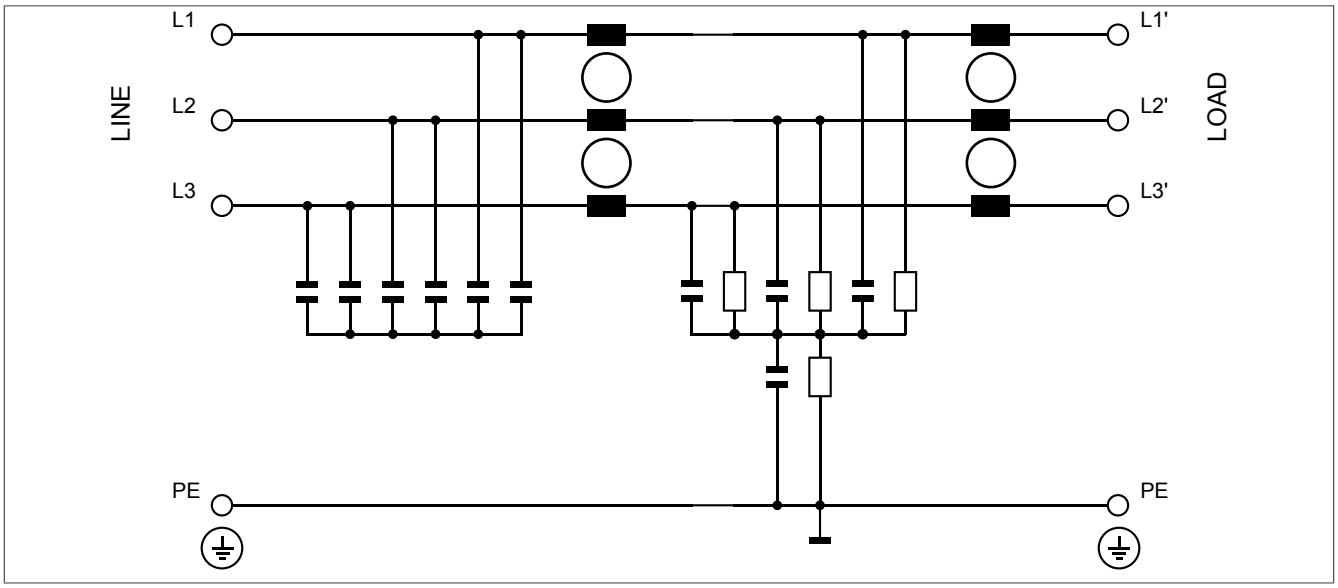


Figure 34: 8EF0160H300.1-1 - Input/Output circuit diagram

2.3.3 8EAC plug-in modules

2.3.3.1 8EAC0122.001-1

2.3.3.1.1 General information

Resolver plug-in module 8EAC0122.001-1 can be used in the slot of an ACOPOS P3 8EI servo drive. The module contains a resolver interface for evaluating BRX resolvers.

The plug-in module evaluates the output from resolvers that are either built into B&R servo motors or used to evaluate external axes. These resolvers return the absolute position over one revolution. The travel path is normally longer than one revolution. In this case, a reference switch must be used and a homing procedure carried out.

The encoder input signals are monitored. This makes it possible to detect open circuits, short circuits and failures of the encoder power supply (reference signal).

After it is switched on, the plug-in module is automatically identified by the operating system on the ACOPOS P3 8EI servo drive.

Information:

The encoder interfaces of 8EAC plug-in modules are each assigned from the factory to a defined axis (motor connection X5xx) of the 8EI servo drive in which the respective 8EAC plug-in module is being operated.

8EAC encoder interface plug-in module	Assignment		
	8EIxxxxxS... 1-axis modules	8EIxxxxxD... 2-axis modules	8EIxxxxxT... 3-axis modules
X41x	X51 / X51A	X51 / X51A	X51 / X51A
X42x	---	X52	X52
X43x	---	---	X53

The factory assignment of encoder interfaces can be changed in Automation Studio (prerequisite: mapp Motion V.5.22.0 / ACP10 V5.20.0 or higher). For details, see Automation Help (encoder interface assignment).

2.3.3.1.2 Order data

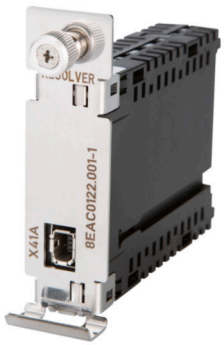
Order number	Short description	Figure
	Plug-in modules	
8EAC0122.001-1	ACOPOS P3 plug-in module, resolver interface 10 kHz	
	Optional accessories	
	Resolver cables	
8ECR0005.1111C-0	ACOPOS P3 resolver cable, length 5 m, 3x 2x 24 AWG (19x 0.127), 12-pin female speedtec connector, 8-pin male Mini I/O connector, can be used in cable drag chains	
8ECR0007.1111C-0	ACOPOS P3 resolver cable, length 7 m, 3x 2x 24 AWG (19x 0.127), 12-pin female speedtec connector, 8-pin male Mini I/O connector, can be used in cable drag chains	
8ECR0008.1111C-0	ACOPOS P3 resolver cable, length 8 m, 3x 2x 24 AWG (19x 0.127), 12-pin female speedtec connector, 8-pin male Mini I/O connector, can be used in cable drag chains	
8ECR0009.1111C-0	ACOPOS P3 resolver cable, length 9 m, 3x 2x 24 AWG (19x 0.127), 12-pin female speedtec connector, 8-pin male Mini I/O connector, can be used in cable drag chains	
8ECR0010.1111C-0	ACOPOS P3 resolver cable, length 10 m, 3x 2x 24 AWG (19x 0.127), 12-pin female speedtec connector, 8-pin male Mini I/O connector, can be used in cable drag chains	
8ECR0012.1111C-0	ACOPOS P3 resolver cable, length 12 m, 3x 2x 24 AWG (19x 0.127), 12-pin female speedtec connector, 8-pin male Mini I/O connector, can be used in cable drag chains	
8ECR0015.1111C-0	ACOPOS P3 resolver cable, length 15 m, 3x 2x 24 AWG (19x 0.127), 12-pin female speedtec connector, 8-pin male Mini I/O connector, can be used in cable drag chains	
8ECR0020.1111C-0	ACOPOS P3 resolver cable, length 20 m, 3x 2x 24 AWG (19x 0.127), 12-pin female speedtec connector, 8-pin male Mini I/O connector, can be used in cable drag chains	
8ECR0025.1111C-0	ACOPOS P3 resolver cable, length 25 m, 3x 2x 24 AWG (19x 0.127), 12-pin female speedtec connector, 8-pin male Mini I/O connector, can be used in cable drag chains	

Table 98: 8EAC0122.001-1 - Order data

2.3.3.1.3 Technical data

Order number	8EAC0122.001-1
General information	
Module type	ACOPOS P3 plug-in module
B&R ID code	0xEA8E
Max. power consumption	1 W
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E225616 Power conversion equipment
KC	Yes
Encoder connection	
Module-side connection [1)]	8-pin female Mini I/O connector
Status indicators	None
Encoder monitoring	Yes
Max. encoder cable length	100 m
Encoder power supply	
Output voltage	Typ. 3 V_{eff}
Output current	Max. 50 mA_{eff}
Frequency	10 kHz
Protective measures	
Overload-proof	Yes
Short-circuit proof	Yes
Position	
Resolution @ 1 V_{ss}	Number of pole pairs * 16 bits
Analog inputs	
Digital converter resolution	16-bit
Input impedance	10.4 kΩ - j8 kΩ
Input voltage	Resolver transformation ratio: 0.2 - 0.55 ±10%
Common-mode voltage	Max. ±12 V
Signal transmission	Differential signals
Support	
Motion system	
mapp Motion	5.00.0 and higher
ACP10/ARNC0	3.11.0 and higher
Ambient conditions	
Temperature	
Operation	
Nominal	5 to 40°C
Maximum	55°C
Storage	-25 to 55°C
Transport	-25 to 70°C
Relative humidity	
Operation	5 to 85%
Storage	5 to 95%
Transport	Max. 95% at 40°C
Mechanical properties	
Dimensions	
Width	24 mm
Height	82 mm
Depth	103 mm
Weight	123 g

Table 99: 8EAC0122.001-1 - Technical data

1) The resolver must be wired using a cable with a single shield and twisted pair signal lines.

2.3.3.1.4 Wiring

2.3.3.1.4.1 Pinout

Information:

Plug-in module 8EAC is not capable of hot plugging. An 8EAC plug-in module is only permitted to be connected to or disconnected from an ACOPOS P3 8EI servo drive when power to the servo drive is switched off.

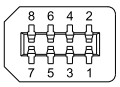
Figure	Mini I/O X41A	Pin	Name [1]	Function	Typical wire colors for the resolver [2]
		1	S2	Sine input -	Yellow
		2	R2	Reference output +	Black/White (or yellow/white)
		3	S4	Sine input +	Blue
		4	R1	Reference output -	Red/White
		5	S3	Cosine input +	Black
		6	T1	Temperature sensor +	---
		7	S1	Cosine input -	Red
		8	T2	Temperature sensor -	---

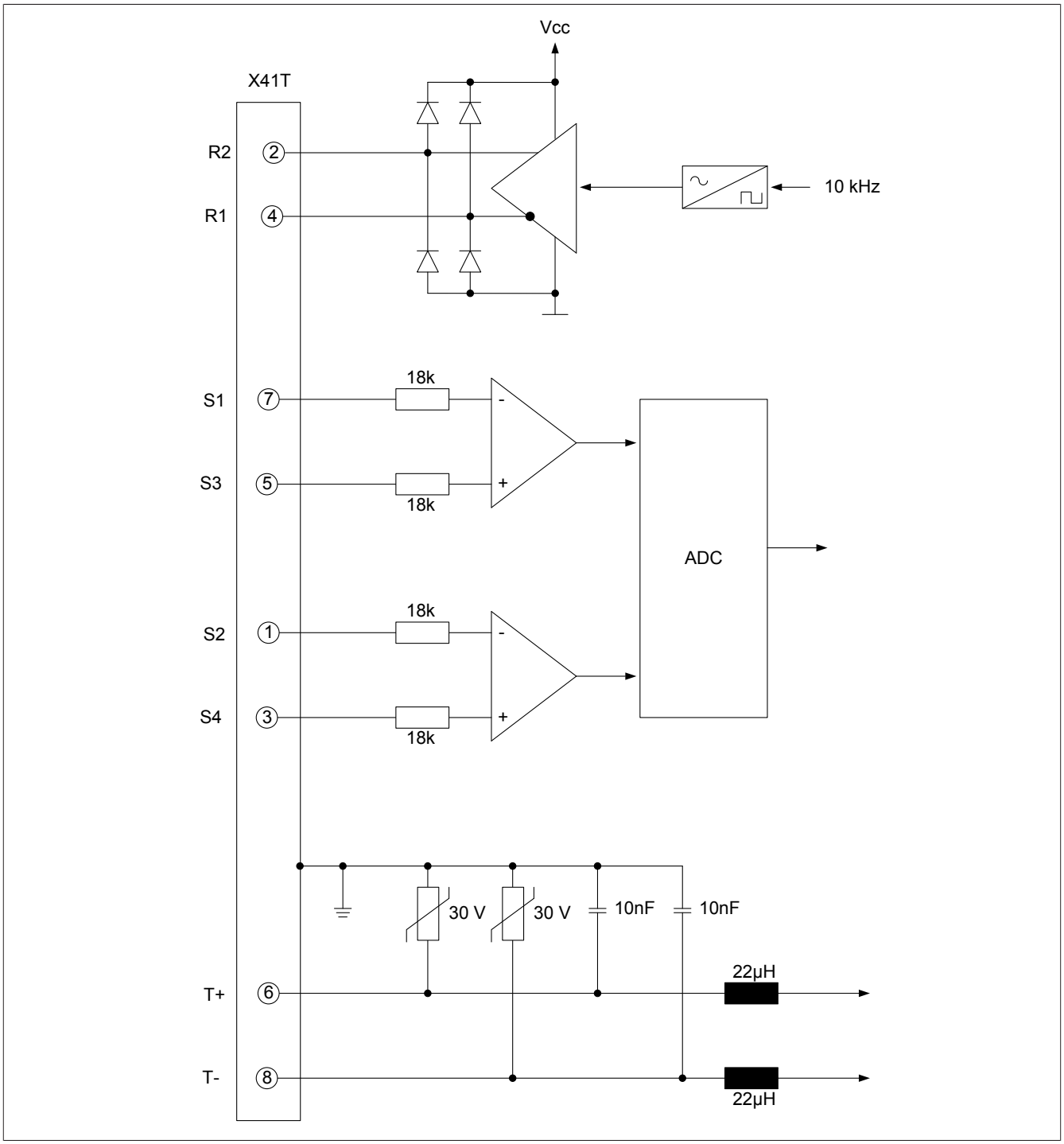
Table 100: Resolver interface 8EAC0122.001-1 - Pinout

1) Names are the same as those used by leading manufacturers (Tamagawa, Tyco, LTN).
2) This refers to the wire colors of the lines connected directly to the resolver that are used universally by leading manufacturers (Tamagawa, Tyco, LTN). **These are not the wire colors in B&R resolver cables!**

Danger!

The connections for the motor temperature sensor and encoder are safely isolated circuits. These connections are therefore only permitted to be connected to devices or components that have sufficient isolation per IEC 60364-4-41 or EN 61800-5-1.

2.3.3.1.5 Input/Output circuit diagram



2.3.3.1.6 Firmware

The firmware is part of the operating system for the ACOPOS P3 8EI servo drive. Firmware is updated by updating the ACOPOS P3 operating system.

2.3.3.2 8EAC0122.003-1

2.3.3.2.1 General information

Resolver plug-in module 8EAC0122.003-1 can be used in the slot of an ACOPOS P3 8EI servo drive. The module contains three resolver interfaces for evaluating BRX resolvers.

The plug-in module evaluates the output from resolvers that are either built into B&R servo motors or used to evaluate external axes. These resolvers return the absolute position over one revolution. The traverse path is normally longer than one revolution. In this case, a reference switch must be used and a homing procedure carried out.

The encoder input signals are monitored. This makes it possible to detect open circuits, short circuits and failures of the encoder power supply (reference signal).

When switched on, the plug-in module is automatically identified by the operating system on the ACOPOS P3 8EI servo drive.

Information:

The encoder interfaces of 8EAC plug-in modules are each assigned from the factory to a defined axis (motor connection X5xx) of the 8EI servo drive in which the respective 8EAC plug-in module is being operated.

8EAC encoder interface plug-in module	Assignment		
	8EIxxxxxS... 1-axis modules	8EIxxxxxD... 2-axis modules	8EIxxxxxT... 3-axis modules
X41x	X51 / X51A	X51 / X51A	X51 / X51A
X42x	---	X52	X52
X43x	---	---	X53

The factory assignment of encoder interfaces can be changed in Automation Studio (prerequisite: mapp Motion V.5.22.0 / ACP10 V5.20.0 or higher). For details, see Automation Help (encoder interface assignment).

2.3.3.2.2 Order data

Order number	Short description	Figure
	Plug-in modules	
8EAC0122.003-1	ACOPOS P3 plug-in module, 3 resolver interfaces 10 kHz	
	Optional accessories	
	Resolver cables	
8ECR0005.1111C-0	ACOPOS P3 resolver cable, length 5 m, 3x 2x 24 AWG (19x 0.127), 12-pin female speedtec connector, 8-pin male Mini I/O connector, can be used in cable drag chains	
8ECR0007.1111C-0	ACOPOS P3 resolver cable, length 7 m, 3x 2x 24 AWG (19x 0.127), 12-pin female speedtec connector, 8-pin male Mini I/O connector, can be used in cable drag chains	
8ECR0008.1111C-0	ACOPOS P3 resolver cable, length 8 m, 3x 2x 24 AWG (19x 0.127), 12-pin female speedtec connector, 8-pin male Mini I/O connector, can be used in cable drag chains	
8ECR0009.1111C-0	ACOPOS P3 resolver cable, length 9 m, 3x 2x 24 AWG (19x 0.127), 12-pin female speedtec connector, 8-pin male Mini I/O connector, can be used in cable drag chains	
8ECR0010.1111C-0	ACOPOS P3 resolver cable, length 10 m, 3x 2x 24 AWG (19x 0.127), 12-pin female speedtec connector, 8-pin male Mini I/O connector, can be used in cable drag chains	
8ECR0012.1111C-0	ACOPOS P3 resolver cable, length 12 m, 3x 2x 24 AWG (19x 0.127), 12-pin female speedtec connector, 8-pin male Mini I/O connector, can be used in cable drag chains	
8ECR0015.1111C-0	ACOPOS P3 resolver cable, length 15 m, 3x 2x 24 AWG (19x 0.127), 12-pin female speedtec connector, 8-pin male Mini I/O connector, can be used in cable drag chains	
8ECR0020.1111C-0	ACOPOS P3 resolver cable, length 20 m, 3x 2x 24 AWG (19x 0.127), 12-pin female speedtec connector, 8-pin male Mini I/O connector, can be used in cable drag chains	
8ECR0025.1111C-0	ACOPOS P3 resolver cable, length 25 m, 3x 2x 24 AWG (19x 0.127), 12-pin female speedtec connector, 8-pin male Mini I/O connector, can be used in cable drag chains	

Table 101: 8EAC0122.003-1 - Order data

2.3.3.2.3 Technical data

Order number	8EAC0122.003-1
General information	
Short description	3 resolver interfaces in one module
Module type	ACOPOS P3 plug-in module
B&R ID code	0xEA84
Slot	Slot 1
Max. power consumption	1.5 W
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E225616 Power conversion equipment
KC	Yes
Encoder connection [1]	
Module-side connection [2]	8-pin female Mini I/O connector
Status indicators	None
Encoder monitoring	Yes
Max. encoder cable length	100 m
Encoder power supply [1]	
Output voltage	Typ. 3 V_{eff}
Output current	Max. 50 mA_{eff}
Frequency	10 kHz
Protective measures	
Overload-proof	Yes
Short-circuit proof	Yes
Position [1]	
Resolution @ 1 V_{ss}	Number of pole pairs * 16 bits
Analog inputs [1]	
Digital converter resolution	16-bit
Input impedance	10.4 kΩ - j8 kΩ
Input voltage	Resolver transformation ratio: 0.2 - 0.55 ±10%
Common-mode voltage	Max. ±12 V
Signal transmission	Differential signals
Support	
Motion system	
mapp Motion	5.00.0 and higher
ACP10/ARNC0	3.11.0 and higher
Ambient conditions	
Temperature	
Operation	
Nominal	5 to 40°C
Maximum	55°C
Storage	-25 to 55°C
Transport	-25 to 70°C
Relative humidity	
Operation	5 to 85%
Storage	5 to 95%
Transport	Max. 95% at 40°C
Mechanical properties	
Dimensions	
Width	24 mm
Height	82 mm
Depth	103 mm
Weight	127 g

Table 102: 8EAC0122.003-1 - Technical data

1) The data in this section applies to each of the 3 resolver interfaces.
2) The resolver must be wired using a cable with a single shield and twisted pair signal lines.

2.3.3.2.4 Wiring

2.3.3.2.4.1 Pinout

Information:

Plug-in module 8EAC is not capable of hot plugging. An 8EAC plug-in module is only permitted to be connected to or disconnected from an ACOPOS P3 8EI servo drive when power to the servo drive is switched off.

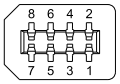
Figure	Mini I/O X41C/X42C/X43C	Pin	Name [1]	Function	Typical wire colors for the resolver [2]
		1	S2	Sine input -	Yellow
		2	R2	Reference output +	Black/White (or yellow/white)
		3	S4	Sine input +	Blue
		4	R1	Reference output -	Red/White
		5	S3	Cosine input +	Black
		6	T1	Temperature sensor +	---
		7	S1	Cosine input -	Red
		8	T2	Temperature sensor -	---

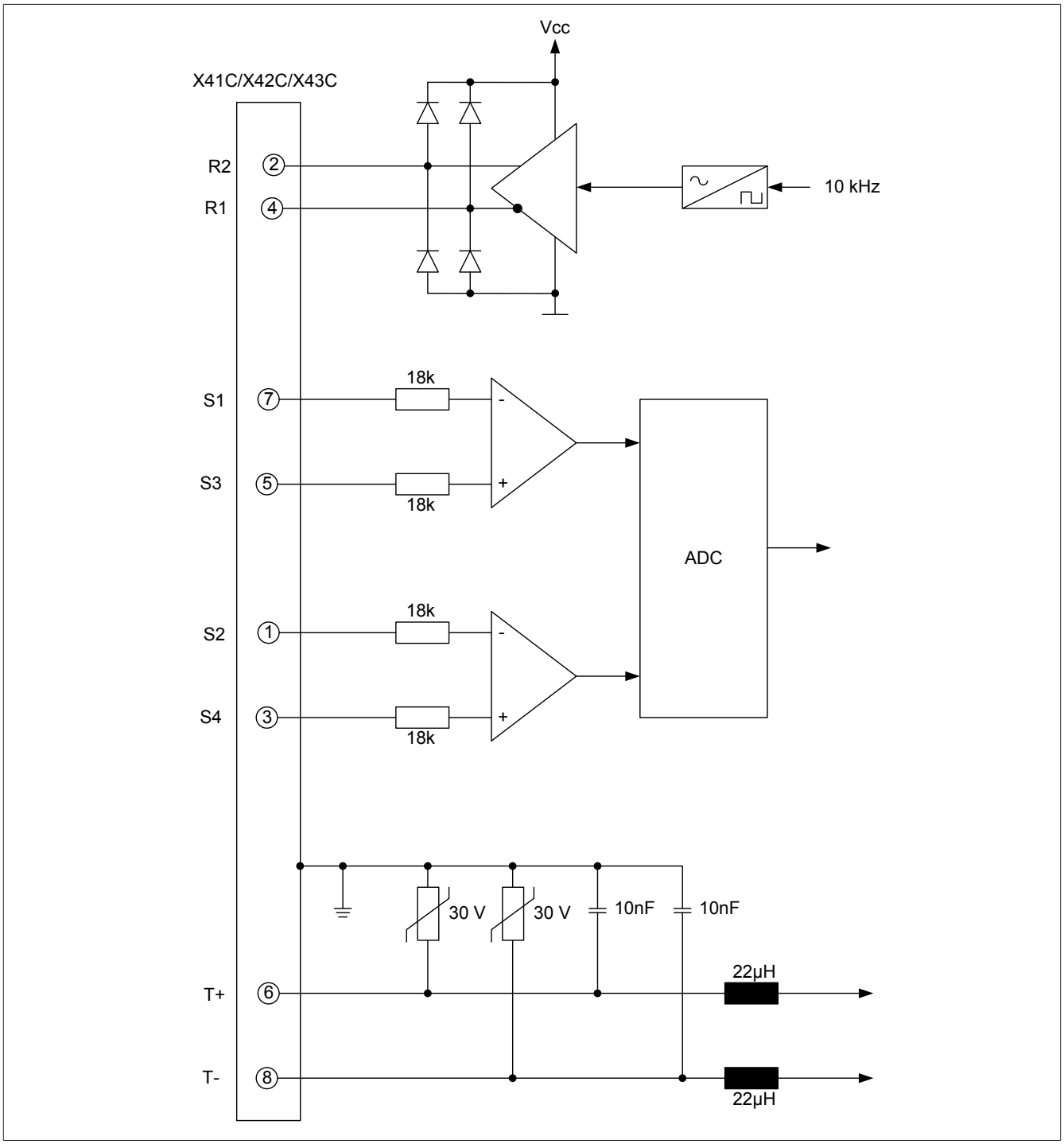
Table 103: Resolver interface 8EAC0122.003-1 - Pinout

1) Names are the same as those used by leading manufacturers (Tamagawa, Tyco, LTN).
2) This refers to the wire colors of the lines connected directly to the resolver that are used universally by leading manufacturers (Tamagawa, Tyco, LTN). **These are not the wire colors in B&R resolver cables!**

Danger!

The connections for the motor temperature sensor and encoder are safely isolated circuits. These connections are therefore only permitted to be connected to devices or components that have sufficient isolation per IEC 60364-4-41 or EN 61800-5-1.

2.3.3.2.5 Input/Output circuit diagram



2.3.3.2.6 Firmware

The firmware is part of the operating system for the ACOPOS P3 8EI servo drive. Firmware is updated by updating the ACOPOS P3 operating system.

2.3.3.3 8EAC0130.000-1

2.3.3.3.1 General information

I/O plug-in module 8EAC0130.000-1 can be used in the slot of an ACOPOS P3 8EI servo drive. The plug-in module provides 10 digital input/outputs.

Digital inputs/outputs 1 to 8 can be configured individually; digital inputs/outputs 9 and 10 can be configured in pairs as inputs or outputs.
Up to 4 high-speed (push-pull) outputs with maximum current of 100 mA, 4 standard (high-side) outputs with maximum current of 400 mA and 2 slow (high-side) outputs with maximum current of 2 A are available.

The digital inputs/outputs are also equipped with an internal reverse current protection circuit:
Even if the input voltage on one of the digital I/O connections exceeds the value of the supply voltage on connections X41D/29 and X41D/30, they are protected against damage by the internal reverse current protection circuit.

Information:

The type of individual digital I/O connections is not predefined at the factory.
Before commissioning, configure the desired type (input or output) for each I/O connection in Automation Studio!

2.3.3.3.2 Order data

Order number	Short description	Figure
	Plug-in modules	
8EAC0130.000-1	ACOPOS P3 plug-in module, 8 digital I/O 24 V (4x 400 mA, 4x 100 mA) individually configurable as inputs or outputs, 2 digital I/O 24 V 2 A configurable in pairs as inputs or outputs, order terminal block 8TB0230.221A-00 separately!	
	Required accessories	
	Terminal blocks	
8TB0230.221A-00	30-pin push-in terminal block, 2-row, pitch: 2.54 mm, label 1: Numbered consecutively	

Table 104: 8EAC0130.000-1 - Order data

2.3.3.3.3 Technical data

Order number	8EAC0130.000-1
General information	
Module type	ACOPOS P3 plug-in module
B&R ID code	0xF037
Slot	Slot 1
Power consumption	Typ. 1.5 W
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E225616 Power conversion equipment
KC	Yes
Inputs/Outputs	
Module-side connection	30-pin multipoint connector
Status indicators	None
Configuration of digital inputs/outputs	Input/Output 1 - 8: Individually configurable as inputs or outputs Input/Output 9 - 10: Configurable in pairs as inputs or outputs
Incremental encoders [1)]	
Counter size	16-bit
Input frequency	Max. 125 kHz
Evaluation	4x
Signal form	Rectangle
Encoder monitoring	Yes

Table 105: 8EAC0130.000-1 - Technical data

Order number	8EAC0130.000-1
Counter frequency	Max. 500 kHz
Reference frequency	Max. 125 kHz
Distance between edges	Min. 0.64 µs
Inputs	
Input 1	Channel A
Input 2	Channel B
Input 3	Reference pulse R
Power supply [2]	
Reverse polarity protection	Yes
Power supply	
Minimum	18 VDC
Nominal	24 VDC
Maximum	30 VDC
Digital inputs [3]	
Quantity	Max. 10
Input current at 24 VDC	Inputs 1 - 8: Typ. 2.5 mA Inputs 9 - 10: Typ. 3 mA
Input filter	
Hardware	Inputs 1 - 8: No filter Inputs 9 - 10: Yes
Software	5.12 µs (default) Between 0 and 20.97 ms
Connection type	1-wire connections
Circuit	Sink
Input frequency [4]	Inputs 1 - 8: Max. 125 kHz Inputs 9 - 10: Max. 10 kHz
Switching threshold	
Low	≤5 V
High	≥15 V
Input voltage	
Maximum	Supply voltage
Electrical isolation	
Channel - ACOPOS	Yes
Channel - Channel	No
Switching delay [5]	
Digital input	Inputs 1 - 8: Approx. 1 µs Inputs 9 - 10: Typ. 34 µs
Event counters [1]	
Signal form	Square wave pulse
Input frequency	Max. 125 kHz
Counter size	16-bit
Inputs	
Input 1	Counter 1
Input 2	Counter 2
Trigger inputs [6]	
Quantity	4
Channels	Digital I/O 5 - 8
Digital outputs	
Quantity	Max. 10
Variant	Output 1 - 4: Push-pull transistor outputs Output 5 - 8: High-side transistor outputs Output 9 - 10: High-side transistor outputs
Connection type	1-wire connections
Readable outputs	Yes
Continuous current	Outputs 1 - 4: Max. 100 mA Outputs 5 - 8: Max. 400 mA Outputs 9 - 10: Max. 2 A
Peak short-circuit current	Outputs 1 - 8: Approx. 10 A, 0.5 µs Outputs 9 -10: Max. 90 A, 800 µs
Switching frequency (resistive load) [7]	Outputs 1 - 4: Max. 125 kHz Outputs 5 - 8: Max. 10 kHz Outputs 9 - 10: Max. 100 Hz
Switching delay [8]	Outputs 1 - 8: <3 µs Outputs 9 - 10: 50 to 150 µs
Electrical isolation	
Output - ACOPOS	Yes
Output - Output	No
Switching voltage	
Nominal	≤Supply voltage
Protection	
Short-circuit proof	Yes
Overload-proof	Yes
Encoder emulation [1]	
Output frequency	Max. 125 kHz [9]

Table 105: 8EAC0130.000-1 - Technical data

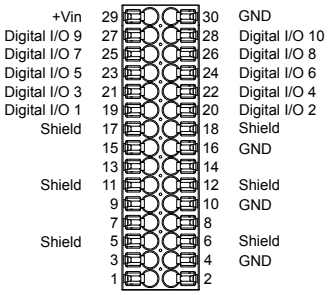
Technical data

Order number	8EAC0130.000-1
Outputs	
Output 1	Channel A
Output 2	Channel B
Output 3	Reference pulse R
Support	
Motion system [10]	
mapp Motion	5.03.3 and higher
ACP10/ARNC0	5.03.3 and higher
Ambient conditions	
Temperature	
Operation	
Nominal	5 to 40°C
Maximum	55°C
Storage	-25 to 55°C
Transport	-25 to 70°C
Relative humidity	
Operation	5 to 85%
Storage	5 to 95%
Transport	Max. 95% at 40°C
Mechanical properties	
Dimensions	
Width	82 mm
Height	24 mm
Depth	103 mm
Weight	79 g

Table 105: 8EAC0130.000-1 - Technical data

1) Carry out wiring with shielded lines!
2) Carry out wiring for line lengths > 3 m with shielded lines!
3) When controlled by a push output or normally closed contact, the filter time should be increased to 655 µs in order to avoid disturbances from electromagnetic interference (EMI).
4) The maximum input frequency depends on the selected software function.
5) When controlled by a push output or normally closed contact, the switch-off time is extended depending on the length of the power supply cable since the line capacity is only discharged by the input current.
6) For additional technical data, see section "Digital inputs".
7) Outputs 1 to 8: The maximum switching frequency depends on the selected software function.
8) Without and with resistive load at continuous current.
9) Corresponds to max. 500,000 increments/s (4x evaluation).
10) Incremental encoder, event counter and encoder emulation functions are supported starting with version 5.08.2.

2.3.3.3.4 Pinout

Figure	X41D	Pin	Description		Function		
					Incremental encoders / Encoder emulation	Event counters	Trigger
		1	---	---	---	---	---
		2	---	---	---	---	---
		3	---	---	---	---	---
		4	GND	GND	---	---	---
		5	Shield	Shield	---	---	---
		6	Shield	Shield	---	---	---
		7	---	---	---	---	---
		8	---	---	---	---	---
		9	---	---	---	---	---
		10	GND	GND	---	---	---
		11	Shield	Shield	---	---	---
		12	Shield	Shield	---	---	---
		13	---	---	---	---	---
		14	---	---	---	---	---
		15	---	---	---	---	---
		16	GND	GND	---	---	---
		17	Shield	Shield	---	---	---
		18	Shield	Shield	---	---	---
		19	Digital I/O 1	Digital input/output 1	Channel A	Counter 1	---
		20	Digital I/O 2	Digital input/output 2	Channel B	Counter 2	---
		21	Digital I/O 3	Digital input/output 3	Reference pulse R	---	---
		22	Digital I/O 4	Digital input/output 4	---	---	---
		23	Digital I/O 5	Digital input/output 5	---	---	Trigger
		24	Digital I/O 6	Digital input/output 6	---	---	Trigger
		25	Digital I/O 7	Digital input/output 7	---	---	Trigger
		26	Digital I/O 8	Digital input/output 8	---	---	Trigger
		27	Digital I/O 9	Digital input/output 9	---	---	---
		28	Digital I/O 10	Digital input/output 10	---	---	---
		29	+Vin	External power supply +18 ... 30 VDC	---	---	---
		30	GND	External power supply 0 V	---	---	---

Terminal cross sections	[mm²]	[AWG]
Solid core / Multiple-conductor lines	0.14 - 0.5	26 - 20
Flexible, multiple wire line Without wire end sleeves With wire end sleeves	 0.14 - 0.5 0.14 - 0.25	 26 - 20 26 - 24
Approbation data UL/C-UL-US CSA	 --- ---	 26 - 20 26 - 20

Table 106: DIO interface 8BAC0130.000-1 - Pinout

Information:

The digital I/O connections can only be used if voltage is supplied to the module via connectors X41D/29 and X41D/30.

Notice!

Reverse current protection for the digital inputs is only ensured if the module is supplied with voltage via connections X41D/29 and X41D/30.

Danger!

The digital inputs are isolated circuits. They are therefore only permitted to be connected to devices or components that have at least safe isolation per IEC 60364-4-41 or EN 61800-5-1.

2.3.3.3.5 Input/Output circuit diagram

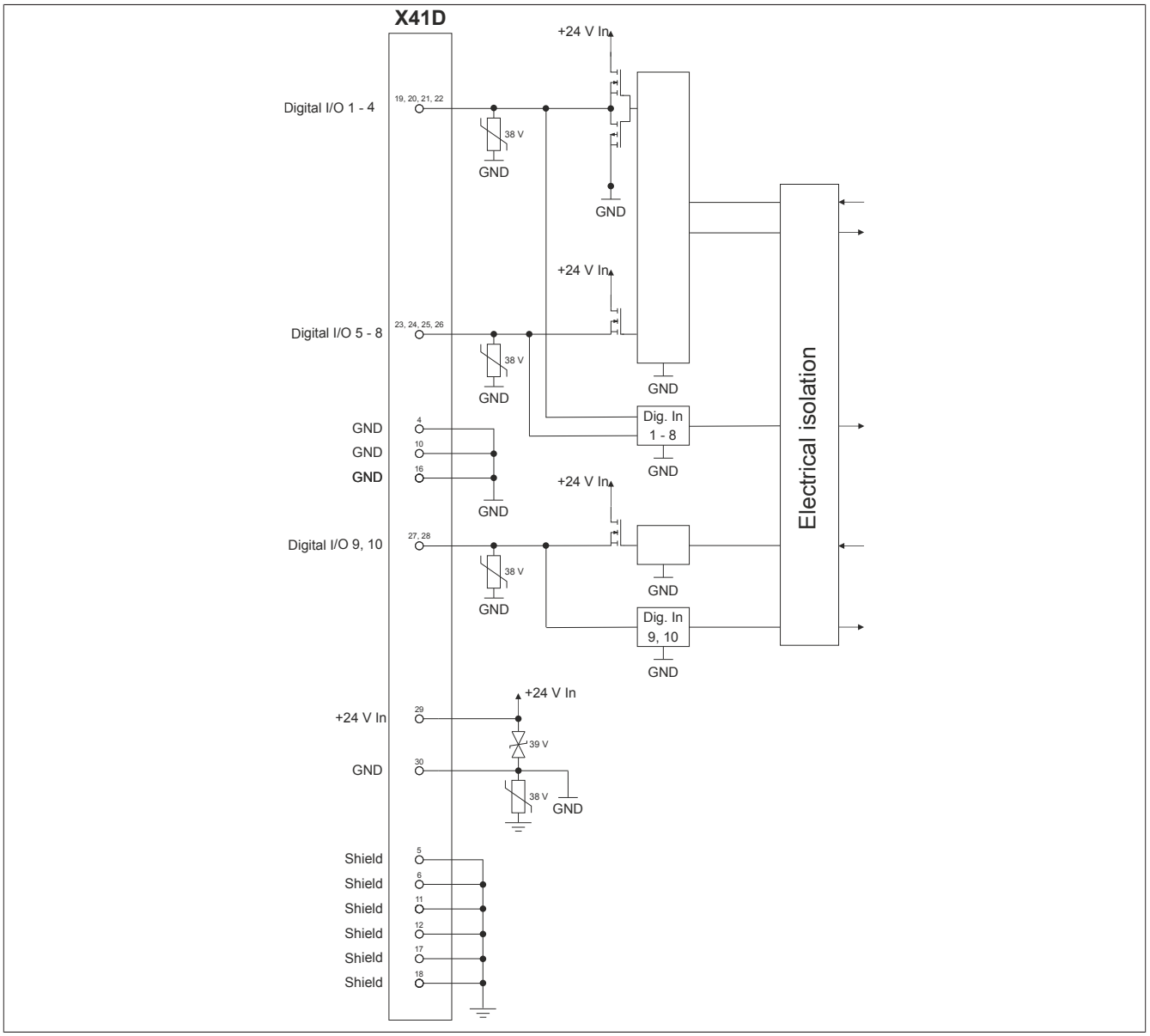


Figure 35: DIO interface 8EAC0130.000-1 - Input/Output circuit diagram

2.3.3.4 8EAC0134.000-1

2.3.3.4.1 General information

I/O plug-in module 8EAC0134.000-1 can be used in the slot of an ACOPOS P3 8EI servo drive. The plug-in module provides 10 digital inputs/outputs, 3 analog inputs and 3 analog outputs.

Digital inputs/outputs 1 to 8 can be configured individually; digital inputs/outputs 9 and 10 can be configured in pairs as inputs or outputs.
Up to 4 high-speed (push-pull) outputs with maximum current of 100 mA, 4 standard (high-side) outputs with maximum current of 400 mA and 2 slow (high-side) outputs with maximum current of 2 A are available.

The digital inputs/outputs are also equipped with an internal reverse current protection circuit:
Even if the input voltage on one of the digital I/O connections exceeds the value of the supply voltage on connections X41E/29 and X41E/30, they are protected against damage by the internal reverse current protection circuit.

Information:

**The type of individual digital I/O connections is not predefined at the factory.
Before commissioning, configure the desired type (input or output) for each I/O connection in Automation Studio!**

The analog inputs (±10 V differential inputs) are equipped with a configurable high-performance filter.[6)]

The analog outputs can be used as either current or voltage outputs.

Information:

**The type of individual analog outputs connections is not predefined at the factory.
Before commissioning, configure the desired type (current or voltage output) for each analog output in Automation Studio!**

2.3.3.4.2 Order data

Order number	Short description	Figure
	Plug-in modules	
8EAC0134.000-1	ACOPOS P3 plug-in module, 8 digital I/O 24 V (4x 400 mA, 4x 100 mA) individually configurable as inputs or outputs, 2 digital I/O 24 V 2 A configurable in pairs as inputs or outputs, 3 analog differential inputs, 14-bit, 3 analog outputs, 12-bit, individually configurable as current or voltages outputs, order terminal block 8TB0230.221A-00 separately!	
	Required accessories	
	Terminal blocks	
8TB0230.221A-00	30-pin push-in terminal block, 2-row, pitch: 2.54 mm, label 1: Numbered consecutively	

Table 107: 8EAC0134.000-1 - Order data

2.3.3.4.3 Technical data

Order number	8EAC0134.000-1
General information	
Module type	ACOPOS P3 plug-in module
B&R ID code	0xF038
Slot	Slot 1
Power consumption	Typ. 3 W

Table 108: 8EAC0134.000-1 - Technical data

[6)] Combination of slew rate and linear-phase low-pass filter. Configuration takes place in Automation Studio.

Order number	8EAC0134.000-1
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E225616 Power conversion equipment
KC	Yes
Inputs/Outputs	
Module-side connection	30-pin multipoint connector
Status indicators	None
Configuration of digital inputs/outputs	Input/Output 1 - 8: Individually configurable as inputs or outputs Input/Output 9 - 10: Configurable in pairs as inputs or outputs
Configuration of analog outputs	Individually configurable as current or voltage outputs
Incremental encoders [1)]	
Counter size	16-bit
Input frequency	Max. 125 kHz
Evaluation	4x
Signal form	Rectangle
Encoder monitoring	Yes
Counter frequency	Max. 500 kHz
Reference frequency	Max. 125 kHz
Distance between edges	Min. 0.64 µs
Inputs	
Input 1	Channel A
Input 2	Channel B
Input 3	Reference pulse R
Power supply [2)]	
Reverse polarity protection	Yes
Power supply	
Minimum	18 VDC
Nominal	24 VDC
Maximum	30 VDC
Digital inputs [3)]	
Quantity	Max. 10
Input current at 24 VDC	Inputs 1 - 8: Typ. 2.5 mA Inputs 9 - 10: Typ. 3 mA
Input filter	
Hardware	Inputs 1 - 8: No filter Inputs 9 - 10: Yes
Software	5.12 µs (default) Between 0 and 20.97 ms
Connection type	1-wire connections
Circuit	Sink
Input frequency [4)]	Inputs 1 - 8: Max. 125 kHz Inputs 9 - 10: Max. 10 kHz
Switching threshold	
Low	≤5 V
High	≥15 V
Input voltage	
Maximum	Supply voltage
Electrical isolation	
Channel - ACOPOS	Yes
Channel - Channel	No
Switching delay [5)]	
Digital input	Inputs 1 - 8: Approx. 1 µs Inputs 9 - 10: Typ. 34 µs
Event counters [1)]	
Signal form	Square wave pulse
Input frequency	Max. 125 kHz
Counter size	16-bit
Inputs	
Input 1	Counter 1
Input 2	Counter 2
Trigger inputs [6)]	
Quantity	4
Channels	Digital I/O 5 - 8
Analog inputs [7)]	
Quantity	3
Converter resolution	14-bit [8)]
Open-circuit detection	Yes
Variant	Differential input
Electrical isolation	
Input - ACOPOS	Yes
Input - Input	No

Table 108: 8EAC0134.000-1 - Technical data

Order number	8EAC0134.000-1
Input signal	
Nominal	-10 to +10 V
Data output	Synchronous to 400 µs cycle of the servo drive
Input filter	Hardware: Third-order low-pass filter Software: Configurable high-performance filter [9]
Max. gain drift	±800 µV/°C
Max. offset drift	±300 µV/°C
Additional EMI noise [10]	±0.5% [11]
Common-mode range [12]	-12 to +12 V
Common-mode rejection	Up to 1 kHz: 80 dB Starting at 1 kHz: -20 dB/dec
Basic accuracy [13]	±0.05% [14]
Digital outputs	
Quantity	Max. 10
Variant	Output 1 - 4: Push-pull transistor outputs Output 5 - 8: High-side transistor outputs Output 9 - 10: High-side transistor outputs
Connection type	1-wire connections
Readable outputs	Yes
Continuous current	Outputs 1 - 4: Max. 100 mA Outputs 5 - 8: Max. 400 mA Outputs 9 - 10: Max. 2 A
Peak short-circuit current	Outputs 1 - 8: Approx. 10 A, 0.5 µs Outputs 9 -10: Max. 90 A, 800 µs
Switching frequency (resistive load) [15]	Outputs 1 - 4: Max. 125 kHz Outputs 5 - 8: Max. 10 kHz Outputs 9 - 10: Max. 100 Hz
Switching delay [16]	Outputs 1 - 8: <3 µs Outputs 9 - 10: 50 to 150 µs
Electrical isolation	
Output - ACOPOS	Yes
Output - Output	No
Switching voltage	
Nominal	≤Supply voltage
Protection	
Short-circuit proof	Yes
Overload-proof	Yes
Encoder emulation [1]	
Switching frequency	Max. 125 kHz
Outputs	
Output 1	Channel A
Output 2	Channel B
Output 3	Reference pulse R
Analog outputs [17]	
Quantity	3
Variant	±10 V or 0 to 20 mA (switchable)
Converter resolution	12-bit [18]
Settling time on output change [19]	Voltage output 0 - 10 V: Max. 200 µs Current output 0 - 20 mA: Max. 300 µs
Output protection	Voltage output: Short-circuit proof typ. 30 mA
Load per channel	Voltage output: Load ≥ 1 kΩ Current output: Load ≤ 600 Ω
Max. gain drift	Voltage output: ±66 µV/°C Current output: ±360 nA/°C
Max. offset drift	Voltage output: ±110 µV/°C Current output: ±480 nA/°C (offset at 0 LSB: typ. 10 µA)
Basic accuracy [13]	
Voltage	±0.1% [14]
Current	±0.1% [14]
Electrical isolation	
Output - ACOPOS	Yes
Output - Output	No
Support	
Motion system	
mapp Motion	5.08.2 and higher
ACP10/ARNC0	5.08.2 and higher
Ambient conditions	
Temperature	
Operation	
Nominal	5 to 40°C
Maximum	55°C
Storage	-25 to 55°C
Transport	-25 to 70°C

Table 108: 8EAC0134.000-1 - Technical data

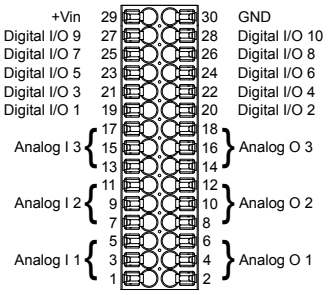
Technical data

Order number	8EAC0134.000-1
Relative humidity	
Operation	5 to 85%
Storage	5 to 95%
Transport	Max. 95% at 40°C
Mechanical properties	
Dimensions	
Width	82 mm
Height	24 mm
Depth	103 mm
Weight	79 g

Table 108: 8EAC0134.000-1 - Technical data

1) Carry out wiring with shielded lines!
2) Carry out wiring for line lengths > 3 m with shielded lines!
3) When controlled by a push output or normally closed contact, the filter time should be increased to 655 µs in order to avoid disturbances from electromagnetic interference (EMI).
4) The maximum input frequency depends on the selected software function.
5) When controlled by a push output or normally closed contact, the switch-off time is extended depending on the length of the power supply cable since the line capacity is only discharged by the input current.
6) For additional technical data, see section "Digital inputs".
7) Carry out wiring with shielded lines! The measured value may temporarily deviate with cable lengths > 30 m when affected by electromagnetic interference (EMI).
8) The smallest measurable voltage change (voltage quantization) is typically 1.526 mV.
9) Combination of slew rate and linear-phase low-pass filter. Configuration takes place in Automation Studio.
10) During operation without high-performance filter.
11) Based on measured value 10 V.
12) Voltage of terminals + and - against GND
13) 25°C at the factory.
14) Based on the current measured value.
15) Outputs 1 to 8: The maximum switching frequency depends on the selected software function.
16) Without and with resistive load at continuous current.
17) Carry out wiring with shielded lines! The signal may temporarily deviate with cable lengths > 30 m when affected by electromagnetic interference (EMI).
18) The smallest configurable voltage change (voltage quantization) is typically 5.371 mV.
The smallest configurable current change (current quantization) is typically 5.86 µA.
19) With resistive load.

2.3.3.4.4 Pinout

Figure	X41E	Pin	Description		Function		
					Incremental encoders / Encoder emulation	Event counter	Trigger
		1	Analog I 1 -	Analog input 1 minus	---	---	---
		2	Analog O 1	Analog output 1	---	---	---
		3	Analog I 1 +	Analog input 1 plus	---	---	---
		4	GND	GND	---	---	---
		5	Shield	Shield	---	---	---
		6	Shield	Shield	---	---	---
		7	Analog I 2 -	Analog input 2 minus	---	---	---
		8	Analog O 2	Analog output 2	---	---	---
		9	Analog I 2 +	Analog input 2 plus	---	---	---
		10	GND	GND	---	---	---
		11	Shield	Shield	---	---	---
		12	Shield	Shield	---	---	---
		13	Analog I 3 -	Analog input 3 minus	---	---	---
		14	Analog O 3	Analog output 3	---	---	---
		15	Analog I 3 +	Analog input 3 plus	---	---	---
		16	GND	GND	---	---	---
		17	Shield	Shield	---	---	---
		18	Shield	Shield	---	---	---
		19	Digital I/O 1	Digital input/output 1	Channel A	Counter 1	---
		20	Digital I/O 2	Digital input/output 2	Channel B	Counter 2	---
		21	Digital I/O 3	Digital input/output 3	Reference pulse R	---	---
		22	Digital I/O 4	Digital input/output 4	---	---	---
		23	Digital I/O 5	Digital input/output 5	---	---	Trigger
		24	Digital I/O 6	Digital input/output 6	---	---	Trigger
		25	Digital I/O 7	Digital input/output 7	---	---	Trigger
		26	Digital I/O 8	Digital input/output 8	---	---	Trigger
		27	Digital I/O 9	Digital input/output 9	---	---	---
		28	Digital I/O 10	Digital input/output 10	---	---	---
		29	+Vin	External power supply +18 ... +30 VDC	---	---	---
		30	GND	External power supply 0 V	---	---	---

Terminal cross section	[mm²]	[AWG]
Solid core / Multiple-conductor lines	0.14 - 0.5	26 - 20
Flexible, multiple wire line		
Without wire end sleeves	0.14 - 0.5	26 - 20
With wire end sleeves	0.14 - 0.25	26 - 24
Approbation data		
UL/C-UL-US	---	26 - 20
CSA	---	26 - 20

Table 109: DIO/AIO interface 8EAC0134.000-1 - Pinout

Information:

The digital and analog inputs/outputs can only be used if voltage is supplied to the module via connectors X41E/29 and X41E/30.

Notice!

Reverse current protection for the digital inputs is only ensured if the module is supplied with voltage via connections X41E/29 and X41E/30.

Danger!

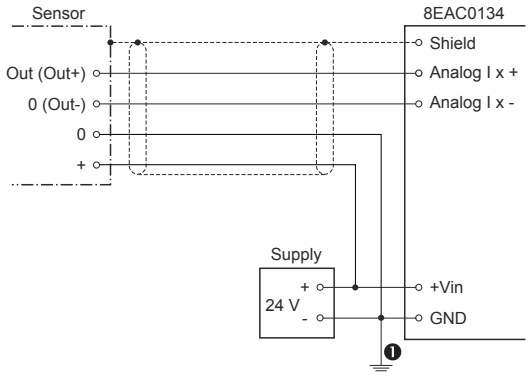
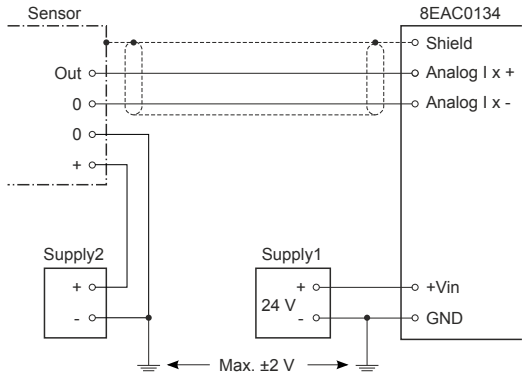
The digital inputs are isolated circuits. Therefore, only devices or components that have at least safe isolation per IEC 60364-4-41 or EN 61800-5-1 are permitted to be connected to these connections.

2.3.3.4.4.1 Wiring the analog inputs

The analog inputs are designed as balanced differential inputs. Both the + and - connections are high-impedance. This ensures that practically no input currents flow and thus no voltage drops occur on the signal lines. When connecting sensors without ground reference, however, it is important to ensure that their electric potential does not drift due to external couplings and the permissible common-mode voltage of the analog inputs is subsequently exceeded!

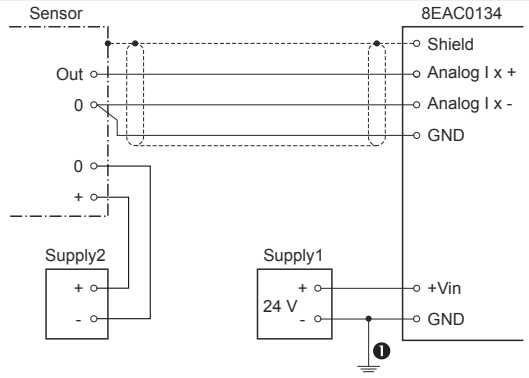
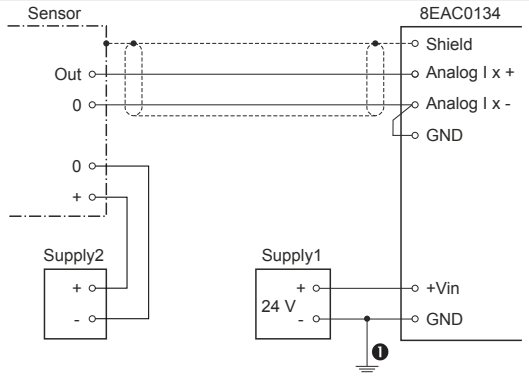
Connection examples

Sensors with ground reference

Sensor power supply together with the module	Sensor with external power supply
	

1) Grounding recommended

Sensors without ground reference

Additional ground line	Jumper on the terminal block
	

1) Grounding recommended

2.3.3.4.5 Input/Output circuit diagram

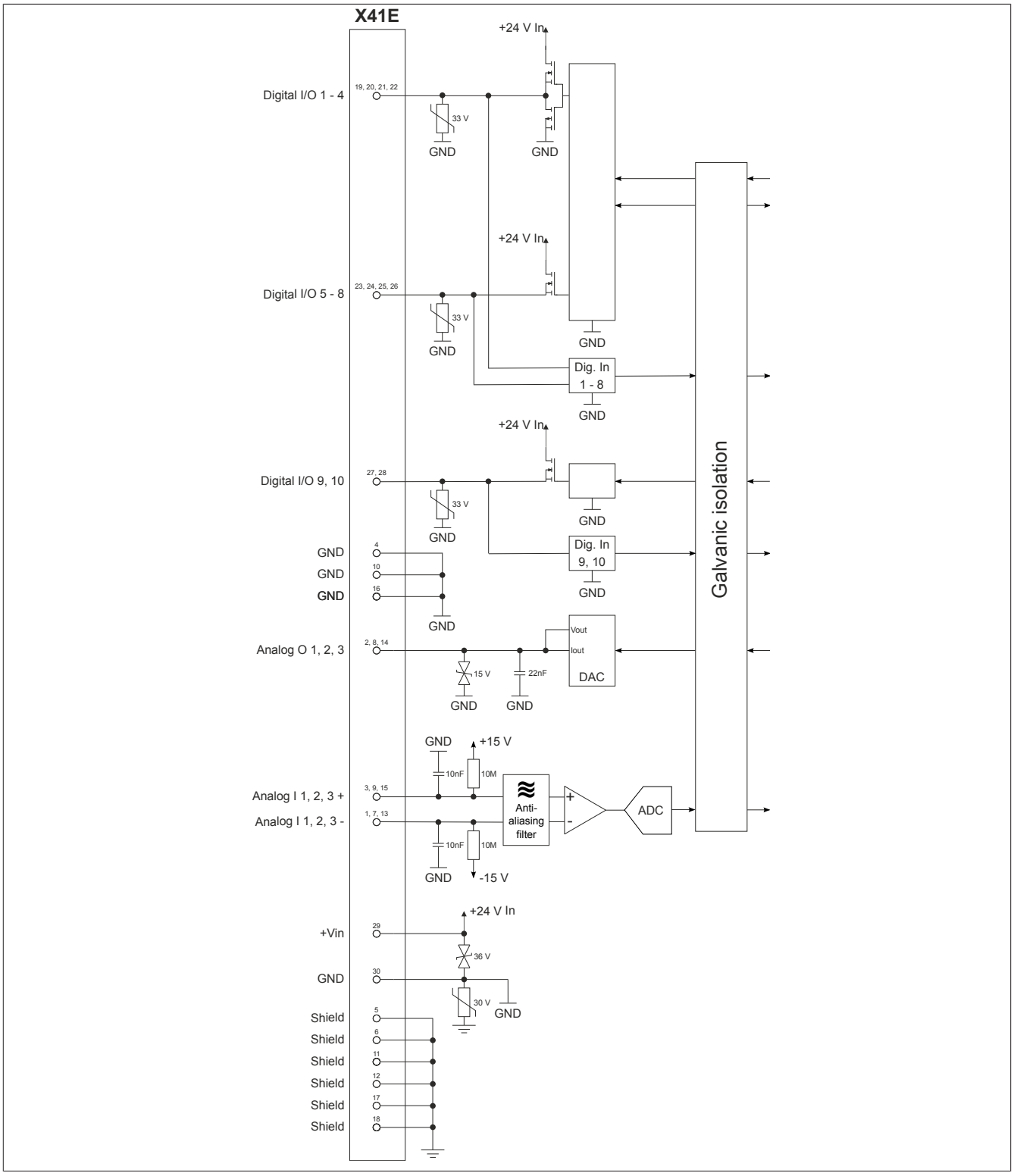


Figure 36: DIO/AIO interface 8EAC0134.000-1 - Input/Output circuit diagram

2.3.3.5 8EAC0150.001-1

2.3.3.5.1 General information

Plug-in module 8EAC0150.001-1 can be used in the slot on an ACOPOS P3 8EI servo drive. The module is equipped with 1 multi-encoder interface for evaluating digital encoders.

The plug-in module evaluates digital encoders that are built into B&R servo motors or used to evaluate external axes.

The encoder input signals are monitored. This makes it possible to detect open circuits, short circuits and failures in the encoder power supply.

When switched on, the plug-in module is automatically identified by the operating system on the ACOPOS P3 8EI servo drive.

Information:

The encoder interfaces of 8EAC plug-in modules are each assigned from the factory to a defined axis (motor connection X5xx) of the 8EI servo drive in which the respective 8EAC plug-in module is being operated.

8EAC encoder interface plug-in module	Assignment		
	8EIxxxxxS... 1-axis modules	8EIxxxxxD... 2-axis modules	8EIxxxxxT... 3-axis modules
X41x	X51 / X51A	X51 / X51A	X51 / X51A
X42x	---	X52	X52
X43x	---	---	X53

The factory assignment of encoder interfaces can be changed in Automation Studio (prerequisite: mapp Motion V.5.22.0 / ACP10 V5.20.0 or higher). For details, see Automation Help (encoder interface assignment).

Digital multi-encoder interfaces

Information:

The encoder type for the multi-encoder interface is not predefined from the factory. Before commissioning, configure the encoder type and – depending on the encoder type – the encoder supply voltage in Automation Studio for each multi-encoder interface!

The following encoder types are supported:

Technical data	Encoder type					
	EnDat 2.2	EnDat 3.0	SSI	BiSS (mode C)	T format	HIPERFACE DSL
Output voltage [1]	11.45 V ±0.1 V		11.45 V ±0.1 V 5.2 V ±0.1 V		5.2 V ±0.1 V	11.45 V ±0.1 V
Data transfer rate	6.25 Mbit/s	25 Mbit/s	100 to 400 kbit/s	1 to 8.33 Mbit/s	2.5 Mbit/s	9.375 Mbit/s
Terminating resistor	120 Ω	110 Ω	120 Ω			110 Ω ±10%
Support [2]	ACOPOS operating system 5.1.0 and higher	ACOPOS operating system 6.2.0 and higher	ACOPOS operating system 5.1.0 and higher		ACOPOS operating system 5.08.0 and higher	ACOPOS operating system 5.5.0 and higher
Selection in Automation Studio	EnDat	EnDat3	SSI	BiSS	T format	HIPERFACE DSL

Table 110: Supported encoder types

1) The output voltage is not predefined from the factory (with the exception of encoder types EnDat 2.2, EnDat 3.0 and HIPERFACE DSL). It must be configured in Automation Studio based on the encoder type.
If no output voltage is configured, then the encoder will not be supplied by digital multi-encoder interface X41H. Power to the encoder can then be supplied externally.

2) Operating system version from which a certain encoder type is supported.

Caution!

An incorrect configuration can result in irreparable damage to the connected encoder!

2.3.3.5.2 Order data

Order number	Short description	Figure
	Plug-in modules	
8EAC0150.001-1	ACOPOS P3 plug-in module, digital multi-encoder interface	
	Optional accessories	
	Adapter cables	
8ECF00X4.1241C-0	ACOPOS P3 adapter cable for digital encoder interface, length 0.4 m, 1x 4x 0.14 mm² + 4x 0.35 mm², 9-pin female DSUB, 8-pin male Mini I/O connector	

Table 111: 8EAC0150.001-1 - Order data

2.3.3.5.3 Technical data

Order number	8EAC0150.001-1
General information	
Module type	ACOPOS P3 plug-in module
B&R ID code	0xE827
Slot	Slot 1
Max. power consumption	P[W] = (15 V * $I_{Encoder}$[A]) + 2 W Max. 6.5 W
Certifications	
CE	Yes
UL	cULus E225616 Power conversion equipment
KC	Yes
Encoder interfaces	
Quantity	1
Type	Digital multi-encoder interface, configurable [1]
Connections	8-pin female Mini I/O connector
Status indicators	None [2]
Electrical isolation	
Encoder - ACOPOS P3	No
Max. encoder cable length	75 m Depends on the cross section of the power supply wires of the encoder cable [3]
Encoder power supply	
Output voltage	Configurable Typ. 11.45 V ±0.1 V / 5.2 V ±0.1 V [4]
Load capacity	Max. 300 mA (HIPERFACE DSL: Max. 200 mA)
Sense lines	2, compensation of max. 2x 0.7 V
Protective measures	
Short-circuit proof	Yes
Overload-proof	Yes
Synchronous serial interface	
Signal transmission	RS485 [5]
Data transfer rate	Depends on the configured encoder type
Differential voltage	
Minimum	2.0 V
Maximum	6.0 V
Support	
Motion system	
mapp Motion	5.1.0 and higher
ACP10/ARNC0	5.01.0 and higher
Ambient conditions	
Temperature	
Operation	
Nominal	-25 to 55°C
Maximum	55°C
Storage	-25 to 55°C
Transport	-25 to 70°C

Table 112: 8EAC0150.001-1 - Technical data

Order number	8EAC0150.001-1
Relative humidity	
Operation	5 to 85%
Storage	5 to 95%
Transport	Max. 95% at 40°C

Table 112: 8EAC0150.001-1 - Technical data

1) The encoder type is not predefined from the factory. The encoder type necessary in each case must be configured in Automation Studio.
2) The direction of rotation of the encoder can be displayed on the 8EAD0000.000-1 display module.
3) Maximum encoder cable length I_{max} can be calculated as follows (the maximum permissible encoder cable length of 75 m is not permitted to be exceeded):

   $I_{max} = f / I_G * A * 1/(2*\rho)$

   f ... (Output voltage of the encoder interface [V] - Min. permissible supply voltage of the connected encoder [V]) * 1.1
   I_G ... Max. current consumption of the connected encoder [A]
   A ... Cross section of the power supply wires [mm²]
   ρ ... Specific resistance [Ωmm²/m] (e.g. for copper: ρ = 0.0178)
4) The output voltage is not predefined from the factory (with the exception of encoder types EnDat 2.2 and HIPERFACE DSL). It must be configured in Automation Studio based on the encoder type. If no output voltage is configured, then the encoder will not be supplied by digital multi-encoder interface X41H. Power to the encoder can then be supplied externally.
5) Except encoder type HIPERFACE DSL.

2.3.3.5.4 Wiring

2.3.3.5.4.1 Pinout

Information:

Plug-in module 8EAC is not capable of hot plugging. An 8EAC plug-in module is only permitted to be connected to or disconnected from an ACOPOS P3 8EI servo drive when power to the servo drive is switched off.

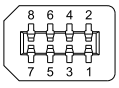
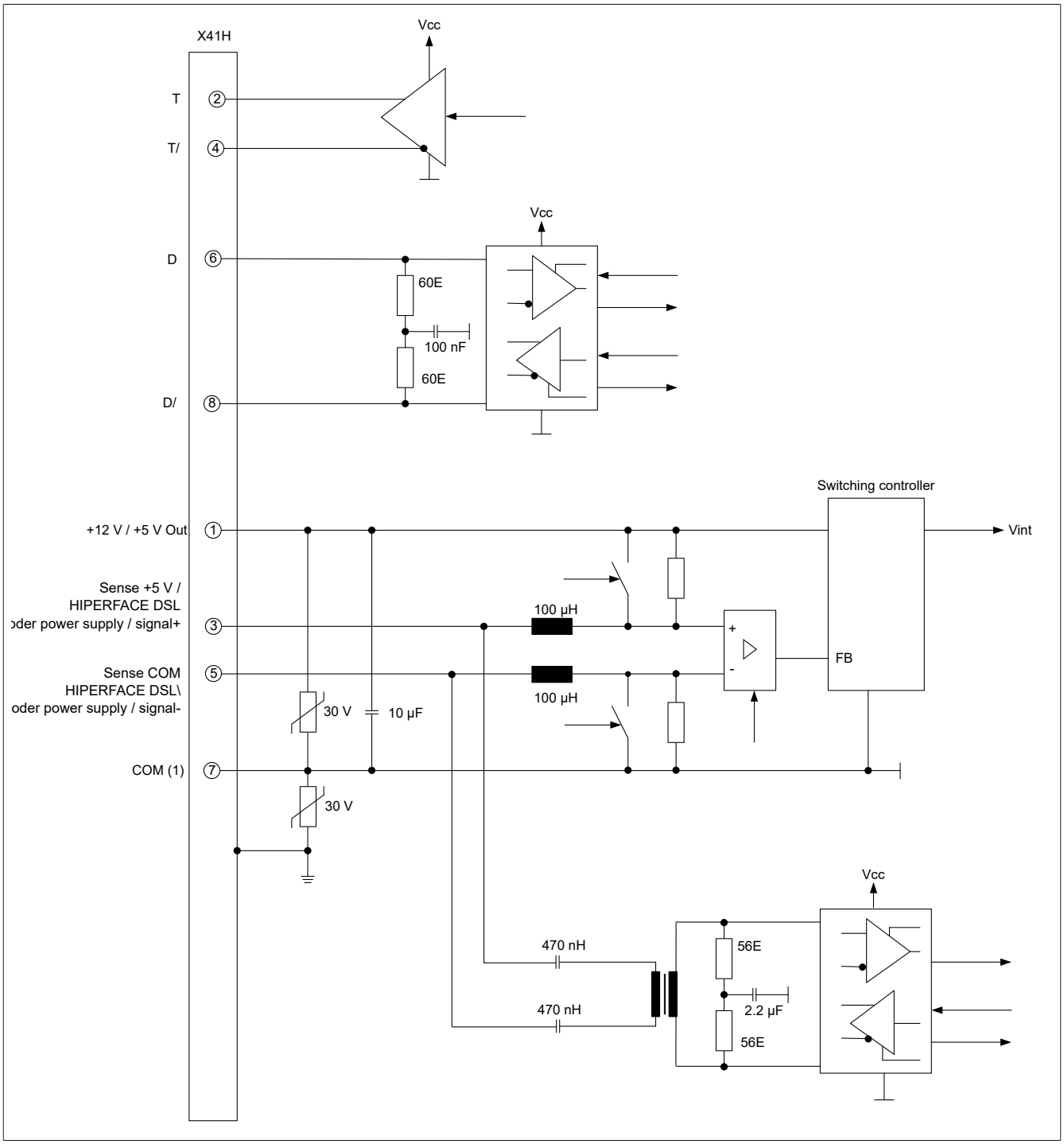
Figure	Mini I/O X41H	Pin	Name	Function depending on configured encoder type					
				EnDat 2.2	SSI	BiSS	T format	HIPERFACE DSL	EnDat 3.0
		1	U+	Encoder power supply +				---	
		2	T	Clock output			---	---	
		3	---	---	Sense input +5 V [1]		---	HIPERFACE DSL	Encoder power supply / Signal +
		4	T\	Clock output inverted			---	---	
		5	---	---	Sense input 0 V [1]		---	HIPERFACE DSL inverted	Encoder power supply / Signal -
		6	D	Data				---	
		7	COM	Encoder power supply 0 V				---	
		8	D\	Data inverted				---	

Table 113: Digital multi-encoder interface 8EAC0150.001-1 - Pinout

1) Only if the encoder supply voltage is configured accordingly (5 V).

2.3.3.5.5 Input/Output circuit diagram



2.3.3.6 8EAC0150.003-1

2.3.3.6.1 General information

Plug-in module 8EAC0150.003-1 can be used in the slot on an ACOPOS P3 8EI servo drive. The module is equipped with 3 multi-encoder interfaces for evaluating digital encoders.

The plug-in module evaluates digital encoders that are built into B&R servo motors or used to evaluate external axes.

The encoder input signals are monitored. This makes it possible to detect open circuits, short circuits and failures in the encoder power supply.

When switched on, the plug-in module is automatically identified by the operating system on the ACOPOS P3 8EI servo drive.

Information:

The encoder interfaces of 8EAC plug-in modules are each assigned from the factory to a defined axis (motor connection X5xx) of the 8EI servo drive in which the respective 8EAC plug-in module is being operated.

8EAC encoder interface plug-in module	Assignment		
	8EIxxxxxS... 1-axis modules	8EIxxxxxD... 2-axis modules	8EIxxxxxT... 3-axis modules
X41x	X51 / X51A	X51 / X51A	X51 / X51A
X42x	---	X52	X52
X43x	---	---	X53

The factory assignment of encoder interfaces can be changed in Automation Studio (prerequisite: mapp Motion V.5.22.0 / ACP10 V5.20.0 or higher). For details, see Automation Help (encoder interface assignment).

Digital multi-encoder interfaces

Information:

The encoder type for the multi-encoder interface is not predefined from the factory. Before commissioning, configure the encoder type and – depending on the encoder type – the encoder supply voltage in Automation Studio for each multi-encoder interface!

The following encoder types are supported:

Technical data	Encoder type					
	EnDat 2.2	EnDat 3.0	SSI	BiSS (mode C)	T format	HIPERFACE DSL
Output voltage [1]	11.45 V ±0.1 V		11.45 V ±0.1 V 5.2 V ±0.1 V		5.2 V ±0.1 V	11.45 V ±0.1 V
Data transfer rate	6.25 Mbit/s	25 Mbit/s	100 to 400 kbit/s	1 to 8.33 Mbit/s	2.5 Mbit/s	9.375 Mbit/s
Terminating resistor	120 Ω	110 Ω	120 Ω			110 Ω
Support [2]	ACOPOS operating system 5.1.0 and higher	ACOPOS operating system 6.2.0 and higher	ACOPOS operating system 5.1.0 and higher		ACOPOS operating system 5.08.0 and higher	ACOPOS operating system 5.5.0 and higher
Selection in Automation Studio	EnDat	EnDat3	SSI	BiSS	T format	HIPERFACE DSL

Table 114: Supported encoder types

1) The output voltage is not predefined from the factory (with the exception of encoder types EnDat 2.2, EnDat 3.0 and HIPERFACE DSL). It must be configured in Automation Studio based on the encoder type.
If no output voltage is configured, then the encoder will not be supplied by digital multi-encoder interface X4xJ. Power to the encoder can then be supplied externally.

2) Operating system version from which a certain encoder type is supported.

Caution!

An incorrect configuration can result in irreparable damage to the connected encoder!

2.3.3.6.2 Order data

Order number	Short description	Figure
	Plug-in modules	
8EAC0150.003-1	ACOPOS P3 plug-in module, 3 digital multi-encoder interfaces	
	Optional accessories	
	Adapter cables	
8ECF00X4.1241C-0	ACOPOS P3 adapter cable for digital encoder interface, length 0.4 m, 1x 4x 0.14 mm² + 4x 0.35 mm², 9-pin female DSUB, 8-pin male Mini I/O connector	

Table 115: 8EAC0150.003-1 - Order data

2.3.3.6.3 Technical data

Order number	8EAC0150.003-1
General information	
Short description	3 digital multi-encoder interfaces in one module
Module type	ACOPOS P3 plug-in module
B&R ID code	0xF075
Slot	Slot 1
Max. power consumption	P[W] = 15 V * ($I_{Encoder1}$[A] + $I_{Encoder2}$[A] + $I_{Encoder3}$[A]) + 3 W Max. 16.5 W
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E225616 Power conversion equipment
KC	Yes
Encoder interfaces	
Quantity	3
Type	Digital multi-encoder interface, configurable [1]
Connections	8-pin female Mini I/O connector
Status indicators	None [2]
Electrical isolation	
Encoder - ACOPOS P3	No
Max. encoder cable length	75 m Depends on the cross section of the power supply wires of the encoder cable [3]
Encoder power supply	
Output voltage	Configurable Typ. 11.45 V ±0.1 V / 5.2 V ±0.1 V [4]
Load capacity	Max. 300 mA (HIPERFACE DSL: Max. 200 mA)
Sense lines	2, compensation of max. 2x 0.7 V
Protective measures	
Short-circuit proof	Yes
Overload-proof	Yes
Synchronous serial interface	
Signal transmission	RS485 [5]
Data transfer rate	Depends on the configured encoder type
Differential voltage	
Minimum	2.0 V
Maximum	6.0 V
Support	
Motion system	
mapp Motion	5.1.0 and higher
ACP10/ARNC0	5.01.0 and higher
Ambient conditions	
Temperature	
Operation	
Nominal	-25 to 55°C
Maximum	55°C
Storage	-25 to 55°C
Transport	-25 to 70°C

Table 116: 8EAC0150.003-1 - Technical data

Order number	8EAC0150.003-1
Relative humidity	
Operation	5 to 85%
Storage	5 to 95%
Transport	Max. 95% at 40°C

Table 116: 8EAC0150.003-1 - Technical data

1) The encoder type is not predefined from the factory. The encoder type necessary in each case must be configured in Automation Studio.
2) The direction of rotation of the encoder can be displayed on the 8EAD0000.000-1 display module.
3) Maximum encoder cable length l_{max} can be calculated as follows (the maximum permissible encoder cable length of 75 m is not permitted to be exceeded):

   $l_{max} = f / I_G * A * 1/(2*\rho)$

   f ... (Output voltage of the encoder interface [V] - Min. permissible supply voltage of the connected encoder [V]) * 1.1
   I_G ... Max. current consumption of the connected encoder [A]
   A ... Cross section of the power supply wires [mm²]
   ρ ... Specific resistance [Ωmm²/m] (e.g. for copper: ρ = 0.0178)
4) The output voltage is not predefined from the factory (with the exception of encoder types EnDat 2.2 and HIPERFACE DSL). It must be configured in Automation Studio based on the encoder type. If no output voltage is configured, then the encoder will not be supplied by digital multi-encoder interface X4x. Power to the encoder can then be supplied externally.
5) Except encoder type HIPERFACE DSL.

2.3.3.6.4 Wiring

2.3.3.6.4.1 Pinout

Information:

Plug-in module 8EAC is not capable of hot plugging. An 8EAC plug-in module is only permitted to be connected to or disconnected from an ACOPOS P3 8EI servo drive when power to the servo drive is switched off.

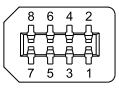
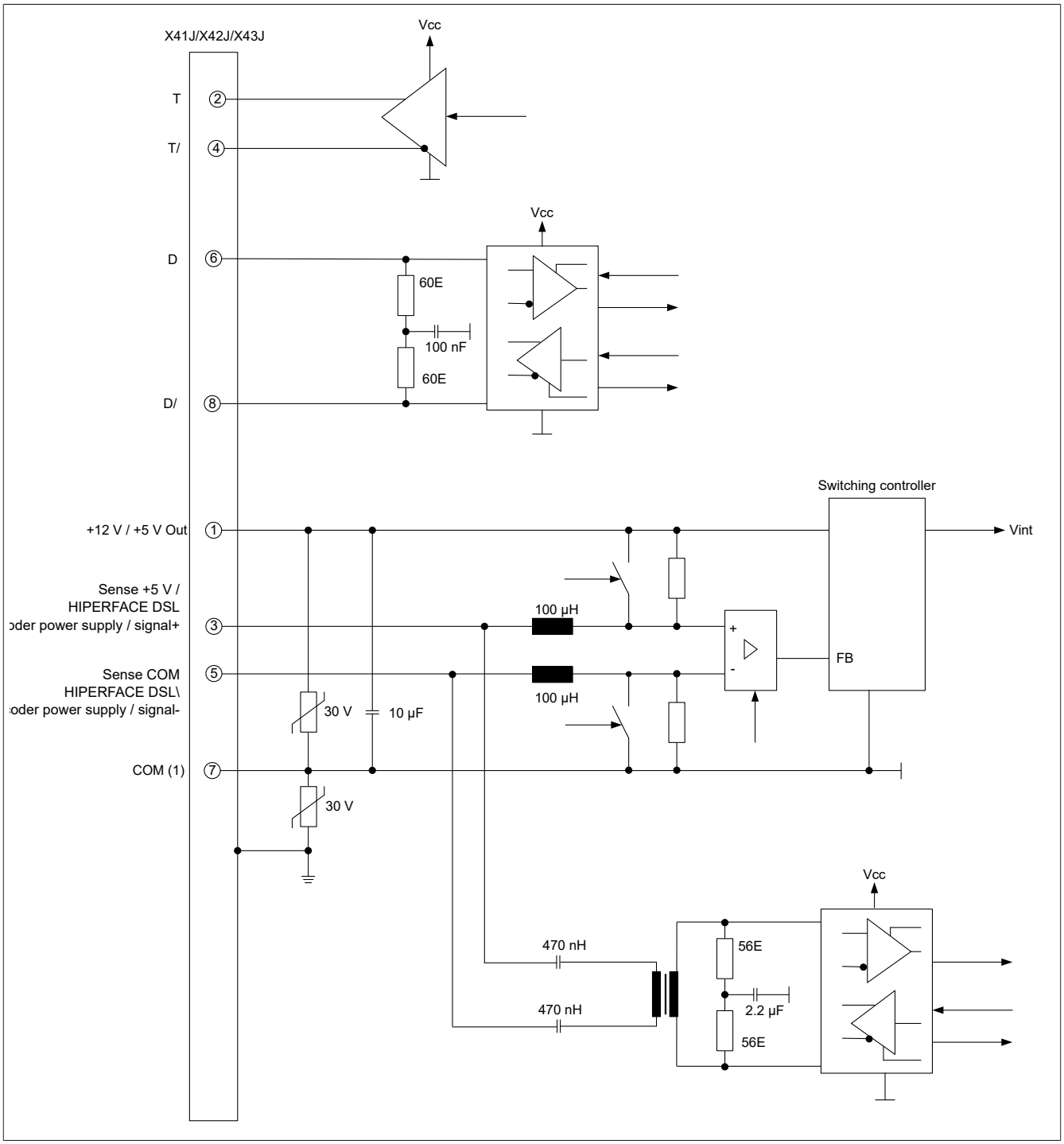
Figure	Mini I/O X41J/X42J/X43J	Pin	Name	Function depending on configured encoder type					
				EnDat 2.2	SSI	BiSS	T format	HIPERFACE DSL	EnDat 3.0
		1	U+	Encoder power supply +				---	
		2	T	Clock output			---	---	
		3	---	---	Sense input +5 V [1]		---	HIPERFACE DSL	Encoder power supply / Signal + +
		4	T\	Clock output inverted			---	---	Encoder power supply / Signal -
		5	---	---	Sense input 0 V [1]		---	HIPERFACE DSL inverted	---
		6	D	Data				---	
		7	COM	Encoder power supply 0 V				---	
		8	D\	Data inverted				---	

Table 117: Digital multi-encoder interface 8EAC0150.003-1 - Pinout

1) Only if the encoder supply voltage is configured accordingly (5 V).

2.3.3.6.5 Input/Output circuit diagram



2.3.3.7 8EAC0151.001-1

2.3.3.7.1 General information

Incremental encoder plug-in module 8EAC0151.001-1 can be used in the slot of an ACOPOS P3 8EI servo drive. The module includes an incremental encoder interface for evaluating incremental encoders with square wave signals electrically phase-shifted by 90°.

The plug-in module is primarily used to evaluate encoders installed in external motors as well as external axis encoders (i.e. encoders that detect any machine movement).

All 4 edges are always evaluated; the counter frequency is therefore 4x the input frequency.

When switched on, the plug-in module is automatically identified by the operating system on the ACOPOS P3 8EI servo drive.

Information:

The encoder interfaces of 8EAC plug-in modules are each assigned from the factory to a defined axis (motor connection X5xx) of the 8EI servo drive in which the respective 8EAC plug-in module is being operated.

8EAC encoder interface plug-in module	Assignment		
	8EIxxxxxS... 1-axis modules	8EIxxxxxD... 2-axis modules	8EIxxxxxT... 3-axis modules
X41x	X51 / X51A	X51 / X51A	X51 / X51A
X42x	---	X52	X52
X43x	---	---	X53

The factory assignment of encoder interfaces can be changed in Automation Studio (prerequisite: mapp Motion V.5.22.0 / ACP10 V5.20.0 or higher). For details, see Automation Help (encoder interface assignment).

Supported encoder types

- Incremental encoders with RS422 output signals
- Incremental encoders with push, pull or push-pull outputs with no complementary signal
- Incremental encoders with symmetrical push-pull outputs
- Incremental encoders with an encoder power supply of +5 V or +12 V

Caution!

An incorrect configuration can result in irreparable damage to the plug-in module or connected encoder!

Information:

The encoder type for the multi-encoder interface is not predefined from the factory. Before commissioning, configure the encoder type in Automation Studio for each incremental encoder interface!

2.3.3.7.2 Order data

Order number	Short description	Figure
	Plug-in modules	
8EAC0151.001-1	ACOPOS P3 plug-in module, incremental encoder interface	
	Optional accessories	
	Adapter cables	
8ECG00X4.3151D-0	ACOPOS P3 adapter cable, length 0.4 m, for analog multi-encoder interfaces and incremental encoder interfaces, 5x 2x 0.14 mm², 10-pin male IX connector to 15-pin female DSUB	

Table 118: 8EAC0151.001-1 - Order data

2.3.3.7.3 Technical data

Order number	8EAC0151.001-1
General information	
Module type	ACOPOS P3 plug-in module
B&R ID code	F301
Slot	Slot 1
Max. power consumption	In preparation
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E225616 Power conversion equipment
KC	Yes
Encoder connection [1]	
Module-side connection	iX industrial connector 10-pin male, coding B
Status indicators	None
Max. encoder cable length [2]	75 m (RS422, digital filter parameterized to maximum 200 kHz) 25 m (all other interfaces and settings)
Encoder power supply	
Output voltage [3]	5 V ±5% 12 V ±10% [4]
Load capacity	300 mA
Protective measures	
Overload-proof	Yes
Short-circuit proof	Yes
Sense lines	No [5]
Inputs A, B, R [6]	
Single-ended signals	
Input voltage for low	<1 V against COM (TTL 5 V) <1.8 V against COM (HTL 12 V)
Input voltage for high	>2.6 V against COM (TTL 5 V) >7 V against COM (HTL 12 V)
Maximum input voltage	-13 V / +16 V against COM
Differential signals	
Differential voltage	±0.5 V to ±5 V (RS422, TTL 5 V) ±2 V to ±13 V (HTL 12 V)
Terminating resistor	112 Ω (RS422)
Open-circuit monitoring	
RS422, HTL/TTL differential, HTL/TTL single-ended	Yes [7]
HTL/TTL open collector, HTL/TTL open emitter	No [8]
Incremental encoder operation	
Signal form	Square wave signals
Evaluation	4x
Input frequency	Max. 6.25 MHz (RS422) Max. 200 kHz (TTL 5 V, HTL 12 V)
Counter frequency	Max. 25 MHz (RS422) Max. 800 kHz (TTL 5 V, HTL 12 V)
Reference frequency	Max. 6.25 MHz (RS422) Max. 200 kHz (TTL 5 V, HTL 12 V)

Table 119: 8EAC0151.001-1 - Technical data

Order number	8EAC0151.001-1
Distance between edges	Min. 40 ns (RS422) Min. 340 ns (TTL 5 V, HTL 12 V)
Max. acceleration	25 * 10^9 increments / s^2 (RS422) 1.5 * 10^9 increments / s^2 (TTL 5 V, HTL 12 V)
Support	
Motion system	
mapp Motion	5.3.0 and higher
ACP10/ARNC0	5.3.0 and higher (RS422, HTL differential, HTL push-pull, HTL pull) 5.8.0 and higher (remaining interfaces)
Ambient conditions	
Temperature	
Operation	
Nominal	5 to 40°C
Maximum	55°C
Storage	-25 to 55°C
Transport	-25 to 70°C
Relative humidity	
Operation	5 to 85%
Storage	5 to 95%
Transport	Max. 95% at 40°C
Mechanical properties	
Dimensions	
Width	82 mm
Length	24 mm
Depth	103 mm
Weight	72 g

Table 119: 8EAC0151.001-1 - Technical data

1) The encoder must be wired using a single shielded cable with twisted pair signal lines (e.g. 4x 2x 0.14 mm² + 2x 0.5 mm²).
2) Depending on the encoder and cable used, the maximum possible frequency may be reduced for a given cable length or the maximum possible cable length may be reduced for a given frequency.
3) The encoder must be supplied using the voltage source provided. The use of any other power supply is not permitted.
4) Depends on the configuration in Automation Studio.
5) With an output voltage of 5 V ±5%, it is possible to compensate for the sensor voltage drop by configuring the cable resistance (max. 2x 4.014 Ω). When using compensation and current >200 mA, the output voltage accuracy is reduced to ±0.5 V.
6) The values refer to the input of the plug-in module.
7) With HTL/TTL differential without terminating resistor, error detection is only guaranteed if both lines are interrupted.
8) Fault detection is not possible because an open circuit cannot be distinguished from a valid condition.

2.3.3.7.4 Wiring

2.3.3.7.4.1 Pinout

Information:

Plug-in module 8EAC is not capable of hot plugging. An 8EAC plug-in module is only permitted to be connected to or disconnected from an ACOPOS P3 8EI servo drive when power to the servo drive is switched off.

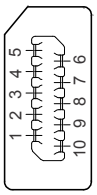
Figure	X41K	Pin	Description	Function
		1	B\ [1]	Channel B inverted
		2	B	Channel B
		3	GND	Encoder power supply 0 V
		4	A\ [1]	Channel A inverted
		5	A	Channel A
		6	R	Reference pulse
		7	R\ [1]	Reference pulse inverted
		8	U+	Encoder supply 5 V / 12 V [2]
		9	T-	Temperature sensor -
		10	T+	Temperature sensor +

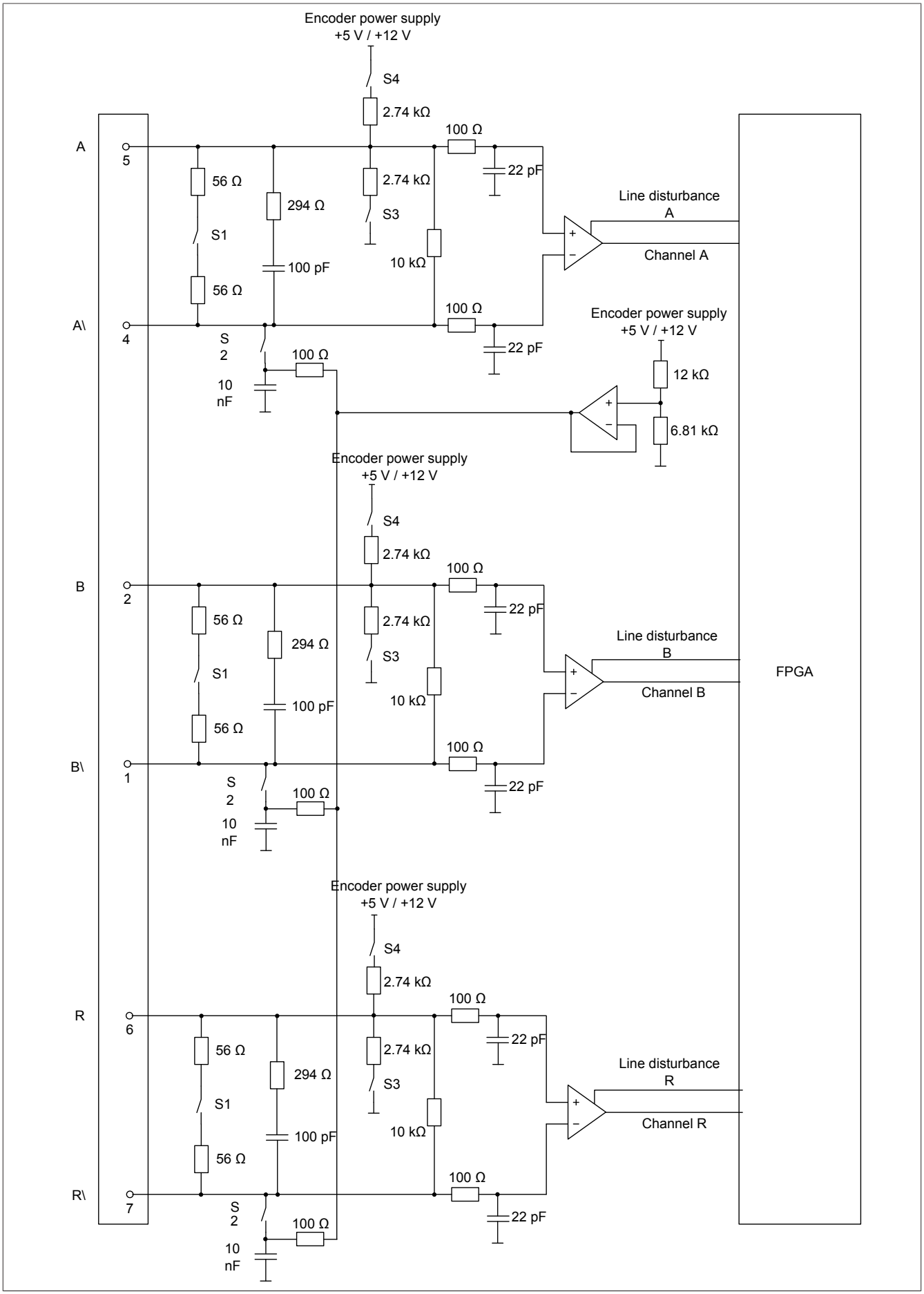
Table 120: Incremental encoder interface 8EAC0151.001-1 - Pinout

1) These pins must be open when operating single-ended encoders; otherwise, the plug-in module may be irreparably damaged.
2) The encoder power supply depends on the configuration in Automation Studio.

Danger!

The connections for the motor temperature sensor and encoder are safely isolated circuits. These connections are therefore only permitted to be connected to devices or components that have sufficient isolation per IEC 60364-4-41 or EN 61800-5-1.

2.3.3.7.4.2 Principle circuit diagram and states of the switches



Interface	S1 Terminating resistor	S2 Single-ended reference	S3 Pull-down resistor	S4 Pull-up resistor
TTL, differential, with terminating resistor (RS422)	Closed	Open	Open	Open
HTL/TTL, differential, push-pull, without terminating resistor	Open	Open	Open	Open
HTL/TTL, single-ended, push-pull	Open	Closed	Open	Open
HTL/TTL, single-ended, pull / open collector	Open	Closed	Open	Closed
HTL/TTL, single-ended, push / open emitter	Open	Closed	Closed	Open

2.3.3.8 8EAC0151.003-1

2.3.3.8.1 General information

Incremental encoder plug-in module 8EAC0151.003-1 can be used in the slot of an ACOPOS P3 8EI servo drive. The module includes three incremental encoder interfaces for evaluating incremental encoders with square wave signals electrically phase-shifted by 90°.

The plug-in module is primarily used to evaluate encoders installed in external motors as well as external axis encoders (i.e. encoders that detect any machine movement).

All 4 edges are always evaluated; the counter frequency is therefore 4x the input frequency.

When switched on, the plug-in module is automatically identified by the operating system on the ACOPOS P3 8EI servo drive.

Information:

The encoder interfaces of 8EAC plug-in modules are each assigned from the factory to a defined axis (motor connection X5xx) of the 8EI servo drive in which the respective 8EAC plug-in module is being operated.

8EAC encoder interface plug-in module	Assignment		
	8EIxxxxxS... 1-axis modules	8EIxxxxxD... 2-axis modules	8EIxxxxxT... 3-axis modules
X41x	X51 / X51A	X51 / X51A	X51 / X51A
X42x	---	X52	X52
X43x	---	---	X53

The factory assignment of encoder interfaces can be changed in Automation Studio (prerequisite: mapp Motion V.5.22.0 / ACP10 V5.20.0 or higher). For details, see Automation Help (encoder interface assignment).

Supported encoder types

- Incremental encoders with RS422 output signals
- Incremental encoders with push, pull or push-pull outputs with no complementary signal
- Incremental encoders with symmetrical push-pull outputs
- Incremental encoders with an encoder power supply of +5 V or +12 V

Caution!

An incorrect configuration can result in irreparable damage to the plug-in module or connected encoder!

Information:

The encoder type for the multi-encoder interface is not predefined from the factory. Before commissioning, configure the encoder type in Automation Studio for each incremental encoder interface!

2.3.3.8.2 Order data

Order number	Short description	Figure
	Plug-in modules	
8EAC0151.003-1	ACOPOS P3 plug-in module, 3 incremental encoder interfaces	
	Optional accessories	
	Adapter cables	
8ECG00X4.3151D-0	ACOPOS P3 adapter cable, length 0.4 m, for analog multi-encoder interfaces and incremental encoder interfaces, 5x 2x 0.14 mm², 10-pin male IX connector to 15-pin female DSUB	

Table 121: 8EAC0151.003-1 - Order data

2.3.3.8.3 Technical data

Order number	8EAC0151.003-1
General information	
Short description	3 incremental encoder interfaces in one module
Module type	ACOPOS P3 plug-in module
B&R ID code	F1B2
Slot	Slot 1
Max. power consumption	In preparation
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E225616 Power conversion equipment
KC	Yes
Encoder connection [1)2)]	
Module-side connection	iX industrial connector 10-pin male, coding B
Status indicators	None
Max. encoder cable length [3)]	75 m (RS422, digital filter parameterized to maximum 200 kHz) 25 m (all other interfaces and settings)
Encoder power supply [4)]	
Output voltage	5 V ±5% 12 V ±10% [5)]
Load capacity	300 mA
Protective measures	
Overload-proof	Yes
Short-circuit proof	Yes
Sense lines	No [6)]
Inputs A, B, R [7)]	
Single-ended signals	
Input voltage for low	<1 V against COM (TTL 5 V) <1.8 V against COM (HTL 12 V)
Input voltage for high	>2.6 V against COM (TTL 5 V) >7 V against COM (HTL 12 V)
Maximum input voltage	-13 V / +16 V against COM
Differential signals	
Differential voltage	±0.5 V to ±5 V (RS422, TTL 5 V) ±2 V to ±13 V (HTL 12 V)
Terminating resistor	112 Ω (RS422)
Open-circuit monitoring	
RS422, HTL/TTL differential, HTL/TTL single-ended	Yes [8)]
HTL/TTL open collector, HTL/TTL open emitter	No [9)]
Incremental encoder operation	
Signal form	Square wave signals
Evaluation	4x
Input frequency	Max. 6.25 MHz (RS422) Max. 200 kHz (TTL 5 V, HTL 12 V)
Counter frequency	Max. 25 MHz (RS422) Max. 800 kHz (TTL 5 V, HTL 12 V)
Reference frequency	Max. 6.25 MHz (RS422) Max. 200 kHz (TTL 5 V, HTL 12 V)

Table 122: 8EAC0151.003-1 - Technical data

Order number	8EAC0151.003-1
Distance between edges	Min. 40 ns (RS422) Min. 340 ns (TTL 5 V, HTL 12 V)
Max. acceleration	25 * 10^9 increments / s^2 (RS422) 1.5 * 10^9 increments / s^2 (TTL 5 V, HTL 12 V)
Support	
Motion system	
mapp Motion	5.3.0 and higher
ACP10/ARNC0	5.3.0 and higher (RS422, HTL differential, HTL push-pull, HTL pull) 5.8.0 and higher (remaining interfaces)
Ambient conditions	
Temperature	
Operation	
Nominal	5 to 40°C
Maximum	55°C
Storage	-25 to 55°C
Transport	-25 to 70°C
Relative humidity	
Operation	5 to 85%
Storage	5 to 95%
Transport	Max. 95% at 40°C
Mechanical properties	
Dimensions	
Width	82 mm
Length	24 mm
Depth	103 mm
Weight	72 g

Table 122: 8EAC0151.003-1 - Technical data

1) The data in this section applies to each of the three incremental encoder interfaces.
2) The encoder must be wired using a single shielded cable with twisted pair signal lines (e.g. 4x 2x 0.14 mm² + 2x 0.5 mm²).
3) Depending on the encoder and cable used, the maximum possible frequency may be reduced for a given cable length or the maximum possible cable length may be reduced for a given frequency.
4) The encoder must be supplied using the voltage source provided. The use of any other power supply is not permitted.
5) Depends on the configuration in Automation Studio.
6) With an output voltage of 5 V ±5%, it is possible to compensate for the sensor voltage drop by configuring the cable resistance (max. 2x 4.014 Ω). When using compensation and current >200 mA, the output voltage accuracy is reduced to ±0.5 V.
7) The values refer to the input of the plug-in module.
8) With HTL/TTL differential without terminating resistor, error detection is only guaranteed if both lines are interrupted.
9) Fault detection is not possible because an open circuit cannot be distinguished from a valid condition.

2.3.3.8.4 Wiring

2.3.3.8.4.1 Pinout

Information:

Plug-in module 8EAC is not capable of hot plugging. An 8EAC plug-in module is only permitted to be connected to or disconnected from an ACOPOS P3 8EI servo drive when power to the servo drive is switched off.

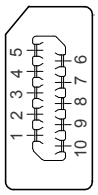
Figure	X41L / X42L / X43L	Pin	Description	Function
		1	B\ [1]	Channel B inverted
		2	B	Channel B
		3	COM	Encoder power supply 0 V
		4	A\ [1]	Channel A inverted
		5	A	Channel A
		6	R	Reference pulse
		7	R\ [1]	Reference pulse inverted
		8	U+	Encoder supply 5 V / 12 V [2]
		9	T-	Temperature sensor -
		10	T+	Temperature sensor +

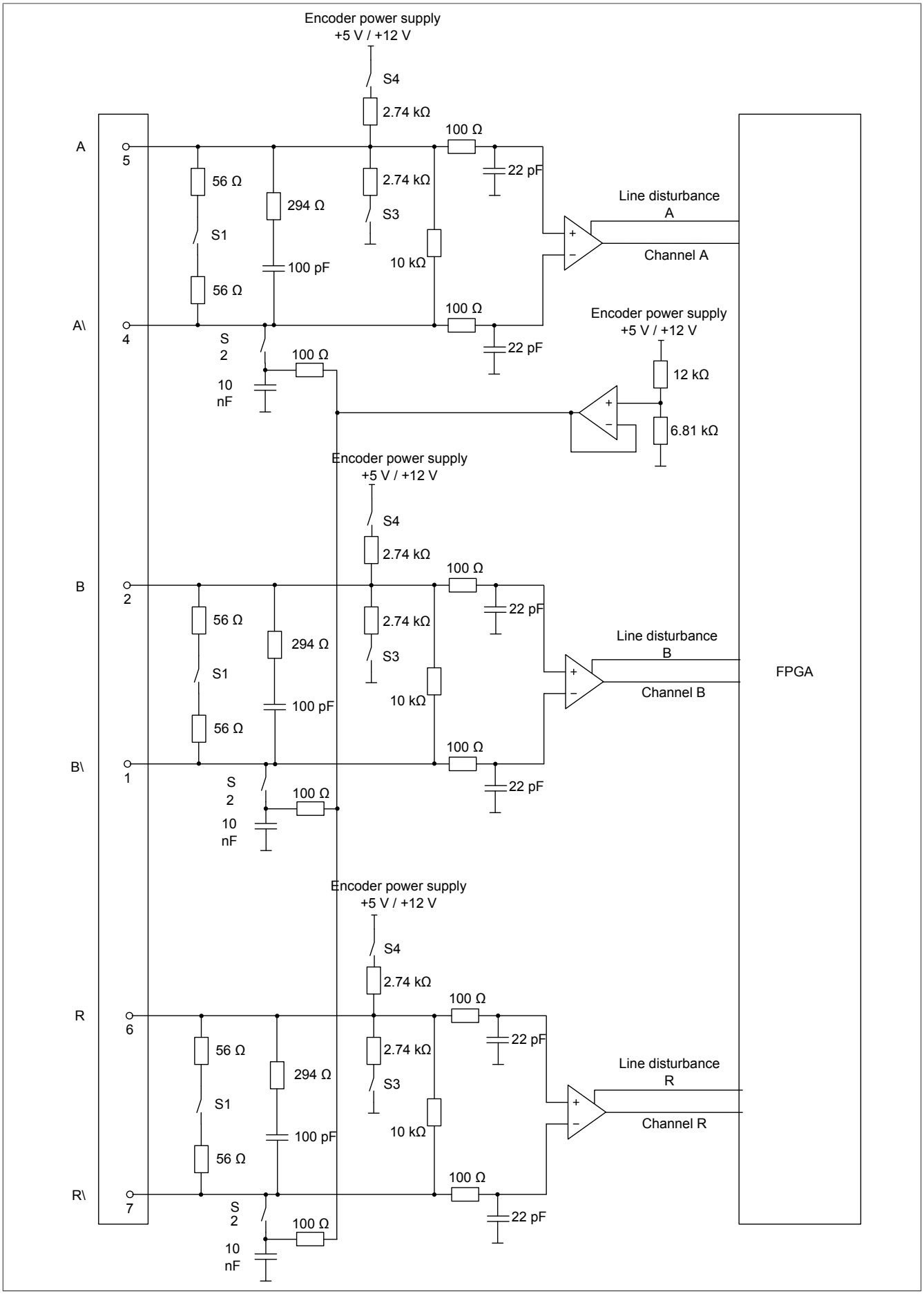
Table 123: Incremental encoder interface 8EAC0151.003-1 - Pinout

1) These pins must be open when operating single-ended encoders; otherwise, the plug-in module may be irreparably damaged.
2) The encoder power supply depends on the configuration in Automation Studio.

Danger!

The connections for the motor temperature sensor and encoder are safely isolated circuits. These connections are therefore only permitted to be connected to devices or components that have sufficient isolation per IEC 60364-4-41 or EN 61800-5-1.

2.3.3.8.4.2 Principle circuit diagram and states of the switches



Interface	S1 Terminating resistor	S2 Single-ended reference	S3 Pull-down resistor	S4 Pull-up resistor
TTL, differential, with terminating resistor (RS422)	Closed	Open	Open	Open
HTL/TTL, differential, push-pull, without terminating resistor	Open	Open	Open	Open
HTL/TTL, single-ended, push-pull	Open	Closed	Open	Open
HTL/TTL, single-ended, pull / open collector	Open	Closed	Open	Closed
HTL/TTL, single-ended, push / open emitter	Open	Closed	Closed	Open

2.3.3.9 8EAC0152.001-1

2.3.3.9.1 General information

Analog multi-encoder plug-in module 8EAC0152.001-1 can be used in the slot on an ACOPOS P3 8EI servo drive. The module contains an analog multi-encoder interface for evaluating analog encoders.

The plug-in module evaluates encoders that are built into B&R servo motors or used to evaluate external axes.

The encoder input signals are monitored. This makes it possible to detect open circuits, short circuits and failures of the encoder power supply (reference signal).

When switched on, the plug-in module is automatically identified by the operating system on the ACOPOS P3 8EI servo drive.

Information:

The encoder interfaces of 8EAC plug-in modules are each assigned from the factory to a defined axis (motor connection X5xx) of the 8EI servo drive in which the respective 8EAC plug-in module is being operated.

8EAC encoder interface plug-in module	Assignment		
	8EIxxxxxS... 1-axis modules	8EIxxxxxD... 2-axis modules	8EIxxxxxT... 3-axis modules
X41x	X51 / X51A	X51 / X51A	X51 / X51A
X42x	---	X52	X52
X43x	---	---	X53

The factory assignment of encoder interfaces can be changed in Automation Studio (prerequisite: mapp Motion V.5.22.0 / ACP10 V5.20.0 or higher). For details, see Automation Help (encoder interface assignment).

Supported encoder types

- SinCos
- EnDat 2.1, serial with evaluation of sinusoidal output signals
- HIPERFACE
- SSI SinCos, serial with evaluation of sinusoidal output signals

Information:

The encoder type for the multi-encoder interface is not predefined from the factory. Before commissioning, configure the encoder type for each multi-encoder interface and – depending on the encoder type – the encoder supply voltage in Automation Studio!

Caution!

An incorrect configuration can result in irreparable damage to the connected encoder!

The following encoder types are supported:

	SinCos	EnDat 2.1	SSI SinCos	HIPERFACE
Encoder power supply	5.2 V ±0.1 V 11.45 V ±0.1 V 3)	5.2 V ±0.1 V	5.2 V ±0.1 V 11.45 V ±0.1 V 3)	11.45 V ±0.1 V
Compensation 1)	Max. 2x 0.7 V			---
Terminating resistors	120 Ω			
Signal frequency	DC up to 400 kHz			DC up to 200 kHz
Transfer rate	---	781.25 kbit/s	100 to 400 kbit/s	9600 bit/s
Support 2)	ACOPOS operating system 5.00.0 and higher			ACOPOS operating system 5.05.0 and higher

Table 124: Encoder types - Overview

1) Compensation takes place by configuring the cable resistance in Automation Studio.
2) Operating system version from which a certain encoder type is supported.
3) 11.45 V encoder power supply is supported by ACOPOS operating system 5.10.0 and later.

2.3.3.9.2 Order data

Order number	Short description	Figure
	Plug-in modules	
8EAC0152.001-1	ACOPOS P3 plug-in module, analog multi-encoder interface	
	Optional accessories	
	Adapter cables	
8ECG00X4.3151D-0	ACOPOS P3 adapter cable, length 0.4 m, for analog multi-encoder interfaces and incremental encoder interfaces, 5x 2x 0.14 mm², 10-pin male IX connector to 15-pin female DSUB	

Table 125: 8EAC0152.001-1 - Order data

2.3.3.9.3 Technical data

Order number	8EAC0152.001-1
General information	
Module type	ACOPOS P3 plug-in module
B&R ID code	0xEFDF
Slot	Slot 1
Max. power consumption	12 W
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E225616 Power conversion equipment
KC	Yes
Encoder connection	
Module-side connection	10-pin male iX industrial connector, coding B
Status indicators	None
Max. encoder cable length	75 m
Encoder inputs	
Sine/Cosine inputs	
Signal transmission	Differential signals, symmetrical [1)]
Signal frequency	Depends on the configured encoder type
Terminating resistor	120 Ω
Resolution	12-bit
Encoder power supply	
Output voltage	Configurable Typ. 11.45 V ±0.1 V / 5.2 V ±0.1 V
Load capacity	Max. 300 mA for 5.2 V Max. 200 mA for 11.45 V [2)]
Protective measures	
Overload-proof	Yes
Short-circuit proof	Yes
Sense lines	None [3)]
Reference input	
Signal transmission	Differential signal, symmetrical
Differential voltage for low	≤-0.2 V
Differential voltage for high	≥+0.2 V
Terminating resistor	120 Ω
Position	
Resolution @ 1 V_{ss}	2^{14} increments * Number of encoder lines
Temperature sensor connection	
Quantity	1
Resistance range	500 Ω to 5 kΩ
Synchronous serial interface	
Signal transmission	RS485
Data transfer rate	Depends on the configured encoder type
Support	
Motion system	
mapp Motion	5.1.0 and higher
ACP10/ARNC0	5.00.0 and higher

Table 126: 8EAC0152.001-1 - Technical data

Order number	8EAC0152.001-1
Ambient conditions	
Temperature	
Operation	
Nominal	5 to 40°C
Maximum	55°C
Storage	-25 to 55°C
Transport	-25 to 70°C
Relative humidity	
Operation	5 to 85%
Storage	5 to 95%
Transport	Max. 95% at 40°C
Mechanical properties	
Dimensions	
Width	82 mm
Length	24 mm
Depth	103 mm
Weight	64 g

Table 126: 8EAC0152.001-1 - Technical data

1) HIPERFACE encoder type: Asymmetrical
2) Up to revision C0, the load capacity is reduced from 200 mA to 100 mA at an output voltage of 11.45 V and ambient temperatures starting at 40°C.
3) Possible to compensate for encoder voltage drop by configuring cable resistance (max. 2x 0.7 V at 5 V output voltage)

2.3.3.9.4 Wiring

2.3.3.9.4.1 Pinout

Information:

Plug-in module 8EAC is not capable of hot plugging. An 8EAC plug-in module is only permitted to be connected to or disconnected from an ACOPOS P3 8EI servo drive when power to the servo drive is switched off.

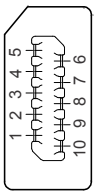
Figure	X41M	Pin	Name	Function depending on configured encoder type			
				SinCos	EnDat 2.1	SSI SinCos	HIPERFACE
		1	B\	Channel B inverted			REF cosine
		2	B	Channel B			Cosine
		3	GND	Encoder power supply 0 V			
		4	A\	Channel A inverted			REF sine
		5	A	Channel A			Sine
		6	R	Reference pulse	Data +		
		7	R\	Reference pulse inverted	Data -		
		8	U+	Encoder power supply 5 V			Encoder power supply 12 V
		9	T-	Temperature sensor -	Clock -		Temperature sensor -
		10	T+	Temperature sensor +	Clock +		Temperature sensor +

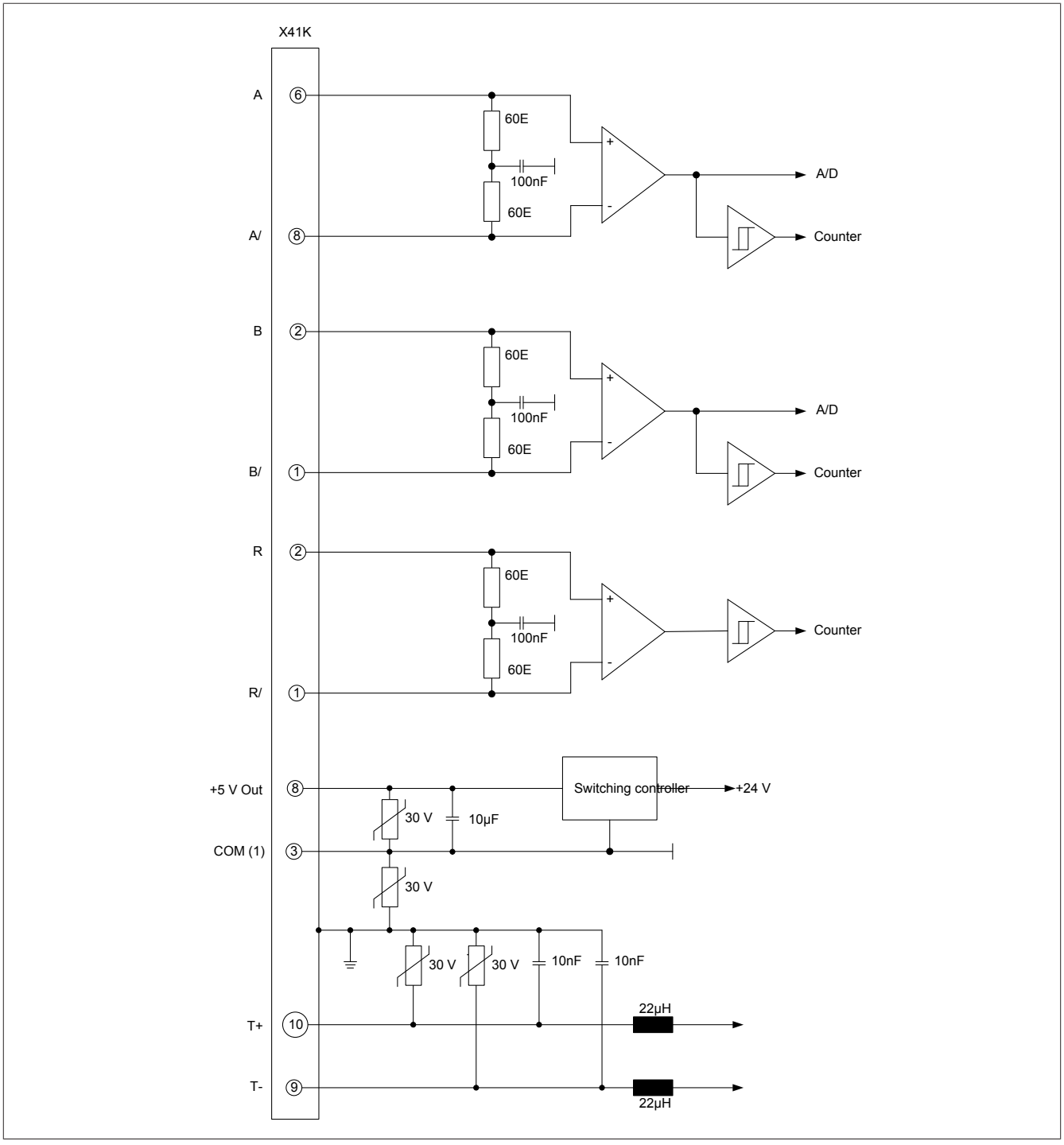
Table 127: Analog multi-encoder interface 8EAC0152.001-1 - Pinout

Danger!

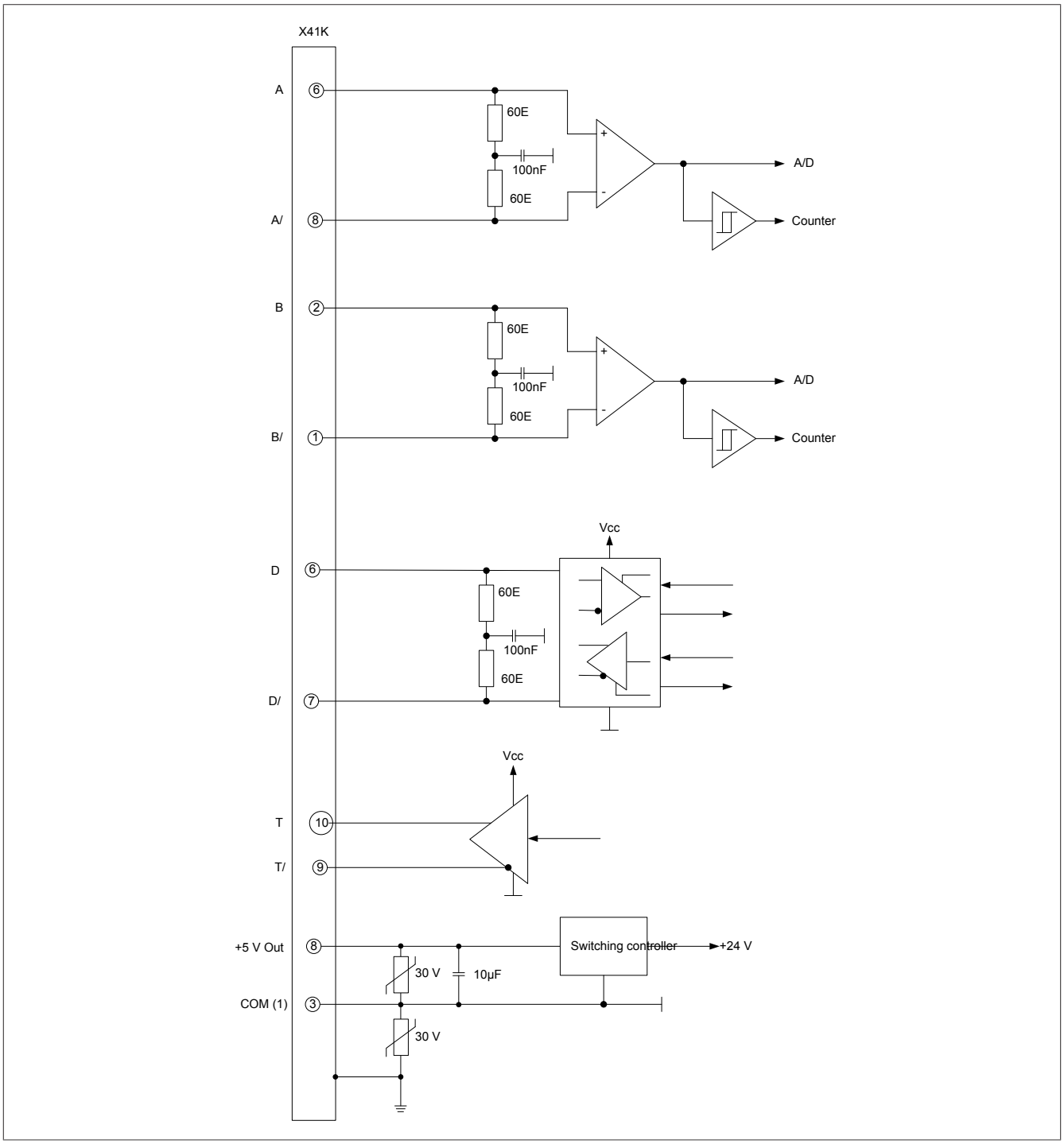
The connections for the encoders are isolated circuits. These connections are therefore only permitted to be connected to devices or components that have sufficient isolation per IEC 60364-4-41 or EN 61800-5-1.

2.3.3.9.5 Input/Output circuit diagram

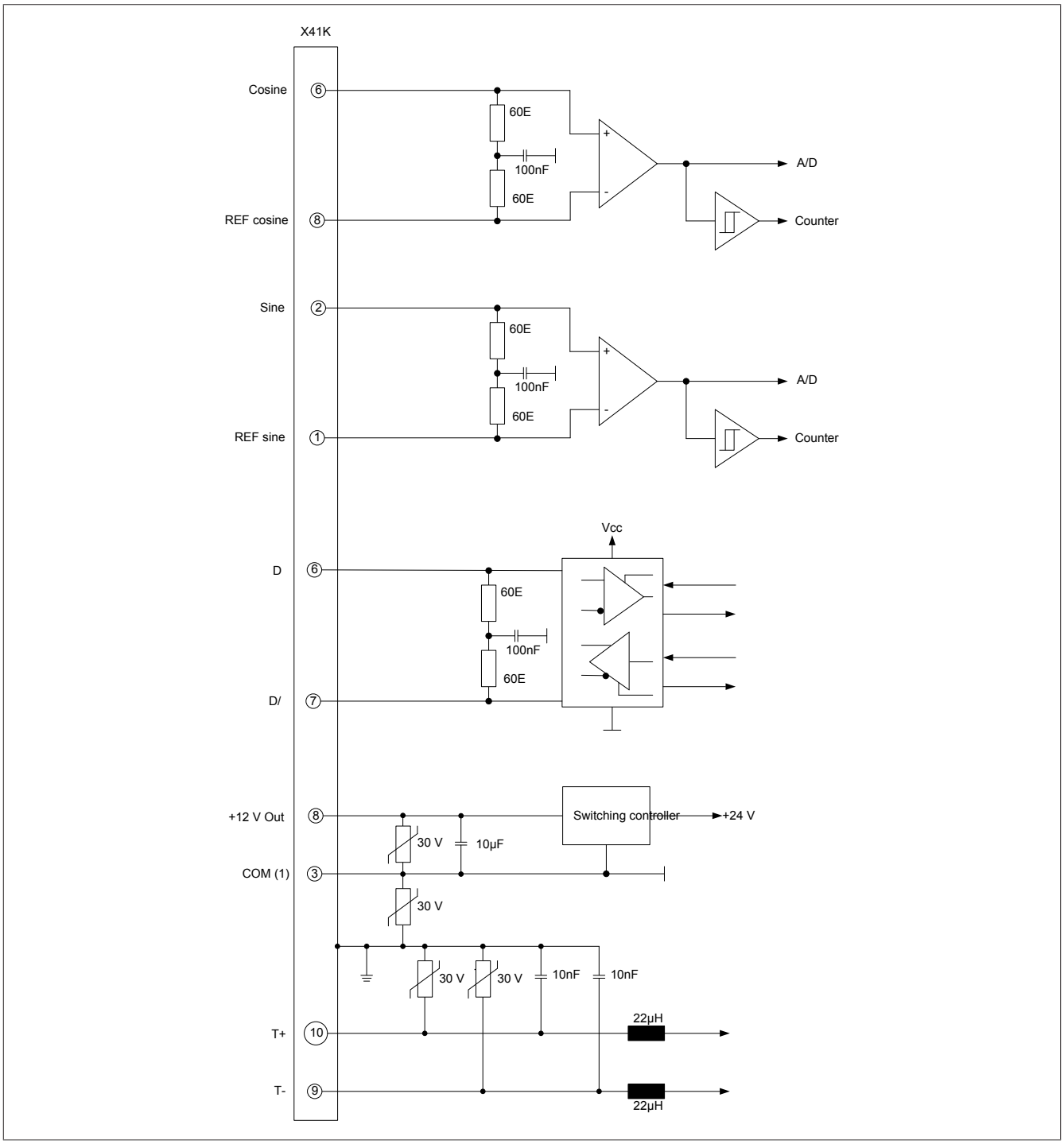
SinCos



EnDat 2.1 and SSI SinCos



HIPERFACE


X41K
Cosine
6
60E
100nF
60E
A/D
Counter
REF cosine
8
Sine
2
60E
100nF
60E
A/D
Counter
REF sine
1
Vcc
D
6
60E
100nF
60E
D/
7
+12 V Out
8
Switching controller
+24 V
30 V
10µF
COM (1)
3
30 V
30 V
30 V
10nF
10nF
22µH
T+
10
T-
9
22µH

2.3.3.10 8EAC0152.003-1

2.3.3.10.1 General information

Analog multi-encoder plug-in module 8EAC0152.003-1 can be used in the slot on an ACOPOS P3 8EI servo drive. The module includes 3 analog multi-encoder interface for evaluating analog encoders.

The plug-in module evaluates encoders that are built into B&R servo motors or used to evaluate external axes.

The encoder input signals are monitored. This makes it possible to detect open circuits, short circuits and failures of the encoder power supply (reference signal).

When switched on, the plug-in module is automatically identified by the operating system on the ACOPOS P3 8EI servo drive.

Information:

The encoder interfaces of 8EAC plug-in modules are each assigned from the factory to a defined axis (motor connection X5xx) of the 8EI servo drive in which the respective 8EAC plug-in module is being operated.

8EAC encoder interface plug-in module	Assignment		
	8EIxxxxxS... 1-axis modules	8EIxxxxxD... 2-axis modules	8EIxxxxxT... 3-axis modules
X41x	X51 / X51A	X51 / X51A	X51 / X51A
X42x	---	X52	X52
X43x	---	---	X53

The factory assignment of encoder interfaces can be changed in Automation Studio (prerequisite: mapp Motion V.5.22.0 / ACP10 V5.20.0 or higher). For details, see Automation Help (encoder interface assignment).

2.3.3.10.1.1 Supported encoder types

- SinCos
- EnDat 2.1, serial with evaluation of sinusoidal output signals
- HIPERFACE
- SSI SinCos, serial with evaluation of sinusoidal output signals

Information:

The encoder type for the multi-encoder interface is not predefined from the factory. Before commissioning, configure the encoder type in Automation Studio for each multi-encoder interface!

Caution!

An incorrect configuration can result in irreparable damage to the connected encoder!

2.3.3.10.1.2 Overview of encoder types

	SinCos	EnDat 2.1	SSI SinCos	HIPERFACE
Encoder power supply	5.2 V ±0.1 V 11.45 V ±0.1 V [3]	5.2 V ±0.1 V	5.2 V ±0.1 V 11.45 V ±0.1 V [3]	11.45 V ±0.1 V
Compensation [1]	Max. 2x 0.7 V			---
Terminating resistors	120 Ω			
Signal frequency	DC up to 400 kHz			DC up to 200 kHz
Transfer rate	---	781.25 kbit/s	100 to 400 kbit/s	9600 bit/s
Support [2]	ACOPOS operating system 5.00.0 and higher			ACOPOS operating system 5.05.0 and higher

Table 128: Encoder types - Overview

1) Compensation takes place by configuring the cable resistance in Automation Studio.
2) Operating system version from which a certain encoder type is supported.
3) 11.45 V encoder power supply is supported by ACOPOS operating system 5.10.0 and later.

2.3.3.10.2 Order data

Order number	Short description	Figure
	Plug-in modules	
8EAC0152.003-1	ACOPOS P3 plug-in module, 3 analog multi-encoder interfaces	
	Optional accessories	
	Adapter cables	
8ECG00X4.3151D-0	ACOPOS P3 adapter cable, length 0.4 m, for analog multi-encoder interfaces and incremental encoder interfaces, 5x 2x 0.14 mm², 10-pin male IX connector to 15-pin female DSUB	

Table 129: 8EAC0152.003-1 - Order data

2.3.3.10.3 Technical data

Order number	8EAC0152.003-1
General information	
Short description	3 analog multi-encoder interfaces in one module
Module type	ACOPOS P3 plug-in module
B&R ID code	0xEFDF
Slot	Slot 1
Max. power consumption	12 W
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E225616 Power conversion equipment
KC	Yes
Encoder connection [1]	
Module-side connection	10-pin male iX industrial connector, coding B
Status indicators	None [2]
Max. encoder cable length	75 m
Encoder inputs	
Sine/Cosine inputs	
Signal transmission	Differential signals, symmetrical [3]
Signal frequency	Depends on the configured encoder type
Terminating resistor	120 Ω
Resolution	12-bit
Encoder power supply [1]	
Output voltage	Configurable Typ. 11.45 V ±0.1 V / 5.2 V ±0.1 V
Load capacity	Max. 300 mA for 5.2 V Max. 200 mA for 11.45 V [4]
Protective measures	
Overload-proof	Yes
Short-circuit proof	Yes
Sense lines	None [5]
Reference input	
Signal transmission	Differential signal, symmetrical
Differential voltage for low	≤-0.2 V
Differential voltage for high	≥+0.2 V
Terminating resistor	120 Ω
Position	
Resolution @ 1 V_{SS}	2^{14} increments * Number of encoder lines
Temperature sensor connection	
Quantity	3
Resistance range	500 Ω to 5 kΩ
Synchronous serial interface	
Signal transmission	RS485
Data transfer rate	Depends on the configured encoder type
Support	
Motion system	
mapp Motion	5.1.0 and higher
ACP10/ARNC0	5.00.0 and higher

Table 130: 8EAC0152.003-1 - Technical data

Order number	8EAC0152.003-1
Ambient conditions	
Temperature	
Operation	
Nominal	5 to 40°C
Maximum	55°C
Storage	-25 to 55°C
Transport	-25 to 70°C
Relative humidity	
Operation	5 to 85%
Storage	5 to 95%
Transport	Max. 95% at 40°C
Mechanical properties	
Dimensions	
Width	82 mm
Length	24 mm
Depth	103 mm
Weight	72 g

Table 130: 8EAC0152.003-1 - Technical data

1) The data in this section applies to each of the 3 analog multi-encoder interfaces.
2) The direction of rotation of the encoder can be displayed on the 8EAD0000.000-1 display module.
3) HIPERFACE encoder type: Asymmetrical
4) Up to revision C0, the load capacity is reduced from 200 mA to 100 mA at an output voltage of 11.45 V and ambient temperatures starting at 40°C.
5) Possible to compensate for encoder voltage drop by configuring cable resistance (max. 2x 0.7 V at 5 V output voltage)

2.3.3.10.4 Wiring

2.3.3.10.4.1 Pinout

Information:

Plug-in module 8EAC is not capable of hot plugging. An 8EAC plug-in module is only permitted to be connected to or disconnected from an ACOPOS P3 8EI servo drive when power to the servo drive is switched off.

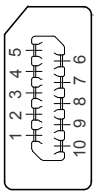
Figure	X41N / X42N / X43N	Pin	Name	Function depending on configured encoder type			
				SinCos	EnDat 2.1	SSI SinCos	HIPERFACE
		1	B\	Channel B inverted			REF cosine
		2	B	Channel B			Cosine
		3	GND	Encoder power supply 0 V			
		4	A\	Channel A inverted			REF sine
		5	A	Channel A			Sine
		6	R	Reference pulse	Data +		
		7	R\	Reference pulse inverted	Data -		
		8	U+	Encoder power supply 5 V			Encoder power supply 12 V
		9	T-	Temperature sensor -	Clock -		Temperature sensor -
		10	T+	Temperature sensor +	Clock +		Temperature sensor +

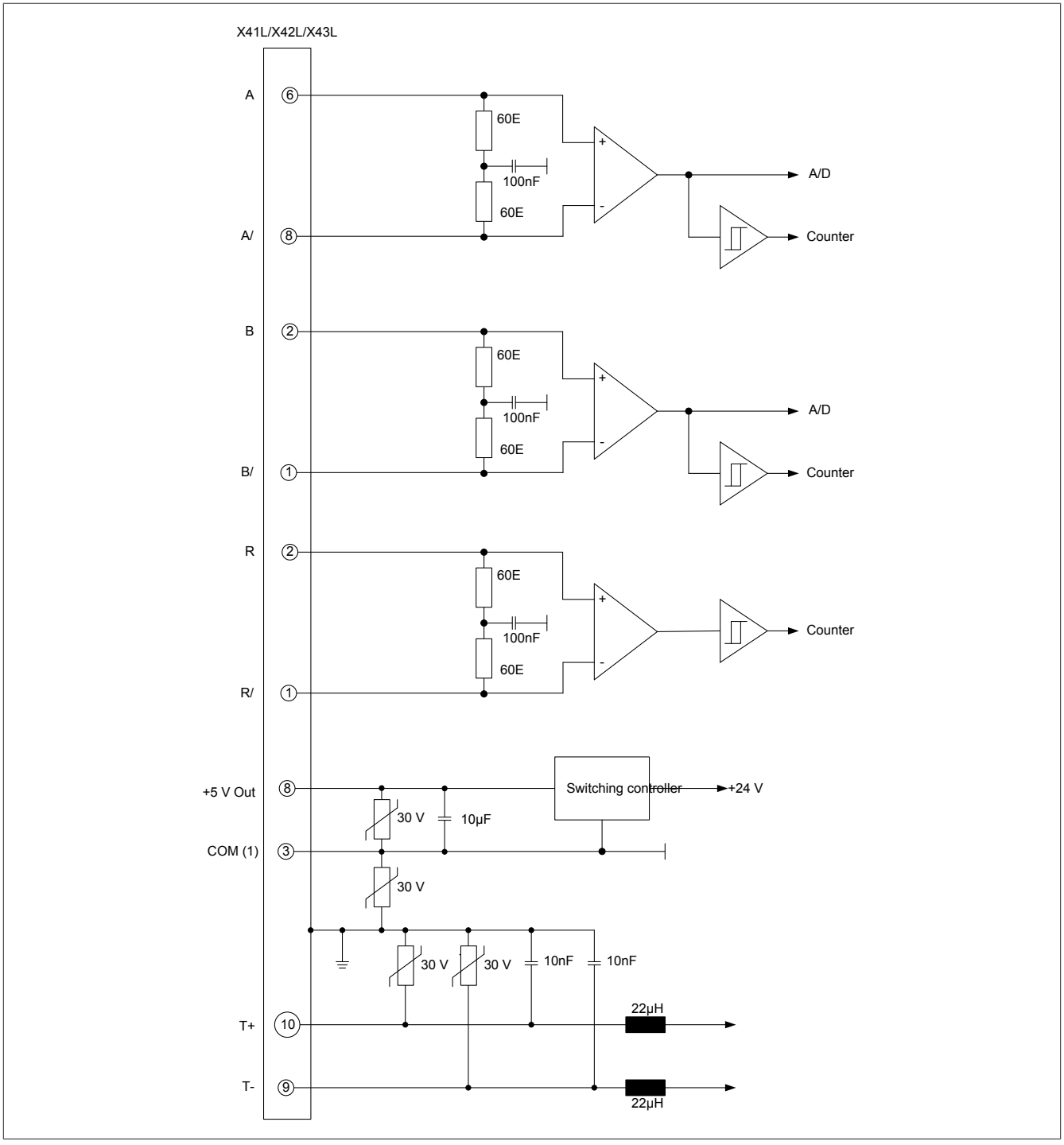
Table 131: Analog multi-encoder interface 8EAC0152.003-1 - Pinout

Danger!

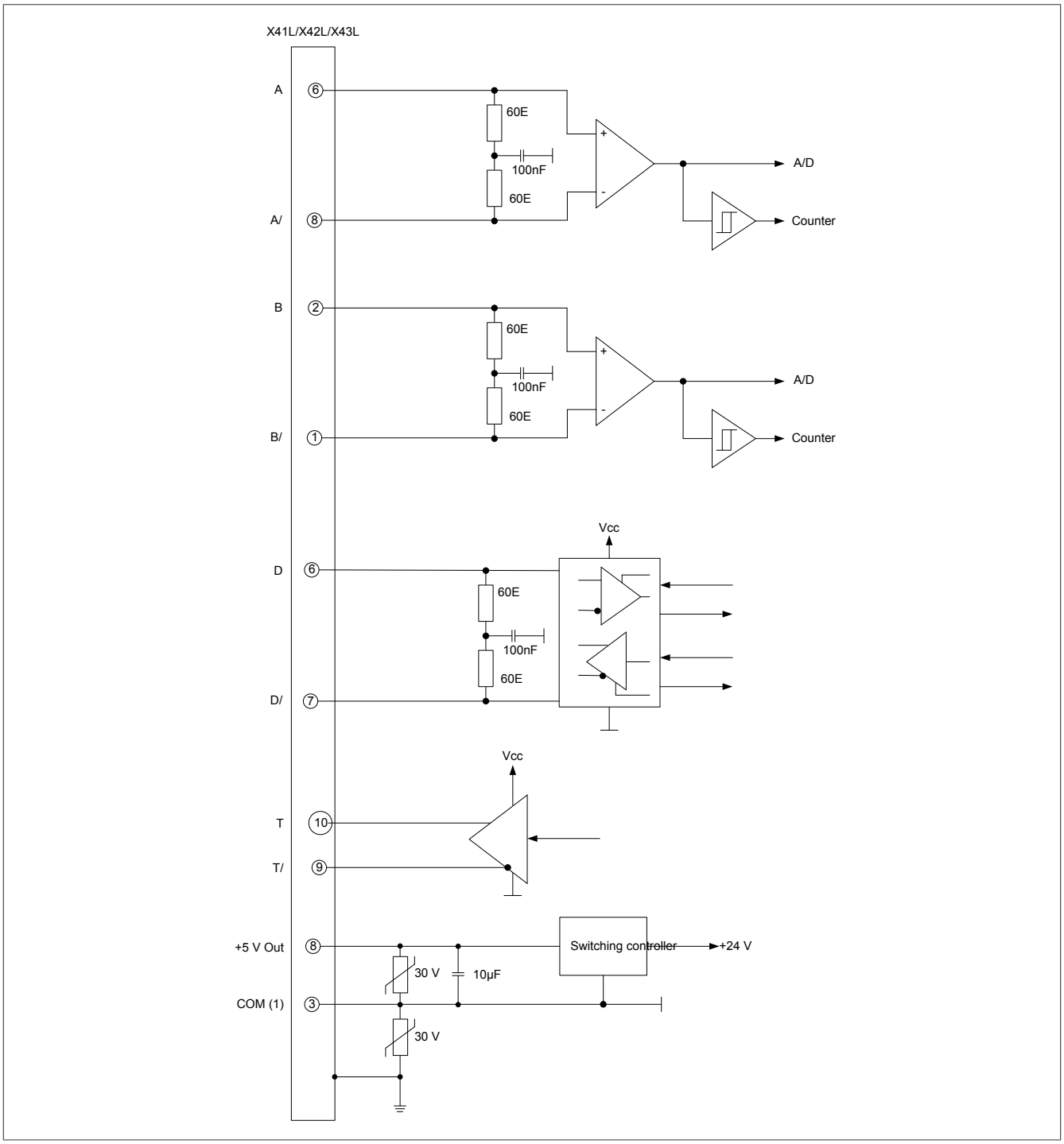
The connections for the encoders are isolated circuits. These connections are therefore only permitted to be connected to devices or components that have sufficient isolation per IEC 60364-4-41 or EN 61800-5-1.

2.3.3.10.5 Input/Output circuit diagram

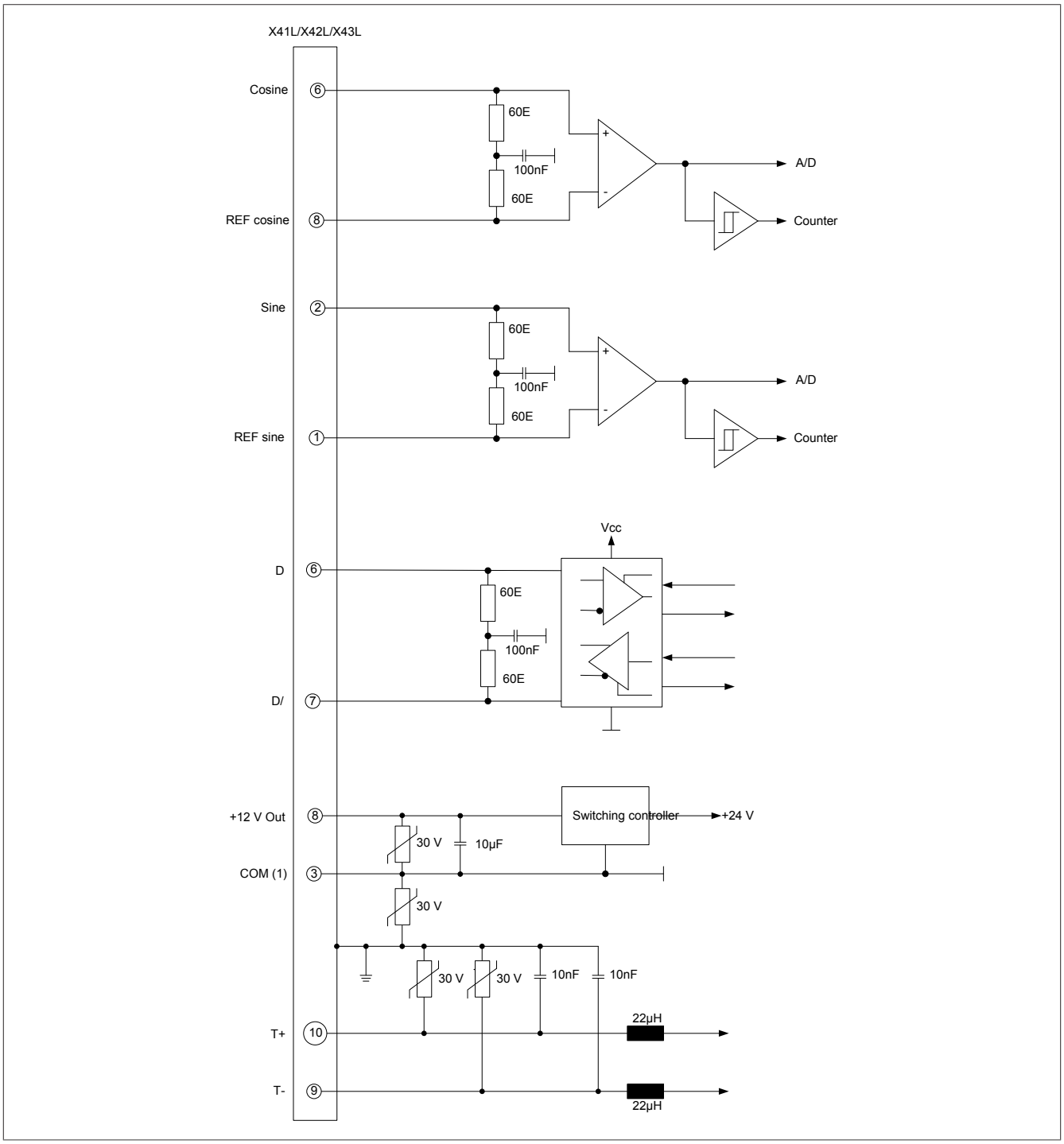
SinCos



EnDat 2.1 and SSI SinCos



HIPERFACE


X41L/X42L/X43L
Cosine
6
60E
100nF
60E
A/D
Counter
REF cosine
8
Sine
2
60E
100nF
60E
A/D
Counter
REF sine
1
Vcc
D
6
60E
100nF
60E
D/
7
+12 V Out
8
Switching controller
+24 V
30 V
10µF
COM (1)
3
30 V
30 V
30 V
10nF
10nF
22µH
T+
10
T-
9
22µH

2.3.4 8EAD display modules

2.3.4.1 Display module 8EAD0000.000-1

2.3.4.1.1 General information

The 8EAD display module is used both to display information and to set parameters:

- Display/Set the POWERLINK node number
- Displaying the operating system version
- Displaying general information

The 4 push keys on the front of the display module are used to navigate through the menu and to set parameters.

2.3.4.1.2 Order data

Order number	Short description	Figure
	Display modules	
8EAD0000.000-1	Display module, LCD, 128 x 64, black/white, 1x USB 3.0	

Table 132: 8EAD0000.000-1 - Order data

2.3.4.1.3 Technical data

Order number	8EAD0000.000-1
General information	
Power consumption	Max. 2.5 W
Certifications	
CE	Yes
UL	cULus E225616 Power conversion equipment
Display	
Type	LCD
Colors	Black/White
Resolution	128 x 64
Keys	
Type	Short stroke keys
Quantity	4
Electrical properties	
Nominal voltage	5 to 26 VDC
Operating conditions	
Degree of protection per EN 60529	IP20
Ambient conditions	
Temperature	
Operation	
Nominal	5 to 40°C
Maximum	55°C
Storage	-25 to 55°C
Transport	-25 to 70°C
Relative humidity	
Storage	5 to 95%
Transport	95% at 40°C

Table 133: 8EAD0000.000-1 - Technical data

Order number	8EAD0000.000-1
Mechanical properties	
Dimensions	
Width	59 mm
Height	75 mm [1]
Depth	20 mm
Weight	54 g

Table 133: 8EAD0000.000-1 - Technical data

1) When connected: 66 mm.

2.3.4.1.4 Use with ACOPOS P3 8EI servo drives

2.3.4.1.4.1 Installation

The 8EAD display module is connected to connector X9 of an 8EI servo drive. A guide rail behind connector X9 on the 8EI servo drive allows optimal positioning of the 8EAD display module. The corresponding recess is located on the back of the 8EAD display module.

Information:

The 8EAD display module supports hot plugging.

Observe all safety guidelines in section "Safety guidelines" on page 10!

Connecting the 8EAD display module

1. Slide the 8EAD display module into the guide rail on the 8EI servo drive.
2. Slide the 8EAD display module down until the 8EAD display module's connector is inserted in connector X9 on the 8EI servo drive.

Removing the 8EAD display module

1. Slide the 8EAD display module up until the 8EAD display module's connector is disconnected from connector X9 on the 8EI servo drive.
2. Slide the 8EAD display module up and off of the guide rail on the 8EI servo drive.

2.3.4.1.4.2 Operation

General information

Display module 8EAD is equipped with four keys that carry out different commands depending on the information displayed. The respective commands are shown at the bottom of the screen being shown on the display module.

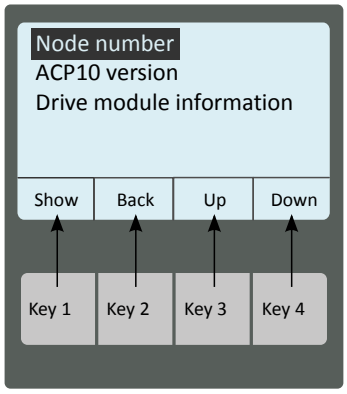


Figure 37: Display module 8EAD0000.000-1: Key/Command assignments (example)

Command	Function
Show	Selects the highlighted menu option and either shows respective information or opens the corresponding sub-menu.
Back	Switches to the higher-level menu.
Up	Moves the entry one position up.
Down	Moves the entry one position down.

Table 134: Command functions

8EAD0000.000-1 - Menu structure overview

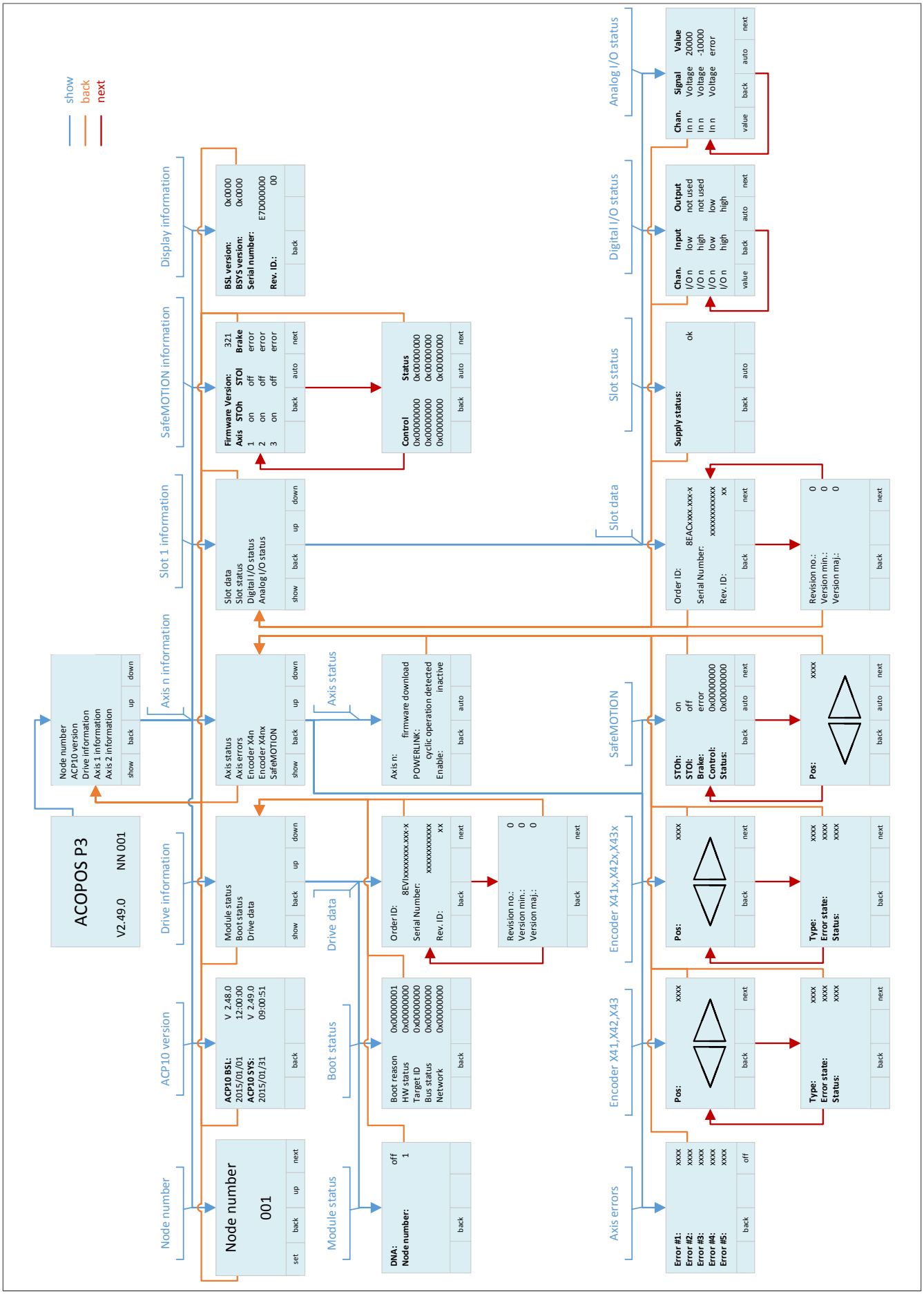


Figure 38: 8EAD0000.000-1 - Menu structure

Startup screen

After the boot procedure (duration approx. 5 seconds), the startup screen is displayed. It contains information about the module to which the 8EAD display module is connected:

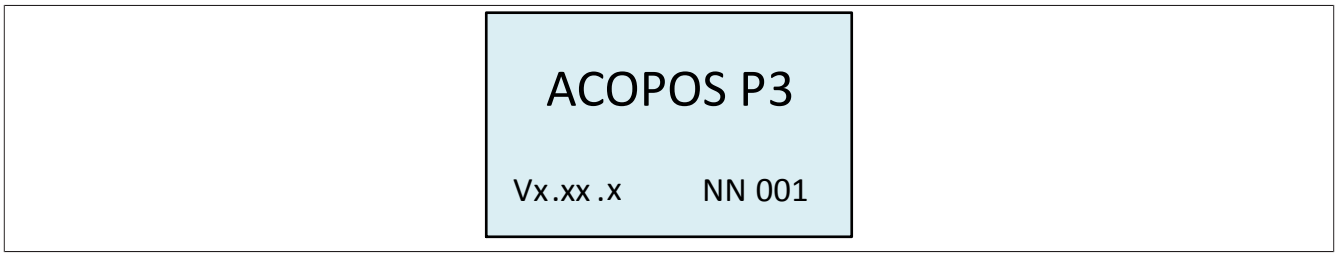


Figure 39: Startup screen

Value	Description
ACOPOS P3	Module name
Vx.xx..x	Current operating system version
NN 001	Current node number (NN xxx or DNA xxx)

Table 135: Information on the startup screen

The main menu is opened by pressing any key on the 8EAD display module.

Main menu

The main menu contains an overview of all setting options and information requests.

Information:

A maximum of 5 menu options can be displayed at once on the 8EAD display module. Additional menu options become visibly by pressing "Up" and "Down".

When a submenu is opened, the first menu option is marked by default (displayed inverted).

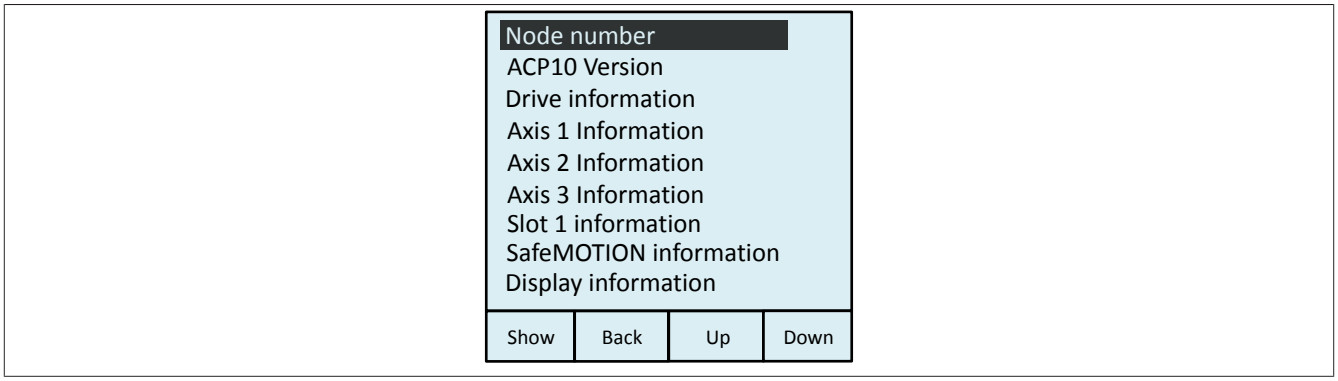


Figure 40: Main menu

Menu option	Description
Node number	Setting the POWERLINK node number
ACP10 version	Information about the ACOPOS operating system version
Drive information	Information about the module status, boot status and drive data
Axis 1 information	Information about axis 1
Axis 2 information	Information about axis 2 [1]
Axis 3 information	Information about axis 3 [1]
Slot 1 information	Information about the slot of the ACOPOS P3 servo drive
SafeMOTION information (optional)	Information about the SafeMOTION module [1]
Display information	Information about the display module

Table 136: Main menu - Menu options

1) This menu option is only displayed if the ACOPOS P3 servo drive has the corresponding functionality.

Command	Function
Show	Selects the highlighted menu option and either shows respective information or opens the corresponding sub-menu.
Back	Switches to the higher-level menu.
Up	Moves the entry one position up.
Down	Moves the entry one position down.

Table 137: Command functions

Information:

If the last menu option is selected, it is possible to wrap around to the first menu option by pressing "Down".

Node number

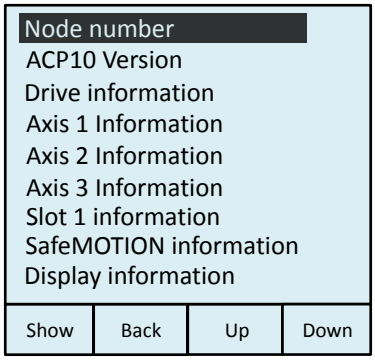


Figure 41: Node number - Main menu option

Command	Function
Show	Displays the screen page for setting the POWERLINK node number.
Back	Switches back to the startup screen.
Up	Moves the entry one position up.
Down	Moves the entry one position down.

Table 138: Command functions

Setting the POWERLINK node number

1. Select "Node number" in the main menu and confirm by pressing key 1 ("Show").
   The current node number setting on the ACOPOS P3 servo drive is displayed. The last (lowest) digit in the node number is selected.

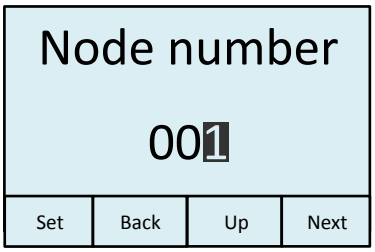


Figure 42: Setting the node number

2. Press key 3 ("Up") repeatedly until the digit has the desired value.
3. Press key 4 ("Next") to navigate to the next digit in the node number.
4. Repeat steps 2 and 3 until every digit of the node number has the desired value.
5. Applying / Not applying the node number

a) To apply the node number and exit menu option "Node number":
Press key 1 ("Set").
The new node number is applied on the next restart. The main menu is displayed on the display again.

Information:

The newly set node number is only applied after the ACOPOS P3 servo drive is restarted.

b) To not apply the node number and exit the "Node number" menu option:
Press key 2 ("Back").
The new node number setting is not applied. The main menu is displayed on the display again.

ACP10 version

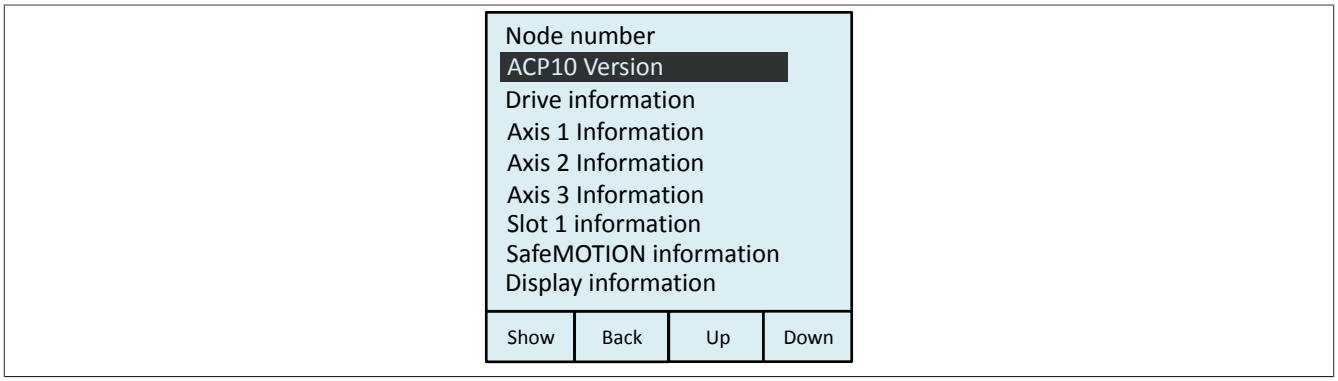


Figure 43: ACP10 version - Main menu option

Command	Function
Show	Displays ACP10 version information.
Back	Switches back to the startup screen.
Up	Moves the entry one position up.
Down	Moves the entry one position down.

Table 139: Command functions

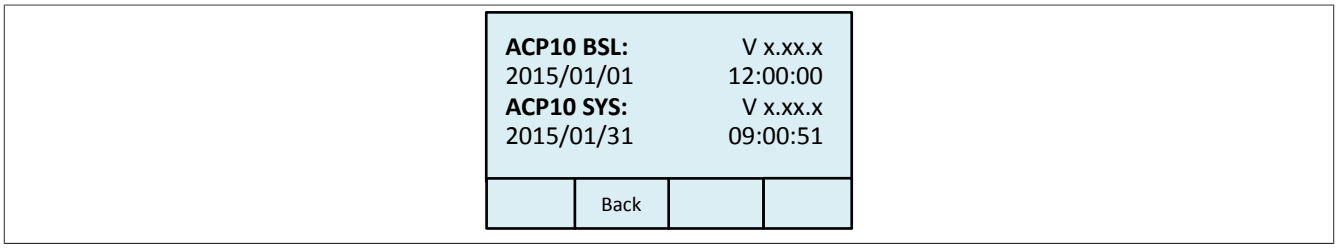


Figure 44: ACP10 version information

- **ACP10 BSL:** Base operating system firmware information (version, date, time)
- **ACP10 SYS:** System firmware information (version, date, time)

Command	Function
Back	Returns to the main menu.

Table 140: Command function

Information:

The ACP10 version information is updated once when this display page is opened! If the ACP10 operating system is updated while this page is being displayed, the ACP10 version information is not updated and the old ACP10 version information is still displayed.

Drive information

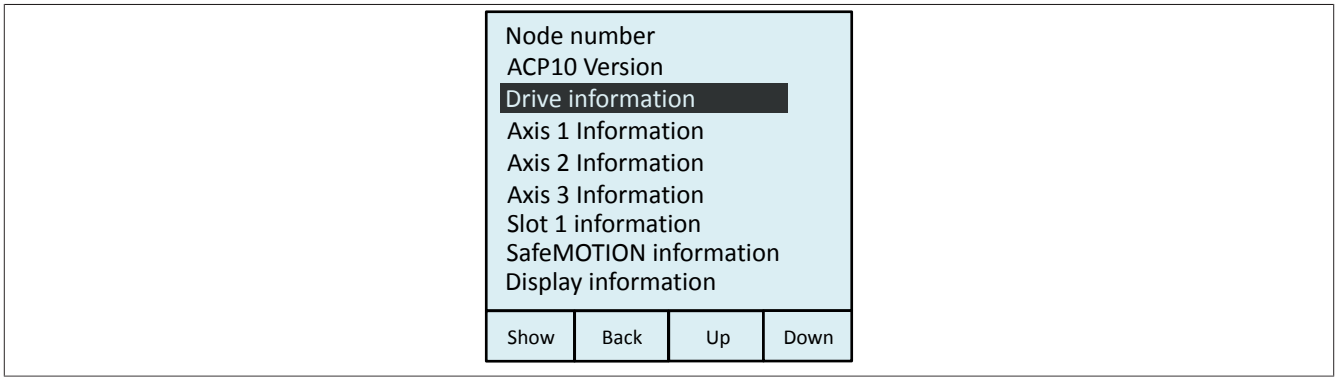


Figure 45: Drive information - Main menu option

Command	Function
Show	Switches to submenu "Drive information".
Back	Switches back to the startup screen.
Up	Moves the entry one position up.
Down	Moves the entry one position down.

Table 141: Command functions

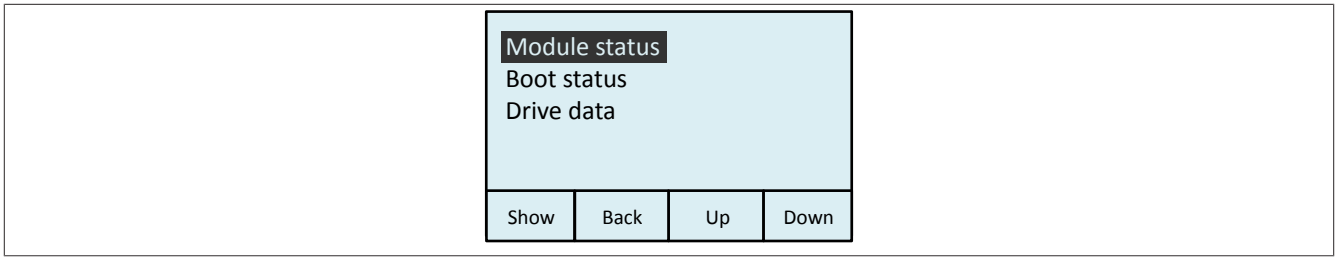


Figure 46: Drive information - Submenu

Command	Function
Show	Switches to the respective information.
Back	Returns to the main menu.
Up	Moves the entry one position up.
Down	Moves the entry one position down.

Table 142: Command functions

Module status

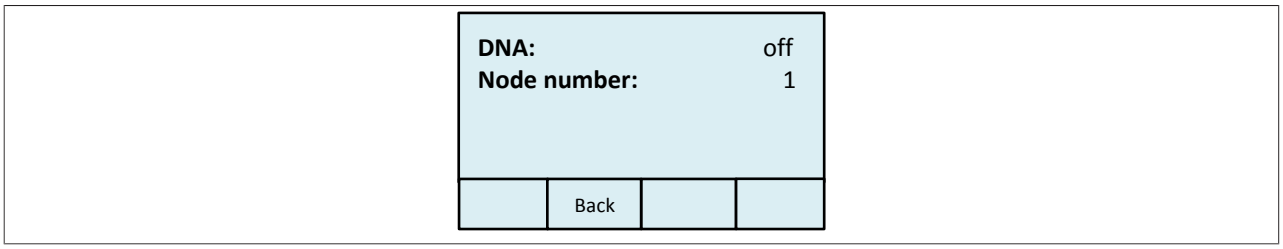


Figure 47: Module status

- **DNA** (dynamic node allocation): This window shows whether the function is enabled ("On") or disabled ("Off").
- **Node number:** Shows the currently set node number.

Command	Function
Back	Returns to submenu "Drive information".

Table 143: Command functions

Boot status

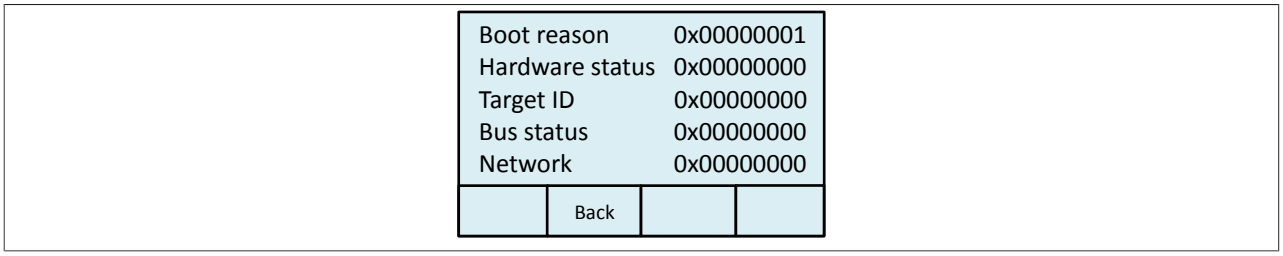


Figure 48: Boot status

Shows the internal state of the device and provides information for general troubleshooting. For more information, please contact Support.

Command	Function
Back	Returns to submenu "Drive information".

Table 144: Command functions

Drive data

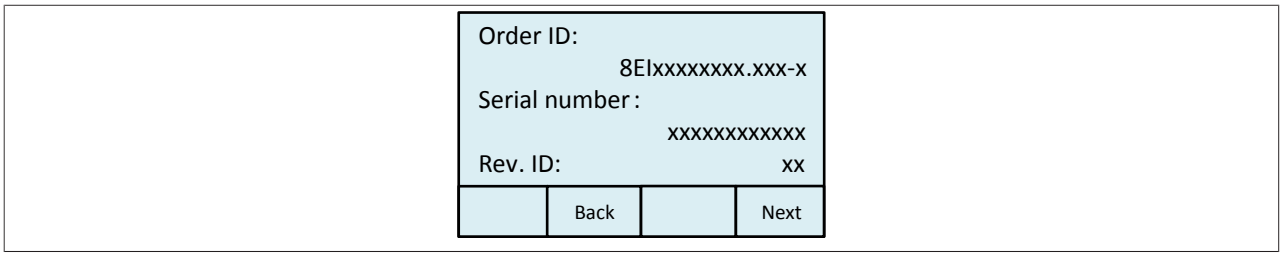


Figure 49: Drive data - Information

- **Order ID:** Displays the model number of the ACOPOS P3 servo drive.
- **Serial number:** Displays the serial number of the ACOPOS P3 servo drive.
- **Rev. ID:**: Displays the revision number of the ACOPOS P3 servo drive.

Command	Function
Back	Returns to submenu "Drive information".
Next	Displays "Drive data - Hardware information".

Table 145: Command functions

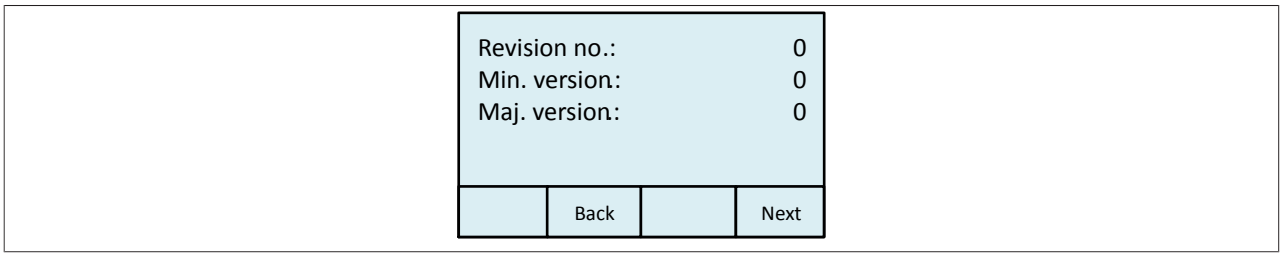


Figure 50: Drive data - Hardware information

For more details about individual states, please contact Support.

Command	Function
Back	Returns to submenu "Drive information".
Next	Displays drive data information.

Table 146: Command functions

Axis information

The main menu contains a menu option containing axis information for each axis of the ACOPOS P3 servo drive.

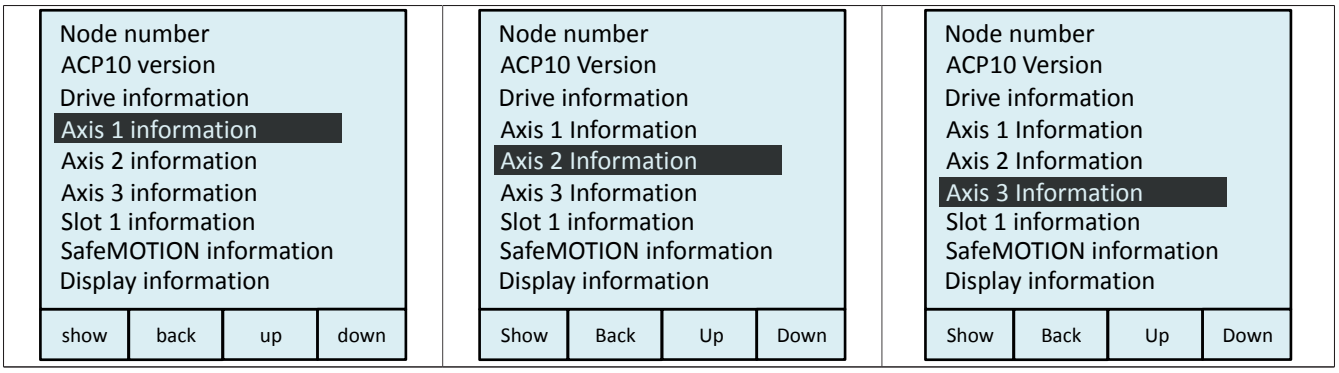


Table 147: Axis n information - Main menu option

Command	Function
Show	Switches to the respective "Axis n information" submenu.
Back	Switches back to the startup screen.
Up	Moves the entry one position up.
Down	Moves the entry one position down.

Table 148: Command functions

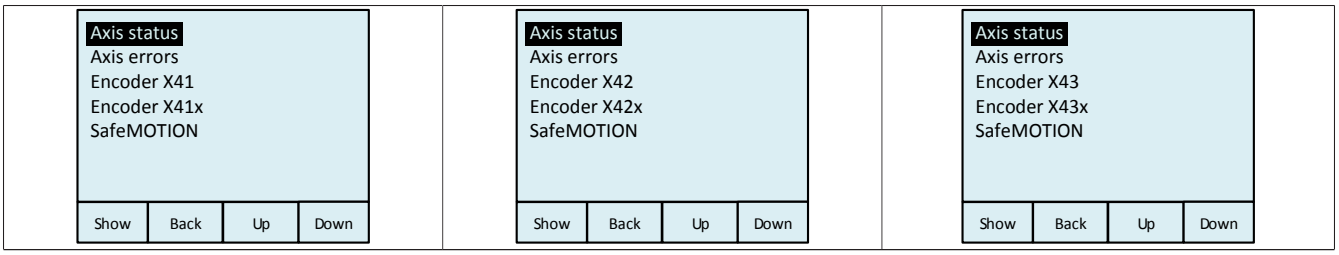


Table 149: Axis n information - Submenu

Command	Function
Show	Switches to the respective information.
Back	Returns to the main menu.
Up	Moves the entry one position up.
Down	Moves the entry one position down.

Table 150: Command functions

Axis status

Current status information of the axis is displayed here.

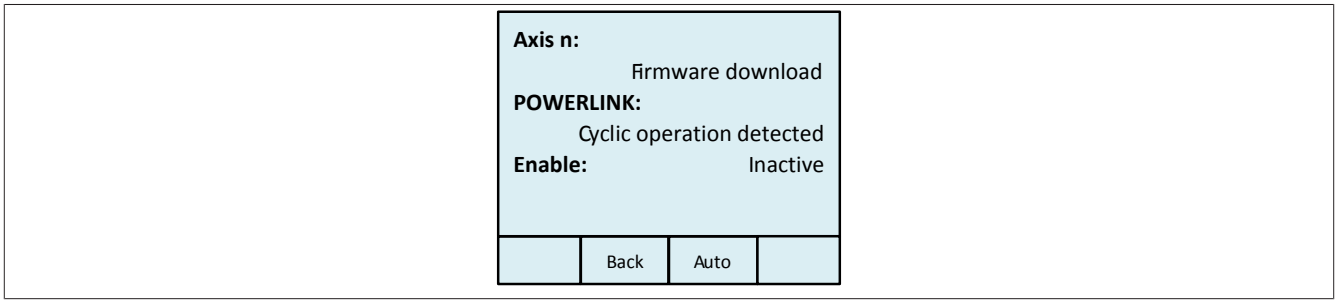


Figure 51: Axis status

Command	Function
Back	Returns to submenu "Axis information".
Auto/Off	Auto ... Displayed data is updated cyclically (default value). Off ... Displayed data is updated only when changing from submenu "Axis information" to this page.

Table 151: Command functions

- **Axis [1|2|3]:** Current status of the axis, analogous to LED status indicator "Ax[1|2|3]".

Value	Description
Waiting for communication	Waiting for network telegram.
Communication active	Network communication active.
Firmware download	ACOPOS P3 operating system being transferred/burned.
Error	There is a permanent error on the module. **Examples:** • Permanent overcurrent • Invalid data in EPROM
Not ready	The module is not ready for operation. **Examples:** • No signal on one or both enable inputs • DC bus voltage outside the tolerance range • Overtemperature on the motor (temperature sensor) • Motor feedback not connected or defective • Motor temperature sensor not connected or defective • Overtemperature on the module (IGBT junction, heat sink, etc.) • Disturbance on network
Ready	The module is operational and the power stage can be enabled (operating system present and booted, no permanent or temporary errors).
Run	The module's power stage is enabled.
Invalid	The state read from the ACOPOS P3 is invalid.

- **POWERLINK:** State of the POWERLINK interface of the ACOPOS P3, analogous to LED status indicator "PLK", independent of the axis.

Value	Description
No operation	The client is not participating in cyclic operation and also does not detect any other stations on the network participating in cyclic operation.
Acyclic operation	The client detects a valid POWERLINK frame on the network.
Cyclic operation detected	Cyclic operation on the network is taking place, but the client itself is not yet a participant.
Cyclic operation init	Cyclic operation of the client is in preparation.
Operational	The client is participating in cyclic operation.
Node number 0 - DNA	• The POWERLINK node number of the module is 0, or • The module is configured for dynamic node allocation and is waiting for the assignment of a node number from the master.
Stopped	The POWERLINK interface of the module is stopped.
Disabled	The POWERLINK interface of the module is disabled.
Invalid	The state read from the ACOPOS P3 is invalid.

- **Enable:** State of the enable inputs of the ACOPOS P3. With ACOPOS P3 SafeMOTION, this state is axis-specific.

Value	Description
Inactive	The level of at least one enable input is low.
Active	The level of both enable inputs is high.
Invalid	The state read from the ACOPOS P3 is invalid.

Axis errors

The first 5 axis errors are displayed by default (mode "Off"). Pressing key 4 switches between modes "Off" and "Auto".

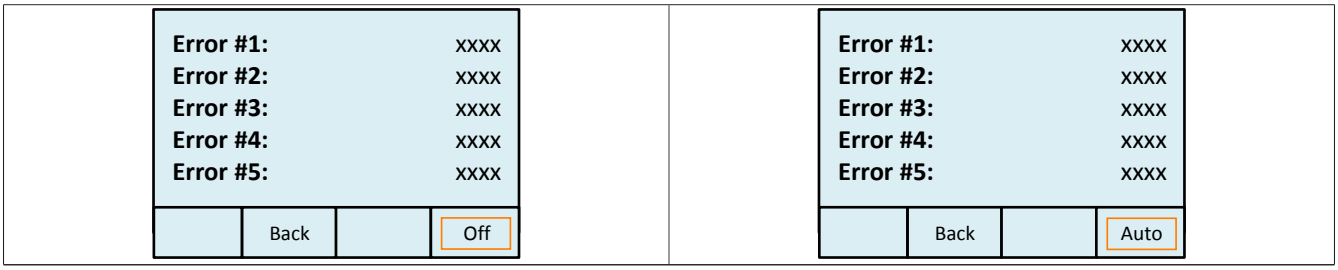


Table 152: Axis errors

Command	Function
Back	Returns to submenu "Axis information".
Auto	Automatically rereads and overwrites errors. → The 5 most current errors are always displayed.
Off	Errors remain frozen. → No notification of new errors.

Table 153: Command functions

Encoder X41, X42, X43

Displays information about the permanently installed encoder interface (in slot X41, X42, X43).

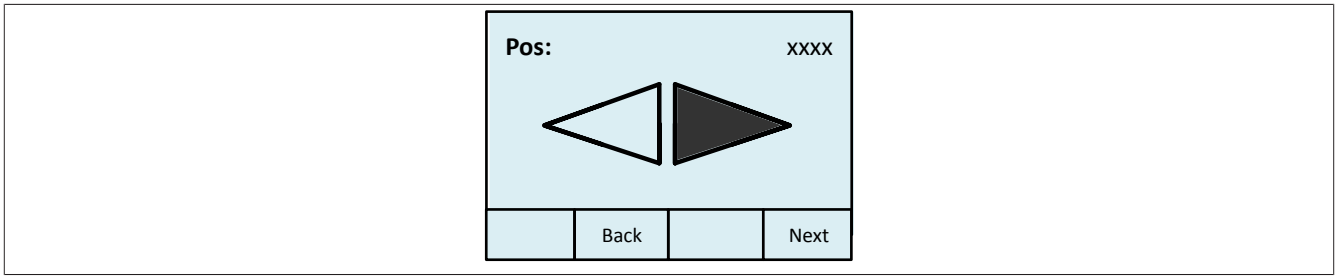


Figure 52: Encoder information

- **Pos:** Shows the position of the encoder in unit positions from the reference point.
- The two arrows indicate the direction of rotation of the connected encoder. The filled-in arrow shows the current direction of rotation of the encoder.

If the selected encoder interface is configured as an incremental encoder in edge counter mode, the values of the two edge counters and the specific counting mode are displayed instead of the position and direction of rotation:

Command	Function
Back	Returns to submenu "Axis information".
Next	Displays "Onboard encoder - Information".

Table 154: Command functions

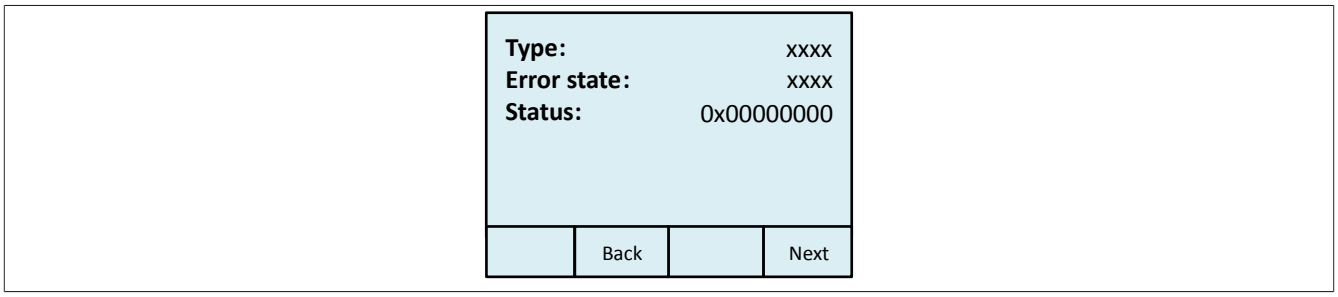


Figure 53: Onboard encoder information

- **Type:** Displays the encoder type.
- **Error state:** Displays the error state of the encoder. Different values can be displayed depending on the encoder being used.
- **Status:** Displays the state of the encoder. Different values can be displayed depending on the encoder being used.

Command	Function
Back	Returns to submenu "Axis information".
Next	Displays "Encoder information".

Table 155: Command functions

Encoder X41x, X42x, X43x (if available)

Displays information about the optionally connected encoder (via plug-in card in the slot of the ACOPOS P3 servo drive). Available depending on the configuration of the ACOPOS P3 servo drive.

For this function, see Encoder X41, X42, X43.

SafeMOTION

Axis-specific SafeMOTION information is displayed here.

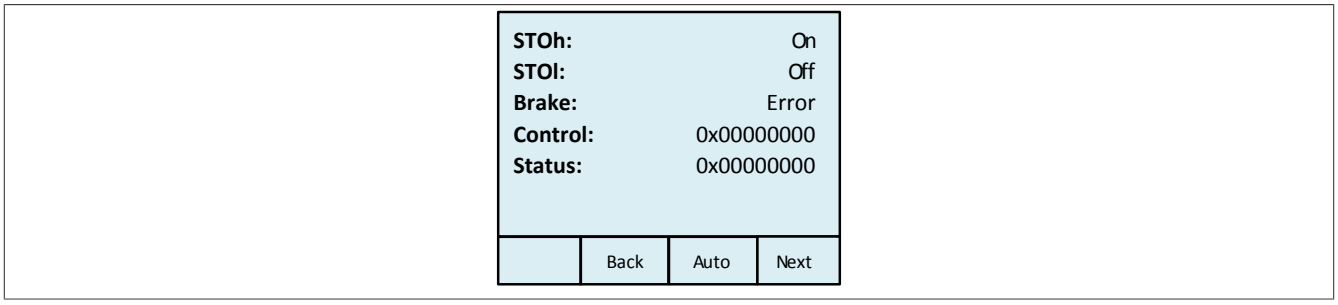


Figure 54: SafeMOTION - Axis-specific information

- **STOh:** Status of the high-side output of safety function Safe Torque Off (high-side pulse disabling / enable 1 of the ACOPOS drive).
- **STOl:** Status of the low-side output of safety function Safe Torque Off (low-side pulse disabling / enable 2 of the ACOPOS drive).
- **Brake:** Status of the holding brake control (output of safety function Safe Brake Control).
- **Control:** Displays the cyclic control word of the SafeMOTION module axis. For details, see the description of ACOPOS parameter ID SAFEMC_CONTROL.
- **Status:** Displays the cyclic status word of the SafeMOTION module axis. For details, see the description of ACOPOS parameter ID SAFEMC_STATUS.

Possible values for STOh, STOl and Brake:

Value	Description
On	Safety function / Brake active, physical level of the output is low.
Off	Safety function / Brake inactive, physical level of the output is high.
Error	Warning/Error on the channel

Table 156: Values for SafeMOTION outputs STOh, STOl and Brake

Information:

During startup of the SafeMOTION module, "Error" is always displayed for STOh, STOl and Brake on all axes.

Command	Function
Back	Returns to submenu "Axis information".
Auto/Off	Auto ... Displayed data is updated cyclically (default value). Off ... Displayed data is updated only when changing from submenu "Axis information" to this page.
Next	Displays the safe position.

Table 157: Command functions

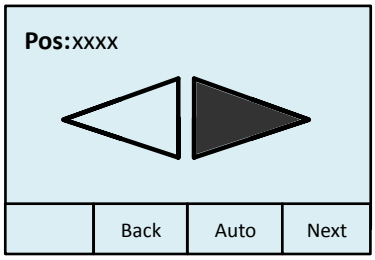


Figure 55: SafeMOTION - Safe position

- **Pos:** Displays the safe unit position of the SafeMOTION module.
- The two arrows indicate the direction of rotation of the connected encoder. The filled-in arrow shows the current direction of rotation of the encoder.

Command	Function
Back	Returns to submenu "Axis information".
Auto/Off	Auto ... Displayed data is updated cyclically (default value). Off ... Displayed data is updated only when changing from submenu "Axis information" to this page.
Next	Displays SafeMOTION statuses.

Table 158: Command functions

Slot 1 information

The main menu contains a menu option for slot information for each slot of the ACOPOS P3 servo drive.

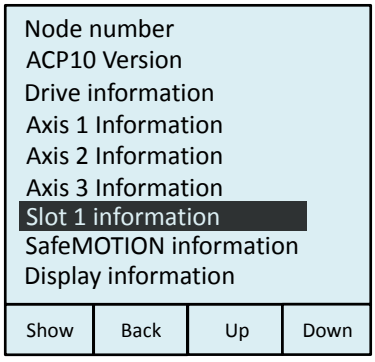


Figure 56: Slot 1 information - Main menu option

Command	Function
Show	Displays information about the ACOPOS P3 slot and any existing plug-in module.
Back	Switches back to the startup screen.
Up	Moves the entry one position up.
Down	Moves the entry one position down.

Table 159: Command functions

The menu options displayed depend on the plug-in module installed in the slot.

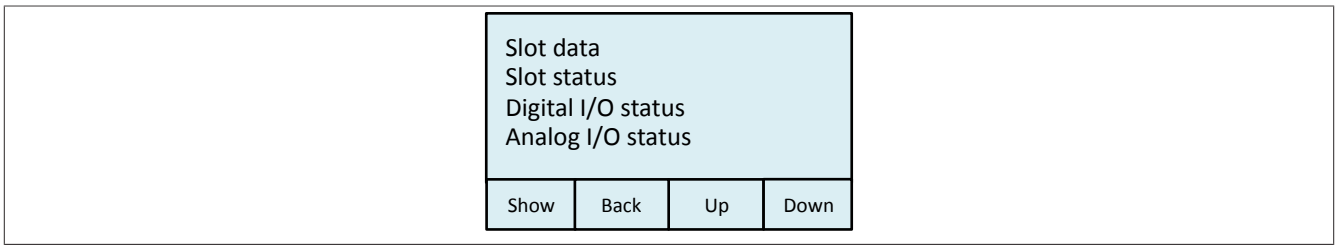


Figure 57: Slot 1 information - Submenu

Command	Function
Show	Switches to the respective information.
Back	Returns to the main menu.
Up	Moves the entry one position up.
Down	Moves the entry one position down.

Table 160: Command functions

If there is no plug-in module in the slot, "Slot data: No card plugged" is displayed.

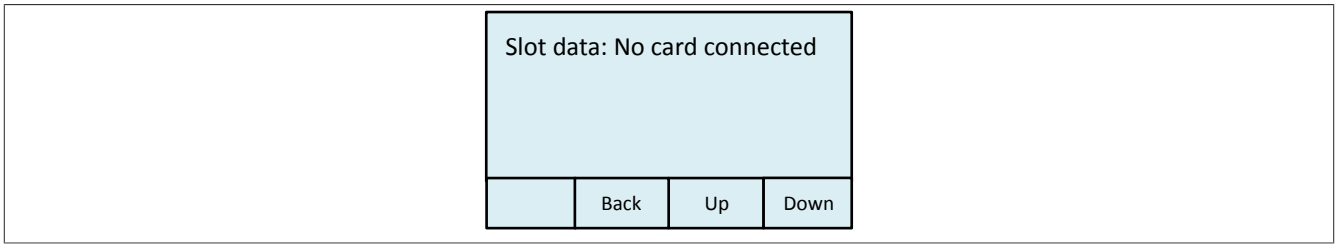


Figure 58: Slot 1 information - Submenu

Slot data

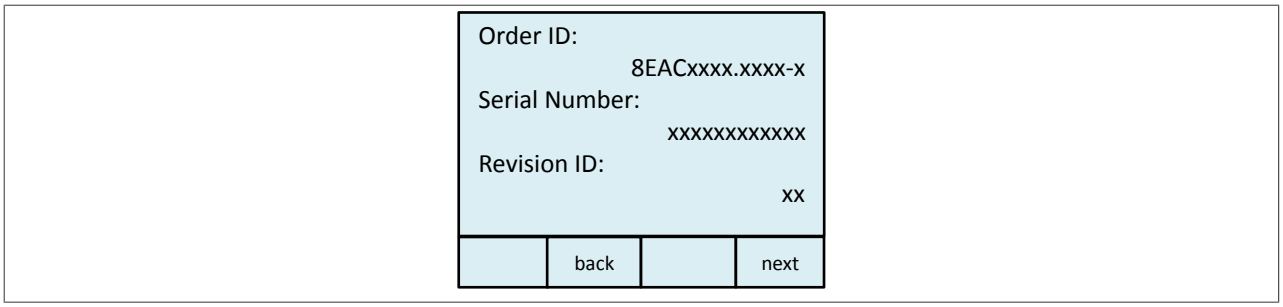


Figure 59: Slot data - Information

- **Order ID:** Displays the order number of the ACOPOS P3 plug-in module.
- **Serial number:** Displays the serial number of the ACOPOS P3 plug-in module.
- **Revision ID:** Displays the revision number of the ACOPOS P3 plug-in module.

Command	Function
Back	Returns to submenu "Slot 1 information".
Next	Displays slot data hardware information.

Table 161: Command functions

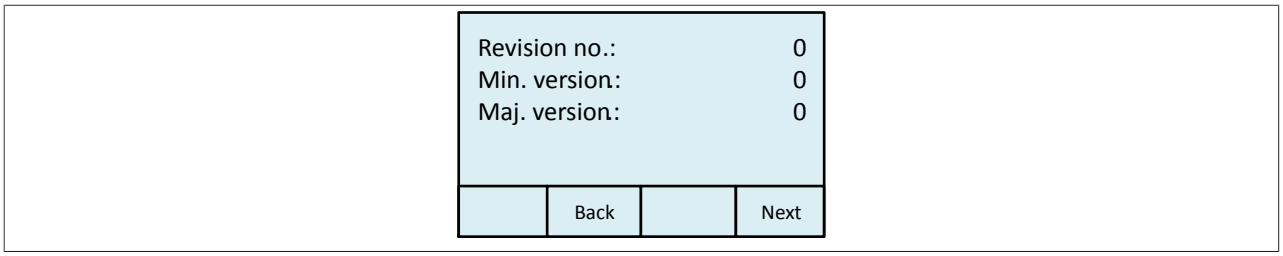


Figure 60: Slot data - Information

For more details about individual states, please contact Support.

Command	Function
Back	Returns to submenu "Slot 1 information".
Next	Displays slot 1 information.

Table 162: Command functions

Slot status (optional)

This page is only available if a corresponding plug-in card is connected (8EAC0130.000-1 or 8EAC0134.000-1).

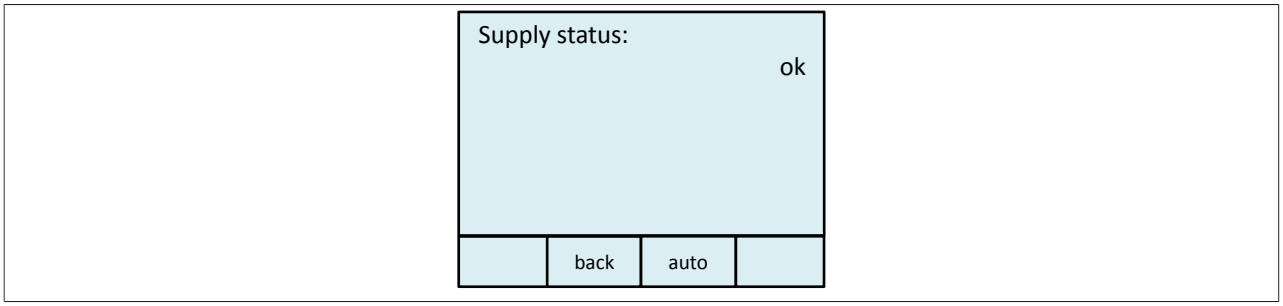


Figure 61: Slot data - Status

Displays the status of the external 24 VDC power supply of the plug-in module.

Command	Function
Back	Returns to submenu "Slot 1 information".
Auto/Off	Auto ... Displayed data is updated cyclically (default value). Off ... Displayed data is updated only when changing from submenu "Slot 1 information" to this page.

Table 163: Command functions

Digital I/O status (optional)

This page is only available if a corresponding plug-in card is connected (8EAC0130.000-1 or 8EAC0134.000-1).

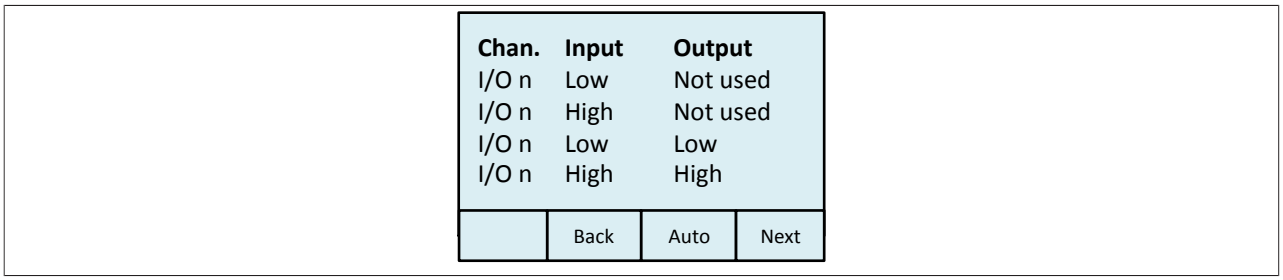


Figure 62: Slot data - Digital I/O status

Table representation of the digital I/O channels of the plug-in card. All channels can be scrolled through with "Next".

- **Chan.:** Type and number of the channel in this row
  - **In:** Pure input
  - **Out:** Pure output
  - **I/O:** Combined input and output
- **Input:** State of the digital input or read-back output value with an active output of the same channel.
- **Output:** State of the digital output.

Possible values for input and output:

Value	Description
High	The input or output is at the high level.
Low	The input or output is at the low level.
Not used	The output is disabled.
Error	Warning/Error on the channel Possible causes: • Voltage of the external 24 VDC power supply of the plug-in module too low
----	Input or output not available

Table 164: Values for input and output

Command	Function
Back	Returns to submenu "Slot 1 information".
Auto/Off	Auto ... Displayed data is updated cyclically (default value). Off ... Displayed data is only updated when changing from submenu "Slot 1 information" to this page or when scrolling through the channels with "Next".
Next	Displays additional channels

Table 165: Command functions

Analog I/O status (optional)

This page is only available if a corresponding plug-in card is connected (8EAC0134.000-1).

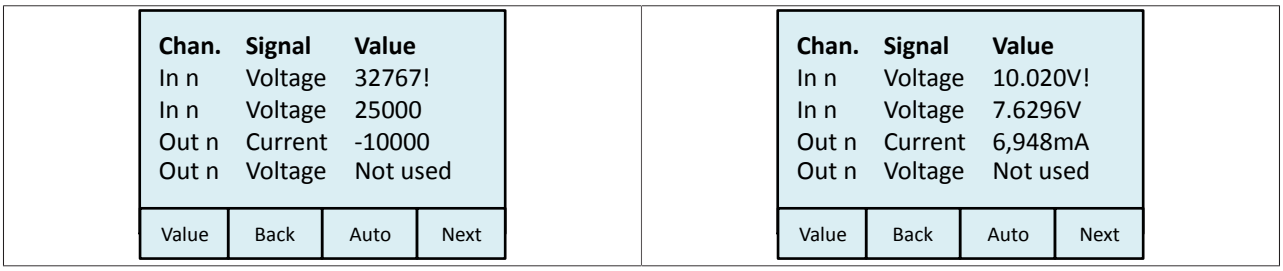


Table representation of the analog I/O channels of the plug-in card. All channels can be scrolled through with "Next".

- **Chan.:** Type and number of the channel in this row
  - **In:** Pure input
  - **Out:** Pure output
  - **I/O:** Combined input and output
- **Signal:** State of the analog output of the channel.
  - **Voltage:** "Value" displays the voltage value.
  - **Current:** "Value" displays the current value.
- **Value:** Input or output value of the channel.

Possible values for "Value":

Value	Description
<x>	Input or output value as INT16, e.g. 1324, -32000
<x.x>[V|mA]	Input or output value in a physical unit, e.g. 3.825 mA, -10.000 V
<x>!	Input value as INT16 slightly outside the measuring limits, e.g. 32767!
<x.x>[V|mA]!	Input value in a physical unit slightly outside the measuring limits, e.g. 10.030 V!
Not used	The output is disabled.
Error	Warning/Error on the channel Possible causes: • Voltage of the external 24 VDC power supply of the plug-in module too low • Input value outside the measuring limits • Input not wired
----	Input or output not available

Table 166: Values for "Value"

Command	Function
Value	Toggles the "Value" column between display of INT16 and the physical value (default: INT16)
Back	Returns to the main menu.
Auto/Off	Auto ... Displayed data is updated cyclically (default value). Off ... Displayed data is only updated when changing from submenu "Slot 1 information" to this page or when scrolling through the channels with "Next".
Next	Displays additional channels

Table 167: Command functions

SafeMOTION information (optional)

This menu option is only displayed if the ACOPOS P3 servo drive has the corresponding functionality.

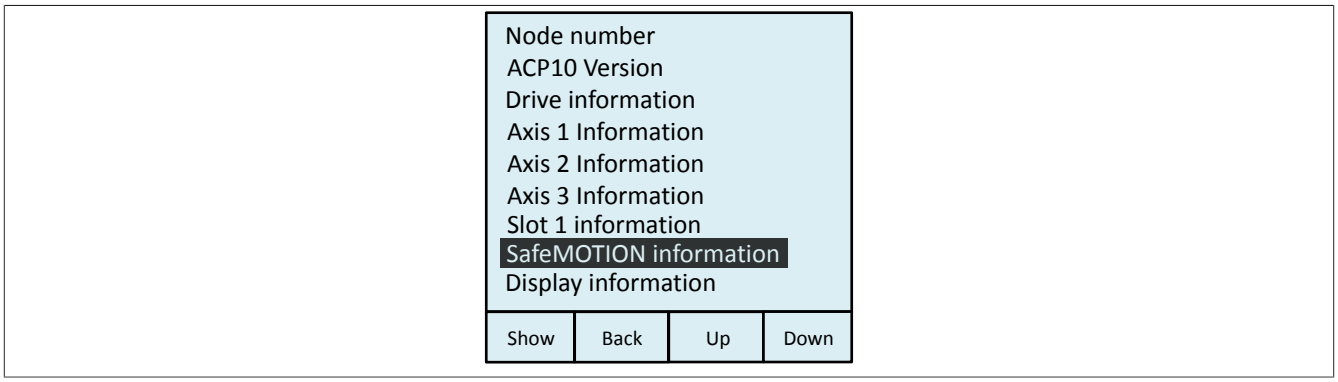


Figure 63: SafeMOTION information - Main menu option

Command	Function
Show	Displays information about the firmware and collected output status of the SafeMOTION module.
Back	Switches back to the startup screen.
Up	Moves the entry one position up.
Down	Moves the entry one position down.

Table 168: Command functions

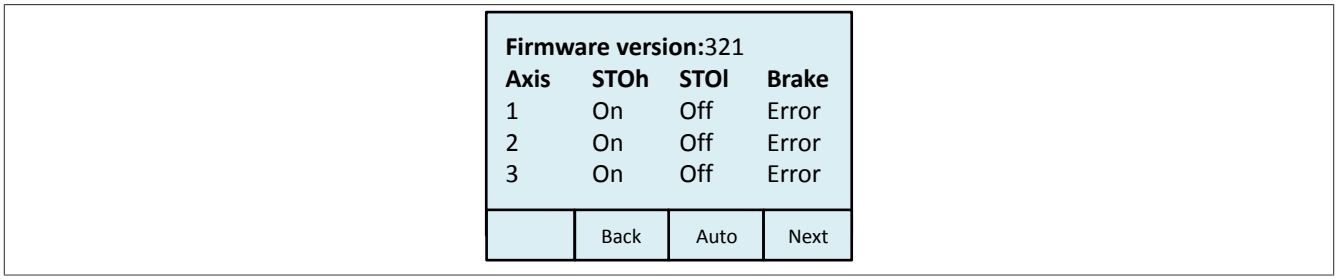


Figure 64: SafeMOTION information - Firmware and collected output status

- **Firmware version:** Shows the firmware version of the SafeMOTION module.
- Table display of the output status of all axes of the SafeMOTION module. The number of axes displayed depends on the number of axes of the respective ACOPOS P3 servo drive.
  - **Axis:** Number of the axis in this row.
  - **STOh:** Status of the high-side output of safety function Safe Torque Off (high-side pulse disabling / enable 1 of the ACOPOS P3 servo drive).
  - **STOl:** Status of the low-side output of safety function Safe Torque Off (low-side pulse disabling / enable 2 of the ACOPOS P3 servo drive).
  - **Brake:** Status of the holding brake control (output of safety function Safe Brake Control).

Possible values for STOh, STOl and Brake:

Value	Description
On	Safety function / Brake active, physical level of the output is low.
Off	Safety function / Brake inactive, physical level of the output is high.
Error	Warning/Error on the channel

Table 169: Values for SafeMOTION outputs STOh, STOl and Brake

Information:

During startup of the SafeMOTION module, "Error" is always displayed for STOh, STOl and Brake on all axes.

Command	Function
Back	Returns to the main menu.
Auto/Off	Auto ... Displayed data is updated cyclically (default value). Off ... Displayed data is updated only when changing from submenu "Axis information" to this page.
Next	Displays the collected cyclic network statuses.

Table 170: Command functions

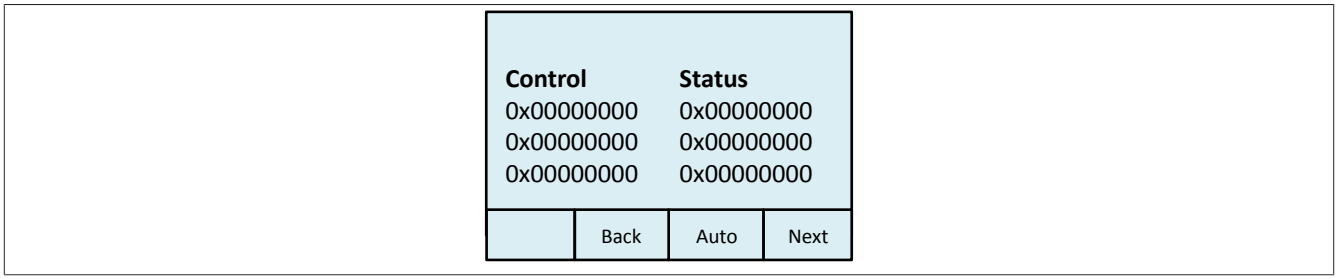


Figure 65: SafeMOTION information - Collected cyclic network statuses

- Continuation of the previous screen page:
  - **Control:** Displays the cyclic control word for each axis of the SafeMOTION module. For details, see ACOPOS parameter ID SAFEMC_CONTROL.
  - **Status:** Displays the cyclic status word for each axis of the SafeMOTION module. For details, see ACOPOS parameter ID SAFEMC_STATUS.

Command	Function
Back	Returns to the main menu.
Auto/Off	Auto ... Displayed data is updated cyclically (default value). Off ... Displayed data is updated only when changing from submenu "Axis information" to this page.
Next	Displays firmware and collected output statuses.

Table 171: Command functions

Display information

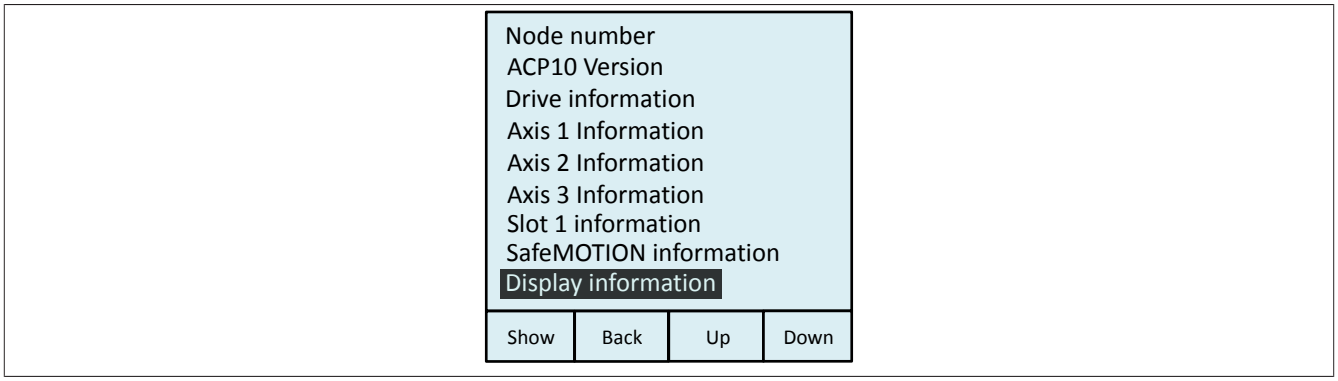


Figure 66: Display information - Main menu option

Command	Function
Show	Displays information about the display module.
Back	Switches back to the startup screen.
Up	Moves the entry one position up.
Down	Moves the entry one position down.

Table 172: Command functions

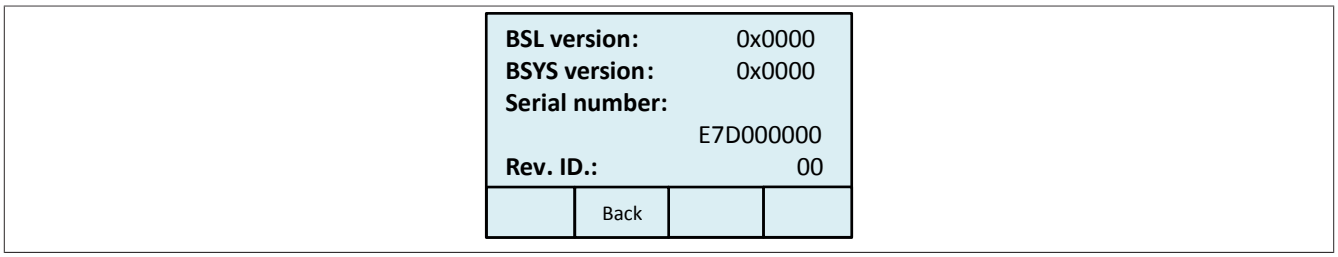


Figure 67: Display information - Information about the display module

- **BSL version:** Shows the version of the base operating system on the display module.
- **BSYS version:** Shows the version of the operating system on the display module.
- **Serial number:** Displays the serial number of the display module.
- **Rev. ID:** Displays the revision number of the display module.

Command	Function
Back	Returns to the main menu.

Table 173: Command function

2.3.5 Cables

2.3.5.1 General information

Assembling cables

Cables assembled by the user are equivalent to cables from 3rd-party manufacturers.

If cables from 3rd-party manufacturers are used, B&R is exempt from any liability and can make no guarantee for the respective characteristics or proper function of the B&R drive system. The user must ensure that the respective national regulations are observed.

Information:

Pre-assembled cables from B&R are designed specifically for B&R drive systems and provide considerable support for the disturbance-free operation of B&R drive systems. Whenever possible, always use pre-assembled cables from B&R!

Caution!

Only B&R cables are permitted to be used with ACOPOS P3 SafeMOTION 8EIxxxxxxSx.xxxx-1 servo drives!

2.3.5.2 Cables - Overview

Order number	Short description	Page
	10 mm² motor cables	
8ECM0005.1523C-0	ACOPOS P3 motor cable, length 5 m, 4 x 10.0 mm² + 2 x 0.75 mm² + 2 x 1.5 mm², 8-pin female speedtec motor connector size 1.5, can be used in cable drag chains	269
8ECM0007.1523C-0	ACOPOS P3 motor cable, length 7 m, 4 x 10.0 mm² + 2 x 0.75 mm² + 2 x 1.5 mm², 8-pin female speedtec motor connector size 1.5, can be used in cable drag chains	269
8ECM0010.1523C-0	ACOPOS P3 motor cable, length 10 m, 4 x 10.0 mm² + 2 x 0.75 mm² + 2 x 1.5 mm², 8-pin female speedtec motor connector size 1.5, can be used in cable drag chains	269
8ECM0015.1523C-0	ACOPOS P3 motor cable, length 15 m, 4 x 10.0 mm² + 2 x 0.75 mm² + 2 x 1.5 mm², 8-pin female speedtec motor connector size 1.5, can be used in cable drag chains	269
8ECM0020.1523C-0	ACOPOS P3 motor cable, length 20 m, 4 x 10.0 mm² + 2 x 0.75 mm² + 2 x 1.5 mm², 8-pin female speedtec motor connector size 1.5, can be used in cable drag chains	269
8ECM0025.1523C-0	ACOPOS P3 motor cable, length 25 m, 4 x 10.0 mm² + 2 x 0.75 mm² + 2 x 1.5 mm², 8-pin female speedtec motor connector size 1.5, can be used in cable drag chains	269
	Adapter cables	
8ECF00X4.1241C-0	ACOPOS P3 adapter cable for digital encoder interface, length 0.4 m, 1x 4x 0.14 mm² + 4x 0.35 mm², 9-pin female DSUB, 8-pin male Mini I/O connector	285
8ECG00X4.3151D-0	ACOPOS P3 adapter cable, length 0.4 m, for analog multi-encoder interfaces and incremental encoder interfaces, 5x 2x 0.14 mm², 10-pin male IX connector to 15-pin female DSUB	288
	EnDat 2.2 cables	
8BCF0005.12230-0	Cable extension for EnDat 2.2 cables with series 615 signal connector, length 5 m, can be used in cable drag chains	298
8BCF0007.12230-0	Cable extension for EnDat 2.2 cables with series 615 signal connector, length 7 m, can be used in cable drag chains	298
8BCF0010.12230-0	Cable extension for EnDat 2.2 cables with series 615 signal connector, length 10 m, can be used in cable drag chains	298
8BCF0015.12230-0	Cable extension for EnDat 2.2 cables with series 615 signal connector, length 15 m, can be used in cable drag chains	298
8BCF0020.12230-0	Cable extension for EnDat 2.2 cables with series 615 signal connector, length 20 m, can be used in cable drag chains	298
8BCF0025.12230-0	Cable extension for EnDat 2.2 cables with series 615 signal connector, length 25 m, can be used in cable drag chains	298
8ECF0005.1221C-0	ACOPOS P3 EnDat 2.2 cable, length 5 m, 1x 4x 0.14 mm² + 4x 0.35 mm², 12-pin female series 615 signal connector, 8-pin Mini I/O male connector, can be used in cable drag chains	272
8ECF0005.1231C-0	ACOPOS P3 EnDat 2.2 cable, length 5 m, 1x 4x 0.14 mm² + 4x 0.35 mm², M12 circular connector, 8-pin, A-coded, 8-pin Mini I/O male connector, can be used in cable drag chains	275
8ECF0007.1221C-0	ACOPOS P3 EnDat 2.2 cable, length 7 m, 1x 4x 0.14 mm² + 4x 0.35 mm², 12-pin female series 615 signal connector, 8-pin Mini I/O male connector, can be used in cable drag chains	272
8ECF0007.1231C-0	ACOPOS P3 EnDat 2.2 cable, length 7 m, 1x 4x 0.14 mm² + 4x 0.35 mm², M12 circular connector, 8-pin, A-coded, 8-pin Mini I/O male connector, can be used in cable drag chains	275
8ECF0010.1221C-0	ACOPOS P3 EnDat 2.2 cable, length 10 m, 1x 4x 0.14 mm² + 4x 0.35 mm², 12-pin female series 615 signal connector, 8-pin Mini I/O male connector, can be used in cable drag chains	272
8ECF0010.1231C-0	ACOPOS P3 EnDat 2.2 cable, length 10 m, 1x 4x 0.14 mm² + 4x 0.35 mm², M12 circular connector, 8-pin, A-coded, 8-pin Mini I/O male connector, can be used in cable drag chains	275
8ECF0015.1221C-0	ACOPOS P3 EnDat 2.2 cable, length 15 m, 1x 4x 0.14 mm² + 4x 0.35 mm², 12-pin female series 615 signal connector, 8-pin Mini I/O male connector, can be used in cable drag chains	272
8ECF0015.1231C-0	ACOPOS P3 EnDat 2.2 cable, length 15 m, 1x 4x 0.14 mm² + 4x 0.35 mm², M12 circular connector, 8-pin, A-coded, 8-pin Mini I/O male connector, can be used in cable drag chains	275
8ECF0020.1221C-0	ACOPOS P3 EnDat 2.2 cable, length 20 m, 1x 4x 0.14 mm² + 4x 0.35 mm², 12-pin female series 615 signal connector, 8-pin Mini I/O male connector, can be used in cable drag chains	272

Order number	Short description	Page
8ECF0020.1231C-0	ACOPOS P3 EnDat 2.2 cable, length 20 m, 1x 4x 0.14 mm² + 4x 0.35 mm², M12 circular connector, 8-pin, A-coded, 8-pin Mini I/O male connector, can be used in cable drag chains	275
8ECF0025.1221C-0	ACOPOS P3 EnDat 2.2 cable, length 25 m, 1x 4x 0.14 mm² + 4x 0.35 mm², 12-pin female series 615 signal connector, 8-pin Mini I/O male connector, can be used in cable drag chains	272
8ECF0025.1231C-0	ACOPOS P3 EnDat 2.2 cable, length 25 m, 1x 4x 0.14 mm² + 4x 0.35 mm², M12 circular connector, 8-pin, A-coded, 8-pin Mini I/O male connector, can be used in cable drag chains	275
	EnDat3 hybrid motor cable 1.5mm²	
8ECH0003.1B41C-0	ACOPOS P3 hybrid motor cable EnDat 3, length 3 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 24 AWG, Speedtec 8-pin female motor connector size 1, Mini I/O 8-pin male connector, can be used in cable drag chains	258
8ECH0005.1B41C-0	ACOPOS P3 hybrid motor cable EnDat 3, length 5 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 24 AWG, Speedtec 8-pin female motor connector size 1, Mini I/O 8-pin male connector, can be used in cable drag chains	258
8ECH0007.1B41C-0	ACOPOS P3 hybrid motor cable EnDat 3, length 7 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 24 AWG, Speedtec 8-pin female motor connector size 1, Mini I/O 8-pin male connector, can be used in cable drag chains	258
8ECH0010.1B41C-0	ACOPOS P3 hybrid motor cable EnDat 3, length 10 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 24 AWG, Speedtec 8-pin female motor connector size 1, Mini I/O 8-pin male connector, can be used in cable drag chains	258
	Motor cables 1.5 mm²	
8BCM0005.11140-0	Cable extension for 1.5 mm² motor cables with speedtec/standard connector size 1, length 5 m, can be used in cable drag chains	290
8BCM0007.11140-0	Cable extension for 1.5 mm² motor cables with speedtec/standard connector size 1, length 7 m, can be used in cable drag chains	290
8BCM0010.11140-0	Cable extension for 1.5 mm² motor cables with speedtec/standard connector size 1, length 10 m, can be used in cable drag chains	290
8BCM0015.11140-0	Cable extension for 1.5 mm² motor cables with speedtec/standard connector size 1, length 15 m, can be used in cable drag chains	290
8BCM0020.11140-0	Cable extension for 1.5 mm² motor cables with speedtec/standard connector size 1, length 20 m, can be used in cable drag chains	290
8BCM0025.11140-0	Cable extension for 1.5 mm² motor cables with speedtec/standard connector size 1, length 25 m, can be used in cable drag chains	290
8ECM0005.1111C-0	ACOPOS P3 motor cable, length 5 m, 4x 1.5 mm² + 2x 2x 0.75 mm², 8-pin female speedtec motor connector size 1, can be used in cable drag chains	264
8ECM0007.1111C-0	ACOPOS P3 motor cable, length 7 m, 4x 1.5 mm² + 2x 2x 0.75 mm², 8-pin female speedtec motor connector size 1, can be used in cable drag chains	264
8ECM0010.1111C-0	ACOPOS P3 motor cable, length 10 m, 4x 1.5 mm² + 2x 2x 0.75 mm², 8-pin female speedtec motor connector size 1, can be used in cable drag chains	264
8ECM0015.1111C-0	ACOPOS P3 motor cable, length 15 m, 4x 1.5 mm² + 2x 2x 0.75 mm², 8-pin female speedtec motor connector size 1, can be used in cable drag chains	264
8ECM0020.1111C-0	ACOPOS P3 motor cable, length 20 m, 4x 1.5 mm² + 2x 2x 0.75 mm², 8-pin female speedtec motor connector size 1, can be used in cable drag chains	264
8ECM0025.1111C-0	ACOPOS P3 motor cable, length 25 m, 4x 1.5 mm² + 2x 2x 0.75 mm², 8-pin female speedtec motor connector size 1, can be used in cable drag chains	264
	Motor cables 4 mm²	
8BCM0005.13140-0	Cable extension for 4 mm² motor cables with speedtec/standard connector size 1, length 5 m, can be used in cable drag chains	292
8BCM0007.13140-0	Cable extension for 4 mm² motor cables with speedtec/standard connector size 1, length 7 m, can be used in cable drag chains	292
8BCM0010.13140-0	Cable extension for 4 mm² motor cables with speedtec/standard connector size 1, length 10 m, can be used in cable drag chains	292
8BCM0015.13140-0	Cable extension for 4 mm² motor cables with speedtec/standard connector size 1, length 15 m, can be used in cable drag chains	292
8BCM0020.13140-0	Cable extension for 4 mm² motor cables with speedtec/standard connector size 1, length 20 m, can be used in cable drag chains	292
8BCM0025.13140-0	Cable extension for 4 mm² motor cables with speedtec/standard connector size 1, length 25 m, can be used in cable drag chains	292
8ECM0005.1312C-0	ACOPOS P3 motor cable, length 5 m, 4x 4 mm² + 2x 0.75 mm² + 2x 1 mm², 8-pin female speedtec motor connector size 1, can be used in cable drag chains	266
8ECM0007.1312C-0	ACOPOS P3 motor cable, length 7 m, 4x 4 mm² + 2x 0.75 mm² + 2x 1 mm², 8-pin female speedtec motor connector size 1, can be used in cable drag chains	266
8ECM0010.1312C-0	ACOPOS P3 motor cable, length 10 m, 4x 4 mm² + 2x 0.75 mm² + 2x 1 mm², 8-pin female speedtec motor connector size 1, can be used in cable drag chains	266
8ECM0015.1312C-0	ACOPOS P3 motor cable, length 15 m, 4x 4 mm² + 2x 0.75 mm² + 2x 1 mm², 8-pin female speedtec motor connector size 1, can be used in cable drag chains	266
8ECM0020.1312C-0	ACOPOS P3 motor cable, length 20 m, 4x 4 mm² + 2x 0.75 mm² + 2x 1 mm², 8-pin female speedtec motor connector size 1, can be used in cable drag chains	266
8ECM0025.1312C-0	ACOPOS P3 motor cable, length 25 m, 4x 4 mm² + 2x 0.75 mm² + 2x 1 mm², 8-pin female speedtec motor connector size 1, can be used in cable drag chains	266
	Motor hybrid cable 1,5 mm²	
8ECH0005.11140-0	Cable extension for 1.5 mm² hybrid motor cable with speedtec connector size 1, length 5 m, can be used in cable drag chains	294
8ECH0007.11140-0	Cable extension for 1.5 mm² hybrid motor cable with speedtec connector size 1, length 7 m, can be used in cable drag chains	294
8ECH0010.11140-0	Cable extension for 1.5 mm² hybrid motor cable with speedtec connector size 1, length 10 m, can be used in cable drag chains	294
8ECH0015.11140-0	Cable extension for 1.5 mm² hybrid motor cable with speedtec connector size 1, length 15 m, can be used in cable drag chains	294
8ECH0020.11140-0	Cable extension for 1.5 mm² hybrid motor cable with speedtec connector size 1, length 20 m, can be used in cable drag chains	294
8ECH0025.11140-0	Cable extension for 1.5 mm² hybrid motor cable with speedtec connector size 1, length 25 m, can be used in cable drag chains	294

Order number	Short description	Page
	Motor hybrid cable 1.5 mm²	
8ECH0005.1111A-0	ACOPOS P3 hybrid motor cable, length 5 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector size 1, can be used in cable drag chains	253
8ECH0007.1111A-0	ACOPOS P3 hybrid motor cable, length 7 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, can be used in cable drag chains	253
8ECH0010.1111A-0	ACOPOS P3 hybrid motor cable, length 10 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector size 1, can be used in cable drag chains	253
8ECH0015.1111A-0	ACOPOS P3 hybrid motor cable, length 15 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector size 1, can be used in cable drag chains	253
8ECH0020.1111A-0	ACOPOS P3 hybrid motor cable, length 20 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector size 1, can be used in cable drag chains	253
8ECH0025.1111A-0	ACOPOS P3 hybrid motor cable, length 25 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector size 1, can be used in cable drag chains	253
	Motor hybrid cable 4 mm²	
8ECH0005.1312A-0	ACOPOS P3 hybrid motor cable, length 5 m, 4x 4 mm² + 2x 1 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector size 1, can be used in cable drag chains	255
8ECH0005.13140-0	Cable extension for 4 mm² hybrid motor cable with speedtec connector size 1, length 5 m, can be used in cable drag chains	296
8ECH0007.1312A-0	ACOPOS P3 hybrid motor cable, length 7 m, 4x 4 mm² + 2x 1 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector size 1, can be used in cable drag chains	255
8ECH0007.13140-0	Cable extension for 4 mm² hybrid motor cable with speedtec connector size 1, length 7 m, can be used in cable drag chains	296
8ECH0010.1312A-0	ACOPOS P3 hybrid motor cable, length 10 m, 4x 4 mm² + 2x 1 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector size 1, can be used in cable drag chains	255
8ECH0010.13140-0	Cable extension for 4 mm² hybrid motor cable with speedtec connector size 1, length 10 m, can be used in cable drag chains	296
8ECH0015.1312A-0	ACOPOS P3 hybrid motor cable, length 15 m, 4x 4 mm² + 2x 1 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector size 1, can be used in cable drag chains	255
8ECH0015.13140-0	Cable extension for 4 mm² hybrid motor cable with speedtec connector size 1, length 15 m, can be used in cable drag chains	296
8ECH0020.1312A-0	ACOPOS P3 hybrid motor cable, length 20 m, 4x 4 mm² + 2x 1 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector size 1, can be used in cable drag chains	255
8ECH0020.13140-0	Cable extension for 4 mm² hybrid motor cable with speedtec connector size 1, length 20 m, can be used in cable drag chains	296
8ECH0025.1312A-0	ACOPOS P3 hybrid motor cable, length 25 m, 4x 4 mm² + 2x 1 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector size 1, can be used in cable drag chains	255
8ECH0025.13140-0	Cable extension for 4 mm² hybrid motor cable with speedtec connector size 1, length 25 m, can be used in cable drag chains	296
	Resolver Cables SpringTec connector	
8BCR0005.11230-0	Cable extension for resolver cables with series 615 signal connector, length 5 m, can be used in cable drag chains	302
8BCR0007.11230-0	Cable extension for resolver cables with series 615 signal connector, length 7 m, can be used in cable drag chains	302
8BCR0010.11230-0	Cable extension for resolver cables with series 615 signal connector, length 10 m, can be used in cable drag chains	302
8BCR0015.11230-0	Cable extension for resolver cables with series 615 signal connector, length 15 m, can be used in cable drag chains	302
8BCR0020.11230-0	Cable extension for resolver cables with series 615 signal connector, length 20 m, can be used in cable drag chains	302
8BCR0025.11230-0	Cable extension for resolver cables with series 615 signal connector, length 25 m, can be used in cable drag chains	302
	Resolver cables	
8BCR0005.11120-0	Cable extension for resolver cable with speedtec or standard connector, length 5 m, can be used in cable drag chains	300
8BCR0007.11120-0	Cable extension for resolver cable with speedtec or standard connector, length 7 m, can be used in cable drag chains	300
8BCR0010.11120-0	Cable extension for resolver cable with speedtec or standard connector, length 10 m, can be used in cable drag chains	300
8BCR0015.11120-0	Cable extension for resolver cable with speedtec or standard connector, length 15 m, can be used in cable drag chains	300
8BCR0020.11120-0	Cable extension for resolver cable with speedtec or standard connector, length 20 m, can be used in cable drag chains	300
8BCR0025.11120-0	Cable extension for resolver cable with speedtec or standard connector, length 25 m, can be used in cable drag chains	300
8ECR0005.1111C-0	ACOPOS P3 resolver cable, length 5 m, 3x 2x 24 AWG (19x 0.127), 12-pin female speedtec connector, 8-pin male Mini I/O connector, can be used in cable drag chains	278
8ECR0007.1111C-0	ACOPOS P3 resolver cable, length 7 m, 3x 2x 24 AWG (19x 0.127), 12-pin female speedtec connector, 8-pin male Mini I/O connector, can be used in cable drag chains	278
8ECR0010.1111C-0	ACOPOS P3 resolver cable, length 10 m, 3x 2x 24 AWG (19x 0.127), 12-pin female speedtec connector, 8-pin male Mini I/O connector, can be used in cable drag chains	278
8ECR0015.1111C-0	ACOPOS P3 resolver cable, length 15 m, 3x 2x 24 AWG (19x 0.127), 12-pin female speedtec connector, 8-pin male Mini I/O connector, can be used in cable drag chains	278
8ECR0020.1111C-0	ACOPOS P3 resolver cable, length 20 m, 3x 2x 24 AWG (19x 0.127), 12-pin female speedtec connector, 8-pin male Mini I/O connector, can be used in cable drag chains	278
8ECR0025.1111C-0	ACOPOS P3 resolver cable, length 25 m, 3x 2x 24 AWG (19x 0.127), 12-pin female speedtec connector, 8-pin male Mini I/O connector, can be used in cable drag chains	278
	Resolver cables SpringTec connector	
8ECR0005.1121C-0	ACOPOS P3 resolver cable, length 5 m, 3x 2x 24 AWG (19x 0.127), 12-pin female series 615 signal connector, 8-pin male Mini I/O connector, can be used in cable drag chains	281

Order number	Short description	Page
8ECR0007.1121C-0	ACOPOS P3 resolver cable, length 7 m, 3x 2x 24 AWG (19x 0.127), 12-pin female series 615 signal connector, 8-pin male Mini I/O connector, can be used in cable drag chains	281
8ECR0010.1121C-0	ACOPOS P3 resolver cable, length 10 m, 3x 2x 24 AWG (19x 0.127), 12-pin female series 615 signal connector, 8-pin male Mini I/O connector, can be used in cable drag chains	281
8ECR0015.1121C-0	ACOPOS P3 resolver cable, length 15 m, 3x 2x 24 AWG (19x 0.127), 12-pin female series 615 signal connector, 8-pin male Mini I/O connector, can be used in cable drag chains	281
8ECR0020.1121C-0	ACOPOS P3 resolver cable, length 20 m, 3x 2x 24 AWG (19x 0.127), 12-pin female series 615 signal connector, 8-pin male Mini I/O connector, can be used in cable drag chains	281
8ECR0025.1121C-0	ACOPOS P3 resolver cable, length 25 m, 3x 2x 24 AWG (19x 0.127), 12-pin female series 615 signal connector, 8-pin male Mini I/O connector, can be used in cable drag chains	281
	motor cable 0.75 mm²	
8ECM0005.1031C-0	ACOPOS P3 motor cable, length 5 m, 4x 0.75 mm² + 2x 2x 0.34 mm², 8-pin series 915 power connector, can be used in cable drag chains	261
8ECM0007.1031C-0	ACOPOS P3 motor cable, length 7 m, 4x 0.75 mm² + 2x 2x 0.34 mm², 8-pin series 915 power connector, can be used in cable drag chains	261
8ECM0010.1031C-0	ACOPOS P3 motor cable, length 10 m, 4x 0.75 mm² + 2x 2x 0.34 mm², 8-pin series 915 power connector, can be used in cable drag chains	261
8ECM0015.1031C-0	ACOPOS P3 motor cable, length 15 m, 4x 0.75 mm² + 2x 2x 0.34 mm², 8-pin series 915 power connector, can be used in cable drag chains	261
8ECM0020.1031C-0	ACOPOS P3 motor cable, length 20 m, 4x 0.75 mm² + 2x 2x 0.34 mm², 8-pin series 915 power connector, can be used in cable drag chains	261
8ECM0025.1031C-0	ACOPOS P3 motor cable, length 25 m, 4x 0.75 mm² + 2x 2x 0.34 mm², 8-pin series 915 power connector, can be used in cable drag chains	261

2.3.5.3 Hybrid motor cable 8ECH EnDat 2.2

2.3.5.3.1 1.5 mm² hybrid motor cables

2.3.5.3.1.1 Order data

Order number	Short description	Figure
	Motor hybrid cable 1.5 mm²	
8ECH0005.1111A-0	ACOPOS P3 hybrid motor cable, length 5 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector size 1, can be used in cable drag chains	
8ECH0007.1111A-0	ACOPOS P3 hybrid motor cable, length 7 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, can be used in cable drag chains	
8ECH0010.1111A-0	ACOPOS P3 hybrid motor cable, length 10 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector size 1, can be used in cable drag chains	
8ECH0015.1111A-0	ACOPOS P3 hybrid motor cable, length 15 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector size 1, can be used in cable drag chains	
8ECH0020.1111A-0	ACOPOS P3 hybrid motor cable, length 20 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector size 1, can be used in cable drag chains	
8ECH0025.1111A-0	ACOPOS P3 hybrid motor cable, length 25 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector size 1, can be used in cable drag chains	

Table 174: 8ECH0005.1111A-0, 8ECH0007.1111A-0, 8ECH0010.1111A-0, 8ECH0015.1111A-0, 8ECH0020.1111A-0, 8ECH0025.1111A-0 - Order data

2.3.5.3.1.2 Technical data

Order number	8ECH0005. 1111A-0	8ECH0007. 1111A-0	8ECH0010. 1111A-0	8ECH0015. 1111A-0	8ECH0020. 1111A-0	8ECH0025. 1111A-0
General information						
Cable cross section	4x 1.5 mm² + 2x 0.75 mm² + (2x 1x 0.30 mm² + 2x 2x 0.15 mm²)					
Durability	Oil resistance per EN 60811-2-1 [1]					
Certification [2]	UL AWM style 21223, 80°C, 1000 V and CSA C22.2 no. 210 I/II A/B FT1 UL AWM style 22381, 90°C, 1000 V and CSA C22.2 no. 210 I/II A/B FT1 UL AWM style 21209, 90°C, 1000 V and CSA C22.2 no. 210 I/II A/B FT1					
Certifications						
CE	Yes					
UKCA	Yes					
Cable construction						
Power lines						
Quantity	4					
Wire insulation	PP					
Wire colors	Black, brown, blue, yellow/green					
Variant	Copper stranded wire					
Cross section	1.5 mm²					
Shield	No					
Stranding	No					
Supply lines						
Quantity	2					
Wire insulation	PP					
Wire colors	White/Blue, white/green					
Variant	Tinned copper stranded wire					
Cross section	0.75 mm²					
Shield	No					
Stranding	No					
Signal line						
Quantity	6					
Wire insulation	PP					
Wire colors	Brown/Green, white/green, gray/pink, yellow/violet					
Variant	2x copper stranded wire, 4x tinned copper stranded wire					
Cross section	2x 0.30 mm², 4x 0.15 mm²					
Shield	Tinned copper braiding, optical coverage >85% and foil shield					
Stranding	Brown/Green with white/green, pink with gray and yellow with violet					
Cable stranding	With filler elements and foil shield					

Table 175: 8ECH0005.1111A-0, 8ECH0007.1111A-0, 8ECH0010.1111A-0, 8ECH0015.1111A-0, 8ECH0020.1111A-0, 8ECH0025.1111A-0 - Technical data

Technical data

Order number	8ECH0005. 1111A-0	8ECH0007. 1111A-0	8ECH0010. 1111A-0	8ECH0015. 1111A-0	8ECH0020. 1111A-0	8ECH0025. 1111A-0
Cable shield	Tinned copper braiding, optical coverage >85% and foil shield					
Outer jacket						
Material	PUR					
Color	Orange, similar to RAL 2003 flat					
Connector						
Type	13-pin female speedtec hybrid motor connector					
Mating cycles	<500					
Contacts	13					
Additional connectors	8-pin male Mini I/O encoder connector Mating cycles: <1500 Contacts: 8 Degree of protection per EN 60529: IP30 when connected					
Degree of protection per EN 60529	IP66/67 when connected					
Electrical properties [1]						
Test voltage						
Wire - Wire	4 kV					
Wire - Shield	4 kV					
Conductor resistance						
Power lines	≤13.3 Ω/km					
Supply lines	≤26 Ω/km					
Signal line	0.30 mm²: ≤68 Ω/km, 0.15 mm²: ≤140 Ω/km					
Insulation resistance	≥200 MΩ*km					
Current-carrying capacity per DIN VDE 0298 part 4, table 11						
Wall mounting	20.2 A					
Installed in conduit or cable duct	17.8 A					
Installed in cable tray	20.9 A					
Ambient conditions [1]						
Temperature						
Moving	-20°C to +90°C					
Static	-20°C to +90°C					
Mechanical properties [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	13 mm ±0.4 mm					
Bend radius						
Single bend	>40 mm					
Moving	≥100 mm					
Drag chain data						
Acceleration	Max. 50 m/s² (depends on the length of the travel path)					
Flex cycles	≥3,000,000					
Velocity	Max. 300 m/min					
Weight	1.2 kg	1.7 kg	2.4 kg	3.6 kg	4.8 kg	5.9 kg

Table 175: 8ECH0005.1111A-0, 8ECH0007.1111A-0, 8ECH0010.1111A-0, 8ECH0015.1111A-0, 8ECH0020.1111A-0, 8ECH0025.1111A-0 - Technical data

1) Values refer to the raw cable being used.
2) Depends on the raw cable used.

2.3.5.3.2 4 mm² hybrid motor cables

2.3.5.3.2.1 Order data

Order number	Short description	Figure
	Motor hybrid cable 4 mm²	
8ECH0005.1312A-0	ACOPOS P3 hybrid motor cable, length 5 m, 4x 4 mm² + 2x 1 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector size 1, can be used in cable drag chains	
8ECH0007.1312A-0	ACOPOS P3 hybrid motor cable, length 7 m, 4x 4 mm² + 2x 1 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector size 1, can be used in cable drag chains	
8ECH0010.1312A-0	ACOPOS P3 hybrid motor cable, length 10 m, 4x 4 mm² + 2x 1 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector size 1, can be used in cable drag chains	
8ECH0015.1312A-0	ACOPOS P3 hybrid motor cable, length 15 m, 4x 4 mm² + 2x 1 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector size 1, can be used in cable drag chains	
8ECH0020.1312A-0	ACOPOS P3 hybrid motor cable, length 20 m, 4x 4 mm² + 2x 1 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector size 1, can be used in cable drag chains	
8ECH0025.1312A-0	ACOPOS P3 hybrid motor cable, length 25 m, 4x 4 mm² + 2x 1 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector size 1, can be used in cable drag chains	

Table 176: 8ECH0005.1312A-0, 8ECH0007.1312A-0, 8ECH0010.1312A-0, 8ECH0015.1312A-0, 8ECH0020.1312A-0, 8ECH0025.1312A-0 - Order data

2.3.5.3.2.2 Technical data

Order number	8ECH0005. 1312A-0	8ECH0007. 1312A-0	8ECH0010. 1312A-0	8ECH0015. 1312A-0	8ECH0020. 1312A-0	8ECH0025. 1312A-0
General information						
Cable cross section	4x 4 mm² + 2x 1 mm² + (2x 1x 0.30 mm² + 2x 2x 0.15 mm²)					
Durability	Oil resistance per EN 60811-2-1 [1]					
Certification	E130266 cRUus AWM style 21223, 80°C, 1000 V and CSA C22.2 no. 210 I/II A/B FT1 [1]				E130266 cRUus AWM Style 21223, 80°C, 1000 V and CSA C22.2 No. 210 I/II A/B FT1 [1]	E130266 cRUus AWM style 21223, 80°C, 1000 V and CSA C22.2 no. 210 I/II A/B FT1 [1]
Certifications						
CE	Yes					
UKCA	Yes					
Cable construction						
Power lines						
Quantity	4					
Wire insulation	PP					
Wire colors	Black, brown, blue, yellow/green					
Variant	Copper stranded wire					
Cross section	4 mm²					
Shield	No					
Stranding	No					
Supply lines						
Quantity	2					
Wire insulation	PP					
Wire colors	White/Blue, white/green					
Variant	Tinned copper stranded wire					
Cross section	1 mm²					
Shield	No					
Stranding	No					
Signal line						
Quantity	6					
Wire insulation	PP					
Wire colors	Brown/Green, white/green, gray/pink, yellow/violet					
Variant	2x copper stranded wire, 4x tinned copper stranded wire					
Cross section	2x 0.30 mm², 4x 0.15 mm²					
Shield	Tinned copper braiding, optical coverage >85% and foil shield					
Stranding	Brown/Green with white/green, pink with gray and yellow with violet					
Cable stranding	With filler elements and foil shield					
Cable shield	Tinned copper braiding, optical coverage >85% and foil shield					

Table 177: 8ECH0005.1312A-0, 8ECH0007.1312A-0, 8ECH0010.1312A-0, 8ECH0015.1312A-0, 8ECH0020.1312A-0, 8ECH0025.1312A-0 - Technical data

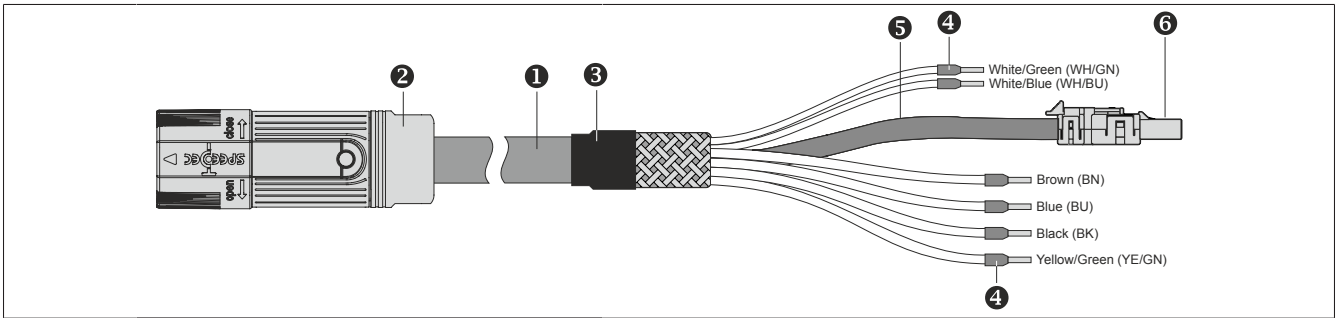
Order number	8ECH0005.1312A-0	8ECH0007.1312A-0	8ECH0010.1312A-0	8ECH0015.1312A-0	8ECH0020.1312A-0	8ECH0025.1312A-0
Outer jacket						
Material	PUR					
Color	Orange, similar to RAL 2003 flat					
Labeling	B&R 4x4 + 2x1 + (2x2 26AWG + 2x1x 23AWG) *E130266* cRUus AWM STYLE 21223* AWM I/II A/B 80°C 1000 V FT1 [1]					
Connector						
Type	13-pin female speedtec hybrid motor connector					
Mating cycles	<500					
Contacts	13					
Additional connectors	8-pin male Mini I/O encoder connector Mating cycles: <1500 Contacts: 8 Degree of protection per EN 60529: IP30 when connected					
Degree of protection per EN 60529	IP66/67 when connected					
Electrical properties [1]						
Test voltage						
Wire - Wire	4 kV					
Wire - Shield	4 kV					
Conductor resistance						
Power lines	≤5 Ω/km					
Supply lines	≤19.5 Ω/km					
Signal line	0.30 mm²: ≤68 Ω/km, 0.15 mm²: ≤140 Ω/km					
Insulation resistance	≥200 MΩ*km					
Current-carrying capacity per DIN VDE 0298 part 4, table 11						
Wall mounting	30 A [2]					
Installed in conduit or cable duct	30 A [2]					
Installed in cable tray	30 A [2]					
Ambient conditions [1]						
Temperature						
Moving	-20°C to +90°C					
Static	-20°C to +90°C					
Mechanical properties [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	15.7 mm ±0.4 mm					
Bend radius						
Single bend	>48 mm					
Moving	≥121 mm					
Drag chain data						
Acceleration	Max. 50 m/s² (depends on the length of the travel path)					
Flex cycles	≥3,000,000					
Velocity	Max. 300 m/min					
Weight	1.9 kg	2.7 kg	3.9 kg	5.8 kg	7.7 kg	9.6 kg

Table 177: 8ECH0005.1312A-0, 8ECH0007.1312A-0, 8ECH0010.1312A-0, 8ECH0015.1312A-0, 8ECH0020.1312A-0, 8ECH0025.1312A-0 - Technical data

1) Values refer to the raw cable being used.
2) Limited to 30 A by the hybrid motor connector.

2.3.5.3.3 Wiring

2.3.5.3.3.1 Cable construction



Pos.	Description	Note
1	Hybrid cable	8ECHxxxx.1111A-0: 4 x 1.5 mm² + 2 x 0.75 mm² + (2 + 1 x 0.30 mm² + 2 x 2 x 0.15 mm²) 8ECHxxxx.1312A-0: 4 x 4.0 mm² + 2 x 1 mm² + (2 x 1 x 0.30 mm² + 2 x 2 x 0.15 mm²)
2	13-pin female circular connector	Dimensions: ø 28 x 80 mm

Table 178: Hybrid motor cables - Cable construction

3	Heat shrink tubing	
4	Wire end sleeves	
5	Heat shrink tubing	
6	Mini I/O encoder connector	Dimensions: 11 x 8 x 33 mm

Table 178: Hybrid motor cables - Cable construction

2.3.5.3.3.2 Pinout

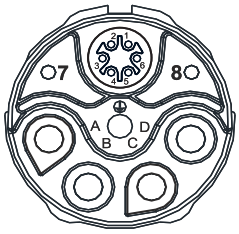
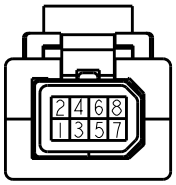
Circular connector	Pin	Description	Function	Pin	Mini I/O connector
	1	U+	Encoder power supply +12 V	1	
	2	COM	Encoder power supply 0 V	7	
	3	D	Data	6	
	4	D\	Data inverted	8	
	5	T	Clock output	2	
	6	T\	Clock output inverted	4	
	7	B-	Brake 0 V	-	
	8	B+	Brake +24 V	-	
	A	U	Motor connection U	-	
	B	V	Motor connection V	-	
	C	W	Motor connection W	-	
	D	-	-	-	
	⏚	PE	Protective ground conductor	-	

Table 179: Hybrid motor cables - Pinout

2.3.5.3.3.3 Cable diagram

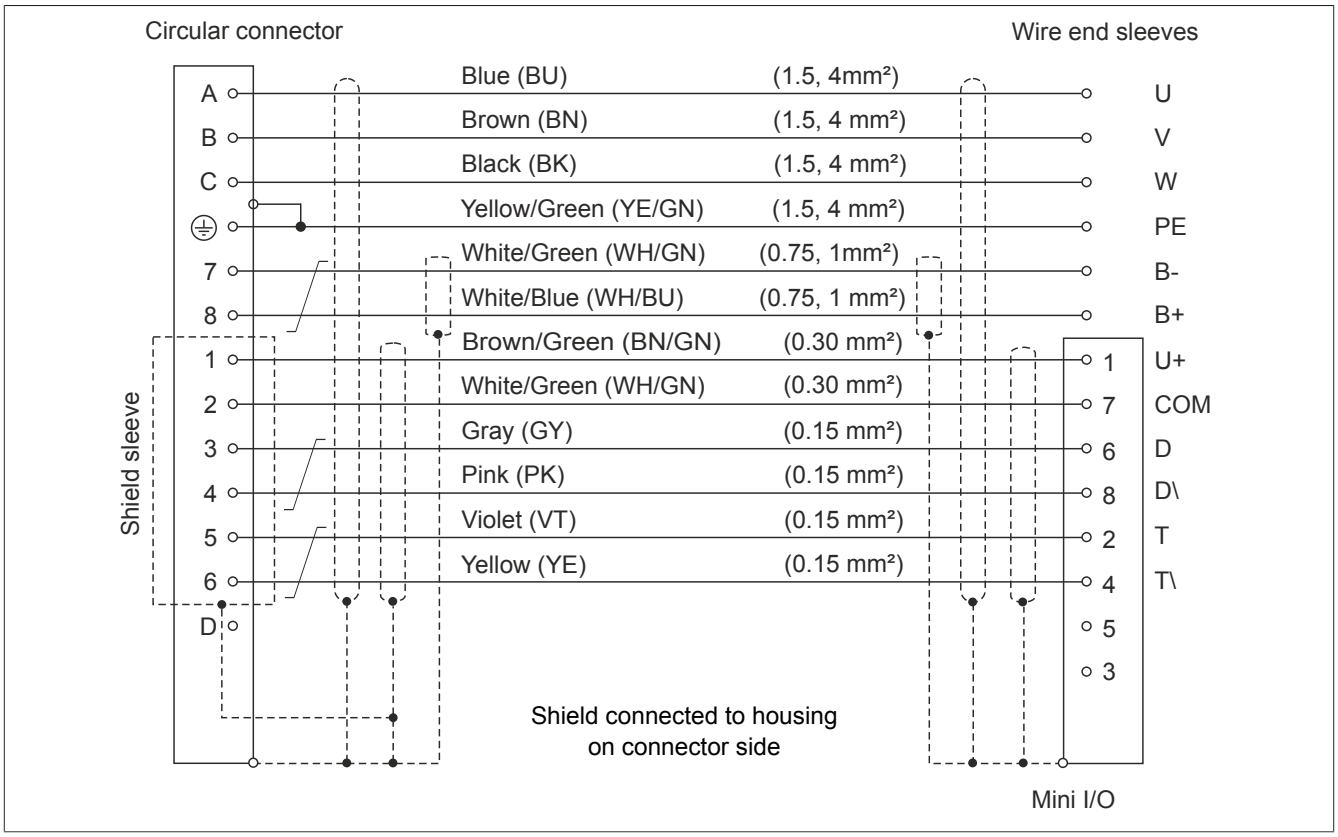


Figure 68: Hybrid motor cables - Cable diagram

2.3.5.4 8ECH EnDat3 hybrid motor cables

2.3.5.4.1 1.5 mm² hybrid motor cables

2.3.5.4.1.1 Order data

Order number	Short description	Figure
	EnDat3 hybrid motor cable 1.5mm²	
8ECH0003.1B41C-0	ACOPOS P3 hybrid motor cable EnDat 3, length 3 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 24 AWG, Speedtec 8-pin female motor connector size 1, Mini I/O 8-pin male connector, can be used in cable drag chains	
8ECH0005.1B41C-0	ACOPOS P3 hybrid motor cable EnDat 3, length 5 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 24 AWG, Speedtec 8-pin female motor connector size 1, Mini I/O 8-pin male connector, can be used in cable drag chains	
8ECH0007.1B41C-0	ACOPOS P3 hybrid motor cable EnDat 3, length 7 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 24 AWG, Speedtec 8-pin female motor connector size 1, Mini I/O 8-pin male connector, can be used in cable drag chains	
8ECH0010.1B41C-0	ACOPOS P3 hybrid motor cable EnDat 3, length 10 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 24 AWG, Speedtec 8-pin female motor connector size 1, Mini I/O 8-pin male connector, can be used in cable drag chains	

Table 180: 8ECH0003.1B41C-0, 8ECH0005.1B41C-0, 8ECH0007.1B41C-0, 8ECH0010.1B41C-0 - Order data

2.3.5.4.1.2 Technical data

Order number	8ECH0003.1B41C-0	8ECH0005.1B41C-0	8ECH0007.1B41C-0	8ECH0010.1B41C-0
General information				
Cable cross section	4x 1.5 mm² + 2x 0.75 mm² + 2x 24 AWG			
Durability	Oil resistance per EN 50363-10-2 [1]			
Certification	E356538 cURus AWM STYLE 21209 90°C 1000 V - AWM I/II A/B 90°C 1000 V FT1 YY/WW [1]			
Certifications				
CE	Yes			
UKCA	Yes			
Cable construction				
Power lines				
Quantity	4			
Wire insulation	PP			
Wire colors	Black U/L1/C/L+, black V/L2, black W/L3/D/L, yellow/green			
Variant	Copper stranded wire			
Cross section	1.5 mm²			
Shield	No			
Stranding	No			
Supply lines				
Quantity	2			
Wire insulation	PP			
Wire colors	White, black			
Variant	Tinned copper stranded wire			
Cross section	0.75 mm²			
Shield	No			
Stranding	No			
Signal line				
Quantity	2			
Wire insulation	PP			
Wire colors	Blue, white			
Variant	2x copper stranded wire			
Cross section	2x 0.24 mm²			
Shield	Tinned copper braiding, optical coverage >85% and foil shield			
Stranding	Two insulated wires are twisted into a pair.			
Cable stranding	With filler elements and foil shield			
Cable shield	Tinned copper braiding, optical coverage >85% and foil shield			
Outer jacket				
Material	PUR			
Color	Orange, similar to RAL 2003 flat			
Labeling	B&R (4G1.5+1x (2x0.75) + ((2xAWG24))) E356538 cURus AWM STYLE 21209 90°C 1000 V - AWM I/II A/B 90°C 1000 V FT1 YY/WW [1]			
Connector				
Type	8-pin female speedtec hybrid motor connector			
Mating cycles	<500			
Contacts	8			

Table 181: 8ECH0003.1B41C-0, 8ECH0005.1B41C-0, 8ECH0007.1B41C-0, 8ECH0010.1B41C-0 - Technical data

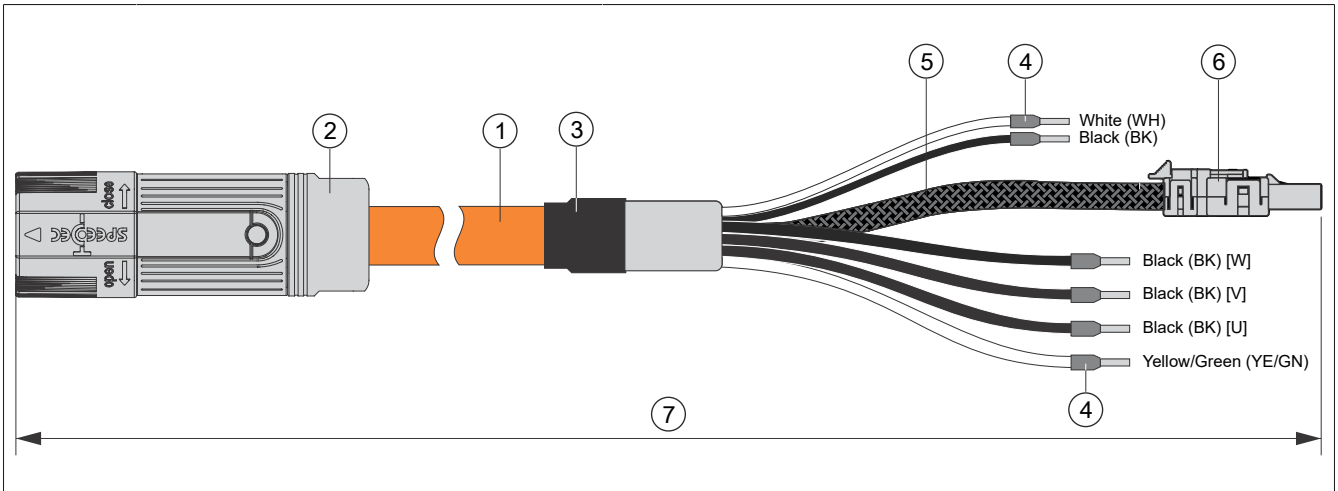
Order number	8ECH0003.1B41C-0	8ECH0005.1B41C-0	8ECH0007.1B41C-0	8ECH0010.1B41C-0
Additional connectors	8-pin male Mini I/O encoder connector Mating cycles: <1500 Contacts: 8 Degree of protection per EN 60529: IP30 when connected			
Degree of protection per EN 60529	IP66/67 when connected			
Electrical properties [1]				
Test voltage				
Wire - Wire	4 kV			
Wire - Shield	4 kV			
Conductor resistance				
Power lines	≤13.3 Ω/km			
Supply lines	≤26 Ω/km			
Signal line	0.24 mm²: ≤84 Ω/km			
Insulation resistance	≥500 MΩ*km			
Current-carrying capacity per DIN VDE 0298 part 4, table 11				
Wall mounting	20.2 A			
Installed in conduit or cable duct	17.8 A			
Installed in cable tray	20.9 A			
Ambient conditions [1]				
Temperature				
Moving	-40°C to +90°C			
Static	-50°C to +90°C			
Mechanical properties [1]				
Dimensions				
Length	3 m	5 m	7 m	10 m
Diameter	13.20 mm ±0.3 mm	13.2 mm ±0.3 mm		
Bend radius				
Single bend	>40.5 mm			
Moving	≥101.25 mm			
Drag chain data				
Acceleration	Max. 50 m/s² (depends on the length of the travel path)			
Flex cycles	≤3,000,000			
Velocity	Max. 300 m/min			
Weight	0.72 kg	1.2 kg	1.68 kg	2.4 kg

Table 181: 8ECH0003.1B41C-0, 8ECH0005.1B41C-0, 8ECH0007.1B41C-0, 8ECH0010.1B41C-0 - Technical data

1) Values refer to the raw cable being used.

2.3.5.4.2 Wiring

2.3.5.4.2.1 Cable construction



Item	Name	Note
1	Hybrid cable	4x 1.5 mm² + 1x 2x 0.75 mm² + 1x 2x 24 AWG
2	8-pin female circular connector	Dimensions: ø 28 x 78 mm
3	Heat shrink tubing	
4	Wire end sleeves	
5	Heat shrink tubing	
6	Mini I/O encoder connector	Dimensions: 11 x 8 x 33 mm

Table 182: Hybrid motor cable EnDat3 cable construction

2.3.5.4.2.2 Pinout

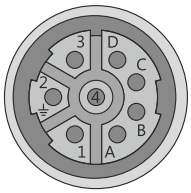
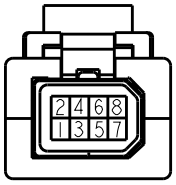
Female circular connector	Pin	Name	Function	Pin	Male Mini I/O connector
	1	U	Motor connection U	---	
	2	PE	Protective ground conductor	---	
	3	W	Motor connection W	---	
	4	V	Motor connection V	---	
	A	P_SD+	12 VDC - Encoder power supply / signal line	3	
	B	P_SD-	COM - Encoder power supply / signal line	5	
	C	B+	Brake +24 V	-	
	D	B-	Brake 0 V	-	

Table 183: Hybrid motor cable EnDat3 pinout

2.3.5.4.2.3 Cable diagram

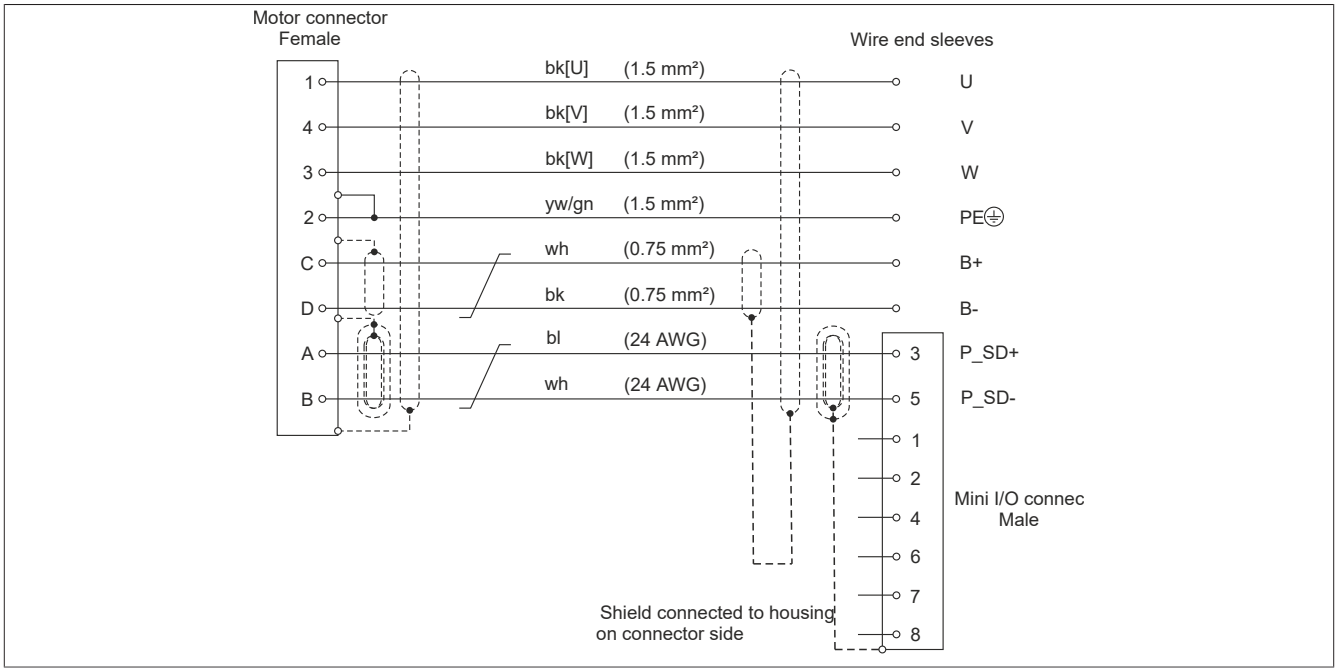


Figure 69: Cable diagram hybrid motor cable EnDat3

2.3.5.5 8ECM motor cables

2.3.5.5.1 0.75 mm² motor cables

Information:

Due to their assembly, these cables can only be used with the following ACOPOS P3 servo drives:

- **8EI1X6xxSxx.xxxx-1**
- **8EI2X2xxxxx.xxxx-1**
- **8EI4X5xxxxx.xxxx-1**
- **8EI8X8xxxxx.xxxx-1**

Information:

8ECMxxxx.1031C-0 motor cables are not suitable for B&R servo motors with connector size 1.

2.3.5.5.1.1 Order data

Order number	Short description	Figure
	motor cable 0.75 mm²	
8ECM0005.1031C-0	ACOPOS P3 motor cable, length 5 m, 4x 0.75 mm² + 2x 2x 0.34 mm², 8-pin series 915 power connector, can be used in cable drag chains	
8ECM0007.1031C-0	ACOPOS P3 motor cable, length 7 m, 4x 0.75 mm² + 2x 2x 0.34 mm², 8-pin series 915 power connector, can be used in cable drag chains	
8ECM0010.1031C-0	ACOPOS P3 motor cable, length 10 m, 4x 0.75 mm² + 2x 2x 0.34 mm², 8-pin series 915 power connector, can be used in cable drag chains	
8ECM0015.1031C-0	ACOPOS P3 motor cable, length 15 m, 4x 0.75 mm² + 2x 2x 0.34 mm², 8-pin series 915 power connector, can be used in cable drag chains	
8ECM0020.1031C-0	ACOPOS P3 motor cable, length 20 m, 4x 0.75 mm² + 2x 2x 0.34 mm², 8-pin series 915 power connector, can be used in cable drag chains	
8ECM0025.1031C-0	ACOPOS P3 motor cable, length 25 m, 4x 0.75 mm² + 2x 2x 0.34 mm², 8-pin series 915 power connector, can be used in cable drag chains	

Table 184: 8ECM0005.1031C-0, 8ECM0007.1031C-0, 8ECM0010.1031C-0, 8ECM0015.1031C-0, 8ECM0020.1031C-0, 8ECM0025.1031C-0 - Order data

2.3.5.5.1.2 Technical data

Order number	8ECM0005. 1031C-0	8ECM0007. 1031C-0	8ECM0010. 1031C-0	8ECM0015. 1031C-0	8ECM0020. 1031C-0	8ECM0025. 1031C-0
General information						
Cable cross section	4x 0.75 mm² + 2x 2x 0.34 mm²					
Durability	Oil resistance per HD 22.10 appendix A, DIN EN 60811-404 [1]					
Certification	E170315 cRUus AWM STYLE 21223 AWM I/II A/B 80°C 1000 V FT1 [1]					
Certifications						
CE	Yes					
UKCA	Yes					
Cable construction						
Power lines						
Quantity	4					
Wire insulation	PP					
Wire colors	Black, brown, blue, yellow/green					
Variant	Tinned copper stranded wire					
Cross section	0.75 mm²					
Shield	No					
Stranding	No					

Table 185: 8ECM0005.1031C-0, 8ECM0007.1031C-0, 8ECM0010.1031C-0, 8ECM0015.1031C-0, 8ECM0020.1031C-0, 8ECM0025.1031C-0 - Technical data

Technical data

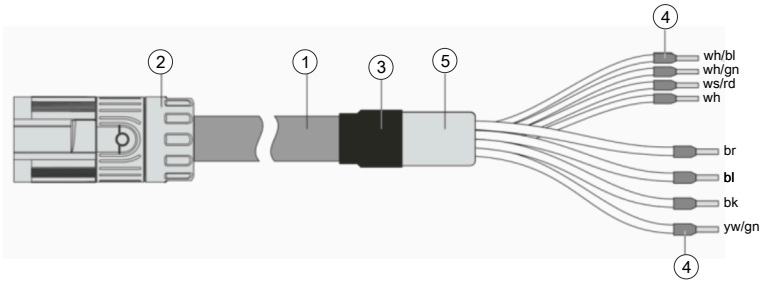
Order number	8ECM0005.1031C-0	8ECM0007.1031C-0	8ECM0010.1031C-0	8ECM0015.1031C-0	8ECM0020.1031C-0	8ECM0025.1031C-0
Signal line						
Quantity	4					
Wire insulation	PP					
Wire colors	White, white/red, white/blue, white/green					
Variant	Tinned copper stranded wire					
Cross section	0.34 mm²					
Shield	Individually shielded in pairs, tinned copper braiding, optical coverage >85% and foil shield					
Stranding	White with white/red and white/blue with white/green					
Cable stranding	With filler elements and foil shield					
Cable shield	Tinned copper braiding, optical coverage >85% and foil shield					
Outer jacket						
Material	PUR					
Color	Orange, similar to RAL 2003 flat					
Labeling	B&R 4 G 0.75 + 2 x (2x0.34)C C E170315 cRUus AWM STYLE 21223 AWM I/II A/B 80°C 1000 V FT1 production order number [1]					
Connector						
Type	8-pin female series 915 power connector					
Mating cycles	<500					
Contacts	8 (4 power and 4 signal contacts)					
Degree of protection per EN 60529	IP66/67 when connected					
Electrical properties [1]						
Operating voltage	Max. 1000 VAC (UL)					
Test voltage						
Wire - Wire	4 kV					
Wire - Shield	4 kV					
Conductor resistance						
Power lines	≤26.7 Ω/km					
Signal line	≤56 Ω/km					
Insulation resistance	≥500 MΩ*km					
Current-carrying capacity per DIN VDE 0298 part 4, table 11						
Wall mounting	13 A					
Installed in conduit or cable duct	11.5 A					
Installed in cable tray	13.5 A					
Ambient conditions [1]						
Temperature						
Moving	-20°C to +80°C					
Static	-20°C to +90°C					
Mechanical properties [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	10.1 mm ±0.3 mm					
Bend radius						
Single bend	>32 mm					
Moving	>78 mm					
Drag chain data						
Acceleration	Max. 50 m/s² (depends on the length of the travel path)					
Flex cycles [2]	≥5,000,000					
Velocity	Max. 300 m/min					
Weight	0.5 kg	0.6 kg	0.9 kg	1.3 kg	1.8 kg	2.2 kg

Table 185: 8ECM0005.1031C-0, 8ECM0007.1031C-0, 8ECM0010.1031C-0, 8ECM0015.1031C-0, 8ECM0020.1031C-0, 8ECM0025.1031C-0 - Technical data

1) Values refer to the raw cable being used.
2) At an ambient temperature from -20°C to +60°C.

2.3.5.5.1.3 Wiring

Cable construction



Item	Name	Note
1	Motor cable	4 x 0.75 mm² + 2 x 2 x 0.34 mm²
2	8-pin female circular connector	
3	Self-adhesive heat shrink tubing	
4	Wire end sleeves	
5	Aluminum strip	

Table 186: 0.75 mm² motor cables - Cable construction

Pinout

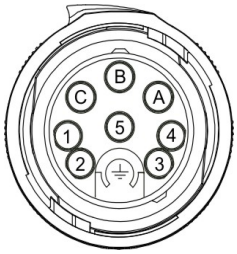
Circular connector	Pin	Name	Function
	A	U	Motor connection U
	B	V	Motor connection V
	C	W	Motor connection W
	⏚	PE	Protective ground conductor
	1	T+	Temperature +
	2	T-	Temperature -
	3	B+	Brake +
	4	B-	Brake -
	5	---	---

Table 187: 0.75 mm² motor cables - Pinout

Cable diagram

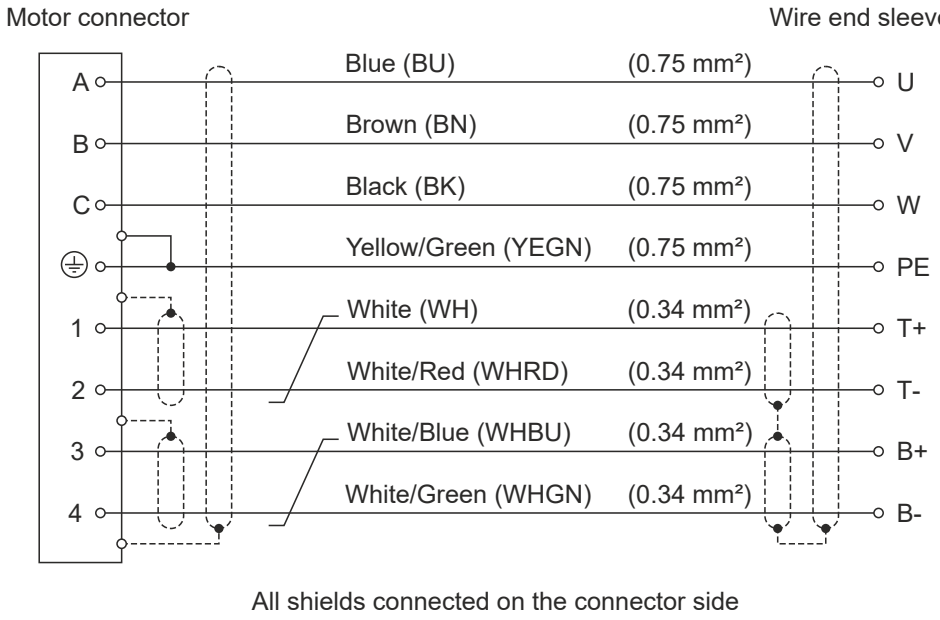


Figure 70: 0.75 mm² ESTB motor cables - Cable diagram

2.3.5.5.2 1.5 mm² motor cables

Information:

Due to their assembly, these cables can only be used with the following ACOPOS P3 servo drives:

- **8EI1X6xxSxx.xxxx-1**
- **8EI2X2xxxxx.xxxx-1**
- **8EI4X5xxxxx.xxxx-1**
- **8EI8X8xxxxx.xxxx-1**

2.3.5.5.2.1 Order data

Order number	Short description	Figure
	Motor cables 1.5 mm²	
8ECM0005.1111C-0	ACOPOS P3 motor cable, length 5 m, 4x 1.5 mm² + 2x 2x 0.75 mm², 8-pin female speedtec motor connector size 1, can be used in cable drag chains	
8ECM0007.1111C-0	ACOPOS P3 motor cable, length 7 m, 4x 1.5 mm² + 2x 2x 0.75 mm², 8-pin female speedtec motor connector size 1, can be used in cable drag chains	
8ECM0010.1111C-0	ACOPOS P3 motor cable, length 10 m, 4x 1.5 mm² + 2x 2x 0.75 mm², 8-pin female speedtec motor connector size 1, can be used in cable drag chains	
8ECM0015.1111C-0	ACOPOS P3 motor cable, length 15 m, 4x 1.5 mm² + 2x 2x 0.75 mm², 8-pin female speedtec motor connector size 1, can be used in cable drag chains	
8ECM0020.1111C-0	ACOPOS P3 motor cable, length 20 m, 4x 1.5 mm² + 2x 2x 0.75 mm², 8-pin female speedtec motor connector size 1, can be used in cable drag chains	
8ECM0025.1111C-0	ACOPOS P3 motor cable, length 25 m, 4x 1.5 mm² + 2x 2x 0.75 mm², 8-pin female speedtec motor connector size 1, can be used in cable drag chains	

Table 188: 8ECM0005.1111C-0, 8ECM0007.1111C-0, 8ECM0010.1111C-0, 8ECM0015.1111C-0, 8ECM0020.1111C-0, 8ECM0025.1111C-0 - Order data

2.3.5.5.2.2 Technical data

Order number	8ECM0005. 1111C-0	8ECM0007. 1111C-0	8ECM0010. 1111C-0	8ECM0015. 1111C-0	8ECM0020. 1111C-0	8ECM0025. 1111C-0
General information						
Cable cross section	4x 1.5 mm² + 2x 2x 0.75 mm²					
Durability	Oil resistance per HD 22.10 appendix A DIN EN 60811-404 [1]					
Certification	E170315 cRUus AWM STYLE 21223 AWM I/II A/B 80°C 1000 V FT1 [1]					
Certifications						
CE	Yes					
UKCA	Yes					
Cable construction						
Power lines						
Quantity	4					
Wire insulation	PP					
Wire colors	Black, brown, blue, yellow/green					
Variant	Tinned copper stranded wire					
Cross section	1.5 mm²					
Shield	No					
Stranding	No					
Signal line						
Quantity	4					
Wire insulation	PP					
Wire colors	White, white/red, white/blue, white/green					
Variant	Tinned copper stranded wire					
Cross section	0.75 mm²					
Shield	Individually shielded in pairs, tinned copper braiding, optical coverage >85% and foil shield					
Stranding	White with white/red and white/blue with white/green					
Cable stranding	With filler elements and foil shield					
Cable shield	Tinned copper braiding, optical coverage >85% and foil shield					

Table 189: 8ECM0005.1111C-0, 8ECM0007.1111C-0, 8ECM0010.1111C-0, 8ECM0015.1111C-0, 8ECM0020.1111C-0, 8ECM0025.1111C-0 - Technical data

Order number	8ECM0005.1111C-0	8ECM0007.1111C-0	8ECM0010.1111C-0	8ECM0015.1111C-0	8ECM0020.1111C-0	8ECM0025.1111C-0
Outer jacket						
Material	TPU					
Color	Orange, similar to RAL 2003 flat					
Labeling	B&R 4 G 1.5 + 2 x (2x0.75)C C E170315 cRUus AWM STYLE 21223 AWM I/II A/B 80°C 1000 V FT1 production order number [1]					
Connector						
Type	8-pin female speedtec motor connector					
Mating cycles	<500					
Contacts	8 (4 power and 4 signal contacts)					
Degree of protection per EN 60529	IP66/67 when connected					
Electrical properties [1]						
Operating voltage	Max. 1000 VAC (UL)					
Test voltage						
Wire - Wire	4 kV					
Wire - Shield	4 kV					
Conductor resistance						
Power lines	≤13.7 Ω/km					
Signal line	≤26.7 Ω/km					
Insulation resistance	≥500 MΩ*km					
Current-carrying capacity per DIN VDE 0298 part 4, table 11						
Wall mounting	20 A					
Installed in conduit or cable duct	17.8 A					
Installed in cable tray	20.9 A					
Ambient conditions [1]						
Temperature						
Moving	-20°C to +80°C					
Static	-20°C to +90°C					
Mechanical properties [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	12.2 mm ±0.3 mm					
Bend radius						
Single bend	>38 mm					
Moving	>94 mm					
Drag chain data						
Acceleration	Max. 50 m/s² (depends on the length of the travel path)					
Flex cycles [2]	≥5,000,000					
Velocity	Max. 300 m/min					
Weight	0.7 kg	1 kg	1.5 kg	2.2 kg	2.9 kg	3.7 kg

Table 189: 8ECM0005.1111C-0, 8ECM0007.1111C-0, 8ECM0010.1111C-0, 8ECM0015.1111C-0, 8ECM0020.1111C-0, 8ECM0025.1111C-0 - Technical data

1) Values refer to the raw cable being used.
2) At an ambient temperature from -20°C to +60°C.

2.3.5.5.3 4 mm² motor cables

Information:

Due to their assembly, these cables can only be used with the following ACOPOS P3 servo drives:

- **8EI017xxDxx.xxxx-1**
- **8EI022xxDxx.xxxx-1**
- **8EI024xxSxx.xxxx-1**
- **8EI034xxSxx.xxxx-1**
- **8EI044xxSxx.xxxx-1**
- **8EI013xxSxx.xxxx-1**
- **8EI017xxSxx.xxxx-1**

2.3.5.5.3.1 Order data

Order number	Short description	Figure
	Motor cables 4 mm²	
8ECM0005.1312C-0	ACOPOS P3 motor cable, length 5 m, 4x 4 mm² + 2x 0.75 mm² + 2x 1 mm², 8-pin female speedtec motor connector size 1, can be used in cable drag chains	
8ECM0007.1312C-0	ACOPOS P3 motor cable, length 7 m, 4x 4 mm² + 2x 0.75 mm² + 2x 1 mm², 8-pin female speedtec motor connector size 1, can be used in cable drag chains	
8ECM0010.1312C-0	ACOPOS P3 motor cable, length 10 m, 4x 4 mm² + 2x 0.75 mm² + 2x 1 mm², 8-pin female speedtec motor connector size 1, can be used in cable drag chains	
8ECM0015.1312C-0	ACOPOS P3 motor cable, length 15 m, 4x 4 mm² + 2x 0.75 mm² + 2x 1 mm², 8-pin female speedtec motor connector size 1, can be used in cable drag chains	
8ECM0020.1312C-0	ACOPOS P3 motor cable, length 20 m, 4x 4 mm² + 2x 0.75 mm² + 2x 1 mm², 8-pin female speedtec motor connector size 1, can be used in cable drag chains	
8ECM0025.1312C-0	ACOPOS P3 motor cable, length 25 m, 4x 4 mm² + 2x 0.75 mm² + 2x 1 mm², 8-pin female speedtec motor connector size 1, can be used in cable drag chains	

Table 190: 8ECM0005.1312C-0, 8ECM0007.1312C-0, 8ECM0010.1312C-0, 8ECM0015.1312C-0, 8ECM0020.1312C-0, 8ECM0025.1312C-0 - Order data

2.3.5.5.3.2 Technical data

Order number	8ECM0005. 1312C-0	8ECM0007. 1312C-0	8ECM0010. 1312C-0	8ECM0015. 1312C-0	8ECM0020. 1312C-0	8ECM0025. 1312C-0
General information						
Cable cross section	4 x 4.0 mm² + 2 x 0.75 mm² + 2 x 1.0 mm²					
Durability	Oil resistance per HD 22.10 appendix A and DIN EN 60811-404 [1]					
Certification	E170315 cRUus AWM STYLE 21223 AWM I/II A/B 80°C 1000 V FT1 [1]					
Certifications						
CE	Yes					
UKCA	Yes					
Cable construction						
Power lines						
Quantity	4					
Wire insulation	PP					
Wire colors	Black, brown, blue, yellow/green					
Variant	Tinned copper stranded wire					
Cross section	4 mm²					
Shield	No					
Stranding	No					
Signal line						
Quantity	4					
Wire insulation	PP					
Wire colors	White, white/red, white/blue, white/green					
Variant	Tinned copper stranded wire					
Cross section	2 x 0.75 mm² + 2 x 1.0 mm²					
Shield	Individually shielded in pairs, tinned copper braiding, optical coverage >85% and foil shield					
Stranding	White with white/red and white/blue with white/green					
Cable stranding	With filler elements and foil shield					

Table 191: 8ECM0005.1312C-0, 8ECM0007.1312C-0, 8ECM0010.1312C-0, 8ECM0015.1312C-0, 8ECM0020.1312C-0, 8ECM0025.1312C-0 - Technical data

Order number	8ECM0005.1312C-0	8ECM0007.1312C-0	8ECM0010.1312C-0	8ECM0015.1312C-0	8ECM0020.1312C-0	8ECM0025.1312C-0
Cable shield	Tinned copper braiding, optical coverage >85% and foil shield					
Outer jacket						
Material	TPU					
Color	Orange, similar to RAL 2003 flat					
Labeling	B&R 4 G 4 + (2x0.75)C + (2x1)C C E170315 cRUus AWM STYLE 21223 AWM I/II A/B 80°C 1000 V FT1 [1]					
Connector						
Type	8-pin female speedtec motor connector					
Mating cycles	<500					
Contacts	8 (4 power and 4 signal contacts)					
Degree of protection per EN 60529	IP66/67 when connected					
Electrical properties [1]						
Operating voltage	Max. 1000 VAC (UL)					
Test voltage						
Wire - Wire	4 kV					
Wire - Shield	4 kV					
Conductor resistance						
Power lines	≤5.1 Ω/km					
Signal line	0.75 mm²: ≤26.7 Ω/km, 1 mm²: ≤20 Ω/km					
Insulation resistance	≥500 MΩ*km					
Current-carrying capacity per DIN VDE 0298 part 4, table 11						
Wall mounting	30 A [2]					
Installed in conduit or cable duct	30 A [2]					
Installed in cable tray	30 A [2]					
Ambient conditions [1]						
Temperature						
Moving	-20°C to +80°C					
Static	-20°C to +90°C					
Mechanical properties [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	15.4 mm ±0.4 mm					
Bend radius						
Single bend	>48 mm					
Moving	>119 mm					
Drag chain data						
Acceleration	Max. 50 m/s² (depends on the length of the travel path)					
Flex cycles [3]	≥5,000,000					
Velocity	Max. 300 m/min					
Weight	1.4 kg	1.9 kg	2.8 kg	4.2 kg	5.5 kg	6.9 kg

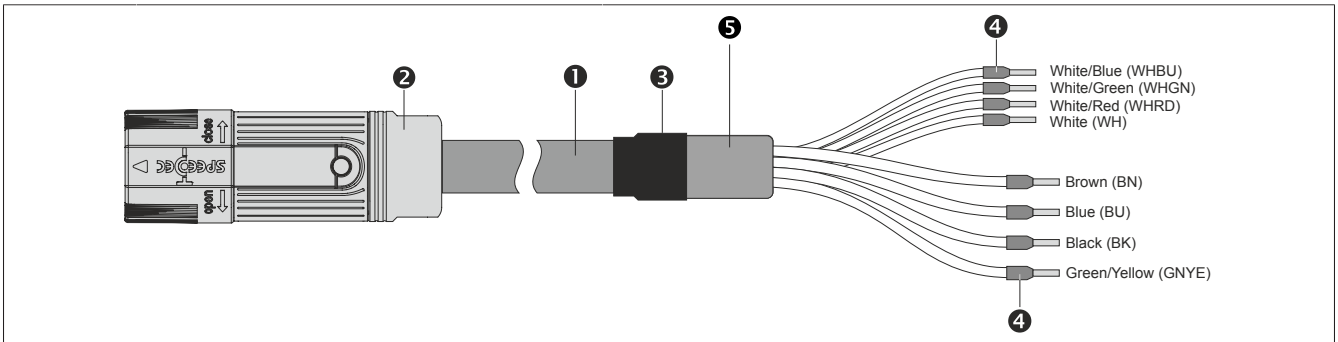
Table 191: 8ECM0005.1312C-0, 8ECM0007.1312C-0, 8ECM0010.1312C-0, 8ECM0015.1312C-0, 8ECM0020.1312C-0, 8ECM0025.1312C-0 - Technical data

1) Values refer to the raw cable being used.
2) Limited to 30 A by the motor connector.
3) At an ambient temperature from -20°C to +60°C.

2.3.5.5.4 Wiring

2.3.5.5.4.1 1.5 mm² - 4 mm² motor cables

Construction



Pos.	Description	Note
1	Motor line	4x 1.5 mm² + 2x 2x 0.75 mm² (for 8ECMxxxx.1111C-0) 4x 4 mm² + 2x 0.75 mm² + 2x 1 mm² (for 8ECMxxxx.1312C-0)
2	8-pin female circular connector	Dimensions: ø 28 x 78 mm
3	Heat shrink tubing	
4	Wire end sleeve	
5	Aluminum belt	With conductive glue

Table 192: 1.5 mm² - 4 mm² motor cables - Construction

Pinout

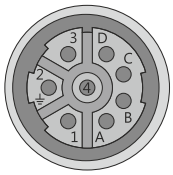
Circular connector	Pin	Description	Function
	1	U	Motor connection U
	2	PE	Protective ground conductor
	3	W	Motor connection W
	4	V	Motor connection V
	A	T+	Temperature +
	B	T-	Temperature -
	C	B+	Brake +
	D	B-	Brake -

Table 193: 1.5 mm² - 4 mm² motor cables - Pinout

Cable diagram

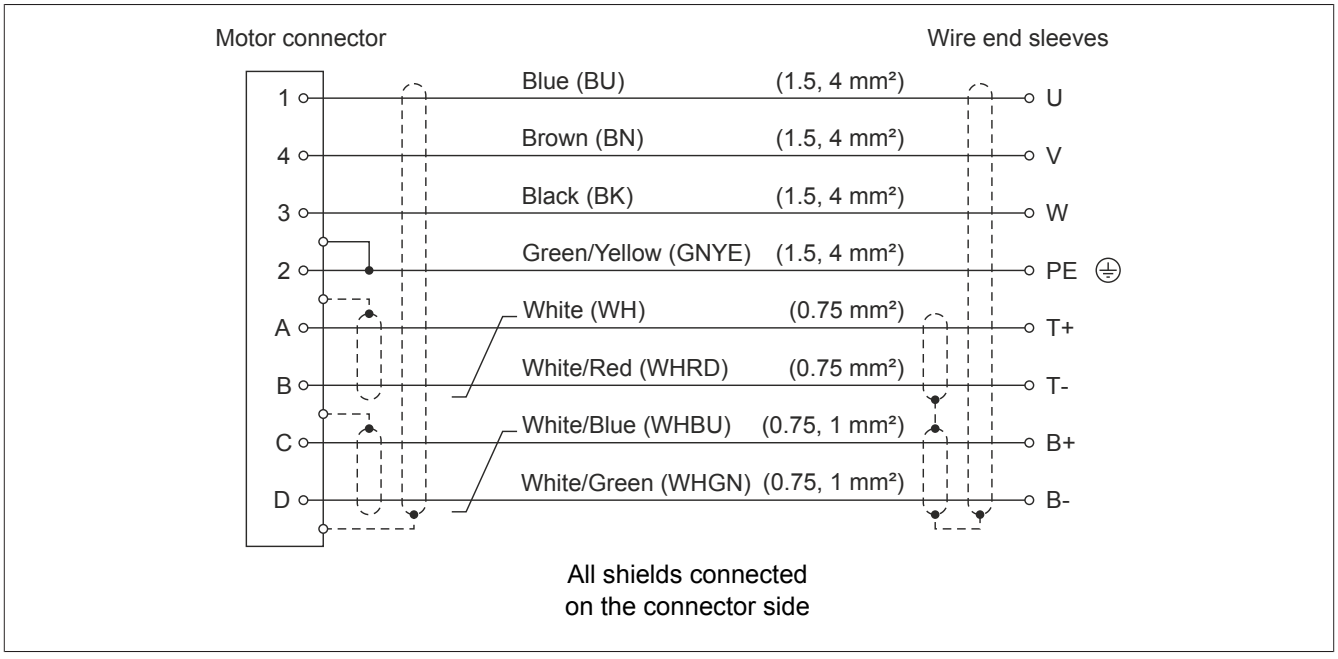


Figure 71: 1.5 mm² - 4 mm² motor cables - Cable diagram

2.3.5.5.5 10 mm² motor cables

Information:

Due to their assembly, these cables can only be used with the following ACOPOS P3 servo drives:

- **8EI017xxDxx.xxxx-1**
- **8EI022xxDxx.xxxx-1**
- **8EI024xxSxx.xxxx-1**
- **8EI034xxSxx.xxxx-1**
- **8EI044xxSxx.xxxx-1**
- **8EI013xxSxx.xxxx-1**
- **8EI017xxSxx.xxxx-1**

2.3.5.5.5.1 Order data

Order number	Short description	Figure
	10 mm² motor cables	
8ECM0005.1523C-0	ACOPOS P3 motor cable, length 5 m, 4 x 10.0 mm² + 2 x 0.75 mm² + 2 x 1.5 mm², 8-pin female speedtec motor connector size 1.5, can be used in cable drag chains	
8ECM0007.1523C-0	ACOPOS P3 motor cable, length 7 m, 4 x 10.0 mm² + 2 x 0.75 mm² + 2 x 1.5 mm², 8-pin female speedtec motor connector size 1.5, can be used in cable drag chains	
8ECM0010.1523C-0	ACOPOS P3 motor cable, length 10 m, 4 x 10.0 mm² + 2 x 0.75 mm² + 2 x 1.5 mm², 8-pin female speedtec motor connector size 1.5, can be used in cable drag chains	
8ECM0015.1523C-0	ACOPOS P3 motor cable, length 15 m, 4 x 10.0 mm² + 2 x 0.75 mm² + 2 x 1.5 mm², 8-pin female speedtec motor connector size 1.5, can be used in cable drag chains	
8ECM0020.1523C-0	ACOPOS P3 motor cable, length 20 m, 4 x 10.0 mm² + 2 x 0.75 mm² + 2 x 1.5 mm², 8-pin female speedtec motor connector size 1.5, can be used in cable drag chains	
8ECM0025.1523C-0	ACOPOS P3 motor cable, length 25 m, 4 x 10.0 mm² + 2 x 0.75 mm² + 2 x 1.5 mm², 8-pin female speedtec motor connector size 1.5, can be used in cable drag chains	

Table 194: 8ECM0005.1523C-0, 8ECM0007.1523C-0, 8ECM0010.1523C-0, 8ECM0015.1523C-0, 8ECM0020.1523C-0, 8ECM0025.1523C-0 - Order data

2.3.5.5.5.2 Technical data

Order number	8ECM0005.1523C-0	8ECM0007.1523C-0	8ECM0010.1523C-0	8ECM0015.1523C-0	8ECM0020.1523C-0	8ECM0025.1523C-0
General information						
Cable cross section	4x 10 mm² + (2x 0.75 mm²)C + (2x 1.5 mm²)C					
Durability	Oil resistance per HD 22.10 appendix A DIN EN 60811-404 [1]					
Certification	E170315 cURus AWM STYLE 21223 AWM I/II A/B 80°C 1000 V FT1 [1]					
Certifications						
CE	Yes					
UKCA	Yes					
Cable construction						
Power lines						
Quantity	4					
Wire insulation	PP					
Wire colors	Black, brown, blue, yellow/green					
Variant	Tinned copper stranded wire					
Cross section	10 mm²					
Shield	No					
Stranding	No					
Signal line						
Quantity	4					
Wire insulation	PP					
Wire colors	White, white/red, white/blue, white/green					
Variant	Tinned copper stranded wire					
Cross section	2x 0.75 mm² + 2x 1.5 mm²					
Shield	Individually shielded in pairs, tinned copper braiding, optical coverage >85% and foil shield					
Stranding	White with white/red and white/blue with white/green					
Cable stranding	With filler elements and foil shield					

Table 195: 8ECM0005.1523C-0, 8ECM0007.1523C-0, 8ECM0010.1523C-0, 8ECM0015.1523C-0, 8ECM0020.1523C-0, 8ECM0025.1523C-0 - Technical data

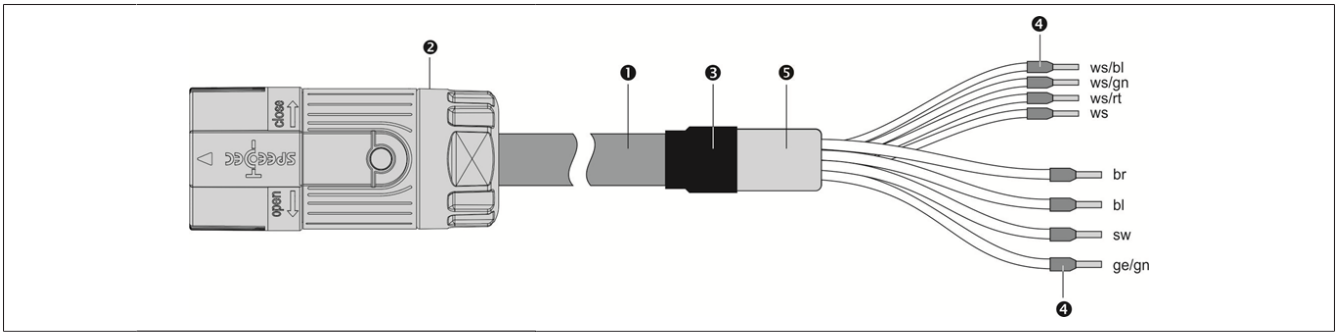
Order number	8ECM0005.1523C-0	8ECM0007.1523C-0	8ECM0010.1523C-0	8ECM0015.1523C-0	8ECM0020.1523C-0	8ECM0025.1523C-0
Cable shield	Tinned copper braiding, optical coverage >85% and foil shield					
Outer jacket						
Material	TPU					
Color	Orange, similar to RAL 2003 flat					
Labeling	B&R 4 G 10 + (2x0.75)C + (2x1.5)C C E170315 cURus AWM STYLE 21223 AWM I/II A/B 80°C 1000 V FT1 [1]					
Connector						
Type	8-pin female speedtec motor connector, size 1.5					
Mating cycles	<500					
Contacts	8 (4 power and 4 signal contacts)					
Degree of protection per EN 60529	IP66/67 when connected					
Electrical properties [1]						
Operating voltage	Max. 1000 VAC (UL)					
Test voltage						
Wire - Wire	4 kV					
Wire - Shield	4 kV					
Conductor resistance						
Power lines	≤2 Ω/km					
Signal line	0.75 mm²: ≤26.7 Ω/km, 1.5 mm²: ≤13.7 Ω/km					
Insulation resistance	≥500 MΩ*km					
Current-carrying capacity per DIN VDE 0298 part 4, table 11						
Wall mounting	64.6 A					
Installed in conduit or cable duct	54.6 A					
Installed in cable tray	68.3 A					
Ambient conditions [1]						
Temperature						
Moving	-20°C to +80°C					
Static	-20°C to +90°C					
Mechanical properties [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	20.1 mm ±0.4 mm					
Bend radius						
Single bend	>62 mm					
Moving	>154 mm					
Drag chain data						
Acceleration	Max. 50 m/s² (depends on the length of the travel path)					
Flex cycles [2]	≥5,000,000					
Velocity	Max. 300 m/min					
Weight	2.7 kg	3.8 kg	5.4 kg	8.1 kg	10.8 kg	13.5 kg

Table 195: 8ECM0005.1523C-0, 8ECM0007.1523C-0, 8ECM0010.1523C-0, 8ECM0015.1523C-0, 8ECM0020.1523C-0, 8ECM0025.1523C-0 - Technical data

1) Values refer to the raw cable being used.
2) At an ambient temperature from -20°C to +60°C.

2.3.5.5.5.3 Wiring

Cable construction



Pos.	Description	Note
1	Motor line	4 x 10 mm² + 2 x 0.75 mm² + 2 x 1.5 mm²
2	8-pin female circular connector	Dimensions: ø 46 x 99 mm
3	Heat shrink tubing	
4	Wire end sleeves	
5	Aluminum strip	

Table 196: 10 mm² motor cables - Cable construction

Pinout

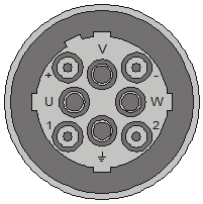
Circular connector	Pin	Description	Function
	U	U	Motor connection U
	Ground symbol	PE	Protective ground conductor
	W	W	Motor connection W
	V	V	Motor connection V
	1	T+	Temperature +
	2	T-	Temperature -
	+	B+	Brake +
	-	B-	Brake

Table 197: 10 mm² motor cables - Pinout

Cable diagram

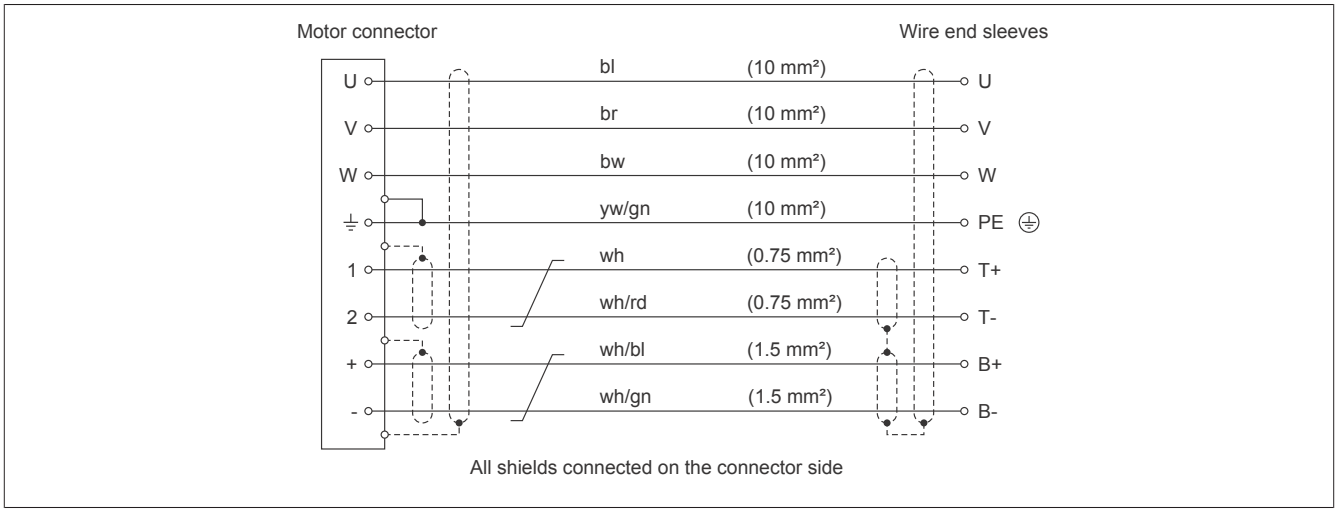


Figure 72: 10 mm² motor cables - Cable diagram

2.3.5.6 8ECF EnDat 2.2 cables

2.3.5.6.1 Order data

Order number	Short description	Figure
	EnDat 2.2 cables	
8ECF0005.1221C-0	ACOPOS P3 EnDat 2.2 cable, length 5 m, 1x 4x 0.14 mm² + 4x 0.35 mm², 12-pin female series 615 signal connector, 8-pin Mini I/O male connector, can be used in cable drag chains	
8ECF0007.1221C-0	ACOPOS P3 EnDat 2.2 cable, length 7 m, 1x 4x 0.14 mm² + 4x 0.35 mm², 12-pin female series 615 signal connector, 8-pin Mini I/O male connector, can be used in cable drag chains	
8ECF0010.1221C-0	ACOPOS P3 EnDat 2.2 cable, length 10 m, 1x 4x 0.14 mm² + 4x 0.35 mm², 12-pin female series 615 signal connector, 8-pin Mini I/O male connector, can be used in cable drag chains	
8ECF0015.1221C-0	ACOPOS P3 EnDat 2.2 cable, length 15 m, 1x 4x 0.14 mm² + 4x 0.35 mm², 12-pin female series 615 signal connector, 8-pin Mini I/O male connector, can be used in cable drag chains	
8ECF0020.1221C-0	ACOPOS P3 EnDat 2.2 cable, length 20 m, 1x 4x 0.14 mm² + 4x 0.35 mm², 12-pin female series 615 signal connector, 8-pin Mini I/O male connector, can be used in cable drag chains	
8ECF0025.1221C-0	ACOPOS P3 EnDat 2.2 cable, length 25 m, 1x 4x 0.14 mm² + 4x 0.35 mm², 12-pin female series 615 signal connector, 8-pin Mini I/O male connector, can be used in cable drag chains	

Table 198: 8ECF0005.1221C-0, 8ECF0007.1221C-0, 8ECF0010.1221C-0, 8ECF0015.1221C-0, 8ECF0020.1221C-0, 8ECF0025.1221C-0 - Order data

2.3.5.6.2 Technical data

Order number	8ECF0005. 1221C-0	8ECF0007. 1221C-0	8ECF0010. 1221C-0	8ECF0015. 1221C-0	8ECF0020. 1221C-0	8ECF0025. 1221C-0
General information						
Cable cross section	4x 0.14 mm² + 4x 0.35 mm²					
Durability	Oil resistance per DIN EN 50363-10-2 (VDE 0207-363-10-2) as well as standard cleaning agents and hydraulic oil [1]					
Certification	UL AWM Style 20963, 80°C, 30 V, E63216 [1]					
Certifications						
CE	Yes					
UKCA	Yes					
Cable construction						
Supply lines						
Quantity	4					
Wire insulation	Special thermoplastic material					
Wire colors	White/Green, brown/green, blue, white					
Variant	Tinned copper stranded wire					
Cross section	0.35 mm²					
Shield	No					
Stranding	No					
Signal line						
Quantity	4					
Wire insulation	Polyolefin foam					
Wire colors	Yellow, gray, pink, violet					
Variant	Tinned copper stranded wire					
Cross section	0.14 mm²					
Shield	No					
Stranding	All 4 wires together					
Cable stranding	With terminating foil shield					
Cable shield	Copper/Tin braiding, optical coverage ≥85%					
Outer jacket						
Material	PUR					
Color	Green flat					
Labeling	B&R 4x0,14 + 4x0,35 FLEX (UL) AWM STYLE 20963 80°C 30 V E63216 [1]					
Connector						
Type	12-pin female series 615 signal connector					
Mating cycles	<500					
Contacts	12					
Additional connectors	8-pin male Mini I/O encoder connector Mating cycles: <1500 Contacts: 8 Degree of protection per EN 60529: IP30 when connected					
Degree of protection per EN 60529	IP66/67 when connected					
Electrical properties [1]						
Operating voltage	≤30 V					

Table 199: 8ECF0005.1221C-0, 8ECF0007.1221C-0, 8ECF0010.1221C-0, 8ECF0015.1221C-0, 8ECF0020.1221C-0, 8ECF0025.1221C-0 - Technical data

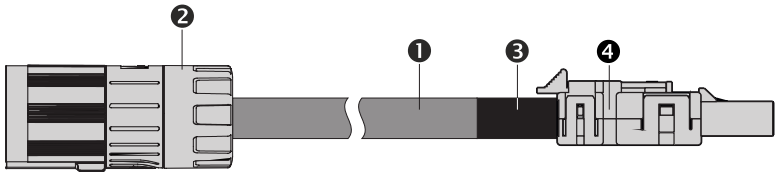
Order number	8ECF0005. 1221C-0	8ECF0007. 1221C-0	8ECF0010. 1221C-0	8ECF0015. 1221C-0	8ECF0020. 1221C-0	8ECF0025. 1221C-0
Test voltage						
Wire - Wire	1 kV					
Wire - Shield	0.5 kV					
Conductor resistance						
Supply lines	≤55 Ω/km					
Signal line	≤134 Ω/km					
Insulation resistance	>200 MΩ*km					
Ambient conditions [1]						
Temperature						
Moving	-10°C to 80°C					
Static	-40°C to 80°C					
Mechanical properties [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	6 mm ±0.2 mm					
Bend radius						
Single bend	≥19 mm					
Moving	>47 mm					
Drag chain data						
Acceleration	≤6 g					
Flex cycles [2]	≥3000000					
Velocity	≤4 m/s					
Weight	0.3 kg	0.41 kg	0.6 kg	0.9 kg	1.2 kg	1.5 kg

Table 199: 8ECF0005.1221C-0, 8ECF0007.1221C-0, 8ECF0010.1221C-0, 8ECF0015.1221C-0, 8ECF0020.1221C-0, 8ECF0025.1221C-0 - Technical data

1) Values refer to the raw cable being used.
2) Valid at an ambient temperature of 20°C and bend radius of 78 mm.

2.3.5.6.3 Wiring

2.3.5.6.3.1 Design



Pos.	Description	Note
1	Encoder line	4x 0.14 mm² + 4x 0.35 mm²
2	12-pin female circular connector Coding contact	Dimensions: ø 19 x 42 mm
3	Heat shrink tubing	
4	Mini I/O encoder connector	Dimensions: 11 x 8 x 33 mm

Table 200: 8ECF EnDat 2.2 cables - Construction

2.3.5.6.3.2 Pinout

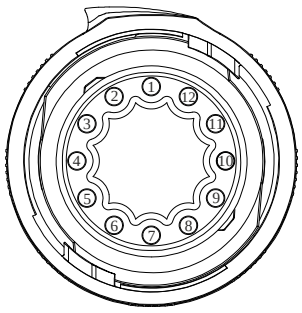
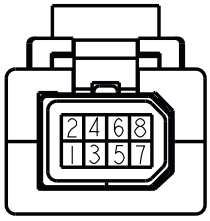
Circular connector	Pin	Description	Function	Pin	Mini I/O connector
	1	+12 V out	Encoder power supply +12 V	1	
	2	D	Data input	6	
	3	D\	Data inverted	8	
	4	T	Clock output	2	
	5	T\	Clock output inverted	4	
	6	---			
	7	COM	Encoder power supply 0 V	7	
	8	---	Coding contact		
	9	---			
	10	---			
	11	---			
	12	---			

Table 201: 8ECF EnDat 2.2 cables - Pinout

2.3.5.6.3.3 Cable diagram

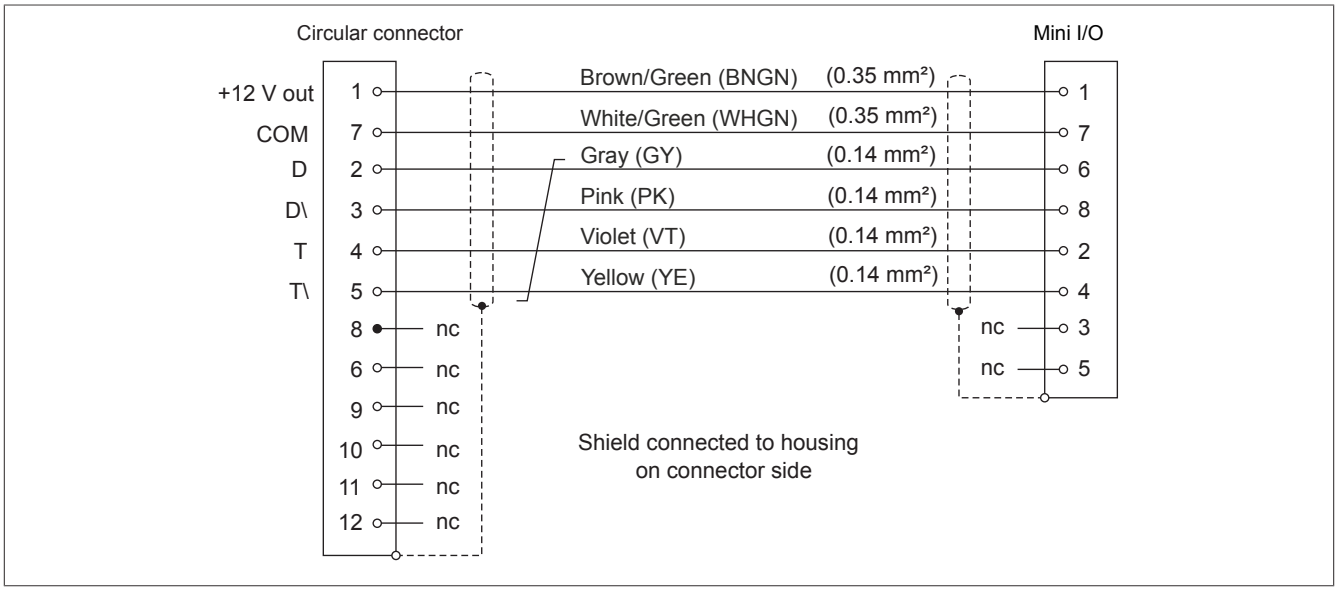


Figure 73: 8ECF EnDat 2.2 cables - Cable diagram

2.3.5.7 8ECFxxxx.1231C-0 - EnDat 2.2 cables

2.3.5.7.1 8ECFxxxx.1231C-0 - Order data

Order number	Short description	Figure
	EnDat 2.2 cables	
8ECF0005.1231C-0	ACOPOS P3 EnDat 2.2 cable, length 5 m, 1x 4x 0.14 mm² + 4x 0.35 mm², M12 circular connector, 8-pin, A-coded, 8-pin Mini I/O male connector, can be used in cable drag chains	
8ECF0007.1231C-0	ACOPOS P3 EnDat 2.2 cable, length 7 m, 1x 4x 0.14 mm² + 4x 0.35 mm², M12 circular connector, 8-pin, A-coded, 8-pin Mini I/O male connector, can be used in cable drag chains	
8ECF0010.1231C-0	ACOPOS P3 EnDat 2.2 cable, length 10 m, 1x 4x 0.14 mm² + 4x 0.35 mm², M12 circular connector, 8-pin, A-coded, 8-pin Mini I/O male connector, can be used in cable drag chains	
8ECF0015.1231C-0	ACOPOS P3 EnDat 2.2 cable, length 15 m, 1x 4x 0.14 mm² + 4x 0.35 mm², M12 circular connector, 8-pin, A-coded, 8-pin Mini I/O male connector, can be used in cable drag chains	
8ECF0020.1231C-0	ACOPOS P3 EnDat 2.2 cable, length 20 m, 1x 4x 0.14 mm² + 4x 0.35 mm², M12 circular connector, 8-pin, A-coded, 8-pin Mini I/O male connector, can be used in cable drag chains	
8ECF0025.1231C-0	ACOPOS P3 EnDat 2.2 cable, length 25 m, 1x 4x 0.14 mm² + 4x 0.35 mm², M12 circular connector, 8-pin, A-coded, 8-pin Mini I/O male connector, can be used in cable drag chains	

Table 202: 8ECF0005.1231C-0, 8ECF0007.1231C-0, 8ECF0010.1231C-0, 8ECF0015.1231C-0, 8ECF0020.1231C-0, 8ECF0025.1231C-0 - Order data

2.3.5.7.2 8ECFxxxx.1231C-0 - Technical data

Order number	8ECF0005. 1231C-0	8ECF0007. 1231C-0	8ECF0010. 1231C-0	8ECF0015. 1231C-0	8ECF0020. 1231C-0	8ECF0025. 1231C-0
General information						
Cable cross section	4x 0.14 mm² + 4x 0.35 mm²					
Durability	Oil resistance per DIN EN 50363-10-2 (VDE 0207-363-10-2) as well as standard cleaning agents and hydraulic oil [1]					
Certification	UL AWM Style 20963, 80°C, 30 V, E63216 [1]					
Certifications						
CE	Yes					
UKCA	Yes					
Cable construction						
Supply lines						
Quantity	4					
Wire insulation	Special thermoplastic material					
Wire colors	White/Green, brown/green, blue, white					
Variant	Tinned copper stranded wire					
Cross section	0.35 mm²					
Shield	No					
Stranding	No					
Signal line						
Quantity	4					
Wire insulation	Polyolefin foam					
Wire colors	Yellow, gray, pink, violet					
Variant	Tinned copper stranded wire					
Cross section	0.14 mm²					
Shield	No					
Stranding	All 4 wires together					
Cable stranding	With terminating foil shield					
Cable shield	Copper/Tin braiding, optical coverage ≥85%					
Outer jacket						
Material	PUR					
Color	Green flat					
Labeling	B&R 4x0.14 + 4x0.35 FLEX (UL) AWM STYLE 20963 80°C 30 V E63216 [1]					
Connector						
Type	8-pin female M12 circular connector, A-coded					
Mating cycles	≥500				<500	≥500
Contacts	8					
Additional connectors	8-pin male Mini I/O encoder connector Mating cycles: <1500 Contacts: 8 Degree of protection per EN 60529: IP30 when connected					
Degree of protection per EN 60529	Connected IP65/IP67				IP65/67 when connected	Connected IP65/IP67
Electrical properties [1]						
Operating voltage	≤30 V					

Table 203: 8ECF0005.1231C-0, 8ECF0007.1231C-0, 8ECF0010.1231C-0, 8ECF0015.1231C-0, 8ECF0020.1231C-0, 8ECF0025.1231C-0 - Technical data

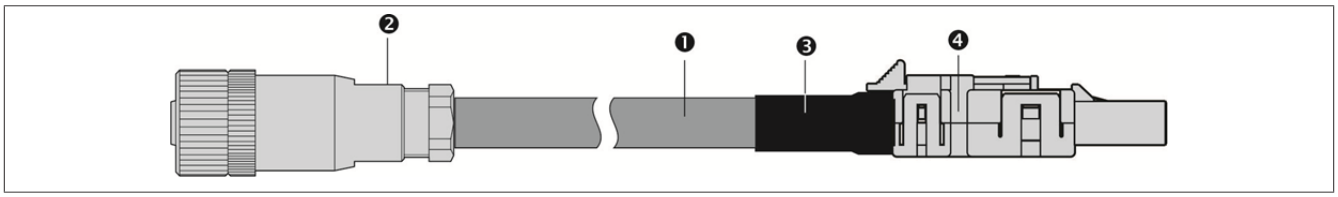
Order number	8ECF0005. 1231C-0	8ECF0007. 1231C-0	8ECF0010. 1231C-0	8ECF0015. 1231C-0	8ECF0020. 1231C-0	8ECF0025. 1231C-0
Test voltage						
Wire - Wire	1 kV					
Wire - Shield	0.5 kV					
Conductor resistance						
Supply lines	≤55 Ω/km					
Signal line	≤134 Ω/km					
Insulation resistance	>200 MΩ*km					
Ambient conditions [1]						
Temperature						
Moving	-10°C to 80°C				-40°C to +80°C	-10°C to 80°C
Static	-40°C to 80°C				-40°C to +80°C	-40°C to 80°C
Mechanical properties [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	6 mm ±0.2 mm					
Bend radius						
Single bend	≥19 mm					
Moving	≥47 mm					
Drag chain data						
Acceleration	≤6 g					
Flex cycles [2]	≥3000000					
Velocity	≤4 m/s					
Weight	0.3 kg	0.41 kg	0.6 kg	0.9 kg	1.2 kg	1.5 kg

Table 203: 8ECF0005.1231C-0, 8ECF0007.1231C-0, 8ECF0010.1231C-0, 8ECF0015.1231C-0, 8ECF0020.1231C-0, 8ECF0025.1231C-0 - Technical data

1) Values refer to the raw cable being used.
2) Valid at an ambient temperature of 20°C and bend radius of 78 mm.

2.3.5.7.3 Wiring

2.3.5.7.3.1 Cable construction



Pos.	Name	Note
1	Encoder line	4 x 0.14 mm² + 4 x 0.35 mm²
2	8-pin circular connector, A-keyed Contact connector	
3	Heat shrink tubing	
4	Mini I/O encoder connector	

Table 204: 8ECFxxxx.1231C-0 - Cable construction

2.3.5.7.3.2 Pinout

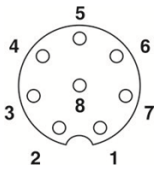
Circular connector	Pin	Name	Function	Pin	DSUB connector
	8	+12 V out	Encoder power supply +12 V	1	
	3	D	Data input	6	
	4	D\	Data inverted	8	
	7	T	Clock output	2	
	6	T\	Clock output inverted	4	
	1	---	---	---	
	5	COM	Encoder power supply 0 V	7	
	2	---	---	---	

Table 205: M12 circular connector - Pinout

2.3.5.7.3.3 Cable diagram

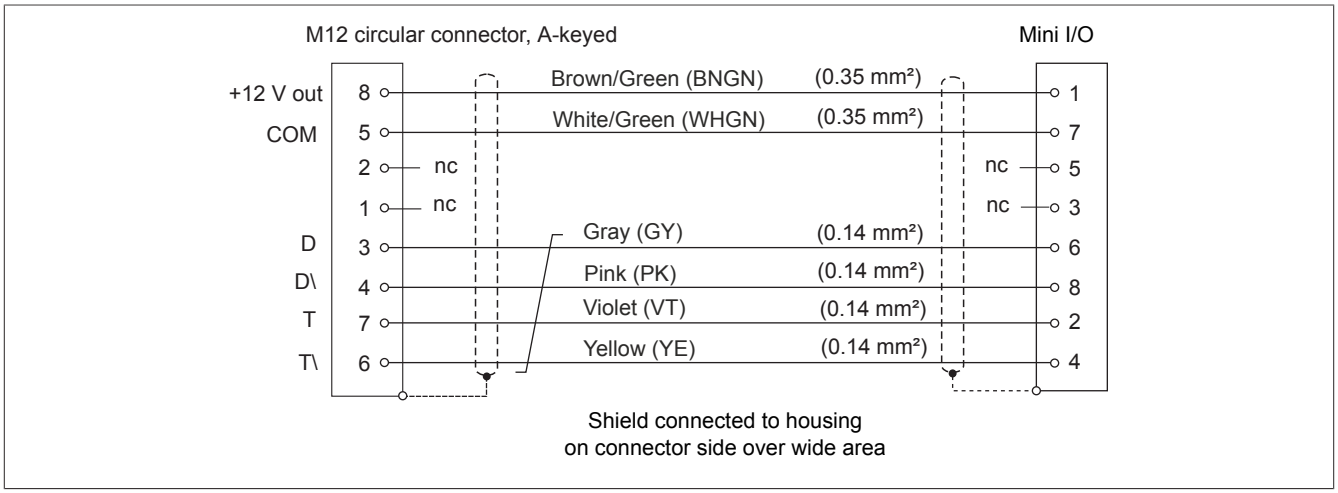


Figure 74: 8ECFxxxx.1231C-0 - Cable diagram

2.3.5.8 8BCR resolver cables

2.3.5.8.1 Order data

Order number	Short description	Figure
	Resolver cables	
8ECR0005.1111C-0	ACOPOS P3 resolver cable, length 5 m, 3x 2x 24 AWG (19x 0.127), 12-pin female speedtec connector, 8-pin male Mini I/O connector, can be used in cable drag chains	
8ECR0007.1111C-0	ACOPOS P3 resolver cable, length 7 m, 3x 2x 24 AWG (19x 0.127), 12-pin female speedtec connector, 8-pin male Mini I/O connector, can be used in cable drag chains	
8ECR0010.1111C-0	ACOPOS P3 resolver cable, length 10 m, 3x 2x 24 AWG (19x 0.127), 12-pin female speedtec connector, 8-pin male Mini I/O connector, can be used in cable drag chains	
8ECR0015.1111C-0	ACOPOS P3 resolver cable, length 15 m, 3x 2x 24 AWG (19x 0.127), 12-pin female speedtec connector, 8-pin male Mini I/O connector, can be used in cable drag chains	
8ECR0020.1111C-0	ACOPOS P3 resolver cable, length 20 m, 3x 2x 24 AWG (19x 0.127), 12-pin female speedtec connector, 8-pin male Mini I/O connector, can be used in cable drag chains	
8ECR0025.1111C-0	ACOPOS P3 resolver cable, length 25 m, 3x 2x 24 AWG (19x 0.127), 12-pin female speedtec connector, 8-pin male Mini I/O connector, can be used in cable drag chains	

Table 206: 8ECR0005.1111C-0, 8ECR0007.1111C-0, 8ECR0010.1111C-0, 8ECR0015.1111C-0, 8ECR0020.1111C-0, 8ECR0025.1111C-0 - Order data

2.3.5.8.2 Technical data

Order number	8ECR0005.1111C-0	8ECR0007.1111C-0	8ECR0010.1111C-0	8ECR0015.1111C-0	8ECR0020.1111C-0	8ECR0025.1111C-0
General information						
Cable cross section	3x 2x 24 19 AWG					
Durability	Oil resistance per VDE 0472 Part 803 as well as standard hydraulic oils [1]					
Certification	UL AWM style 20671, 90°C, 30 V, E63216 and CSA AWM, 90°C, 30 V, I/II A/B FT1 LL46064 [1]					
Certifications						
CE	Yes					
UKCA	Yes					
Cable construction						
Signal line						
Quantity	6					
Wire insulation	Special thermoplastic material					
Wire colors	White/Brown, green/yellow, gray/pink					
Variant	Tinned copper stranded wire					
Cross section	24 AWG / 19 AWG					
Shield	No					
Stranding	White with brown, green with yellow, gray with pink					
Cable stranding	The 3 pairs together covered by foil shield					
Cable shield	Copper braiding, optical coverage ≥90% and foil shield					
Outer jacket						
Material	PUR					
Color	Green, similar to RAL 6018 flat					
Labeling	B&R 3x2x24 AWG FLEX UL AWM STYLE 20671 90°C 30 V E63216 CSA AWM 90°C 30 V I/II A/B FT1 LL46064 [1]					
Connector						
Type	12-pin female speedtec resolver connector					
Mating cycles	<500					
Contacts	12					
Additional connectors	8-pin male Mini I/O encoder connector Mating cycles: <1500 Contacts: 8 Degree of protection per EN 60529: IP30 when connected					
Degree of protection per EN 60529	IP66/67 when connected					
Electrical properties [1]						
Operating voltage	≤30 V_{eff}					
Test voltage						
Wire - Wire	1.5 kV					
Wire - Shield	0.8 kV					
Conductor resistance						
Signal line	≤86 Ω/km					
Insulation resistance	>200 MΩ*km					

Table 207: 8ECR0005.1111C-0, 8ECR0007.1111C-0, 8ECR0010.1111C-0, 8ECR0015.1111C-0, 8ECR0020.1111C-0, 8ECR0025.1111C-0 - Technical data

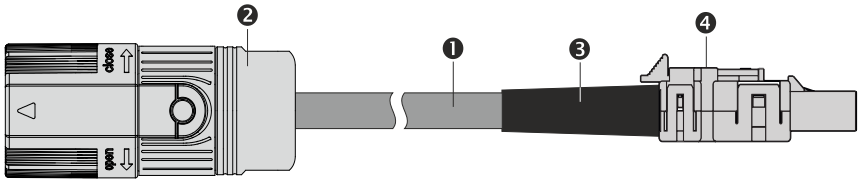
Order number	8ECR0005. 1111C-0	8ECR0007. 1111C-0	8ECR0010. 1111C-0	8ECR0015. 1111C-0	8ECR0020. 1111C-0	8ECR0025. 1111C-0
Ambient conditions [1]						
Temperature						
Moving	-20°C to +80°C					
Static	-20°C to +90°C					
Mechanical properties [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	6.5 mm ±0.2 mm					
Bend radius						
Single bend	≥20 mm					
Moving	≥50 mm					
Drag chain data						
Acceleration	≤6 g					
Flex cycles [2]	>3,000,000					
Velocity	≤4 m/s					
Weight	0.4 kg	0.49 kg	0.7 kg	1.1 kg	1.4 kg	1.8 kg

Table 207: 8ECR0005.1111C-0, 8ECR0007.1111C-0, 8ECR0010.1111C-0, 8ECR0015.1111C-0, 8ECR0020.1111C-0, 8ECR0025.1111C-0 - Technical data

1) Values refer to the raw cable being used.
2) At an ambient temperature of 20°C and bend radius of 65 mm.

2.3.5.8.3 Wiring

2.3.5.8.3.1 Construction



Pos.	Description	Note
1	Encoder cable	3x 2x 24 AWG/19
2	12-pin female circular connector	
3	Heat shrink tubing	
4	Mini I/O encoder connector	

Table 208: 8ECR resolver cables - Construction

2.3.5.8.3.2 Pinout

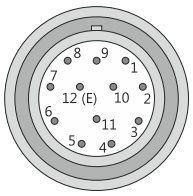
Circular connector	Pin	Description	Function	Pin	Mini I/O connector
	1	---			
	2	---			
	3	S4	Sine input +	3	
	4	S1	Cosine input -	7	
	5	R2	Reference output +	2	
	6	---			
	7	S2	Sine input -	1	
	8	S3	Cosine input +	5	
	9	R1	Reference output -	4	
	10	---			
	11	---			
	12	---			

Table 209: 8ECR resolver cables - Pinout

2.3.5.8.3.3 Cable diagram

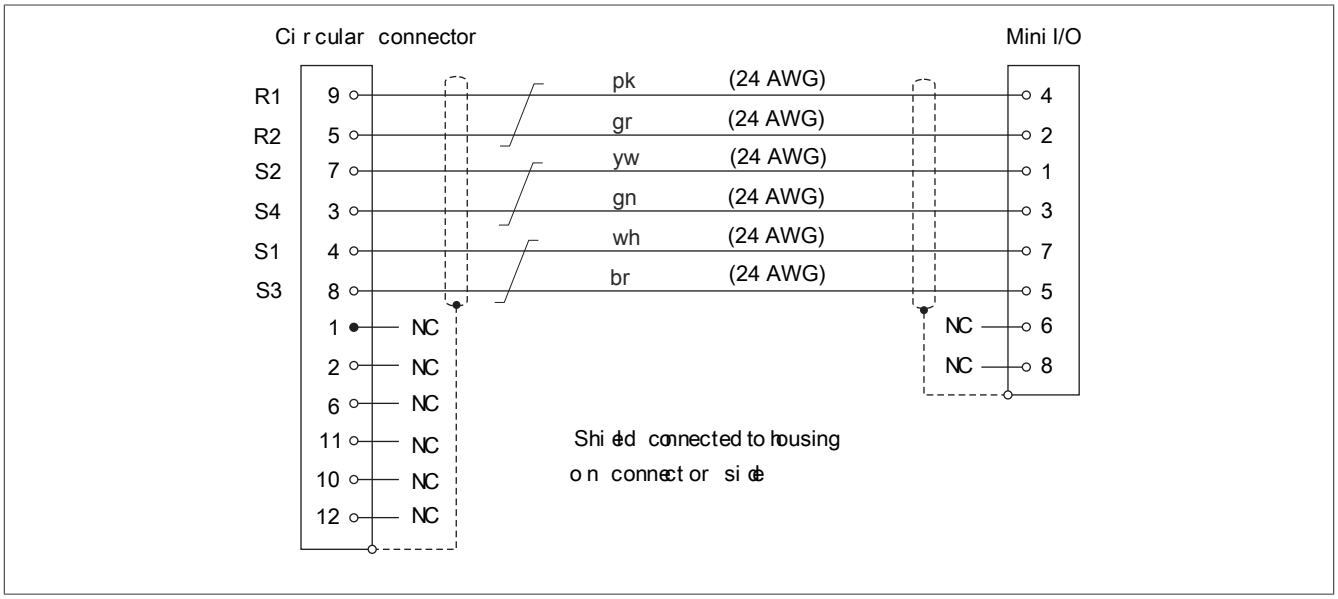


Figure 75: 8ECR resolver cables - Cable diagram

2.3.5.9 8ECR resolver cables with series 615 encoder connector

2.3.5.9.1 Order data

Order number	Short description	Figure
	Resolver cables SpringTec connector	
8ECR0005.1121C-0	ACOPOS P3 resolver cable, length 5 m, 3x 2x 24 AWG (19x 0.127), 12-pin female series 615 signal connector, 8-pin male Mini I/O connector, can be used in cable drag chains	
8ECR0007.1121C-0	ACOPOS P3 resolver cable, length 7 m, 3x 2x 24 AWG (19x 0.127), 12-pin female series 615 signal connector, 8-pin male Mini I/O connector, can be used in cable drag chains	
8ECR0010.1121C-0	ACOPOS P3 resolver cable, length 10 m, 3x 2x 24 AWG (19x 0.127), 12-pin female series 615 signal connector, 8-pin male Mini I/O connector, can be used in cable drag chains	
8ECR0015.1121C-0	ACOPOS P3 resolver cable, length 15 m, 3x 2x 24 AWG (19x 0.127), 12-pin female series 615 signal connector, 8-pin male Mini I/O connector, can be used in cable drag chains	
8ECR0020.1121C-0	ACOPOS P3 resolver cable, length 20 m, 3x 2x 24 AWG (19x 0.127), 12-pin female series 615 signal connector, 8-pin male Mini I/O connector, can be used in cable drag chains	
8ECR0025.1121C-0	ACOPOS P3 resolver cable, length 25 m, 3x 2x 24 AWG (19x 0.127), 12-pin female series 615 signal connector, 8-pin male Mini I/O connector, can be used in cable drag chains	

Table 210: 8ECR0005.1121C-0, 8ECR0007.1121C-0, 8ECR0010.1121C-0, 8ECR0015.1121C-0, 8ECR0020.1121C-0, 8ECR0025.1121C-0 - Order data

2.3.5.9.2 Technical data

Order number	8ECR0005. 1121C-0	8ECR0007. 1121C-0	8ECR0010. 1121C-0	8ECR0015. 1121C-0	8ECR0020. 1121C-0	8ECR0025. 1121C-0
General information						
Cable cross section	3x 2x 24 19 AWG					
Durability	Oil resistance per VDE 0472 Part 803 as well as standard hydraulic oils [1]					
Certification	UL AWM Style 20671, 90°C, 30 V, E63216 and CSA AWM, 90°C, 30 V, I/II A/B FT1 LL46064 [1]					
Certifications						
CE	Yes					
UKCA	Yes					
Cable construction						
Signal line						
Quantity	6					
Wire insulation	Special thermoplastic material					
Wire colors	White/Brown, green/yellow, gray/pink					
Variant	Tinned copper stranded wire					
Cross section	24 AWG / 19 AWG					
Shield	No					
Stranding	White with brown, green with yellow, gray with pink					
Cable stranding	The 3 pairs together covered by foil shield					
Cable shield	Copper braiding, optical coverage ≥90% and foil shield					
Outer jacket						
Material	PUR					
Color	Green, similar to RAL 6018 flat					
Labeling	BERNECKER + RAINER 3x2x24 AWG FLEX UL AWM STYLE 20671 90°C 30 V E63216 CSA AWM 90°C 30 V I/II A/B FT1 LL46064 [1]					
Connector						
Type	12-pin female series 615 signal connector					
Mating cycles	<500					
Contacts	12					
Additional connectors	8-pin female Mini I/O encoder connector Mating cycles: <1500 Contacts: 8 Degree of protection per EN 60529: IP30 when connected					
Degree of protection per EN 60529	IP66/67 when connected					
Electrical properties [1]						
Operating voltage	≤30 V_{eff}					
Test voltage						
Wire - Wire	1.5 kV					
Wire - Shield	0.8 kV					
Conductor resistance						
Signal line	≤86 Ω/km					
Insulation resistance	>200 MΩ*km					

Table 211: 8ECR0005.1121C-0, 8ECR0007.1121C-0, 8ECR0010.1121C-0, 8ECR0015.1121C-0, 8ECR0020.1121C-0, 8ECR0025.1121C-0 - Technical data

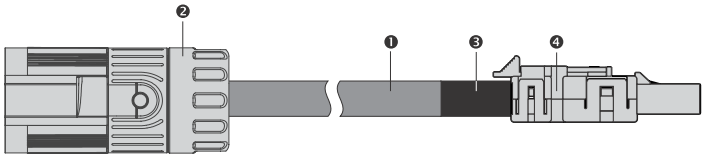
Order number	8ECR0005. 1121C-0	8ECR0007. 1121C-0	8ECR0010. 1121C-0	8ECR0015. 1121C-0	8ECR0020. 1121C-0	8ECR0025. 1121C-0
Ambient conditions [1]						
Temperature						
Moving	-20°C to +80°C					
Static	-20°C to +90°C					
Mechanical properties [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	6.5 mm ±0.2 mm					
Bend radius						
Single bend	≥20 mm					
Moving	≥50 mm					
Drag chain data						
Acceleration	≤6 g					
Flex cycles [2]	>3,000,000					
Velocity	≤4 m/s					
Weight	0.35 kg	0.49 kg	0.7 kg	1.1 kg	1.4 kg	1.75 kg

Table 211: 8ECR0005.1121C-0, 8ECR0007.1121C-0, 8ECR0010.1121C-0, 8ECR0015.1121C-0, 8ECR0020.1121C-0, 8ECR0025.1121C-0 - Technical data

1) Values refer to the raw cable being used.
2) At an ambient temperature of 20°C and bend radius of 65 mm.

2.3.5.9.3 Wiring

2.3.5.9.3.1 Cable construction



Pos.	Description	Note
1	Encoder line	3 x 2 x 24 AWG/19
2	12-pin female circular connector Coding contact	
3	Heat shrink tubing	
4	Mini I/O encoder connector	

Table 212: ESTB resolver cables - Cable construction

2.3.5.9.3.2 Pinout

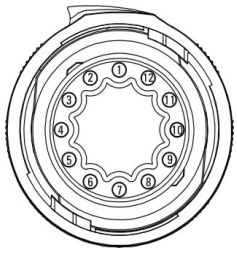
Circular connector	Pin	Description	Function	Pin	Mini I/O connector
	1	---	**Coding contact!**	---	
	2	---		---	
	3	---		---	
	4	---		---	
	5	---		---	
	6	R1	Reference output inverted	4	
	7	---		---	
	8	S4	Sine input +	3	
	9	S2	Sine input -	1	
	10	S3	Cosine input +	5	
	11	S1	Cosine input -	7	
	12	R2	Reference output	2	

Table 213: ESTB resolver cables - Pinout

2.3.5.9.3.3 Cable diagram

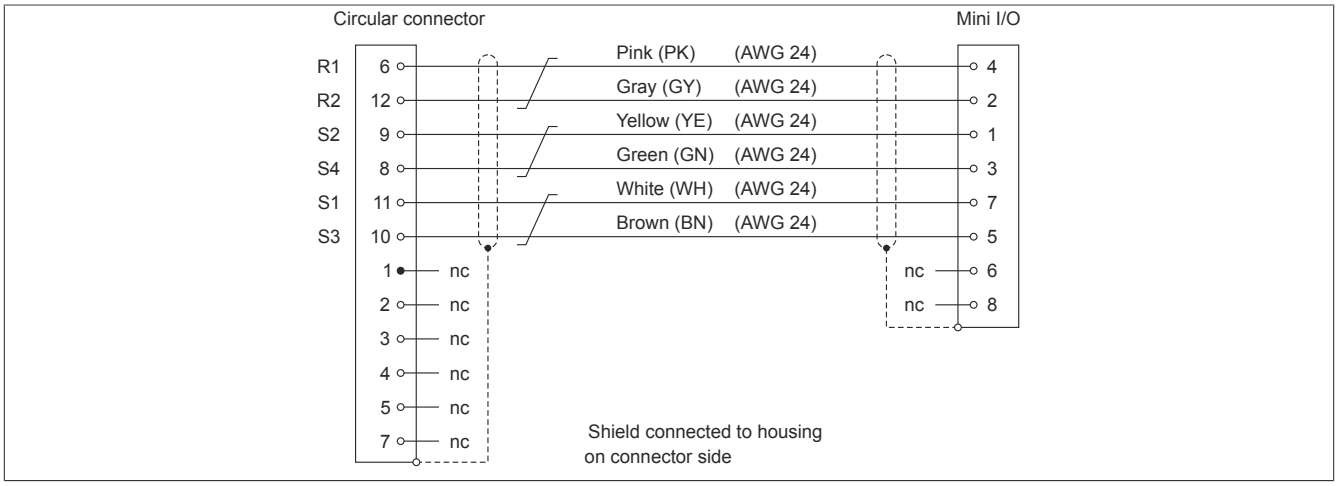


Figure 76: ESTB resolver cables - Cable diagram

2.3.5.10 Adapter cable

2.3.5.10.1 8ECF00X4.1241C-0

2.3.5.10.1.1 General information

- ACOPOS P3 adapter cable for digital encoder interfaces
- Makes it possible to connect an encoder cable with 9-pin DSUB connector to a digital encoder interface on an ACOPOS P3 8EI servo drive or ACOPOS P3 8EAC0150.00x-1 plug-in module
- Assembled specifically for use with ACOPOS P3 8EI servo drives and ACOPOS P3 8EAC0150.00x-1 plug-in modules

Information:

On X4x connectors of ACOPOS P3 SafeMOTION 8EIxxxxxxS... servo drives, it is only permitted to use adapter cable 8ECF00X4.1241C-0 in combination with B&R cables (e.g. 8BCFxxxx.1221B-0).

Instructions for use

- The DSUB connectors of the encoder cable and adapter cable must be screwed together to ensure a reliable connection between the two cables.

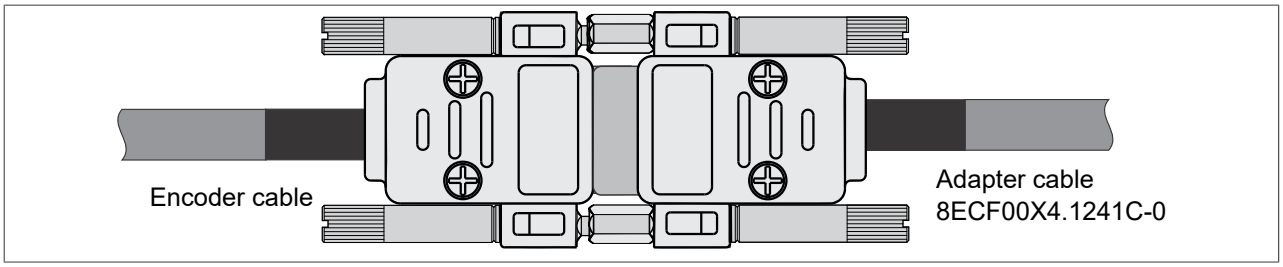


Figure 77: Screwing together the DSUB connectors on the adapter cable and encoder cable

- To ensure proper strain relief of the adapter cable, secure it to the holding bracket of the ACOPOS P3 8EI servo drive using a cable tie.

Figure 78: Strain relief on the holding bracket (figure shows 8ECH hybrid motor cable)

- It is recommended to also provide separate strain relief for the encoder cable.

Information:

If the ACOPOS P3 8EI servo drive is equipped with a shield plate (8SCSE shield component set), a cable tie on this shield plate can provide strain relief for the encoder cable.

2.3.5.10.1.2 Order data

Order number	Short description	Figure
	Adapter cables	
8ECF00X4.1241C-0	ACOPOS P3 adapter cable for digital encoder interface, length 0.4 m, 1x 4x 0.14 mm² + 4x 0.35 mm², 9-pin female DSUB, 8-pin male Mini I/O connector	

Table 214: 8ECF00X4.1241C-0 - Order data

2.3.5.10.1.3 Technical data

Order number	8ECF00X4.1241C-0
General information	
Cable cross section	4x 0.14 mm² + 4x 0.35 mm²
Durability	Oil resistance per DIN EN 50363-10-2 (VDE 0207-363-10-2) as well as standard cleaning agents and hydraulic oil [1]
Certification	UR AWM Style 20963, 80°C, 30 V, E63216 [1]
Certifications	
CE	Yes
UKCA	Yes
Cable construction	
Supply lines	
Quantity	4
Wire insulation	Special thermoplastic material
Wire colors	White/Green, brown/green, blue, white
Variant	Tinned copper stranded wire
Cross section	0.35 mm²
Shield	No
Stranding	No
Signal line	
Quantity	4
Wire insulation	Polyolefin foam
Wire colors	Yellow, gray, pink, violet
Variant	Tinned copper stranded wire
Cross section	0.14 mm²
Shield	No
Stranding	All 4 wires together
Cable stranding	With terminating foil shield
Cable shield	Copper/Tin braiding, optical coverage ≥85%
Outer jacket	
Material	PUR
Color	Green flat
Labeling	B&R 4x0.14 + 4x0.35 FLEX (UL) AWM STYLE 20963 80°C 30 V E63216 [1]
Connector	
Type	9-pin female DSUB connector
Mating cycles	<200
Contacts	9
Additional connectors	8-pin male Mini I/O servo connector Mating cycles: <1500 Contacts: 8 Degree of protection per EN 60529: IP30 when connected
Degree of protection per EN 60529	IP20 when connected
Electrical properties [1]	
Test voltage	
Wire - Wire	1 kV
Wire - Shield	0.5 kV
Conductor resistance	
Supply lines	≤55 Ω/km
Signal line	≤134 Ω/km
Insulation resistance	>200 MΩ*km
Ambient conditions [1]	
Temperature	
Moving	-10 to 80°C
Static	-40 to 80°C
Mechanical properties [1]	
Dimensions	
Length	0.4 m
Diameter	6 mm ±0.2 mm
Bend radius	
Single bend	≥19 mm
Moving	≥47 mm

Table 215: 8ECF00X4.1241C-0 - Technical data

Technical data

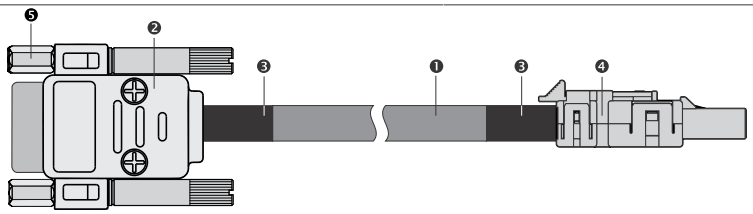
Order number	8ECF00X4.1241C-0
Drag chain data	
Acceleration	≤6 g
Flex cycles [2]	≥3000000
Velocity	≤4 m/s
Weight	0.03 kg

Table 215: 8ECF00X4.1241C-0 - Technical data

1) Values refer to the raw cable being used.
2) Valid at an ambient temperature of 20°C and bend radius of 78 mm.

2.3.5.10.1.4 Wiring

Cable construction



Pos.	Name	Note
1	Cables	4 x 0.14 mm² + 4 x 0.35 mm²
2	9-pin female DSUB including metal housing	
3	Heat shrink tubing	
4	Mini I/O connector	
5	Hex extender	For screwing in the DSUB connector on an encoder cable

Table 216: Adapter cable 8ECF00X4.1241C-0 - Cable construction

Pinout

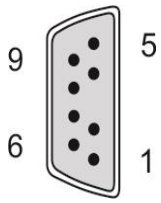
DSUB connector	Pin	Name [1]	Function [1]	Pin	Mini I/O connector
	1	V out	Encoder power supply +	1	
	2	S+ / HDSL+	Sense+ / HiperfaceDSL+	3	
	3	---	---	---	
	4	D	Data input	6	
	5	T	Clock output	2	
	6	COM	Encoder power supply 0 V	7	
	7	S- / HDSL-	Sense- / HiperfaceDSL-	5	
	8	D\	Data inverted	8	
	9	T\	Clock output inverted	4	

Table 217: Adapter cable 8ECF00X4.1241C-0 - Pinout

1) Corresponds to the name/function of X4x connectors on ACOPOS P3 8EI servo drives or X4xx connectors on ACOPOS P3 8EAC plug-in modules.

Cable diagram

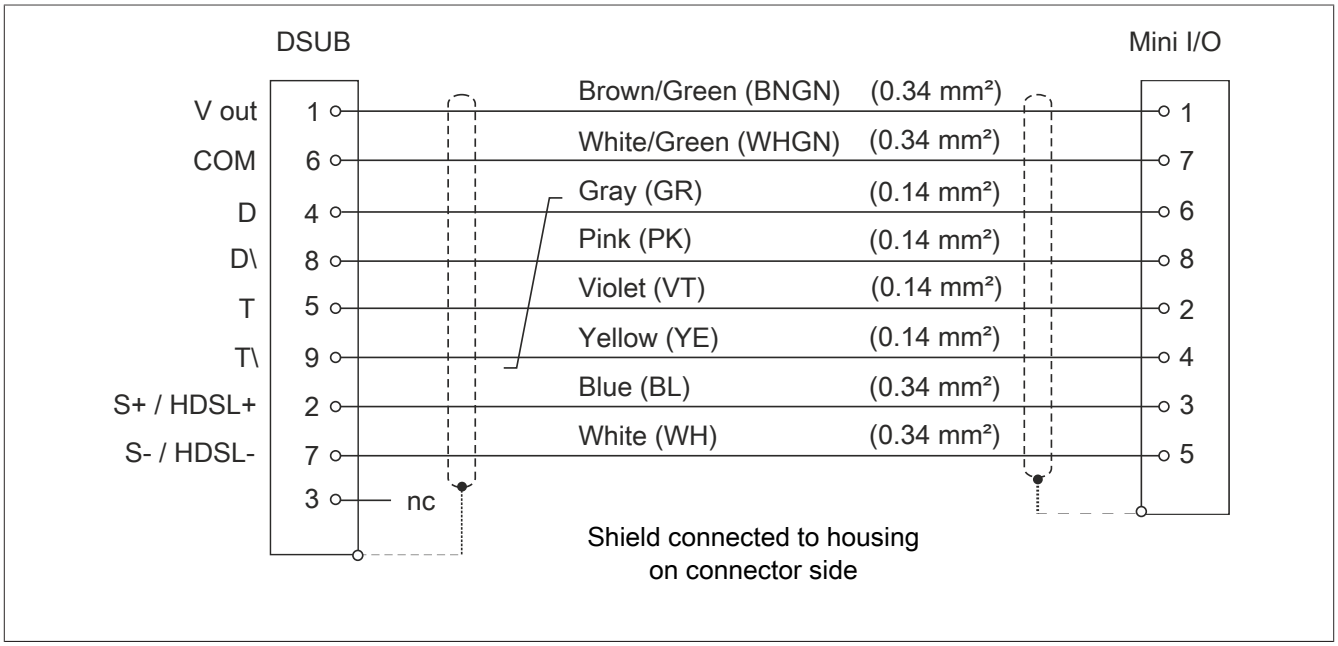


Figure 79: Adapter cable 8ECF00X4.1241C-0 - Cable diagram

2.3.5.10.2 8ECG00X4.3151D-0

2.3.5.10.2.1 General information

- An ACOPOS P3 adapter cable enables the connection of a cable assembly with 15-pin DSUB connector to ACOPOS P3 plug-in card 8EAC0151.00x-1 / 8EAC0152.00x-1.

Information:

The adapter cable cannot be used in combination with front cover 8EXAx00.00xx-00.

2.3.5.10.2.2 Order data

Order number	Short description	Figure
	Adapter cables	
8ECG00X4.3151D-0	ACOPOS P3 adapter cable, length 0.4 m, for analog multi-encoder interfaces and incremental encoder interfaces, 5x 2x 0.14 mm², 10-pin male IX connector to 15-pin female DSUB	

Table 218: 8ECG00X4.3151D-0 - Order data

2.3.5.10.2.3 Technical data

Order number	8ECG00X4.3151D-0
General information	
Cable cross section	5 x 2 x 0.14 mm²
Certifications	
CE	Yes
UKCA	Yes
Cable construction	
Cable shield	Braided shield made of tinned copper wires, optical coverage ≥85%
Outer jacket	
Material	PVC
Color	Gray (RAL 7032)
Connector	
Type	15-pin female DSUB connector
Mating cycles	<500
Additional connectors	10-pin male IX connector Mating cycles: <1500 Degree of protection per EN 60529: IP30 when connected
Degree of protection per EN 60529	IP20 when connected
Electrical properties [1]	
Conductor resistance	
Signal line	≤122 Ω/km
Insulation resistance	>200 MΩ*km
Ambient conditions [2]	
Temperature	
Moving	-5°C to +80°C
Static	-30°C to +80°C
Mechanical properties [2]	
Dimensions	
Length	0.4 m (+ 1%)
Diameter	6 mm ±0.8 mm
Bend radius	
Single bend	≥34 mm
Moving	≥68 mm
Weight	63 g

Table 219: 8ECG00X4.3151D-0 - Technical data

1) Values refer to the raw cable.
2) Values refer to the assembly.

2.3.5.10.2.4 Wiring

Adapter cable - Pinout

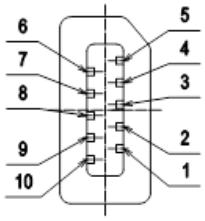
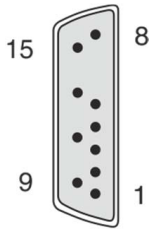
IX connector - B-coded	Pin	Description	Function	Pin	Female DSUB connector
	1	B\	Channel B inverted	11	
	2	B	Channel B	3	
	3	GND	Encoder power supply 0 V	2	
	4	A\	Channel A inverted	9	
	5	A	Channel A	1	
	6	R / DATA+	Channel R / Data +	5	
	7	R\ / DATA-	Channel R inverted / Data -	13	
	8	U+	Encoder supply 5 V / 12 V	4	
	9	T- / CLK-	Temperature sensor - / Clock -	15	
	10	T+ / CLK+	Temperature sensor + / Clock +	8	

Table 220: Adapter cable 8ECGxxxx.3151D-0 - Pinout

Adapter cable - Cable diagram

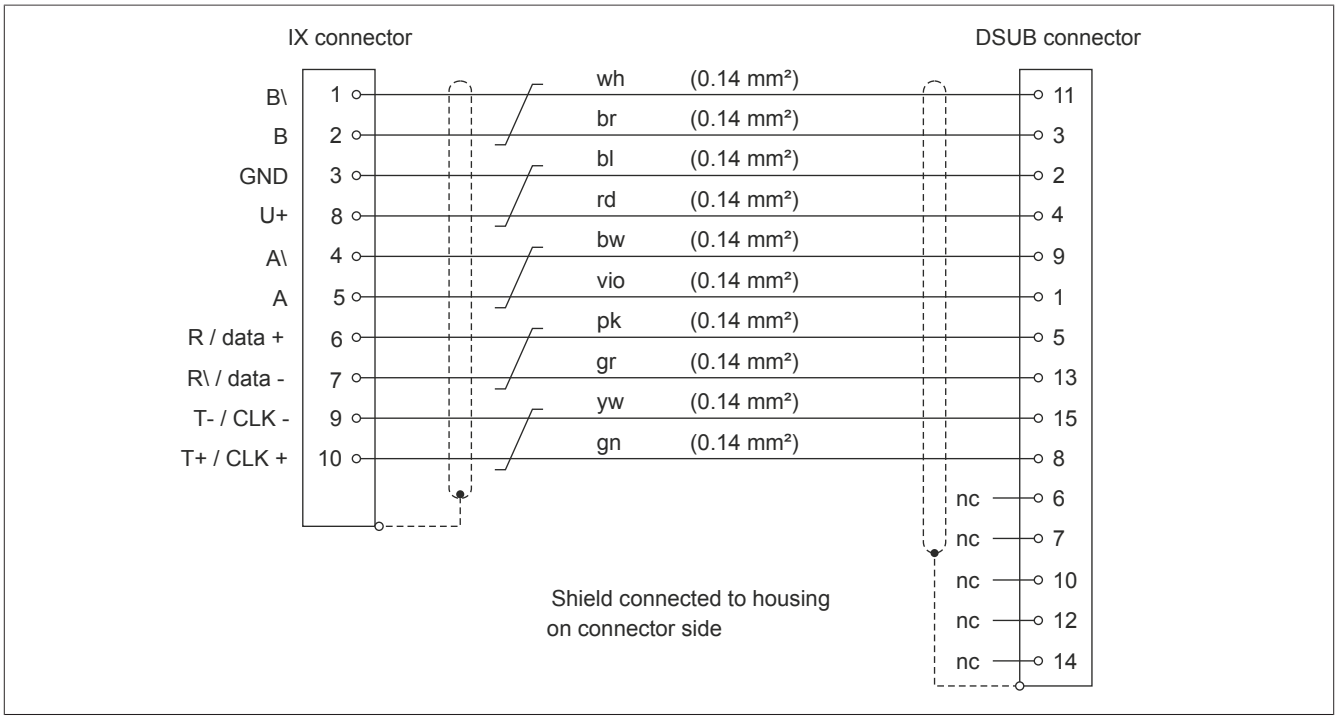


Figure 80: Adapter cable 8ECGxxxx.3151D-0 - Cable diagram

2.3.5.11 Cable extensions

Information:

An extension for a motor, motor hybrid or encoder cable is permitted to be composed of a maximum of 5 individual cable extensions.

2.3.5.11.1 1.5 mm² motor cables

2.3.5.11.1.1 Order data

Order number	Short description	Figure
	Motor cables 1.5 mm²	
8BCM0005.11140-0	Cable extension for 1.5 mm² motor cables with speedtec/ standard connector size 1, length 5 m, can be used in cable drag chains	
8BCM0007.11140-0	Cable extension for 1.5 mm² motor cables with speedtec/ standard connector size 1, length 7 m, can be used in cable drag chains	
8BCM0010.11140-0	Cable extension for 1.5 mm² motor cables with speedtec/ standard connector size 1, length 10 m, can be used in cable drag chains	
8BCM0015.11140-0	Cable extension for 1.5 mm² motor cables with speedtec/ standard connector size 1, length 15 m, can be used in cable drag chains	
8BCM0020.11140-0	Cable extension for 1.5 mm² motor cables with speedtec/ standard connector size 1, length 20 m, can be used in cable drag chains	
8BCM0025.11140-0	Cable extension for 1.5 mm² motor cables with speedtec/ standard connector size 1, length 25 m, can be used in cable drag chains	

Table 221: 8BCM0005.11140-0, 8BCM0007.11140-0, 8BCM0010.11140-0, 8BCM0015.11140-0, 8BCM0020.11140-0, 8BCM0025.11140-0 - Order data

Information:

This cable assembly may be available in other lengths.
For a current overview, see the B&R website (1.5 mm² motor cables).

2.3.5.11.1.2 Technical data

Order number	8BCM0005.11140-0	8BCM0007.11140-0	8BCM0010.11140-0	8BCM0015.11140-0	8BCM0020.11140-0	8BCM0025.11140-0
General information						
Cable cross section	4x 1.5 mm² + 2x 2x 0.75 mm²					
Durability	Oil resistance per HD 22.10 appendix A DIN EN 60811-404 [1)]					
Certifications						
CE	Yes					
UKCA	Yes					
UL	cULus E225616 Power conversion equipment					
Cable construction						
Power lines						
Quantity	4					
Wire insulation	PP					
Wire colors	Black, brown, blue, yellow/green					
Variant	Tinned copper stranded wire					
Cross section	1.5 mm²					
Shield	No					
Stranding	No					
Signal line						
Quantity	4					
Wire insulation	PP					
Wire colors	White, white/red, white/blue, white/green					
Variant	Tinned copper stranded wire					
Cross section	0.75 mm²					
Shield	Individually shielded in pairs, tinned copper braiding, optical coverage >85% and foil shield					
Stranding	White with white/red and white/blue with white/green					
Cable stranding	With filler elements and foil shield					
Cable shield	Tinned copper braiding, optical coverage >85% and foil shield					

Table 222: 8BCM0005.11140-0, 8BCM0007.11140-0, 8BCM0010.11140-0, 8BCM0015.11140-0, 8BCM0020.11140-0, 8BCM0025.11140-0 - Technical data

Order number	8BCM0005.11140-0	8BCM0007.11140-0	8BCM0010.11140-0	8BCM0015.11140-0	8BCM0020.11140-0	8BCM0025.11140-0
Outer jacket						
Material	TPU					
Color	Orange, similar to RAL 2003 flat					
Connector						
Type	8-pin female speedtec motor connector					
Mating cycles	<500					
Contacts	8 (4 power and 4 signal contacts)					
Additional connectors	8-pin male coupling Mating cycles: <500 Contacts: 8 Degree of protection per EN 60529: IP66/67 when connected					
Degree of protection per EN 60529	IP66/67 when connected					
Electrical properties [1]						
Operating voltage	Max. 1000 VAC (UL)					
Test voltage						
Wire - Wire	4 kV					
Wire - Shield	4 kV					
Conductor resistance						
Power lines	≤13.7 Ω/km					
Signal line	≤26.7 Ω/km					
Insulation resistance	≥500 MΩ*km					
Current-carrying capacity per DIN VDE 0298 part 4, table 11						
Wall mounting	20 A					
Installed in conduit or cable duct	17.8 A					
Installed in cable tray	20.9 A					
Ambient conditions [1]						
Temperature						
Moving	-20°C to +80°C					
Static	-20°C to +90°C					
Mechanical properties [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	12.2 mm ±0.3 mm					
Bend radius						
Single bend	>38 mm					
Moving	>94 mm					
Drag chain data						
Acceleration	Max. 50 m/s² (depends on the length of the travel path)					
Flex cycles [2]	≥5,000,000					
Velocity	Max. 300 m/min					
Weight	0.7 kg	1 kg	1.5 kg	2.2 kg	2.9 kg	3.7 kg

Table 222: 8BCM0005.11140-0, 8BCM0007.11140-0, 8BCM0010.11140-0, 8BCM0015.11140-0, 8BCM0020.11140-0, 8BCM0025.11140-0 - Technical data

1) Values refer to the raw cable being used.
2) At an ambient temperature from -20°C to +60°C.

2.3.5.11.2 4 mm² motor cables

2.3.5.11.2.1 Order data

Order number	Short description	Figure
	Motor cables 4 mm²	
8BCM0005.13140-0	Cable extension for 4 mm² motor cables with speedtec/ standard connector size 1, length 5 m, can be used in cable drag chains	
8BCM0007.13140-0	Cable extension for 4 mm² motor cables with speedtec/ standard connector size 1, length 7 m, can be used in cable drag chains	
8BCM0010.13140-0	Cable extension for 4 mm² motor cables with speedtec/ standard connector size 1, length 10 m, can be used in cable drag chains	
8BCM0015.13140-0	Cable extension for 4 mm² motor cables with speedtec/ standard connector size 1, length 15 m, can be used in cable drag chains	
8BCM0020.13140-0	Cable extension for 4 mm² motor cables with speedtec/ standard connector size 1, length 20 m, can be used in cable drag chains	
8BCM0025.13140-0	Cable extension for 4 mm² motor cables with speedtec/ standard connector size 1, length 25 m, can be used in cable drag chains	

Table 223: 8BCM0005.13140-0, 8BCM0007.13140-0, 8BCM0010.13140-0, 8BCM0015.13140-0, 8BCM0020.13140-0, 8BCM0025.13140-0 - Order data

Information:

This cable assembly may be available in other lengths.
For a current overview, see the B&R website (4 mm² motor cables).

2.3.5.11.2.2 Technical data

Order number	8BCM0005. 13140-0	8BCM0007. 13140-0	8BCM0010. 13140-0	8BCM0015. 13140-0	8BCM0020. 13140-0	8BCM0025. 13140-0
General information						
Cable cross section	4x 4 mm² + 2x 0.75 mm² + 2x 1 mm²					
Durability	Oil resistance per HD 22.10 appendix A and DIN EN 60811-404 [1]					
Certifications						
CE	Yes					
UKCA	Yes					
UL	cULus E225616 Power conversion equipment					
Cable construction						
Power lines						
Quantity	4					
Wire insulation	PP					
Wire colors	Black, brown, blue, yellow/green					
Variant	Tinned copper stranded wire					
Cross section	4 mm²					
Shield	No					
Stranding	No					
Signal line						
Quantity	4					
Wire insulation	PP					
Wire colors	White, white/red, white/blue, white/green					
Variant	Tinned copper stranded wire					
Cross section	2x 0.75 mm² + 2x 1 mm²					
Shield	Individually shielded in pairs, tinned copper braiding, optical coverage >85% and foil shield					
Stranding	White with white/red and white/blue with white/green					
Cable stranding	With filler elements and foil shield					
Cable shield	Tinned copper braiding, optical coverage >85% and foil shield					
Outer jacket						
Material	TPU					
Color	Orange, similar to RAL 2003 flat					
Connector						
Type	8-pin female speedtec motor connector					
Mating cycles	<500					
Contacts	8 (4 power and 4 signal contacts)					

Table 224: 8BCM0005.13140-0, 8BCM0007.13140-0, 8BCM0010.13140-0, 8BCM0015.13140-0, 8BCM0020.13140-0, 8BCM0025.13140-0 - Technical data

Order number	8BCM0005.13140-0	8BCM0007.13140-0	8BCM0010.13140-0	8BCM0015.13140-0	8BCM0020.13140-0	8BCM0025.13140-0
Additional connectors	8-pin male coupling Mating cycles: <500 Contacts: 8 Degree of protection per EN 60529: IP66/67 when connected					
Degree of protection per EN 60529	IP66/67 when connected					
Electrical properties [1]						
Operating voltage	Max. 1000 VAC (UL)					
Test voltage						
Wire - Wire	4 kV					
Wire - Shield	4 kV					
Conductor resistance						
Power lines	≤5.1 Ω/km					
Signal line	0.75 mm²: ≤26.7 Ω/km, 1 mm²: ≤20 Ω/km					
Insulation resistance	≥500 MΩ*km					
Current-carrying capacity per DIN VDE 0298 part 4, table 11						
Wall mounting	30 A [2]					
Installed in conduit or cable duct	30 A [2]					
Installed in cable tray	30 A [2]					
Ambient conditions [1]						
Temperature						
Moving	-20°C to +80°C					
Static	-20°C to +90°C					
Mechanical properties [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	15.4 mm ±0.4 mm					
Bend radius						
Single bend	>48 mm					
Moving	>119 mm					
Drag chain data						
Acceleration	Max. 50 m/s² (depends on the length of the travel path)					
Flex cycles [3]	≥5,000,000					
Velocity	Max. 300 m/min					
Weight	1.4 kg	1.9 kg	2.8 kg	4.2 kg	5.5 kg	6.9 kg

Table 224: 8BCM0005.13140-0, 8BCM0007.13140-0, 8BCM0010.13140-0, 8BCM0015.13140-0, 8BCM0020.13140-0, 8BCM0025.13140-0 - Technical data

1) Values refer to the raw cable being used.
2) Limited to 30 A by the motor connector.
3) At an ambient temperature from -20°C to +60°C.

2.3.5.11.3 1.5 mm² hybrid motor cables

2.3.5.11.3.1 Order data

Order number	Short description	Figure
	Motor hybrid cable 1,5 mm²	
8ECH0005.11140-0	Cable extension for 1.5 mm² hybrid motor cable with speedtec connector size 1, length 5 m, can be used in cable drag chains	
8ECH0007.11140-0	Cable extension for 1.5 mm² hybrid motor cable with speedtec connector size 1, length 7 m, can be used in cable drag chains	
8ECH0010.11140-0	Cable extension for 1.5 mm² hybrid motor cable with speedtec connector size 1, length 10 m, can be used in cable drag chains	
8ECH0015.11140-0	Cable extension for 1.5 mm² hybrid motor cable with speedtec connector size 1, length 15 m, can be used in cable drag chains	
8ECH0020.11140-0	Cable extension for 1.5 mm² hybrid motor cable with speedtec connector size 1, length 20 m, can be used in cable drag chains	
8ECH0025.11140-0	Cable extension for 1.5 mm² hybrid motor cable with speedtec connector size 1, length 25 m, can be used in cable drag chains	

Table 225: 8ECH0005.11140-0, 8ECH0007.11140-0, 8ECH0010.11140-0, 8ECH0015.11140-0, 8ECH0020.11140-0, 8ECH0025.11140-0 - Order data

2.3.5.11.3.2 Technical data

Order number	8ECH0005.11140-0	8ECH0007.11140-0	8ECH0010.11140-0	8ECH0015.11140-0	8ECH0020.11140-0	8ECH0025.11140-0
General information						
Cable cross section	4x 1.5 mm² + 2x 0.75 mm² + (2x 1x 0.30 mm² + 2x 2x 0.15 mm²)					
Durability	Oil resistance per EN 60811-2-1 [1]					
Certification [2]	UL AWM style 21223, 80°C, 1000 V and CSA C22.2 no. 210 I/II A/B FT1 UL AWM style 22381, 90°C, 1000 V and CSA C22.2 no. 210 I/II A/B FT1 UL AWM style 21209, 90°C, 1000 V and CSA C22.2 no. 210 I/II A/B FT1					
Certifications						
CE	Yes					
UKCA	Yes					
Cable construction						
Power lines						
Quantity	4					
Wire insulation	PP					
Wire colors	Black, brown, blue, yellow/green					
Variant	Copper stranded wire					
Cross section	1.5 mm²					
Shield	No					
Stranding	No					
Supply lines						
Quantity	2					
Wire insulation	PP					
Wire colors	White/Blue, white/green					
Variant	Tinned copper stranded wire					
Cross section	0.75 mm²					
Shield	No					
Stranding	No					
Signal line						
Quantity	6					
Wire insulation	PP					
Wire colors	Brown/Green, white/green, gray/pink, yellow/violet					
Variant	2x copper stranded wire, 4x tinned copper stranded wire					
Cross section	2x 0.30 mm², 4x 0.15 mm²					
Shield	Tinned copper braiding, optical coverage >85% and foil shield					
Stranding	Brown/Green with white/green, pink with gray and yellow with violet					
Cable stranding	With filler elements and foil shield					
Cable shield	Tinned copper braiding, optical coverage >85% and foil shield					
Outer jacket						
Material	PUR					
Color	Orange, similar to RAL 2003 flat					
Connector						
Type	13-pin female speedtec circular connector					
Mating cycles	<500					

Table 226: 8ECH0005.11140-0, 8ECH0007.11140-0, 8ECH0010.11140-0, 8ECH0015.11140-0, 8ECH0020.11140-0, 8ECH0025.11140-0 - Technical data

Order number	8ECH0005.11140-0	8ECH0007.11140-0	8ECH0010.11140-0	8ECH0015.11140-0	8ECH0020.11140-0	8ECH0025.11140-0
Contacts	13					
Additional connectors	13-pin male coupling Mating cycles: <500 Contacts: 13 Degree of protection per EN 60529: IP66/67 when connected					
Degree of protection per EN 60529	IP66/67 when connected					
Electrical properties [1]						
Test voltage						
Wire - Wire	4 kV					
Wire - Shield	4 kV					
Conductor resistance						
Power lines	≤13.3 Ω/km					
Supply lines	≤26 Ω/km					
Signal line	0.30 mm²: ≤68 Ω/km, 0.15 mm²: ≤140 Ω/km					
Insulation resistance	≥200 MΩ*km					
Current-carrying capacity per DIN VDE 0298 part 4, table 11						
Wall mounting	20.2 A					
Installed in conduit or cable duct	17.8 A					
Installed in cable tray	20.9 A					
Ambient conditions [1]						
Temperature						
Moving	-20°C to +90°C					
Static	-20°C to +90°C					
Mechanical properties [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	13 mm ±0.4 mm					
Bend radius						
Single bend	>40 mm					
Moving	≥100 mm					
Drag chain data						
Acceleration	Max. 50 m/s² (depends on the length of the travel path)					
Flex cycles	≥3,000,000					
Velocity	Max. 300 m/min					
Weight	1.2 kg	1.7 kg	2.4 kg	3.6 kg	4.8 kg	5.9 kg

Table 226: 8ECH0005.11140-0, 8ECH0007.11140-0, 8ECH0010.11140-0, 8ECH0015.11140-0, 8ECH0020.11140-0, 8ECH0025.11140-0 - Technical data

1) Values refer to the raw cable being used.
2) Depends on the raw cable used.

2.3.5.11.4 4 mm² hybrid motor cables

2.3.5.11.4.1 Order data

Order number	Short description	Figure
	Motor hybrid cable 4 mm²	
8ECH0005.13140-0	Cable extension for 4 mm² hybrid motor cable with speedtec connector size 1, length 5 m, can be used in cable drag chains	
8ECH0007.13140-0	Cable extension for 4 mm² hybrid motor cable with speedtec connector size 1, length 7 m, can be used in cable drag chains	
8ECH0010.13140-0	Cable extension for 4 mm² hybrid motor cable with speedtec connector size 1, length 10 m, can be used in cable drag chains	
8ECH0015.13140-0	Cable extension for 4 mm² hybrid motor cable with speedtec connector size 1, length 15 m, can be used in cable drag chains	
8ECH0020.13140-0	Cable extension for 4 mm² hybrid motor cable with speedtec connector size 1, length 20 m, can be used in cable drag chains	
8ECH0025.13140-0	Cable extension for 4 mm² hybrid motor cable with speedtec connector size 1, length 25 m, can be used in cable drag chains	

Table 227: 8ECH0005.13140-0, 8ECH0007.13140-0, 8ECH0010.13140-0, 8ECH0015.13140-0, 8ECH0020.13140-0, 8ECH0025.13140-0 - Order data

2.3.5.11.4.2 Technical data

Order number	8ECH0005.13140-0	8ECH0007.13140-0	8ECH0010.13140-0	8ECH0015.13140-0	8ECH0020.13140-0	8ECH0025.13140-0
General information						
Cable cross section	4x 4 mm² + 2x 1 mm² + (2x 1x 0.30 mm² + 2x 2x 0.15 mm²)					
Durability	Oil resistance per EN 60811-2-1 [1]					
Certification	E130266 cRUus AWM style 21223, 80°C, 1000 V and CSA C22.2 no. 210 I/II A/B FT1 [1]					
Certifications						
CE	Yes					
UKCA	Yes					
Cable construction						
Power lines						
Quantity	4					
Wire insulation	PP					
Wire colors	Black, brown, blue, yellow/green					
Variant	Copper stranded wire					
Cross section	4 mm²					
Shield	No					
Stranding	No					
Supply lines						
Quantity	2					
Wire insulation	PP					
Wire colors	White/Blue, white/green					
Variant	Tinned copper stranded wire					
Cross section	1 mm²					
Shield	No					
Stranding	No					
Signal line						
Quantity	6					
Wire insulation	PP					
Wire colors	Brown/Green, white/green, gray/pink, yellow/violet					
Variant	2x copper stranded wire, 4x tinned copper stranded wire					
Cross section	2x 0.30 mm², 4x 0.15 mm²					
Shield	Tinned copper braiding, optical coverage >85% and foil shield					
Stranding	Brown/Green with white/green, pink with gray and yellow with violet					
Cable stranding	With filler elements and foil shield					
Cable shield	Tinned copper braiding, optical coverage >85% and foil shield					
Outer jacket						
Material	PUR					
Color	Orange, similar to RAL 2003 flat					
Labeling	B&R 4x4 + 2x1 + (2x2 26AWG + 2x1x 23AWG) *E130266* cRUus AWM STYLE 21223* AWM I/II A/B 80°C 1000 V FT1 [1]					
Connector						
Type	13-pin female speedtec circular connector					
Mating cycles	<500					
Contacts	13					

Table 228: 8ECH0005.13140-0, 8ECH0007.13140-0, 8ECH0010.13140-0, 8ECH0015.13140-0, 8ECH0020.13140-0, 8ECH0025.13140-0 - Technical data

Order number	8ECH0005.13140-0	8ECH0007.13140-0	8ECH0010.13140-0	8ECH0015.13140-0	8ECH0020.13140-0	8ECH0025.13140-0
Additional connectors	13-pin male coupling Mating cycles: <500 Contacts: 13 Degree of protection per EN 60529: IP66/67 when connected					
Degree of protection per EN 60529	IP66/67 when connected					
Electrical properties [1]						
Test voltage						
Wire - Wire	4 kV					
Wire - Shield	4 kV					
Conductor resistance						
Power lines	≤5 Ω/km					
Supply lines	≤19.5 Ω/km					
Signal line	0.30 mm²: ≤68 Ω/km, 0.15 mm²: ≤140 Ω/km					
Insulation resistance	≥200 MΩ*km					
Current-carrying capacity per DIN VDE 0298 part 4, table 11						
Wall mounting	30 A [2]					
Installed in conduit or cable duct	30 A [2]					
Installed in cable tray	30 A [2]					
Ambient conditions [1]						
Temperature						
Moving	-20°C to +90°C					
Static	-20°C to +90°C					
Mechanical properties [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	15.7 mm ±0.4 mm					
Bend radius						
Single bend	>48 mm					
Moving	≥121 mm					
Drag chain data						
Acceleration	Max. 50 m/s² (depends on the length of the travel path)					
Flex cycles	≥3,000,000					
Velocity	Max. 300 m/min					
Weight	1.9 kg	2.7 kg	3.9 kg	5.8 kg	7.7 kg	9.6 kg

Table 228: 8ECH0005.13140-0, 8ECH0007.13140-0, 8ECH0010.13140-0, 8ECH0015.13140-0, 8ECH0020.13140-0, 8ECH0025.13140-0 - Technical data

1) Values refer to the raw cable being used.
2) Limited to 30 A by the hybrid motor connector.

2.3.5.11.5 EnDat 2.2 cables

2.3.5.11.5.1 Order data

Order number	Short description	Figure
	EnDat 2.2 cables	
8BCF0005.12230-0	Cable extension for EnDat 2.2 cables with series 615 signal connector, length 5 m, can be used in cable drag chains	
8BCF0007.12230-0	Cable extension for EnDat 2.2 cables with series 615 signal connector, length 7 m, can be used in cable drag chains	
8BCF0010.12230-0	Cable extension for EnDat 2.2 cables with series 615 signal connector, length 10 m, can be used in cable drag chains	
8BCF0015.12230-0	Cable extension for EnDat 2.2 cables with series 615 signal connector, length 15 m, can be used in cable drag chains	
8BCF0020.12230-0	Cable extension for EnDat 2.2 cables with series 615 signal connector, length 20 m, can be used in cable drag chains	
8BCF0025.12230-0	Cable extension for EnDat 2.2 cables with series 615 signal connector, length 25 m, can be used in cable drag chains	

Table 229: 8BCF0005.12230-0, 8BCF0007.12230-0, 8BCF0010.12230-0, 8BCF0015.12230-0, 8BCF0020.12230-0, 8BCF0025.12230-0 - Order data

2.3.5.11.5.2 Technical data

Order number	8BCF0005. 12230-0	8BCF0007. 12230-0	8BCF0010. 12230-0	8BCF0015. 12230-0	8BCF0020. 12230-0	8BCF0025. 12230-0
General information						
Cable cross section	4x 0.14 mm² + 4x 0.35 mm²					
Durability	Oil resistance per DIN EN 50363-10-2 (VDE 0207-363-10-2) as well as standard cleaning agents and hydraulic oil [1]					
Certification	UL AWM Style 20963, 80°C, 30 V, E63216 [1]					
Certifications						
CE	Yes					
UKCA	Yes					
Cable construction						
Supply lines						
Quantity	4					
Wire insulation	Special thermoplastic material					
Wire colors	White/Green, brown/green, blue, white					
Variant	Tinned copper stranded wire					
Cross section	0.35 mm²					
Shield	No					
Stranding	No					
Signal line						
Quantity	4					
Wire insulation	Polyolefin foam					
Wire colors	Yellow, gray, pink, violet					
Variant	Tinned copper stranded wire					
Cross section	0.14 mm²					
Shield	No					
Stranding	All 4 wires together					
Cable stranding	With terminating foil shield					
Cable shield	Copper/Tin braiding, optical coverage ≥85%					
Outer jacket						
Material	PUR					
Color	Green flat					
Labeling	B&R 4x0,14 + 4x0,35 FLEX (UL) AWM STYLE 20963 80°C 30 V E63216 [1]					
Connector						
Type	12-pin female series 615 signal connector					
Mating cycles	<500					
Contacts	12					
Additional connectors	12-pin male coupling Mating cycles: <500 Contacts: 12 Degree of protection per EN 60529: IP66/67 when connected					
Degree of protection per EN 60529	IP66/67 when connected					
Electrical properties [1]						
Operating voltage	≤30 V					
Test voltage						
Wire - Wire	1 kV					
Wire - Shield	0.5 kV					
Conductor resistance						
Supply lines	≤55 Ω/km					
Signal line	≤134 Ω/km					
Insulation resistance	>200 MΩ*km					

Table 230: 8BCF0005.12230-0, 8BCF0007.12230-0, 8BCF0010.12230-0, 8BCF0015.12230-0, 8BCF0020.12230-0, 8BCF0025.12230-0 - Technical data

Order number	8BCF0005.12230-0	8BCF0007.12230-0	8BCF0010.12230-0	8BCF0015.12230-0	8BCF0020.12230-0	8BCF0025.12230-0
Ambient conditions [1]						
Temperature						
Moving	-20°C to +80°C					
Static	-20°C to +80°C					
Mechanical properties [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	6 mm ±0.2 mm					
Bend radius						
Single bend	≥19 mm					
Moving	≥47 mm					
Drag chain data						
Acceleration	≤6 g					
Flex cycles [2]	≥3000000					
Velocity	≤4 m/s					
Weight	0.33 kg	0.41 kg	0.6 kg	0.9 kg	1.2 kg	1.5 kg

Table 230: 8BCF0005.12230-0, 8BCF0007.12230-0, 8BCF0010.12230-0, 8BCF0015.12230-0, 8BCF0020.12230-0, 8BCF0025.12230-0 - Technical data

1) Values refer to the raw cable being used.
2) Valid at an ambient temperature of 20°C and bend radius of 78 mm.

2.3.5.11.6 Resolver cables

2.3.5.11.6.1 Order data

Order number	Short description	Figure
	Resolver cables	
8BCR0005.11120-0	Cable extension for resolver cable with speedtec or standard connector, length 5 m, can be used in cable drag chains	
8BCR0007.11120-0	Cable extension for resolver cable with speedtec or standard connector, length 7 m, can be used in cable drag chains	
8BCR0010.11120-0	Cable extension for resolver cable with speedtec or standard connector, length 10 m, can be used in cable drag chains	
8BCR0015.11120-0	Cable extension for resolver cable with speedtec or standard connector, length 15 m, can be used in cable drag chains	
8BCR0020.11120-0	Cable extension for resolver cable with speedtec or standard connector, length 20 m, can be used in cable drag chains	
8BCR0025.11120-0	Cable extension for resolver cable with speedtec or standard connector, length 25 m, can be used in cable drag chains	

Table 231: 8BCR0005.11120-0, 8BCR0007.11120-0, 8BCR0010.11120-0, 8BCR0015.11120-0, 8BCR0020.11120-0, 8BCR0025.11120-0 - Order data

Information:

This cable assembly may be available in other lengths.
For a current overview, see the B&R website (Resolver cables).

2.3.5.11.6.2 Technical data

Order number	8BCR0005.11120-0	8BCR0007.11120-0	8BCR0010.11120-0	8BCR0015.11120-0	8BCR0020.11120-0	8BCR0025.11120-0
General information						
Cable cross section	3x 2x 24 19 AWG					
Durability	Oil resistance per VDE 0472 Part 803 as well as standard hydraulic oils [1]					
Certifications						
CE	Yes					
UKCA	Yes					
UL	cULus E225616 Power conversion equipment					
Cable construction						
Signal line						
Quantity	6					
Wire insulation	Special thermoplastic material					
Wire colors	White/Brown, green/yellow, gray/pink					
Variant	Tinned copper stranded wire					
Cross section	24 AWG / 19 AWG					
Shield	No					
Stranding	White with brown, green with yellow, gray with pink					
Cable stranding	The 3 pairs together covered by foil shield					
Cable shield	Copper braiding, optical coverage ≥90% and foil shield					
Outer jacket						
Material	PUR					
Color	Green, similar to RAL 6018 flat					
Connector						
Type	12-pin female speedtec circular connector					
Mating cycles	<500					
Contacts	12					
Additional connectors	12-pin male coupling Mating cycles: <500 Contacts: 12 Degree of protection per EN 60529: IP66/67 when connected					
Degree of protection per EN 60529	IP66/67 when connected					
Electrical properties [1]						
Operating voltage	≤30 V_{eff}					
Test voltage						
Wire - Wire	1.5 kV					
Wire - Shield	0.8 kV					
Conductor resistance						
Signal line	≤86 Ω/km					

Table 232: 8BCR0005.11120-0, 8BCR0007.11120-0, 8BCR0010.11120-0, 8BCR0015.11120-0, 8BCR0020.11120-0, 8BCR0025.11120-0 - Technical data

Order number	8BCR0005.11120-0	8BCR0007.11120-0	8BCR0010.11120-0	8BCR0015.11120-0	8BCR0020.11120-0	8BCR0025.11120-0
Insulation resistance	>200 MΩ*km					
Ambient conditions [1]						
Temperature						
Moving	-20°C to +80°C					
Static	-20°C to +90°C					
Mechanical properties [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	6.5 mm ±0.2 mm					
Bend radius						
Single bend	≥20 mm					
Moving	≥50 mm					
Drag chain data						
Acceleration	≤6 g					
Flex cycles [2]	>3,000,000					
Velocity	≤4 m/s					
Weight	0.4 kg	0.5 kg	0.7 kg	1.1 kg	1.4 kg	1.8 kg

Table 232: 8BCR0005.11120-0, 8BCR0007.11120-0, 8BCR0010.11120-0, 8BCR0015.11120-0, 8BCR0020.11120-0, 8BCR0025.11120-0 - Technical data

1) Values refer to the raw cable being used.
2) At an ambient temperature of 20°C and bend radius of 65 mm.

2.3.5.11.7 Resolver cables with springtec connector

2.3.5.11.7.1 Order data

Order number	Short description	Figure
	Resolver Cables SpringTec connector	
8BCR0005.11230-0	Cable extension for resolver cables with series 615 signal connector, length 5 m, can be used in cable drag chains	
8BCR0007.11230-0	Cable extension for resolver cables with series 615 signal connector, length 7 m, can be used in cable drag chains	
8BCR0010.11230-0	Cable extension for resolver cables with series 615 signal connector, length 10 m, can be used in cable drag chains	
8BCR0015.11230-0	Cable extension for resolver cables with series 615 signal connector, length 15 m, can be used in cable drag chains	
8BCR0020.11230-0	Cable extension for resolver cables with series 615 signal connector, length 20 m, can be used in cable drag chains	
8BCR0025.11230-0	Cable extension for resolver cables with series 615 signal connector, length 25 m, can be used in cable drag chains	

Table 233: 8BCR0005.11230-0, 8BCR0007.11230-0, 8BCR0010.11230-0, 8BCR0015.11230-0, 8BCR0020.11230-0, 8BCR0025.11230-0 - Order data

2.3.5.11.7.2 Technical data

Order number	8BCR0005. 11230-0	8BCR0007. 11230-0	8BCR0010. 11230-0	8BCR0015. 11230-0	8BCR0020. 11230-0	8BCR0025. 11230-0
General information						
Cable cross section	3x 2x 24 19 AWG					
Durability	Oil resistance per VDE 0472 Part 803 as well as standard hydraulic oils [1]					
Certifications						
CE	Yes					
UKCA	Yes					
UL	cULus E225616 Power conversion equipment					
Cable construction						
Signal line						
Quantity	6					
Wire insulation	Special thermoplastic material					
Wire colors	White/Brown, green/yellow, gray/pink					
Variant	Tinned copper stranded wire					
Cross section	24 AWG / 19 AWG					
Shield	No					
Stranding	White with brown, green with yellow, gray with pink					
Cable stranding	The 3 pairs together covered by foil shield					
Cable shield	Copper braiding, optical coverage ≥90% and foil shield					
Outer jacket						
Material	PUR					
Color	Green, similar to RAL 6018 flat					
Connector						
Type	12-pin female series 615 signal connector					
Mating cycles	<500					
Contacts	12					
Additional connectors	12-pin male coupling Mating cycles: <500 Contacts: 12 Degree of protection per EN 60529: IP66/67 when connected					
Degree of protection per EN 60529	IP66/67 when connected					
Electrical properties [1]						
Operating voltage	≤30 V_{eff}					
Test voltage						
Wire - Wire	1.5 kV					
Wire - Shield	0.8 kV					
Conductor resistance						
Signal line	≤86 Ω/km					
Insulation resistance	>200 MΩ*km					
Ambient conditions [1]						
Temperature						
Moving	-20°C to +80°C					
Static	-20°C to +90°C					
Mechanical properties [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	6.5 mm ±0.2 mm					

Table 234: 8BCR0005.11230-0, 8BCR0007.11230-0, 8BCR0010.11230-0, 8BCR0015.11230-0, 8BCR0020.11230-0, 8BCR0025.11230-0 - Technical data

Order number	8BCR0005.11230-0	8BCR0007.11230-0	8BCR0010.11230-0	8BCR0015.11230-0	8BCR0020.11230-0	8BCR0025.11230-0
Bend radius						
Single bend	≥20 mm					
Moving	≥50 mm					
Drag chain data						
Acceleration	≤6 g					
Flex cycles [2]	>3,000,000					
Velocity	≤4 m/s					
Weight	0.4 kg	0.49 kg	0.7 kg	1.1 kg	1.4 kg	1.8 kg

Table 234: 8BCR0005.11230-0, 8BCR0007.11230-0, 8BCR0010.11230-0, 8BCR0015.11230-0, 8BCR0020.11230-0, 8BCR0025.11230-0 - Technical data

1) Values refer to the raw cable being used.
2) At an ambient temperature of 20°C and bend radius of 65 mm.

2.3.6 General accessories

2.3.6.1 Overview

Order number	Short description	Page
	Coding keys	
8EXC000.0022-00	Coding plug, red (20x 6 pcs), for 8TB3308.222A-00	335
	Fan modules	
8EXF100.0000-00	ACOPOS P3 fan module, replacement fan for ACOPOS P3 servo drive single-width (8EI1X6/8EI2X2/8EI4X5/ 8EI8X8/8EI013/8EI017xxS)	336
8EXF200.0000-00	ACOPOS P3 fan module, replacement fan for ACOPOS P3 servo drive double-width (8EI017xxD/8EI022xxD/ 8EI024/8EI034/8EI044)	339
8EXF300.0000-00	ACOPOS P3 ELKO fan module, replacement fan for ACOPOS P3 servo drive double-width (8EI017xxD/8EI022xxD/ 8EI024/8EI034/8EI044)	342
	Front covers	
8EXA100.0010-00	ACOPOS P3 cover, B&R orange, single-width, suitable for servo drives 8EI1X6xxSxx.xxxx-x / 8EI2X2xxSxx.xxxx-x / 8EI4X5xxSxx.xxxx-x /8EI8X8xxSxx.xxxx-x	311
8EXA100.0020-00	ACOPOS P3 cover, B&R dark gray, single-width, suitable for servo drives 8EI1X6xxSxx.xxxx-x / 8EI2X2xxSxx.xxxx-x / 8EI4X5xxSxx.xxxx-x /8EI8X8xxSxx.xxxx-x	312
8EXA200.0010-00	ACOPOS P3 dover, B&R orange, single-width, suitable for servo drives 8EI2X2xxDxx.xxxx-x / 8EI2X2xxTxx.xxxx-x / 8EI4X5xxDxx.xxxx-x / 8EI4X5xxTxx.xxxx-x /8EI8X8xxDxx.xxxx-x / 8EI8X8xxTxx.xxxx-x / 8EI013xxSxx.xxxx-x / 8EI017xxSxx.xxxx-x	313
8EXA200.0020-00	ACOPOS P3 cover, B&R dark gray, single-width, suitable for servo drives 8EI2X2xxDxx.xxxx-x / 8EI2X2xxTxx.xxxx-x / 8EI4X5xxDxx.xxxx-x / 8EI4X5xxTxx.xxxx-x / 8EI8X8xxDxx.xxxx-x / 8EI8X8xxTxx.xxxx-x / 8EI013xxSxx.xxxx-x / 8EI017xxSxx.xxxx-x	314
8EXA300.0010-00	ACOPOS P3 cover, B&R orange, double-width, suitable for servo drives 8EI017xxDxx.xxxx-x / 8EI022xxDxx.xxxx-x / 8EI024xxSxx.xxxx-x / 8EI034xxSxx.xxxx-x / 8EI044xxSxx.xxxx-x	315
8EXA300.0020-00	ACOPOS P3 cover, B&R dark gray, double-width, suitable for servo drives 8EI017xxDxx.xxxx-x / 8EI022xxDxx.xxxx-x / 8EI024xxSxx.xxxx-x / 8EI034xxSxx.xxxx-x / 8EI044xxSxx.xxxx-x	316
	Metal Flanges	
8BXC011.0000-00	Metal flange for feeding a size 1 speedtec connector (type 623) through a control cabinet panel, front or rear panel installation possible	345
8BXC013.0000-00	Metal flange for feeding a size 1.5 speedtec connector (type 940) through a control cabinet panel, front or rear panel installation possible	354
8BXC014.0000-00	Metal flange for feeding a series 615/915 connector through a control cabinet panel, front or rear panel installation possible	358
	Metal flanges	
8BXC012.0000-00	Metal flange for feeding a size 1 speedtec connector (type 723/923) through a control cabinet panel, front or rear panel installation possible	349
	Shield component sets	
8SCSE01.0100-00	ACOPOS P3 shield component set: 1x ACOPOS P3 shield mounting plate, 1x 2x M3x6 screws	305
8SCSE01.0200-00	ACOPOS P3 shield component set: 1x ACOPOS P3 shield mounting plate, 2x 2x M3x6 screws	306
8SCSE01.0300-00	ACOPOS P3 shield component set: 1x support plate with 2 grounding clamps 3-6 mm, 1x M4x6 screw	307
8SCSE02.0100-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK14	309
8SCSE02.0200-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK20	310
	Terminal blocks	
8TB2104.2210-00	4-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively	333
8TB2104.2210-50	4-pin push-in terminal block, yellow, 1-row, with locking mechanism, pitch: 5.08 mm, label 1: 4 3 2 1	331
8TB2104.223L-00	4-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 3: T- T+ B- B+, coding L: 1010	328
8TB2204.2210-50	4-pin push-in terminal block, yellow, 2-row, pitch: 5.08 mm, label 1: 4 3 2 1,	332
8TB3102.222C-20	2-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	324
8TB3103.222A-20	3-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: PE RB- RB+, coding A: 000	329
8TB3106.222B-20	6-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: PE L3 L2 L1 DC- DC +, coding B: 000001	318
8TB3106.223C-20	6-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 3: PE L3 N(L2) L1 DC- DC+, coding C: 000010	319
8TB3202.222C-40	2-pin push-in terminal block, 2-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	325
8TB3206.222B-40	6-pin push-in terminal block, 2-row, with locking mechanism, pitch: 7.62 mm, label 2: PE L3 L2 L1 DC- DC +, coding B: 000001	320
8TB3206.223C-40	6-pin push-in terminal block, 2-row, with locking mechanism, pitch: 7.62 mm, label 3: PE L3 N(L2) L1 DC- DC+, coding C: 000010	321
8TB3308.222A-00	4+4-pin push-in terminal block 1-row / 2-row, pitch: 7.62 mm, label 2: T- B- T+ B+ PE W V U coding A: 0000	326
8TB4103.222A-10	3-pin push-in terminal block, one-row, pitch: 10.16 mm, label 2: PE RB- RB+, coding A: 000	330
8TB4104.222L-10	4-pin push-in terminal block, 1-row, pitch: 10.16 mm, label 2: PE L3 L2 L1, coding L: 1010	322
8TB4104.224G-10	4-pin push-in terminal block, 1-row, pitch: 10.16 mm, label 4: PE W V U, coding G: 0110	327
8TB4104.227F-10	4-pin push-in terminal block, 1-row, pitch: 10.16 mm, label 4: DC-, DC-, DC+, DC+ coding F: 0101	334
8TB4204.202L-10	4-pin push-in screw terminal block, two-row, pitch: 10.16 mm, label 2: PE L3 L2 L1, coding L: 1010	323

2.3.6.2 8SCSE shield component sets

2.3.6.2.1 8SCSE01.0100-00

2.3.6.2.1.1 General information

Shield component set 8SCSE01.0100-00 is installed on the underside of ACOPOS P3 8EI servo drives with a width of 66 mm and consists of a shield mounting plate on which shield connection clamps for device-side shielding of DC bus and brake resistor cables can be installed.

2.3.6.2.1.2 Order data

Order number	Short description	Figure
	Shield component sets	
8SCSE01.0100-00	ACOPOS P3 shield component set: 1x ACOPOS P3 shield mounting plate, 1x 2x M3x6 screws	

Table 235: 8SCSE01.0100-00 - Order data

2.3.6.2.1.3 Technical data

Order number	8SCSE01.0100-00
General information	
Short description	ACOPOS P3 shield component set: 1x ACOPOS P3 shield mounting plate 1x, 2x M3x6 screws
Certifications	
CE	Yes
UKCA	Yes
Mechanical properties	
Dimensions	
Width	57.5 mm
Height	108.6 mm
Depth	102 mm
Weight	85 g

Table 236: 8SCSE01.0100-00 - Technical data

2.3.6.2.1.4 Installation

Procedure

- Install the shield component set on the underside of the ACOPOS P3 servo drive as shown in the illustration using the screws included in delivery.

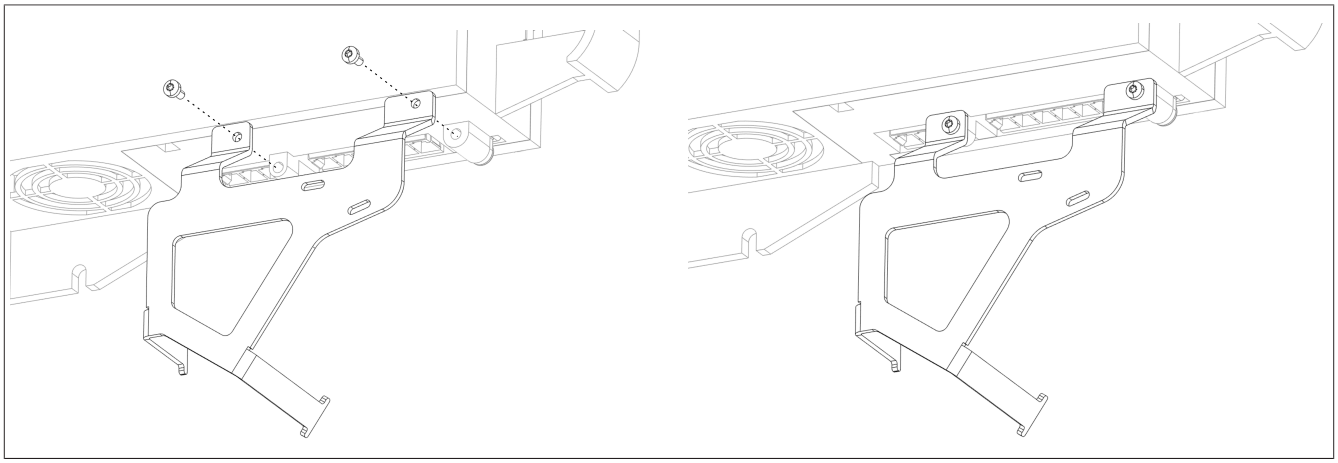


Figure 81: Shield component set 8SCSE01.0100-00 - Installation

2.3.6.2.2 8SCSE01.0200-00

2.3.6.2.2.1 General information

Shield component set 8SCSE01.0200-00 is installed on the underside of ACOPOS P3 8EI servo drives with a width of 133 mm and consists of a shield mounting plate on which shield connection clamps for device-side shielding of DC bus and brake resistor cables can be installed.

2.3.6.2.2.2 Order data

Order number	Short description	Figure
	Shield component sets	
8SCSE01.0200-00	ACOPOS P3 shield component set: 1x ACOPOS P3 shield mounting plate, 2x 2x M3x6 screws	

Table 237: 8SCSE01.0200-00 - Order data

2.3.6.2.2.3 Technical data

Order number	8SCSE01.0200-00
General information	
Short description	ACOPOS P3 shield component set: 1x ACOPOS P3 shield mounting plate 2x, 2x M3x6 screws
Certifications	
CE	Yes
UKCA	Yes
Mechanical properties	
Dimensions	
Width	84 mm
Height	108.6 mm
Depth	102 mm
Weight	80 g

Table 238: 8SCSE01.0200-00 - Technical data

2.3.6.2.2.4 Installation

Procedure

- Install the shield component set on the underside of the ACOPOS P3 servo drive as shown in the illustration using the screws included in delivery.

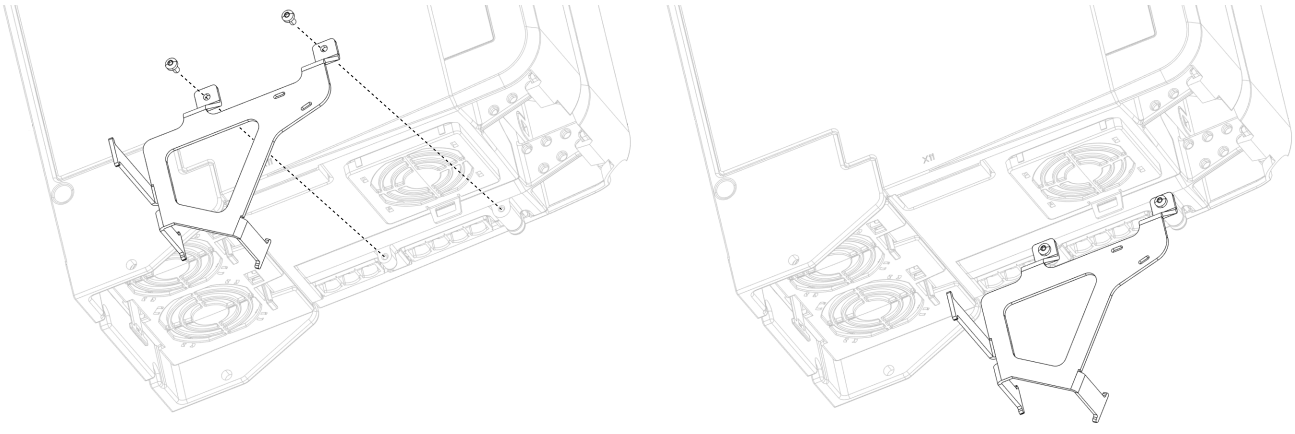


Table 239: Shield component set 8SCSE001.0200-00 - Installation

2.3.6.2.3 8SCSE01.0300-00

2.3.6.2.3.1 General information

Shield component set 8SCSE01.0300-00 consists of a support plate with 2 grounding clamps and can be used to provide shielding or strain relief for enable and trigger lines on ACOPOS P3 8EI servo drives.

2.3.6.2.3.2 Order data

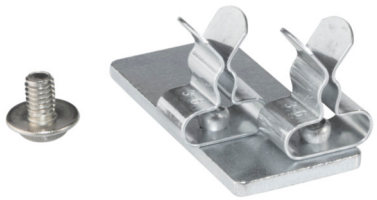
Order number	Short description	Figure
	Shield component sets	
8SCSE01.0300-00	ACOPOS P3 shield component set: 1x support plate with 2 grounding clamps 3-6 mm, 1x M4x6 screw	

Table 240: 8SCSE01.0300-00 - Order data

2.3.6.2.3.3 Technical data

Order number	8SCSE01.0300-00
General information	
Short description	ACOPOS P3 shield component set: 1x support plate with 2 grounding clamps 3-6 mm, 1x M4x6 screw
Certifications	
CE	Yes
UKCA	Yes
Mechanical properties	
Dimensions	
Width	18 mm
Height	40 mm
Depth	19 mm
Weight	18 g

Table 241: 8SCSE01.0300-00 - Technical data

2.3.6.2.3.4 Installation

Procedure

- Install the shield component set on ACOPOS P3 8EI servo drive as shown in the illustration using the screw included in delivery.

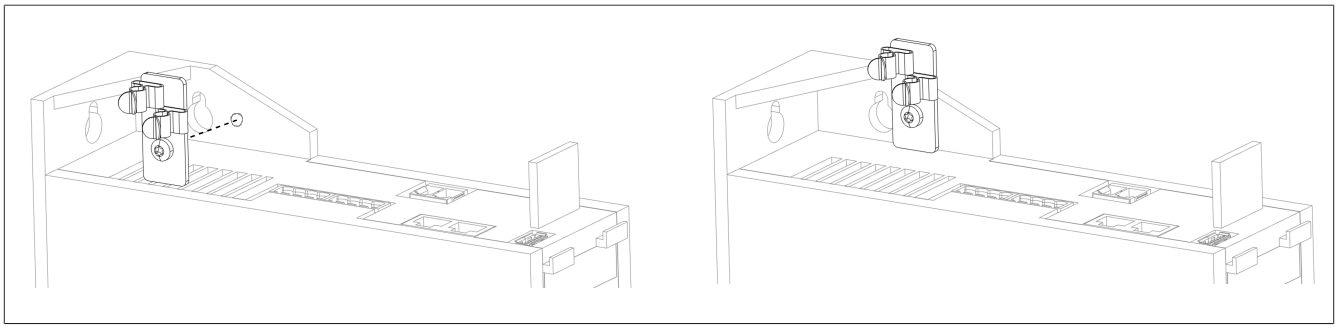


Figure 82: Shield component set 8SCSE01.0300-00 - Installation (servo drive with 66 mm width)

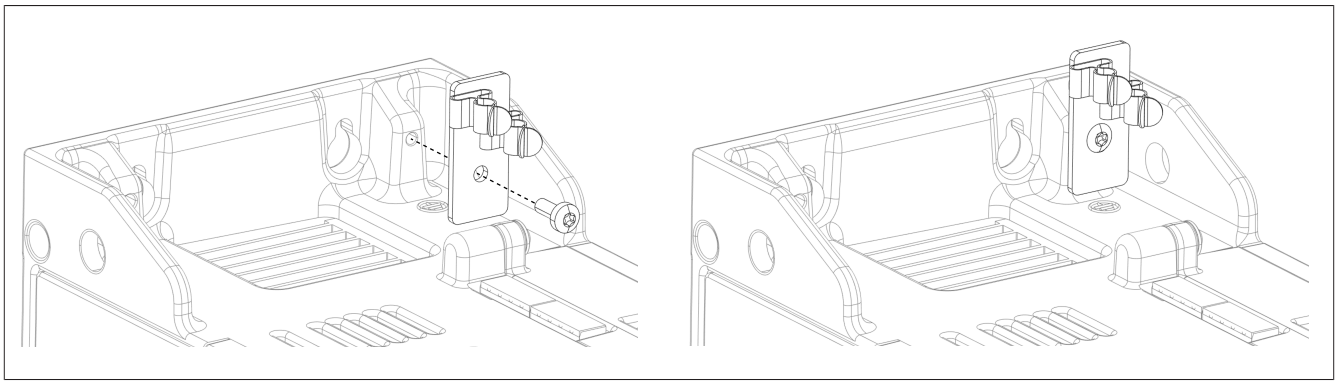


Figure 83: Shield component set 8SCSE01.0300-00 - Installation (servo drive with 133 mm width)

2.3.6.2.4 8SCSE02.0100-00

2.3.6.2.4.1 Order data

Order number	Short description	Figure
	Shield component sets	
8SCSE02.0100-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK14	

Table 242: 8SCSE02.0100-00 - Order data

2.3.6.2.4.2 Technical data

Order number	8SCSE02.0100-00
General information	
Short description	ACOPOS P3 shield component set: 1x shield connection clamp type SK14
Certifications	
CE	Yes
UKCA	Yes
Mechanical properties	
Dimensions	
Width	17 mm
Height	54 mm
Depth	20 mm
Weight	20 g
Cable terminals	4 to 13.5 mm

Table 243: 8SCSE02.0100-00 - Technical data

2.3.6.2.5 8SCSE02.0200-00

2.3.6.2.5.1 Order data

Order number	Short description	Figure
	Shield component sets	
8SCSE02.0200-00	ACOPOS P3 shield component set: 1x shield connection clamp type SK20	

Table 244: 8SCSE02.0200-00 - Order data

2.3.6.2.5.2 Technical data

Order number	8SCSE02.0200-00
General information	
Short description	ACOPOS P3 shield component set: 1x shield connection clamp SK20
Certifications	
CE	Yes
UKCA	Yes
Mechanical properties	
Dimensions	
Width	24 mm
Height	63 mm
Depth	20 mm
Weight	28 g
Cable terminals	4 to 20 mm

Table 245: 8SCSE02.0200-00 - Technical data

2.3.6.3 8EXA front covers

2.3.6.3.1 8EXA100.0010-00

2.3.6.3.1.1 General information

8EXA covers protect the interfaces on the front of ACOPOS P3 8EI servo drives and contribute to a uniform appearance inside the control cabinet.

2.3.6.3.1.2 Order data

Order number	Short description	Figure
	Front covers	
8EXA100.0010-00	ACOPOS P3 cover, B&R orange, single-width, suitable for servo drives 8EI1X6xxSxx.xxxx-x / 8EI2X2xxSxx.xxxx-x / 8EI4X5xxSxx.xxxx-x /8EI8X8xxSxx.xxxx-x	

Table 246: 8EXA100.0010-00 - Order data

2.3.6.3.1.3 Technical data

Order number	8EXA100.0010-00
General information	
Short description	ACOPOS P3 cover, B&R orange, single-width, suitable for servo drives 8EI1X6xxSxx.xxxx-x / 8EI2X2xxSxx.xxxx-x / 8EI4X5xxSxx.xxxx-x /8EI8X8xxSxx.xxxx-x
Certifications	
CE	Yes
UKCA	Yes
Mechanical properties	
Dimensions	
Width	66 mm
Length	240 mm
Height	47 mm
Weight	97 g

Table 247: 8EXA100.0010-00 - Technical data

2.3.6.3.2 8EXA100.0020-00

2.3.6.3.2.1 General information

8EXA covers protect the interfaces on the front of ACOPOS P3 8EI servo drives and contribute to a uniform appearance inside the control cabinet.

2.3.6.3.2.2 Order data

Order number	Short description	Figure
	Front covers	
8EXA100.0020-00	ACOPOS P3 cover, B&R dark gray, single-width, suitable for servo drives 8EI1X6xxSxx.xxxx-x / 8EI2X2xxSxx.xxxx-x / 8EI4X5xxSxx.xxxx-x /8EI8X8xxSxx.xxxx-x	

Table 248: 8EXA100.0020-00 - Order data

2.3.6.3.2.3 Technical data

Order number	8EXA100.0020-00
General information	
Short description	ACOPOS P3 cover, B&R dark gray, single-width, suitable for servo drives 8EI1X6xxSxx.xxxx-x / 8EI2X2xxSxx.xxxx-x / 8EI4X5xxSxx.xxxx-x / 8EI8X8xxSxx.xxxx-x
Certifications	
CE	Yes
UKCA	Yes
Mechanical properties	
Dimensions	
Width	66 mm
Length	240 mm
Height	47 mm
Weight	97 g

Table 249: 8EXA100.0020-00 - Technical data

2.3.6.3.3 8EXA200.0010-00

2.3.6.3.3.1 General information

8EXA covers protect the interfaces on the front of ACOPOS P3 8EI servo drives and contribute to a uniform appearance inside the control cabinet.

2.3.6.3.3.2 Order data

Order number	Short description	Figure
	Front covers	
8EXA200.0010-00	ACOPOS P3 dover, B&R orange, single-width, suitable for servo drives 8EI2X2xxDxx.xxxx-x / 8EI2X2xxTxx.xxxx-x / 8EI4X5xxDxx.xxxx-x / 8EI4X5xxTxx.xxxx-x /8EI8X8xxDxx.xxxx-x / 8EI8X8xxTxx.xxxx-x / 8EI013xxSxx.xxxx-x / 8EI017xxSxx.xxxx-x	

Table 250: 8EXA200.0010-00 - Order data

2.3.6.3.3.3 Technical data

Order number	8EXA200.0010-00
General information	
Short description	ACOPOS P3 cover, B&R orange, single-width, suitable for servo drives 8EI2X2xxDxx.xxxx-x / 8EI2X2xxTxx.xxxx-x / 8EI4X5xxDxx.xxxx-x / 8EI4X5xxTxx.xxxx-x / 8EI8X8xxDxx.xxxx-x / 8EI8X8xxTxx.xxxx-x / 8EI013xxSxx.xxxx-x / 8EI017xxSxx.xxxx-x
Certifications	
CE	Yes
UKCA	Yes
Mechanical properties	
Dimensions	
Width	66 mm
Length	320 mm
Height	47 mm
Weight	123 g

Table 251: 8EXA200.0010-00 - Technical data

2.3.6.3.4 8EXA200.0020-00

2.3.6.3.4.1 General information

8EXA covers protect the interfaces on the front of ACOPOS P3 8EI servo drives and contribute to a uniform appearance inside the control cabinet.

2.3.6.3.4.2 Order data

Order number	Short description	Figure
	Front covers	
8EXA200.0020-00	ACOPOS P3 cover, B&R dark gray, single-width, suitable for servo drives 8EI2X2xxDxx.xxxx-x / 8EI2X2xxTxx.xxxx-x / 8EI4X5xxDxx.xxxx-x / 8EI4X5xxTxx.xxxx-x / 8EI8X8xxDxx.xxxx-x / 8EI8X8xxTxx.xxxx-x / 8EI013xxSxx.xxxx-x / 8EI017xxSxx.xxxx-x	

Table 252: 8EXA200.0020-00 - Order data

2.3.6.3.4.3 Technical data

Order number	8EXA200.0020-00
General information	
Short description	ACOPOS P3 cover, B&R dark gray, single-width, suitable for servo drives 8EI2X2xxDxx.xxxx-x / 8EI2X2xxTxx.xxxx-x / 8EI4X5xxDxx.xxxx-x / 8EI4X5xxTxx.xxxx-x / 8EI8X8xxDxx.xxxx-x / 8EI8X8xxTxx.xxxx-x / 8EI013xxSxx.xxxx-x / 8EI017xxSxx.xxxx-x
Certifications	
CE	Yes
UKCA	Yes
Mechanical properties	
Dimensions	
Width	66 mm
Length	320 mm
Height	47 mm
Weight	123 g

Table 253: 8EXA200.0020-00 - Technical data

2.3.6.3.5 8EXA300.0010-00

2.3.6.3.5.1 General information

8EXA covers protect the interfaces on the front of ACOPOS P3 8EI servo drives and contribute to a uniform appearance inside the control cabinet.

2.3.6.3.5.2 Order data

Order number	Short description	Figure
	Front covers	
8EXA300.0010-00	ACOPOS P3 cover, B&R orange, double-width, suitable for servo drives 8EI017xxDxx.xxxx-x / 8EI022xxDxx.xxxx-x / 8EI024xxSxx.xxxx-x / 8EI034xxSxx.xxxx-x / 8EI044xxSxx.xxxx-x	

Table 254: 8EXA300.0010-00 - Order data

2.3.6.3.5.3 Technical data

Order number	8EXA300.0010-00
General information	
Short description	ACOPOS P3 cover, B&R orange, double-width, suitable for servo drives 8EI017xxDxx.xxxx-x / 8EI022xxDxx.xxxx-x /8EI024xxSxx.xxxx-x / 8EI034xxSxx.xxxx-x / 8EI044xxSxx.xxxx-x
Certifications	
CE	Yes
UKCA	Yes
Mechanical properties	
Dimensions	
Width	133 mm
Length	320 mm
Height	47 mm
Weight	187 g

Table 255: 8EXA300.0010-00 - Technical data

2.3.6.3.6 8EXA300.0020-00

2.3.6.3.6.1 General information

8EXA covers protect the interfaces on the front of ACOPOS P3 8EI servo drives and contribute to a uniform appearance inside the control cabinet.

2.3.6.3.6.2 Order data

Order number	Short description	Figure
	Front covers	
8EXA300.0020-00	ACOPOS P3 cover, B&R dark gray, double-width, suitable for servo drives 8EI017xxDxx.xxxx-x / 8EI022xxDxx.xxxx-x / 8EI024xxSxx.xxxx-x / 8EI034xxSxx.xxxx-x / 8EI044xxSxx.xxxx-x	

Table 256: 8EXA300.0020-00 - Order data

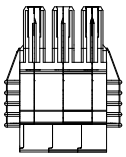
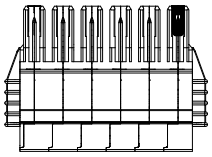
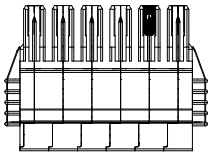
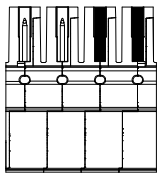
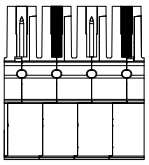
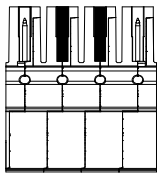
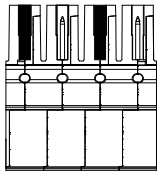
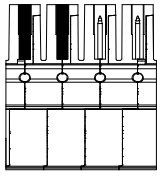
2.3.6.3.6.3 Technical data

Order number	8EXA300.0020-00
General information	
Short description	ACOPOS P3 cover, B&R dark gray, double-width, suitable for servo drives 8EI017xxDxx.xxxx-x / 8EI022xxDxx.xxxx-x /8EI024xxSxx.xxxx-x / 8EI034xxSxx.xxxx-x / 8EI044xxSxx.xxxx-x
Certifications	
CE	Yes
UKCA	Yes
Mechanical properties	
Dimensions	
Width	133 mm
Length	320 mm
Height	47 mm
Weight	187 g

Table 257: 8EXA300.0020-00 - Technical data

2.3.6.4 8TB terminal blocks

2.3.6.4.1 Examples of terminal coding

Coding	Example / Terminal	
A: 000 (3-pin)	8TB3103.222A-20	
B: 000001 (6-pin)	8TB3106.222B-20	
C: 000010 (6-pin)	8TB3106.223C-20	
D: 0011 (4-pin)	8TB4104.226D-10	
F: 0101 (4-pin)	8TB4104.227F-10	
G: 0110 (4-pin)	8TB4104.224G-10	
L: 1010 (4-pin)	8TB4104.222L-10	
N: 1100 (4-pin)	8TB4104.222N-10	

2.3.6.4.2 Mains supply (connector X1)

2.3.6.4.2.1 8TB3106.222B-20

Order data

Order number	Short description	Figure
	Terminal blocks	
8TB3106.222B-20	6-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: PE L3 L2 L1 DC- DC+, coding B: 000001	

Table 258: 8TB3106.222B-20 - Order data

Technical data

Order number	8TB3106.222B-20
General information	
Short description	Push-in terminal block, 1-row, for 8EIxXxxHxx... / 8EI01xHxS... servo drives, connector X1 (mains)
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E225616 Power conversion equipment
Terminal block	
Note	Label 2: PE L3 L2 L1 DC- DC+ Coding B: 000001 1-row Locking mechanism: Click-and-lock system
Number of pins	6
Type of terminal block	Push-in spring connector
Cable type	Only copper wires (no aluminum wires!)
Coding	B
Pitch	7.62 mm
Wire stripping length	15 mm
Connection cross section	
AWG wire	24 to 8 AWG
Wire end sleeves with plastic covering	0.25 to 4 mm²
Single-wire	0.2 to 10 mm²
Fine-stranded wires	0.2 to 6 mm²
With wire end sleeve	0.25 to 6 mm²
Electrical properties	
Nominal voltage	1000 V (IEC) / 600 V (UL)
Nominal current	41 A (IEC) / 35 A (UL)
Mechanical properties	
Dimensions	
Width	53.7 mm
Height	19.8 mm
Depth	38.5 mm
Weight	31 g

Table 259: 8TB3106.222B-20 - Technical data

2.3.6.4.2.2 8TB3106.223C-20

Order data

Order number	Short description	Figure
	Terminal blocks	
8TB3106.223C-20	6-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 3: PE L3 N(L2) L1 DC- DC+, coding C: 000010	

Table 260: 8TB3106.223C-20 - Order data

Technical data

Order number	8TB3106.223C-20
General information	
Short description	Push-in terminal block, 1-row, for 8EIxXxMxx.. servo drives, connector X1 (mains)
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E225616 Power conversion equipment
Terminal block	
Note	Label 3: PE L3 L2(N) L1 DC- DC+ Coding C: 000010 1-row Locking mechanism: Click-and-lock system
Number of pins	6
Type of terminal block	Push-in spring connector
Cable type	Only copper wires (no aluminum wires!)
Coding	C
Pitch	7.62 mm
Wire stripping length	15 mm
Connection cross section	
AWG wire	24 to 8 AWG
Wire end sleeves with plastic covering	0.25 to 4 mm²
Single-wire	0.2 to 10 mm²
Fine-stranded wires	0.2 to 6 mm²
With wire end sleeve	0.25 to 6 mm²
Electrical properties	
Nominal voltage	1000 V (IEC) / 600 V (UL)
Nominal current	41 A (IEC) / 35 A (UL)
Mechanical properties	
Dimensions	
Width	53.7 mm
Height	19.8 mm
Depth	38.5 mm
Weight	31 g

Table 261: 8TB3106.223C-20 - Technical data

2.3.6.4.2.3 8TB3206.222B-40

Order data

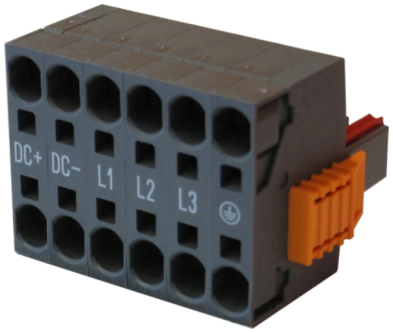
Order number	Short description	Figure
	Terminal blocks	
8TB3206.222B-40	6-pin push-in terminal block, 2-row, with locking mechanism, pitch: 7.62 mm, label 2: PE L3 L2 L1 DC- DC+, coding B: 000001	

Table 262: 8TB3206.222B-40 - Order data

Technical data

Order number	8TB3206.222B-40
General information	
Short description	Push-in terminal block, 2-row, for 8EIxXxHxx.../8EI01xHxSxxx servo drives, connector X1 (mains)
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E225616 Power conversion equipment
Terminal block	
Note	Label 3: PE L3 L2 L1 DC- DC+ Coding B: 000001 2-row Locking mechanism: Click-and-lock system
Number of pins	6
Type of terminal block	Push-in spring connector
Cable type	Only copper wires (no aluminum wires!)
Coding	B
Pitch	7.62 mm
Wire stripping length	15 mm
Connection cross section	
AWG wire	24 to 8 AWG
Wire end sleeves with plastic covering	0.25 to 4 mm²
Single-wire	0.2 to 10 mm²
Fine-stranded wires	0.2 to 6 mm²
With wire end sleeve	0.25 to 6 mm²
Electrical properties	
Nominal voltage	1000 V (IEC) / 600 V (UL)
Nominal current	41 A (IEC) / 31 A (UL)
Mechanical properties	
Dimensions	
Width	53.7 mm
Height	35 mm
Depth	41.5 mm
Weight	55 g

Table 263: 8TB3206.222B-40 - Technical data

2.3.6.4.2.4 8TB3206.223C-40

Order data

Order number	Short description	Figure
	Terminal blocks	
8TB3206.223C-40	6-pin push-in terminal block, 2-row, with locking mechanism, pitch: 7.62 mm, label 3: PE L3 N(L2) L1 DC- DC+, coding C: 000010	

Table 264: 8TB3206.223C-40 - Order data

Technical data

Order number	8TB3206.223C-40
General information	
Short description	Push-in terminal block, 2-row, for 8EIxXxMxx.. servo drives, connector X1 (mains)
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E225616 Power conversion equipment
Terminal block	
Note	Label 3: PE L3 L2(N) L1 DC- DC+ Coding C: 000010 2-row Locking mechanism: Click-and-lock system
Number of pins	6
Type of terminal block	Push-in spring connector
Cable type	Only copper wires (no aluminum wires!)
Coding	C
Pitch	7.62 mm
Wire stripping length	15 mm
Connection cross section	
AWG wire	24 to 8 AWG
Wire end sleeves with plastic covering	0.25 to 4 mm²
Single-wire	0.2 to 10 mm²
Fine-stranded wires	0.2 to 6 mm²
With wire end sleeve	0.25 to 6 mm²
Electrical properties	
Nominal voltage	1000 V (IEC) / 600 V (UL)
Nominal current	41 A (IEC) / 31 A (UL)
Mechanical properties	
Dimensions	
Width	53.7 mm
Height	35 mm
Depth	41.5 mm
Weight	55 g

Table 265: 8TB3206.223C-40 - Technical data

2.3.6.4.2.5 8TB4104.222L-10

Order data

Order number	Short description	Figure
	Terminal blocks	
8TB4104.222L-10	4-pin push-in terminal block, 1-row, pitch: 10.16 mm, label 2: PE L3 L2 L1, coding L: 1010	

Table 266: 8TB4104.222L-10 - Order data

Technical data

Order number	8TB4104.222L-10
General information	
Short description	Push-in terminal block, 1-row, for 8EI017HWD.../8EI022HWD.../8EI024H-WS.../8EI034HWS.../8EI044HWS... servo drives, connector X1 (mains supply)
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E225616 Power conversion equipment
Terminal block	
Note	Label 2: PE L3 L2 L1 Coding L: 1010 1-row
Number of pins	4
Type of terminal block	Push-in spring connector
Cable type	Only copper wires (no aluminum wires!)
Coding	L
Pitch	10.16 mm
Wire stripping length	18 mm
Connection cross section	
AWG wire	20 to 4 AWG
Wire end sleeves with plastic covering	0.75 to 10 mm²
Single-wire	0.75 to 16 mm²
Fine-stranded wires	0.75 to 16 mm²
With wire end sleeve	0.75 to 16 mm²
Electrical properties	
Nominal voltage	1000 V (IEC) / 600 V (UL)
Nominal current	76 A (IEC) / 66 A (UL)
Mechanical properties	
Dimensions	
Width	40.6 mm
Height	44.5 mm
Depth	25.1 mm
Weight	32 g

Table 267: 8TB4104.222L-10 - Technical data

2.3.6.4.2.6 8TB4204.202L-10

Order data

Order number	Short description	Figure
	Terminal blocks	
8TB4204.202L-10	4-pin push-in screw terminal block, two-row, pitch: 10.16 mm, label 2: PE L3 L2 L1, coding L: 1010	

Table 268: 8TB4204.202L-10 - Order data

Technical data

Order number	8TB4204.202L-10
General information	
Short description	Push-in screw terminal block, two-row, for 8EI017HWD.../8EI022HWD.../8EI024H-WS.../8EI034HWS.../8EI044HWS... servo drives, connector X1 (mains supply)
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E225616 Power conversion equipment
Terminal block	
Note	Label 2: PE L3 L2 L1 Coding L: 1010 Two-row
Number of pins	4
Type of terminal block	Screw terminal with tension sleeve
Cable type	Only copper wires (no aluminum wires!)
Coding	L
Pitch	10.16 mm
Wire stripping length	18 mm
Connection cross section	
AWG wire	20 to 4 AWG
Wire end sleeves with plastic covering	0.5 to 16 mm²
Single-wire	0.75 to 16 mm²
Fine-stranded wires	0.75 to 16 mm²
With wire end sleeve	0.5 to 16 mm²
Tightening torque	Min. 1.7 Nm Max. 1.8 Nm
Electrical properties	
Nominal voltage	1000 V (IEC) / 600 V (UL)
Nominal current	76 A (IEC) / 60 A (UL)
Mechanical properties	
Dimensions	
Width	40.5 mm
Height	54.9 mm
Depth	51.4 mm
Weight	96 g

Table 269: 8TB4204.202L-10 - Technical data

2.3.6.4.3 24 VDC power supply (connector X2)

2.3.6.4.3.1 8TB3102.222C-20

Order data

Order number	Short description	Figure
	Terminal blocks	
8TB3102.222C-20	2-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	

Table 270: 8TB3102.222C-20 - Order data

Technical data

Order number	8TB3102.222C-20
General information	
Short description	Push-in terminal block, 1-row, for 8EIXXXXXXXX.XXXX-1 servo drives, connector X2 (24 V)
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E225616 Power conversion equipment
Terminal block	
Note	Label 3: COM 24 V Coding C: 10 1-row Locking mechanism: Click-and-lock system
Number of pins	2
Type of terminal block	Push-in spring connector
Cable type	Only copper wires (no aluminum wires!)
Coding	C
Pitch	7.62 mm
Wire stripping length	15 mm
Connection cross section	
AWG wire	24 to 8 AWG
Wire end sleeves with plastic covering	0.25 to 4 mm²
Single-wire	0.2 to 10 mm²
Fine-stranded wires	0.2 to 6 mm²
With wire end sleeve	0.25 to 6 mm²
Electrical properties	
Nominal voltage	1000 V (IEC) / 600 V (UL)
Nominal current	41 A (IEC) / 35 A (UL)
Mechanical properties	
Dimensions	
Width	15.2 mm
Height	19.8 mm
Depth	38.5 mm
Weight	10 g

Table 271: 8TB3102.222C-20 - Technical data

2.3.6.4.3.2 8TB3202.222C-40

Order data

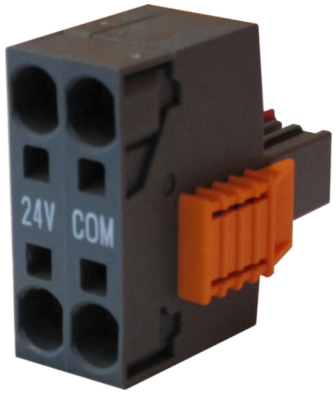
Order number	Short description	Figure
	Terminal blocks	
8TB3202.222C-40	2-pin push-in terminal block, 2-row, with locking mechanism, pitch: 7.62 mm, label 2: COM 24 V, coding C: 10	

Table 272: 8TB3202.222C-40 - Order data

Technical data

Order number	8TB3202.222C-40
General information	
Short description	Push-in terminal block, 2-row, for 8EIXXXXXXXX.XXXX-1 servo drives, connector X2 (24 V)
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E225616 Power conversion equipment
Terminal block	
Note	Label 2: COM 24 V Coding C: 10 2-row Locking mechanism: Click-and-lock system
Number of pins	2
Type of terminal block	Push-in spring connector
Cable type	Only copper wires (no aluminum wires!)
Coding	C
Pitch	7.62 mm
Wire stripping length	15 mm
Connection cross section	
AWG wire	24 to 8 AWG
Wire end sleeves with plastic covering	0.25 to 4 mm²
Single-wire	0.2 to 10 mm²
Fine-stranded wires	0.2 to 6 mm²
With wire end sleeve	0.25 to 6 mm²
Electrical properties	
Nominal voltage	1000 V (IEC) / 600 V (UL)
Nominal current	41 A (IEC) / 31 A (UL)
Mechanical properties	
Dimensions	
Width	15.2 mm
Height	35 mm
Depth	41.5 mm
Weight	20 g

Table 273: 8TB3202.222C-40 - Technical data

2.3.6.4.4 Motor output

2.3.6.4.4.1 Connector X5x

8TB3308.222A-00

Order data

Order number	Short description	Figure
	Terminal blocks	
8TB3308.222A-00	4+4-pin push-in terminal block 1-row / 2-row, pitch: 7.62 mm, label 2: T- B- T+ B+ PE W V U coding A: 0000	
	Optional accessories	
	Coding keys	
8EXC000.0022-00	Coding plug, red (20x 6 pcs), for 8TB3308.222A-00	

Table 274: 8TB3308.222A-00 - Order data

Technical data

Order number	8TB3308.222A-00
General information	
Short description	Push-in terminal block, for 8EIxXxxxx.xxxx-1 / 8EI01xHxxxx.xxxx-1 / 8EI022HxDxx.xxxx-1 servo drives, connector X5x (motor)
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E225616 Power conversion equipment
Terminal block	
Note	Label 2: U V W PE B+ B- T+ T- Coding A: No coding
Number of pins	8 (4 + 4)
Type of terminal block	Push-in spring connector
Cable type	Only copper wires (no aluminum wires!)
Coding	A
Pitch	7.62 mm
Wire stripping length	12 mm
Connection cross section	
AWG wire	U V W PE: 24 to 8 AWG B+ B- T+ T-: 26 to 16 AWG
Wire end sleeves with plastic covering	1.5 to 6 mm² 0.25 to 1.5 mm²
Single-wire	0.5 to 10 mm² 0.14 to 1.5 mm²
Fine-stranded wires	0.5 to 10 mm² 0.14 to 1.5 mm²
With wire end sleeve	1.5 to 6 mm² 0.25 to 1.5 mm²
Electrical properties	
Nominal voltage	1000 V (IEC) / 600 V (UL)
Nominal current	34 A (IEC) / 33 A (UL)
Mechanical properties	
Dimensions	
Width	39 mm
Height	23.1 mm
Depth	44.7 mm
Weight	24 g

Table 275: 8TB3308.222A-00 - Technical data

2.3.6.4.4.2 Connector X51A

8TB4104.224G-10

Order data

Order number	Short description	Figure
	Terminal blocks	
8TB4104.224G-10	4-pin push-in terminal block, 1-row, pitch: 10.16 mm, label 4: PE W V U, coding G: 0110	

Table 276: 8TB4104.224G-10 - Order data

Technical data

Order number	8TB4104.224G-10
General information	
Short description	Push-in terminal block, 1-row, for 8EI024HxSxx.xxxx-1 / 8EI034HxSxx.xxxx-1 / 8EI044HxSxx.xxxx-1 servo drives, connector X51A (motor output)
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E225616 Power conversion equipment
Terminal block	
Note	Label 4: PE W V U Coding G: 0110 1-row
Number of pins	4
Type of terminal block	Push-in spring connector
Cable type	Only copper wires (no aluminum wires!)
Coding	G
Pitch	10.16 mm
Wire stripping length	18 mm
Connection cross section	
AWG wire	20 to 4 AWG
Wire end sleeves with plastic covering	0.75 to 10 mm²
Single-wire	0.75 to 16 mm²
Fine-stranded wires	0.75 to 16 mm²
With wire end sleeve	0.75 to 16 mm²
Electrical properties	
Nominal voltage	1000 V (IEC) / 600 V (UL)
Nominal current	76 A (IEC) / 66 A (UL)
Mechanical properties	
Dimensions	
Width	40.6 mm
Height	44.5 mm
Depth	25.1 mm
Weight	32 g

Table 277: 8TB4104.224G-10 - Technical data

2.3.6.4.4.3 Connector X51B

8TB2104.223L-00

Order data

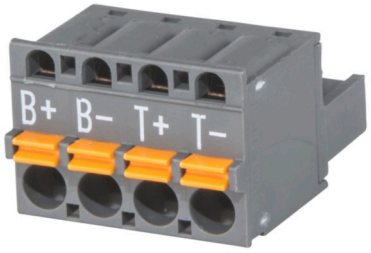
Order number	Short description	Figure
	Terminal blocks	
8TB2104.223L-00	4-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 3: T- T+ B- B+, coding L: 1010	

Table 278: 8TB2104.223L-00 - Order data

Technical data

Order number	8TB2104.223L-00
General information	
Short description	Push-in terminal block, 1-row, for 8EI0x4HxSxx.xxxx-1 servo drives, connector X51B (motor output)
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E225616 Power conversion equipment
Terminal block	
Note	Label 3: T- T+ B- B+ Coding L: 1010 1-row
Number of pins	4
Type of terminal block	Push-in spring connector
Cable type	Only copper wires (no aluminum wires!)
Coding	L
Pitch	5 mm
Wire stripping length	10 mm
Connection cross section	
AWG wire	26 to 12 AWG
Wire end sleeves with plastic covering	0.25 to 2.5 mm²
Single-wire	0.2 to 2.5 mm²
Fine-stranded wires	0.2 to 2.5 mm²
With wire end sleeve	0.25 to 2.5 mm²
Electrical properties	
Nominal voltage	250 V (IEC) / 300 V (UL)
Nominal current	12 A (IEC) / 10 A (UL)
Mechanical properties	
Dimensions	
Width	20.1 mm
Height	25.6 mm
Depth	15 mm
Weight	65 g

Table 279: 8TB2104.223L-00 - Technical data

2.3.6.4.5 Braking resistor (connector X6)

2.3.6.4.5.1 8TB3103.222A-20

Order data

Order number	Short description	Figure
	Terminal blocks	
8TB3103.222A-20	3-pin push-in terminal block, 1-row, with locking mechanism, pitch: 7.62 mm, label 2: PE RB- RB+, coding A: 000	

Table 280: 8TB3103.222A-20 - Order data

Technical data

Order number	8TB3103.222A-20
General information	
Short description	Push-in terminal block, 1-row, for 8EIxXxxxx.xxxx-1 / 8EI01x-HxSxx.xxxx-1 servo drives, connector X6 (braking resistor)
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E225616 Power conversion equipment
Terminal block	
Note	Label 3: PE RB- RB+ Coding A: 000 1-row Locking mechanism: Click-and-lock system
Number of pins	3
Type of terminal block	Push-in spring connector
Cable type	Only copper wires (no aluminum wires!)
Coding	A
Pitch	7.62 mm
Wire stripping length	15 mm
Connection cross section	
AWG wire	24 to 8 AWG
Wire end sleeves with plastic covering	0.25 to 4 mm²
Single-wire	0.2 to 10 mm²
Fine-stranded wires	0.2 to 6 mm²
With wire end sleeve	0.25 to 6 mm²
Electrical properties	
Nominal voltage	1000 V (IEC) / 600 V (UL)
Nominal current	41 A (IEC) / 35 A (UL)
Mechanical properties	
Dimensions	
Width	22.9 mm
Height	19.8 mm
Depth	38.5 mm
Weight	16 g

Table 281: 8TB3103.222A-20 - Technical data

2.3.6.4.5.2 8TB4103.222A-10

Order data

Order number	Short description	Figure
	Terminal blocks	
8TB4103.222A-10	3-pin push-in terminal block, one-row, pitch: 10.16 mm, label 2: PE RB- RB+, coding A: 000	

Table 282: 8TB4103.222A-10 - Order data

Technical data

Order number	8TB4103.222A-10
General information	
Short description	Push-in terminal block, one-row, for 8EI0xxHxDxx.xxxx-1 / 8EI0x4HxSxx.xxxx-1 servo drives, connector X6 (external braking resistor)
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E225616 Power conversion equipment
Terminal block	
Note	Label 2: PE RB- RB+ Coding A: 000 1-row
Number of pins	3
Type of terminal block	Push-in spring connector
Cable type	Only copper wires (no aluminum wires!)
Coding	A
Pitch	10.16 mm
Wire stripping length	18 mm
Connection cross section	
AWG wire	20 to 4 AWG
Wire end sleeves with plastic covering	0.75 to 10 mm²
Single-wire	0.75 to 16 mm²
Fine-stranded wires	0.75 to 16 mm²
With wire end sleeve	0.75 to 16 mm²
Electrical properties	
Nominal voltage	1000 V (IEC) / 600 V (UL)
Nominal current	76 A (IEC) / 66 A (UL)
Mechanical properties	
Dimensions	
Width	30.5 mm
Height	25.1 mm
Depth	44.5 mm
Weight	24 g

Table 283: 8TB4103.222A-10 - Technical data

2.3.6.4.6 Enable inputs (connector X7)

2.3.6.4.6.1 8TB2104.2210-50

Order data

Order number	Short description	Figure
	Terminal blocks	
8TB2104.2210-50	4-pin push-in terminal block, yellow, 1-row, with locking mechanism, pitch: 5.08 mm, label 1: 4 3 2 1	

Table 284: 8TB2104.2210-50 - Order data

Technical data

Order number	8TB2104.2210-50
General information	
Short description	Push-in terminal block, 1-row, for 8EIxxxxxx1x.xxxx-1 servo drives, connector X7 (enable)
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E225616 Power conversion equipment
Terminal block	
Note	Label 1: 4 3 2 1 Coding 0: None 1-row Yellow
Number of pins	4
Type of terminal block	Push-in spring connector
Cable type	Only copper wires (no aluminum wires!)
Coding	0
Pitch	5.08 mm
Wire stripping length	10 mm
Connection cross section	
AWG wire	26 to 12 AWG
Wire end sleeves with plastic covering	0.25 to 1.5 mm²
Single-wire	0.2 to 2.5 mm²
Fine-stranded wires	0.2 to 2.5 mm²
With wire end sleeve	0.25 to 2.5 mm²
Electrical properties	
Nominal voltage	320 V (IEC) / 300 V (UL)
Nominal current	12 A (IEC) / 10 A (UL)
Mechanical properties	
Dimensions	
Width	26 mm
Height	15 mm
Depth	25.6 mm
Weight	7 g

Table 285: 8TB2104.2210-50 - Technical data

2.3.6.4.6.2 8TB2204.2210-50

Order data

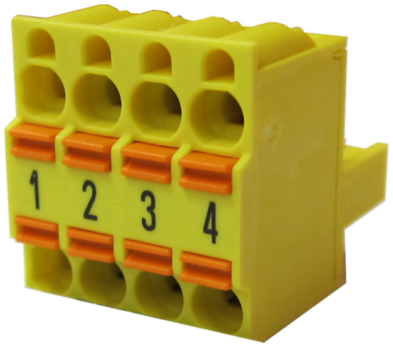
Order number	Short description	Figure
	Terminal blocks	
8TB2204.2210-50	4-pin push-in terminal block, yellow, 2-row, pitch: 5.08 mm, label 1: 4 3 2 1,	

Table 286: 8TB2204.2210-50 - Order data

Technical data

Order number	8TB2204.2210-50
General information	
Short description	Push-in terminal block, 2-row, for 8EIxxxxxx1x.xxxx-1 servo drives, connector X7 (enable)
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E225616 Power conversion equipment
Terminal block	
Note	Label 1: 4 3 2 1 Coding 0: None 2-row Yellow
Number of pins	4
Type of terminal block	Push-in spring connector
Cable type	Only copper wires (no aluminum wires!)
Coding	0
Pitch	5.08 mm
Wire stripping length	10 mm
Connection cross section	
AWG wire	26 to 12 AWG
Wire end sleeves with plastic covering	0.25 to 1.5 mm²
Single-wire	0.2 to 2.5 mm²
Fine-stranded wires	0.2 to 2.5 mm²
With wire end sleeve	0.25 to 2.5 mm²
Electrical properties	
Nominal voltage	320 V (IEC) / 300 V (UL)
Nominal current	12 A (IEC) / 10 A (UL)
Mechanical properties	
Dimensions	
Width	25.5 mm
Height	22.1 mm
Depth	25.7 mm
Weight	9 g

Table 287: 8TB2204.2210-50 - Technical data

2.3.6.4.7 Trigger inputs (connector X8)

2.3.6.4.7.1 8TB2104.2210-00

Order data

Order number	Short description	Figure
	Terminal blocks	
8TB2104.2210-00	4-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively	

Table 288: 8TB2104.2210-00 - Order data

Technical data

Order number	8TB2104.2210-00
General information	
Short description	Push-in terminal block, 1-row, for 8EIXXXXXXXX.XXXX-1 servo drives, connector X8 (trigger)
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E225616 Power conversion equipment
Terminal block	
Note	Label 1: 4 3 2 1 Coding 0: None 1-row
Number of pins	4
Type of terminal block	Push-in spring connector
Cable type	Only copper wires (no aluminum wires!)
Coding	0
Pitch	5.08 mm
Wire stripping length	10 mm
Connection cross section	
AWG wire	26 to 12 AWG
Wire end sleeves with plastic covering	0.25 to 1.5 mm²
Single-wire	0.2 to 2.5 mm²
Fine-stranded wires	0.2 to 2.5 mm²
With wire end sleeve	0.25 to 2.5 mm²
Electrical properties	
Nominal voltage	320 V (IEC) / 300 V (UL)
Nominal current	12 A (IEC) / 10 A (UL)
Mechanical properties	
Dimensions	
Width	26 mm
Height	15 mm
Depth	25.6 mm
Weight	7 g

Table 289: 8TB2104.2210-00 - Technical data

2.3.6.4.8 DC bus (connector X11)

2.3.6.4.8.1 8TB4104.227F-10

Order data

Order number	Short description	Figure
	Terminal blocks	
8TB4104.227F-10	4-pin push-in terminal block, 1-row, pitch: 10.16 mm, label 4: DC-, DC-, DC+, DC+ coding F: 0101	

Table 290: 8TB4104.227F-10 - Order data

Technical data

Order number	8TB4104.227F-10
General information	
Short description	Push-in terminal block, 1-row, for 8EI0xxHxDxx.xxxx-1 / 8EI0x4HxSxx.xxxx-1 servo drives, connector X11 (DC bus)
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E225616 Power conversion equipment
Terminal block	
Note	Label 4: DC- DC- DC+ DC+ Coding F: 0101 1-row
Number of pins	4
Type of terminal block	Push-in spring connector
Cable type	Only copper wires (no aluminum wires!)
Coding	F
Pitch	10.16 mm
Wire stripping length	18 mm
Connection cross section	
AWG wire	20 to 4 AWG
Wire end sleeves with plastic covering	0.75 to 10 mm²
Single-wire	0.75 to 16 mm²
Fine-stranded wires	0.75 to 16 mm²
With wire end sleeve	0.75 to 16 mm²
Electrical properties	
Nominal voltage	1000 V (IEC) / 600 V (UL)
Nominal current	76 A (IEC) / 66 A (UL)
Mechanical properties	
Dimensions	
Width	40.6 mm
Height	44.5 mm
Depth	25.1 mm
Weight	32 g

Table 291: 8TB4104.227F-10 - Technical data

2.3.6.5 8EXC keying plugs

2.3.6.5.1 8EXC000.0022-00

2.3.6.5.1.1 General information

8EXC keying plugs allow the keying of 8TB3308.222A-00 / 8TB4104.224G-10 terminal blocks to be adapted to the respective keying of motor connections X51/X51A/X52/X53 on ACOPOS P3 8EI servo drives.

2.3.6.5.1.2 Order data

Order number	Short description	Figure
	Coding keys	
8EXC000.0022-00	Coding plug, red (20x 6 pcs), for 8TB3308.222A-00	

Table 292: 8EXC000.0022-00 - Order data

2.3.6.5.1.3 Technical data

Order number	8EXC000.0022-00
General information	
Short description	Keying plug, red (20x 6 pieces), for 8TB3308.222A-00 / 8TB4104.224G-10
Certifications	
CE	Yes
UKCA	Yes
Mechanical properties	
Weight	16 g

Table 293: 8EXC000.0022-00 - Technical data

2.3.6.6 Fan modules

2.3.6.6.1 8EXF100.0000-00

2.3.6.6.1.1 Order data

Order number	Short description	Figure
	Fan modules	
8EXF100.0000-00	ACOPOS P3 fan module, replacement fan for ACOPOS P3 servo drive single-width (8EI1X6/8EI2X2/8EI4X5/8EI8X8/8EI013/8EI017xxS)	

Table 294: 8EXF100.0000-00 - Order data

2.3.6.6.1.2 Technical data

Order number	8EXF100.0000-00
General information	
Short description	ACOPOS P3 fan module, replacement fan for ACOPOS P3 servo drive single-width (8EI1X6/8EI2X2/8EI4X5/8EI8X8/8EI013/8EI017xxS)
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E225616 Power conversion equipment
Mechanical properties	
Dimensions	
Width	80 mm
Height	63 mm
Depth	49 mm
Weight	150 g

Table 295: 8EXF100.0000-00 - Technical data

2.3.6.6.1.3 Replacing fan module 8EXF100.0000-00

Fan module 8EXF100.0000-00 is installed on the bottom of the ACOPOS P3 8EI servo drive.

Figure 84: Fan module 8EXF100.0000-00

Information:

Fan module 8EXF100.0000-00 can only be replaced if the ACOPOS P3 8EI servo drive is not installed on a mounting plate.

Procedure:

1. Disconnect the ACOPOS P3 drive system from the power system and secure it against being switched on again.

Danger!

Before starting work, disconnect the power supply and wait 5 minutes to ensure that the DC bus of the ACOPOS P3 drive system has discharged. Observe regulations!

Information:

The device is not permitted to be operated without a fan.

2. The fan module is snapped into the ACOPOS P3 module with two snap-fit connectors (❶).

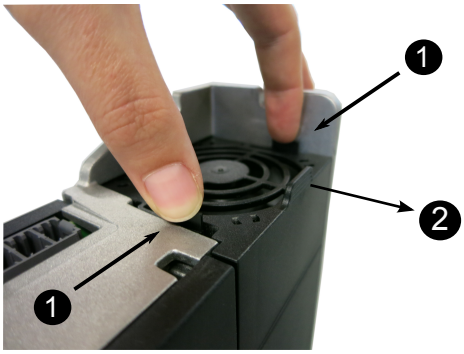


Figure 85: Pulling out the fan module

Press the two snap-fit connectors (❶) firmly together in the direction of the arrows and carefully pull the fan module out of the ACOPOS P3 module in the direction of the arrow using the side tab (❷).

3. Slide the new fan module into the ACOPOS P3 module in the direction of the arrow until the two snap-fit connectors audibly engage.

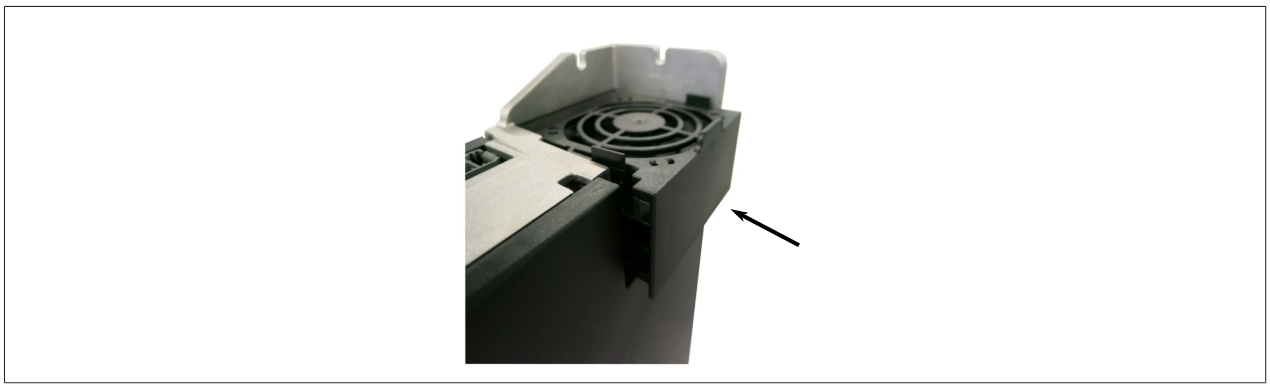


Figure 86: Installing the fan module

Information:

8EXF100.0000-00 fan modules have an average service life of approx. 65,000 h.

B&R recommends replacing all fan modules on an ACOPOS P3 module at the same time.

Information:

After installation, check whether the fan rotates when the module starts up.

2.3.6.6.2 8EXF200.0000-00

2.3.6.6.2.1 Order data

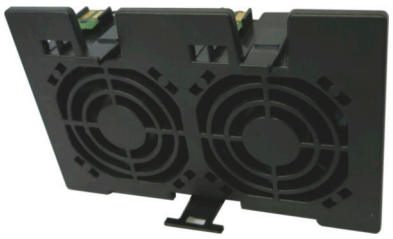
Order number	Short description	Figure
	Fan modules	
8EXF200.0000-00	ACOPOS P3 fan module, replacement fan for ACOPOS P3 servo drive double-width (8EI017xxD/8EI022xxD/ 8EI024/8EI034/8EI044)	

Table 296: 8EXF200.0000-00 - Order data

2.3.6.6.2.2 Technical data

Order number	8EXF200.0000-00
General information	
Short description	ACOPOS P3 fan module, replacement fan for ACOPOS P3 servo drive double-width (8EI017xxD/8EI022xxD/8EI024/8EI034/8EI044)
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E225616 Power conversion equipment
Mechanical properties	
Dimensions	
Width	121 mm
Height	77 mm
Depth	50 mm
Weight	150 g

Table 297: 8EXF200.0000-00 - Technical data

2.3.6.6.2.3 Replacing fan module 8EXF200.0000-00

Fan module 8EXF200.0000-00 is installed on the bottom of the ACOPOS P3 8EI servo drive.

Figure 87: Fan module 8EXF200.000-00

Procedure

1. Disconnect the ACOPOS P3 drive system from the power system and secure it against being switched on again.

Danger!

Before starting work, disconnect the power supply and wait 5 minutes to ensure that the DC bus of the ACOPOS P3 drive system has discharged. Observe regulations!

Information:

The device is not permitted to be operated without a fan.

2. The fan module is snapped into the ACOPOS P3 module with three snap-fit connectors (❶).

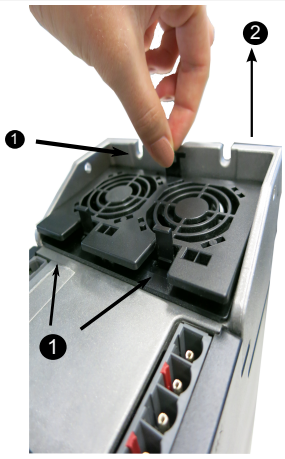


Figure 88: Removing the fan module

Carefully pull the fan module out of the ACOPOS P3 module in the direction of the arrow using the rear tab (❷).

3. Slide the new fan module downwards into the ACOPOS P3 module in the direction of the arrow until it audibly engages again.

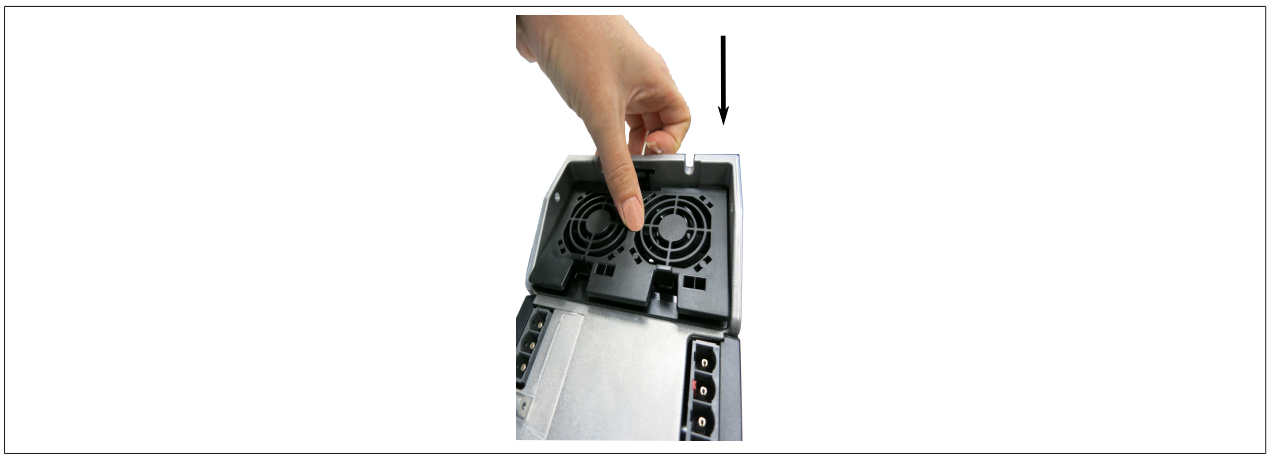


Figure 89: Installing the fan module

Information:

8EXF200.0000-00 fan modules have an average service life of approx. 65,000 h.

B&R recommends replacing all fan modules on an ACOPOS P3 module at the same time.

Information:

After installation, check whether the fan rotates when the module starts up.

2.3.6.6.3 8EXF300.0000-00

2.3.6.6.3.1 Order data

Order number	Short description	Figure
	Fan modules	
8EXF300.0000-00	ACOPOS P3 ELKO fan module, replacement fan for ACOPOS P3 servo drive double-width (8EI017xxD/8EI022xxD/ 8EI024/8EI034/8EI044)	

Table 298: 8EXF300.0000-00 - Order data

2.3.6.6.3.2 Technical data

Order number	8EXF300.0000-00
General information	
Short description	ACOPOS P3 ELKO fan module, replacement fan for ACOPOS P3 servo drive double-width (8EI017xxD/8EI022xxD/8EI024/8EI034/8EI044)
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E225616 Power conversion equipment
Mechanical properties	
Dimensions	
Width	65 mm
Height	62 mm
Depth	33 mm
Weight	40 g

Table 299: 8EXF300.0000-00 - Technical data

2.3.6.6.3.3 Replacing fan module 8EXF300.0000-00

Fan module 8EXF300.0000-00 is installed on the bottom of the ACOPOS P3 8EI servo drive.

Figure 90: Fan module 8EXF300.0000-00

Procedure

1. Disconnect the ACOPOS P3 drive system from the power system and secure it against being switched on again.

Danger!

Before starting work, disconnect the power supply and wait 5 minutes to ensure that the DC bus of the ACOPOS P3 drive system has discharged. Observe regulations!

Information:

The device is not permitted to be operated without a fan.

2. The fan module is snapped into the ACOPOS P3 module with a snap-fit connector (❶).

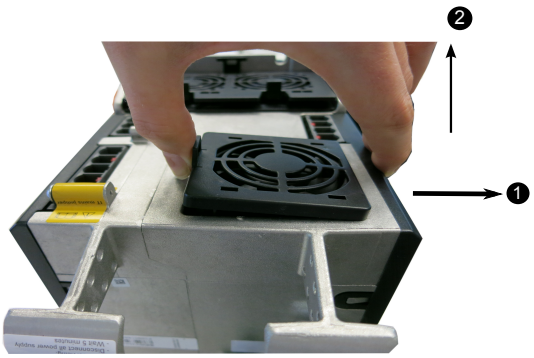


Figure 91: Removing the fan module

Carefully push the fan module outwards (❶) using the side tab and pull it out of the ACOPOS P3 module in the direction of the arrow (❷).

3. Slide the new fan module into the ACOPOS P3 module and push it downwards in the direction of the arrow until the snap-fit connector audibly engages.

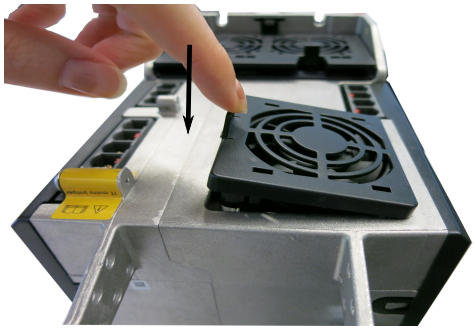


Figure 92: Installing the fan module

Information:

8EXF300.0000-00 fan modules have an average service life of approx. 65,000 h.

B&R recommends replacing all fan modules on an ACOPOS P3 module at the same time.

Information:

After installation, check whether the fan rotates when the module starts up.

2.3.6.7 Metal flanges

2.3.6.7.1 8BXC011.0000-00

2.3.6.7.1.1 General information

Metal flange 8BXC011.0000-00 is used to feed a B&R cable through a control cabinet panel.
Both front panel installation and rear panel installation are possible.

In the installed state, the cable grommet achieves IP67 protection.[7)]

Metal flange 8BXC011.0000-00 can be used for the following B&R cable assemblies:

Order number	Description
8BCExxxx.1111A-0	ACOPOSmulti EnDat 2.1 cable, length x m, 10x 0.14 mm² + 2x 0.5 mm², 17-pin female speedtec EnDat connector, 15-pin male DSUB servo connector, can be used in cable drag chains
8BCExxxx.3111A-0	ACOPOSmulti EnDat 2.1 cable, length x m, 10x 0.14 mm² + 2x 0.5 mm², 17-pin female speedtec EnDat connector, 15-pin male DSUB servo connector
8BCRxxxx.1111A-0	ACOPOSmulti resolver cable, length x m, 3x 2x 24 AWG (19x 0.127), 12-pin female speedtec resolver connector, 9-pin male DSUB servo connector, can be used in cable drag chains
8BCRxxxx.3111A-0	ACOPOSmulti resolver cable, length x m, 3x 2x 0.22, 12-pin female speedtec resolver connector, 9-pin male DSUB servo connector
8BCSxxxx.1111A-0	ACOPOSmulti SinCos cable, length x m, 10x 0.14 mm² + 2x 0.5 mm², SinCos 12-pin female speedtec connector, 15-pin male DSUB servo connector, can be used in cable drag chains
8CExxx.12-1	EnDat 2.1 cable, length x m, 10x 0.14 mm² + 2x 0.5 mm², 17-pin female Intercontec EnDat connector, 15-pin male DSUB servo connector, can be used in cable drag chains
8CRxxx.12-1	Resolver cable, length x m, 3x 2x 24 AWG (19x 0.127), 12-pin female Intercontec resolver connector, 9-pin male DSUB servo connector, can be used in cable drag chains
8ECRxxxx.1111C-0	ACOPOS P3 resolver cable, length x m, 3x 2x 24 AWG (19x 0.127), 12-pin female speedtec connector, 8-pin male Mini I/O connector, can be used in cable drag chains

2.3.6.7.1.2 Order data

Order number	Short description	Figure
	Metal Flanges	
8BXC011.0000-00	Metal flange for feeding a size 1 speedtec connector (type 623) through a control cabinet panel, front or rear panel installation possible	

Table 300: 8BXC011.0000-00 - Order data

2.3.6.7.1.3 Technical data

Order number	8BXC011.0000-00
Mechanical properties	
Housing	
Material	Nickel-plated zinc casting
Dimensions	
Width	35 mm
Height	35 mm
Depth	6.5 mm
Weight	24 g
Gasket	FKM

Table 301: 8BXC011.0000-00 - Technical data

[7)] Observe the instructions in the installation instructions!

2.3.6.7.1.4 Dimension diagram and installation dimensions

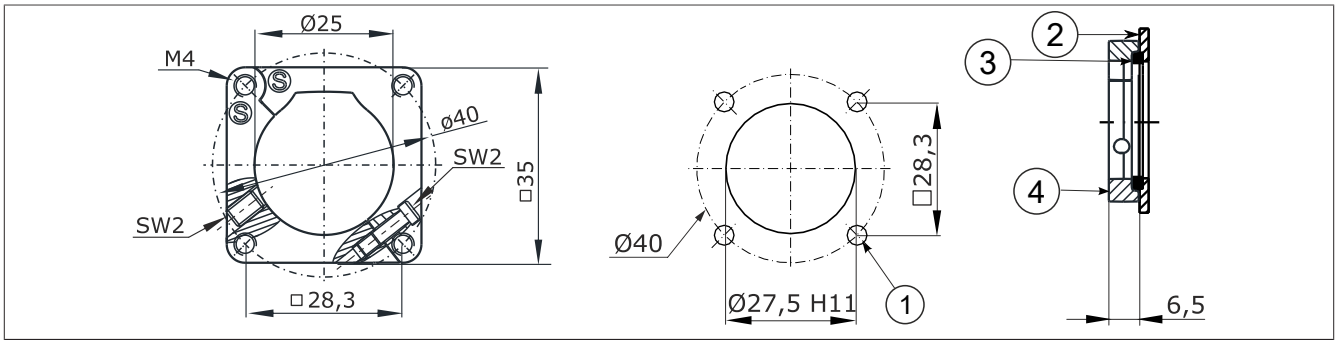


Figure 93: 8BXC011.0000-00 - Dimension diagram

1 Front panel installation: M3
Rear panel installation: ø 4.2
2 Housing, cabinet
3 Gasket
4 Metal flange 8BXC011.0000-00

2.3.6.7.1.5 Installation

Requirement

Installation window per Dimension diagram and installation dimensions (take the desired mounting type into account). For the B&R cable assemblies to be used for this purpose, see General information.

Required tools

Hex key size 2

Procedure

Rear panel installation

1. Slide the sealing ring over the connector.

2. Open the metal flange and attach it to the connector as shown. The mounting type must be taken into account (the illustration shows rear panel installation). The sealing ring must always be located between the metal flange and control cabinet panel.

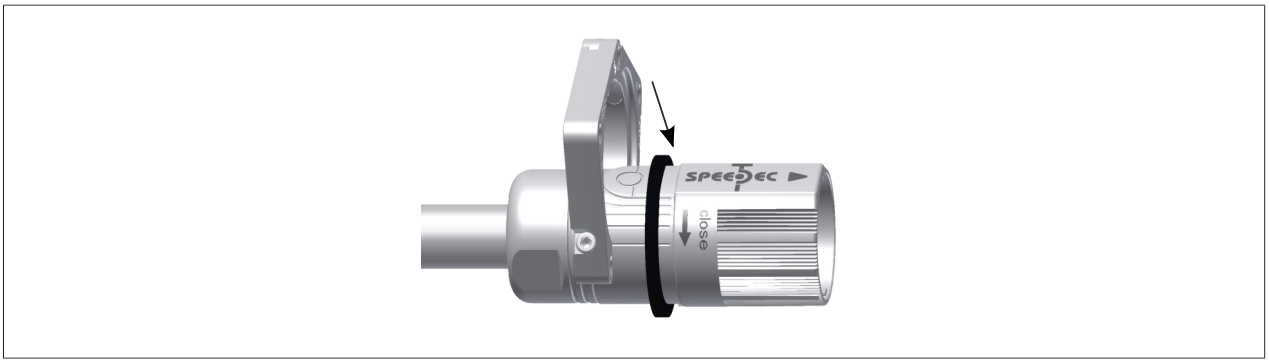


Figure 94: Attaching the metal flange to the connector (rear panel installation)

3. Close the metal flange.

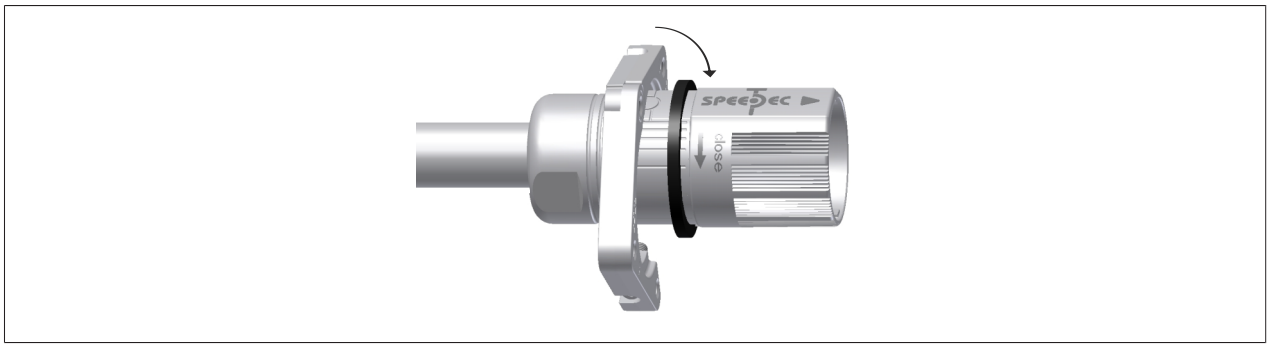


Figure 95: Attaching the metal flange to the connector (rear panel installation)

4. Slide the metal flange over the sealing ring.

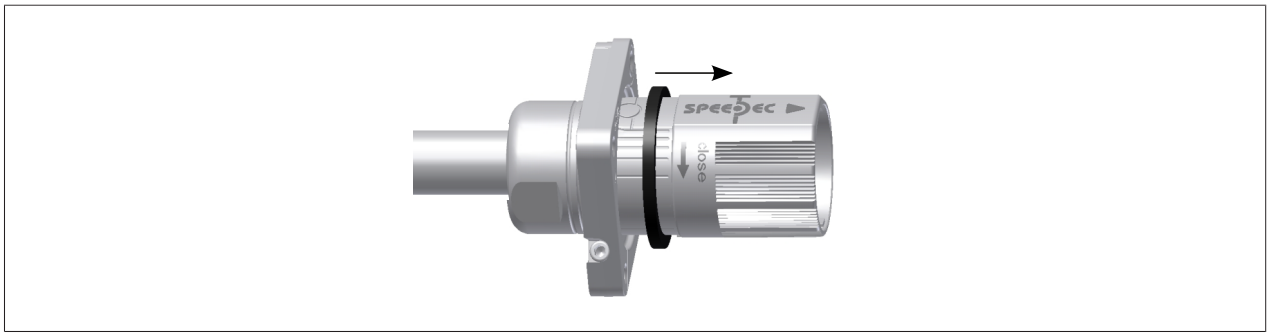


Figure 96: Attaching the metal flange to the connector (rear panel installation)

5. Position the metal flange on the connector (the position of the metal flange determines the length of the connector outside or inside the control cabinet).

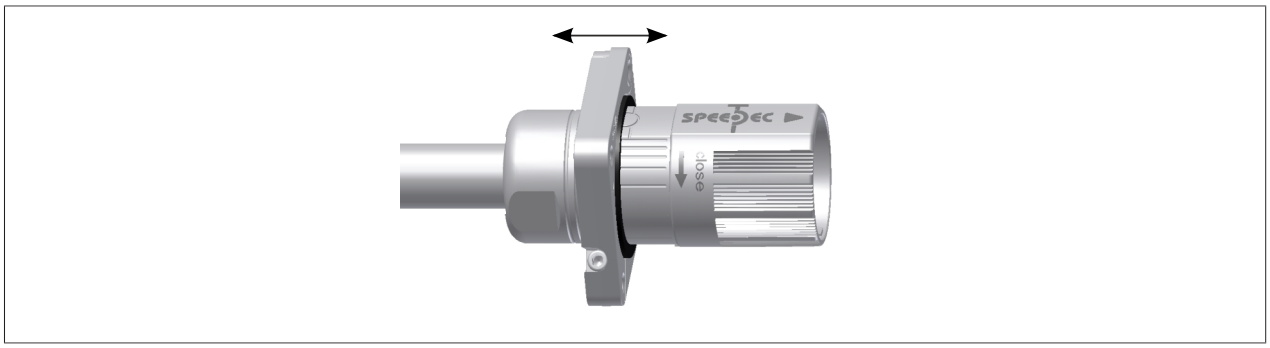
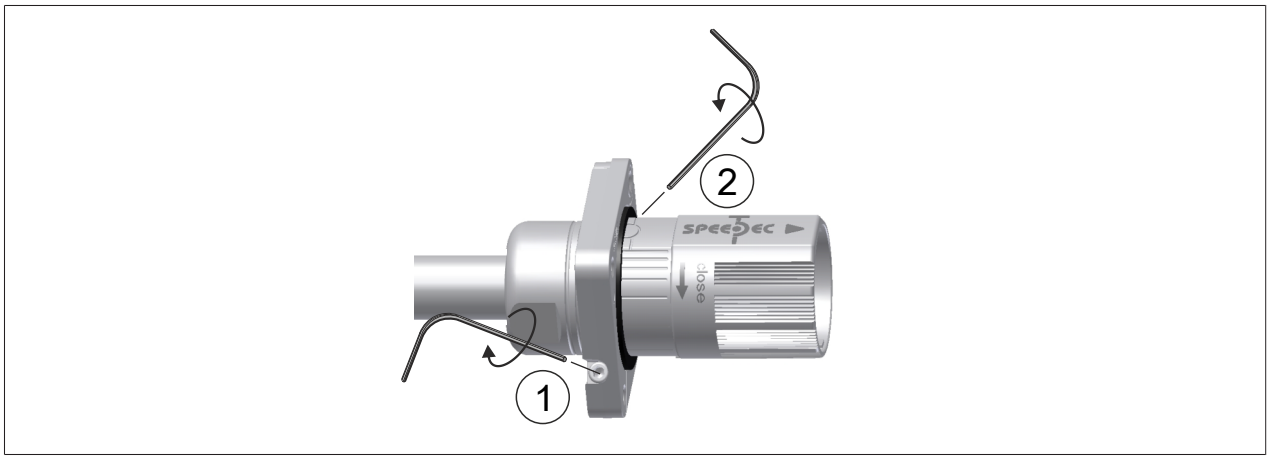


Figure 97: Attaching the metal flange to the connector (rear panel installation)

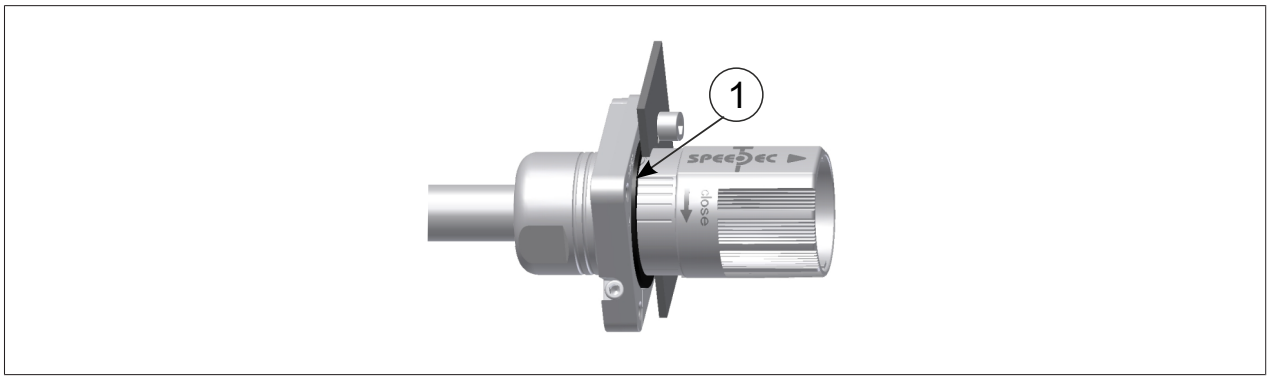
6. Secure the metal flange to the connector with a hex key.



1 Flange screw (max. 1.2 Nm tightening torque)
2 Stud bolt (max. 0.5 Nm tightening torque)

7. Installing the connector in the control cabinet panel:

a) Guide the connector from the inside of the control cabinet through the installation window of the control cabinet panel to the outside until the metal flange is in contact with the control cabinet panel.
b) Screw the control cabinet panel to the metal flange using 4x M3 screws (minimum length: 6.5 mm + Thickness of the control cabinet panel) as shown in the illustration.



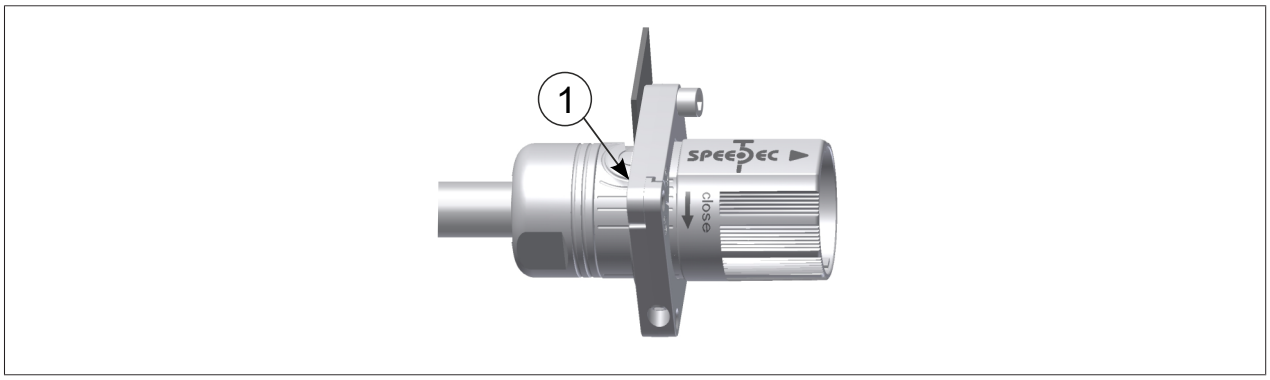
1 Sealing ring

Procedure

Front panel installation

1. Step 1 is the same as for rear panel installation.

2. For steps 2-6, see Rear panel installation (note that the sealing ring must be on the other side of the metal flange for front panel installation).
3. Installing the connector in the control cabinet panel:



1 Sealing ring

a) Guide the connector from the outside of the control cabinet through the installation window of the control cabinet panel to the inside until the metal flange is in contact with the control cabinet panel.
b) Screw the metal flange to the control cabinet panel using 4x M3 screws (minimum length: 6.5 mm + Thickness of the control cabinet panel) as shown in the illustration.

Information:

Due to varying characteristics of non-B&R components, deviations from these instructions may be necessary. Trained qualified personnel must therefore check before installation whether a different installation must be carried out.

2.3.6.7.2 8BXC012.0000-00

2.3.6.7.2.1 General information

Metal flange 8BXC012.0000-00 is used to feed a B&R cable through a control cabinet panel.
Both front panel installation and rear panel installation are possible.

In the installed state, the cable grommet achieves IP67 protection.[8)]

Metal flange 8BXC012.0000-00 can be used for the following B&R cable assemblies:

Order number	Description
8BCHxxxx.1111A-0	ACOPOSmulti hybrid motor cable, length x m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, integrated shield plate, can be used in cable drag chains
8BCHxxxx.1312A-0	ACOPOSmulti hybrid motor cable, length x m, 4x 4 mm² + 2x 1 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, integrated shield plate, can be used in cable drag chains
8BCMxxxx.1011A-0	ACOPOSmulti motor cable, length x m, 4x 0.75 mm² + 2x 2x 0.34 mm², 8-pin female speedtec motor connector size 1, integrated shield plate, can be used in cable drag chains
8BCMxxxx.1111A-0	ACOPOSmulti motor cable, length x m, 4x 1.5 mm² + 2x 2x 0.75 mm², 8-pin female speedtec motor connector size 1, integrated shield plate, can be used in cable drag chains
8BCMxxxx.1312A-0	ACOPOSmulti motor cable, length x m, 4x 4 mm² + 2x 0.75 mm² + 2x 1 mm², 8-pin female speedtec motor connector size 1, integrated shield plate, can be used in cable drag chains
8BCMxxxx.3111A-0	ACOPOSmulti motor cable, length x m, 4x 1.5 mm² + 2x 2x 0.75 mm², 8-pin female speedtec motor connector size 1, integrated shield plate
8BCMxxxx.3312A-0	ACOPOSmulti motor cable, length x m, 4x 4 mm² + 2x 2x 1 mm², 8-pin female speedtec motor connector size 1, integrated shield plate
8CHxxx.12-1	ACOPOS hybrid motor cable, length x m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, can be used in cable drag chains
8CHxxx.1A-1	ACOPOSmicro hybrid motor cable, length x m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, can be used in cable drag chains
8CHxxx.12-3	ACOPOS hybrid motor cable, length x m, 4x 4 mm² + 2x 1 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, can be used in cable drag chains
8ECHxxxx.1111A-0	ACOPOS P3 hybrid motor cable, length x m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, can be used in cable drag chains
8ECHxxxx.1312A-0	ACOPOS P3 hybrid motor cable, length x m, 4x 4 mm² + 2x 1 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, can be used in cable drag chains
8ECMxxxx.1111C-0	ACOPOS P3 motor cable, length x m, 4x 1.5 mm² + 2x 2x 0.75 mm², 8-pin female speedtec motor connector, can be used in cable drag chains
8ECMxxxx.1312C-0	ACOPOS P3 motor cable, length x m, 4x 4 mm² + 2x 0.75 mm² + 2x 1 mm², 8-pin female speedtec motor connector, can be used in cable drag chains
8CMxxx.12-1	Motor cable, length x m, 4x 1.5 mm² + 2x 2x 0.75 mm², 8-pin female Intercontec motor connector size 1, can be used in cable drag chains
8CMxxx.12-0	Motor cable, length x m, 4x 0.75 mm² + 2x 2x 0.34 mm², 8-pin female Intercontec motor connector size 1, can be used in cable drag chains
8CMxxx.18-1	Motor cable, length x m, 4 x 1.5 mm² + 2x 2x 0.75 mm², 8-pin female Intercontec motor connector, medium wire stripping length, can be used in cable drag chains, UL/CSA listed
8CMxxx.12-3	Motor cable, length x m, 4x 4 mm² + 2x 0.75 mm² + 2x 1 mm², 8-pin female Intercontec motor connector size 1, can be used in cable drag chains
8ECHxxxx.1B41C-0	ACOPOS P3 hybrid motor cable EnDat3, length x m, 4x 1.5 mm² + 2x 0.75 mm² + (2x 26 AWG or 24 AWG), 8-pin female speedtec hybrid motor connector, can be used in cable drag chains
8ECHxxxx.1D42C-0	ACOPOS P3 hybrid motor cable EnDat3, length x m, 4x 4 mm² + 2x 1 mm² + (2x 26 AWG or 24 AWG), 8-pin female speedtec hybrid motor connector, can be used in cable drag chains

2.3.6.7.2.2 Order data

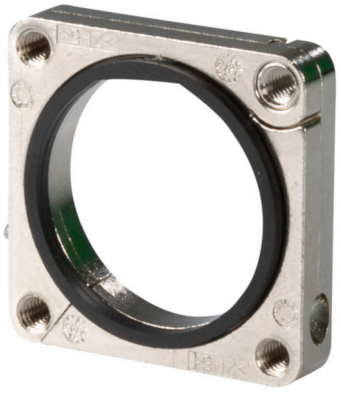
Order number	Short description	Figure
	Metal flanges	
8BXC012.0000-00	Metal flange for feeding a size 1 speedtec connector (type 723/923) through a control cabinet panel, front or rear panel installation possible	

Table 302: 8BXC012.0000-00 - Order data

[8)] Observe the instructions in the installation instructions!

2.3.6.7.2.3 Technical data

Order number	8BXC012.0000-00
Mechanical properties	
Housing	
Material	Nickel-plated zinc casting
Dimensions	
Width	35 mm
Height	35 mm
Depth	6.5 mm
Weight	22 g
Gasket	FKM

Table 303: 8BXC012.0000-00 - Technical data

2.3.6.7.2.4 Dimension diagram and installation dimensions

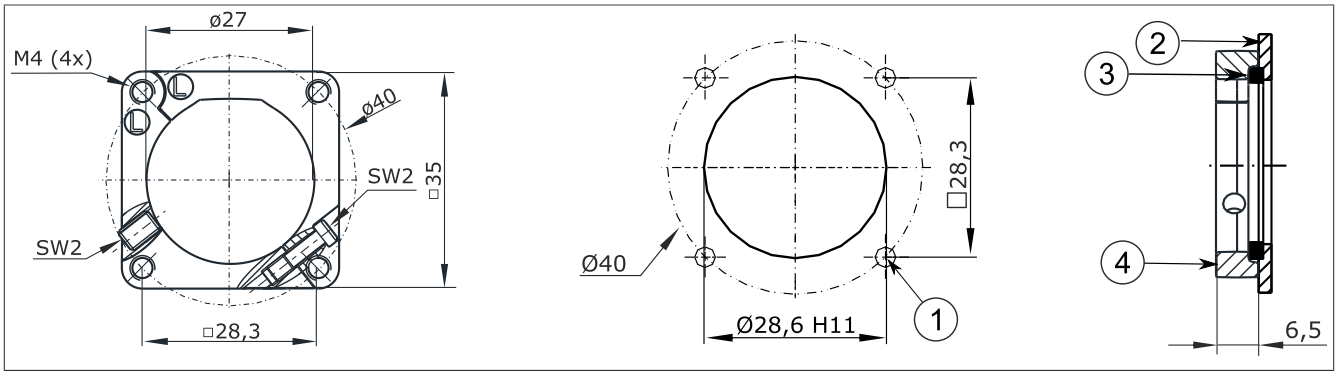


Figure 98: 8BXC012.0000-00 - Dimension diagram

1 Front panel installation: M3
Rear panel installation: ø 4.2
2 Housing, cabinet
3 Gasket
4 Metal flange 8BXC012.0000-00

2.3.6.7.2.5 Installation

Requirements

Installation window per Dimension diagram and installation dimensions (take the desired mounting type into account). For the B&R cable assemblies to be used for this purpose, see General information.

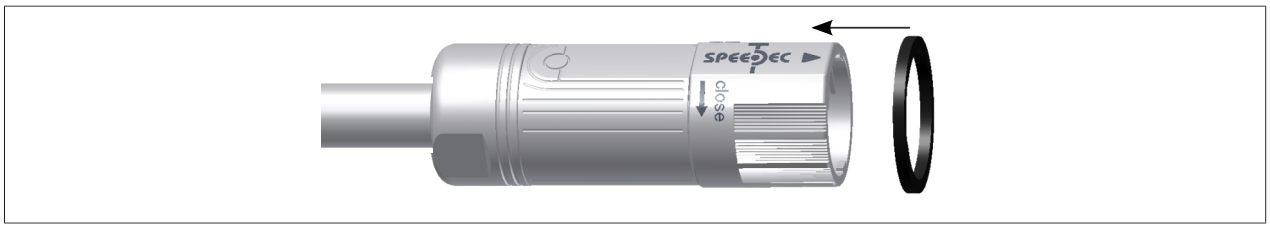
Required tools

Hex key size 2

Procedure

Rear panel installation

1. Slide the sealing ring over the connector.



2. Open the metal flange and attach it to the connector as shown. The mounting type must be taken into account (the illustration shows rear panel installation). The sealing ring must always be located between the metal flange and control cabinet panel.

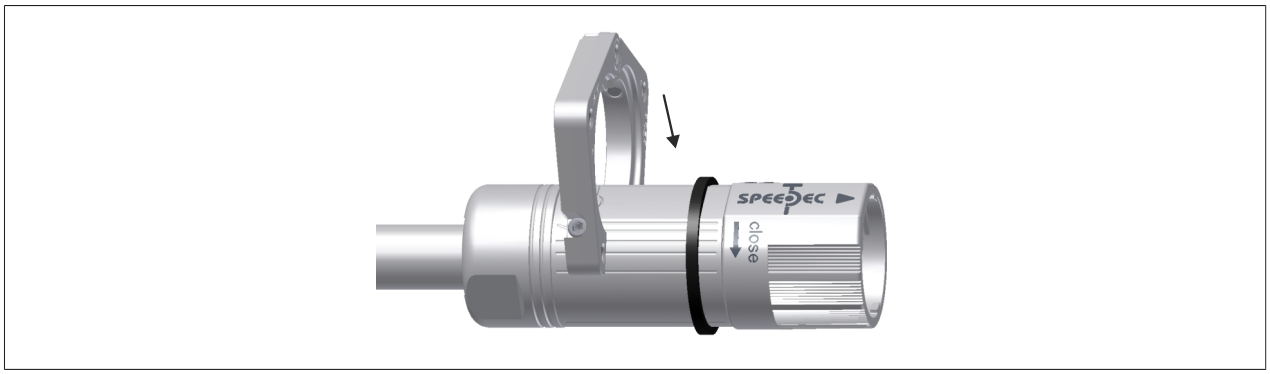


Figure 99: Attaching the metal flange to the connector (rear panel installation)

3. Close the metal flange.

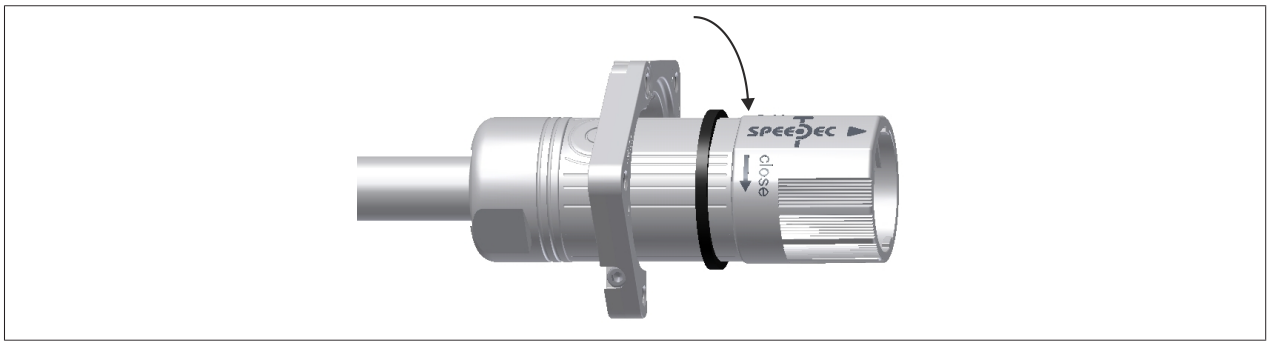


Figure 100: Attaching the metal flange to the connector (rear panel installation)

4. Slide the metal flange over the sealing ring.

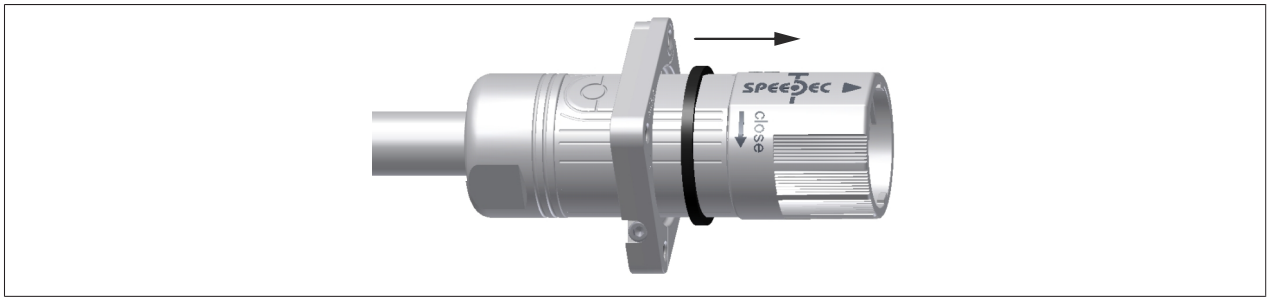


Figure 101: Attaching the metal flange to the connector (rear panel installation)

5. Position the metal flange on the connector (the position of the metal flange determines the length of the connector outside or inside the control cabinet).

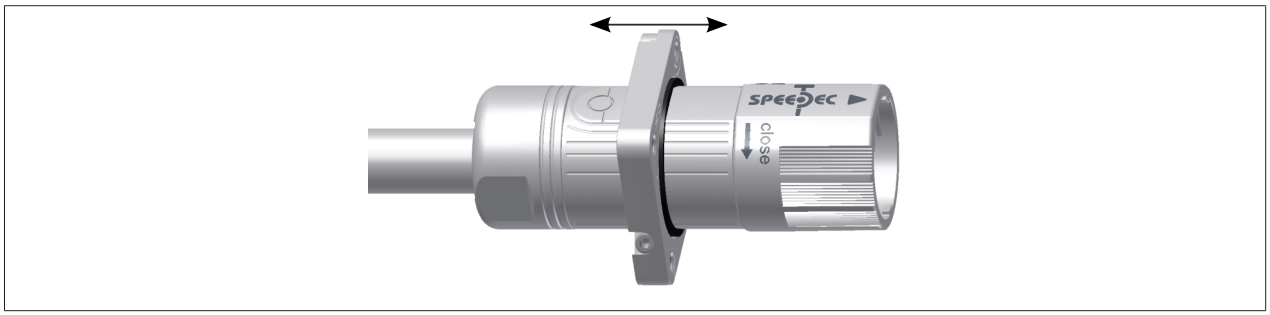


Figure 102: Attaching the metal flange to the connector (rear panel installation)

6. Secure the metal flange to the connector with a hex key.

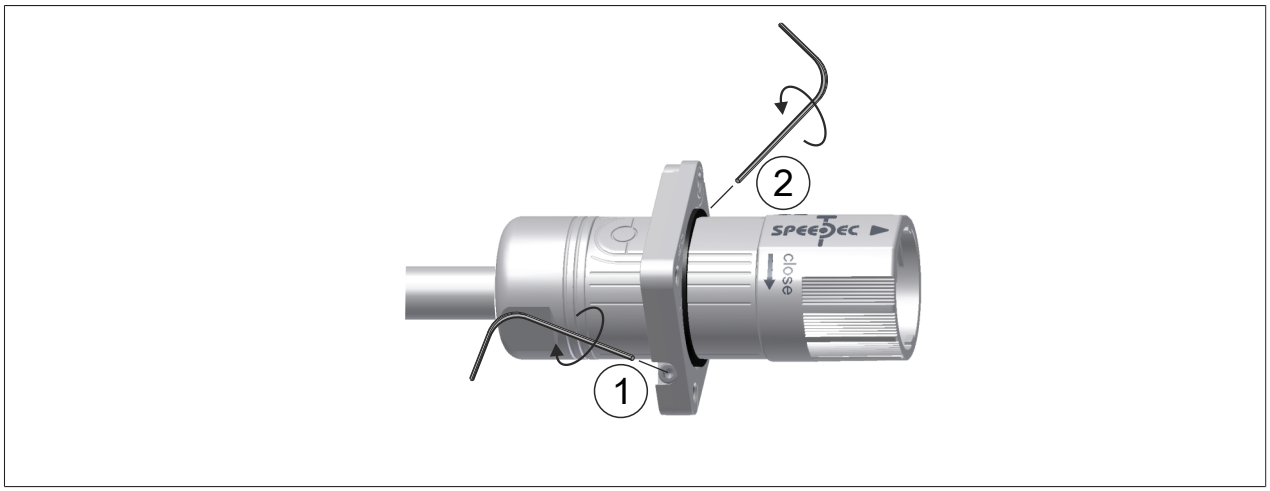
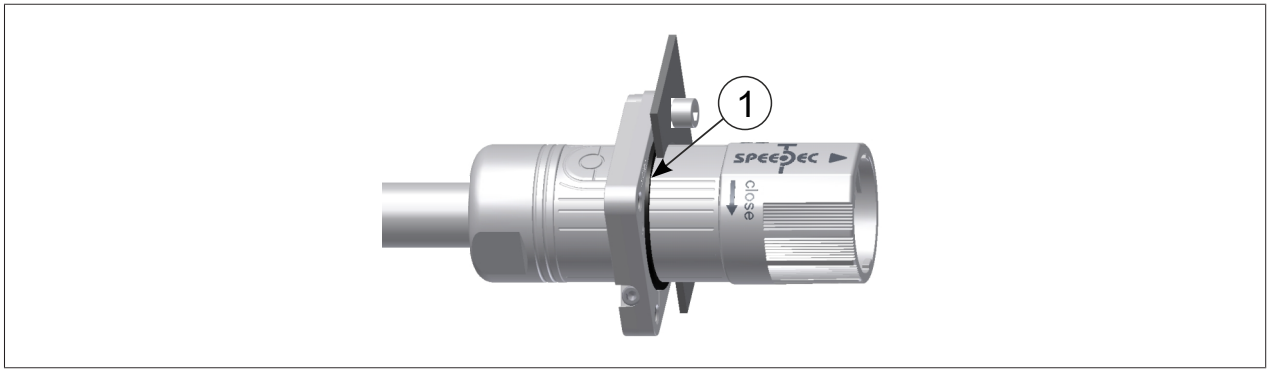


Figure 103: Attaching the metal flange to the connector (rear panel installation)

1 Flange screw (max. 1.2 Nm tightening torque)
2 Stud bolt (max. 0.5 Nm tightening torque)

7. Installing the connector in the control cabinet panel:
   a) Guide the connector from the inside of the control cabinet through the installation window of the control cabinet panel to the outside until the metal flange is in contact with the control cabinet panel.
   b) Screw the control cabinet panel to the metal flange using 4x M3 screws (minimum length: 6.5 mm + Thickness of the control cabinet panel) as shown in the illustration.

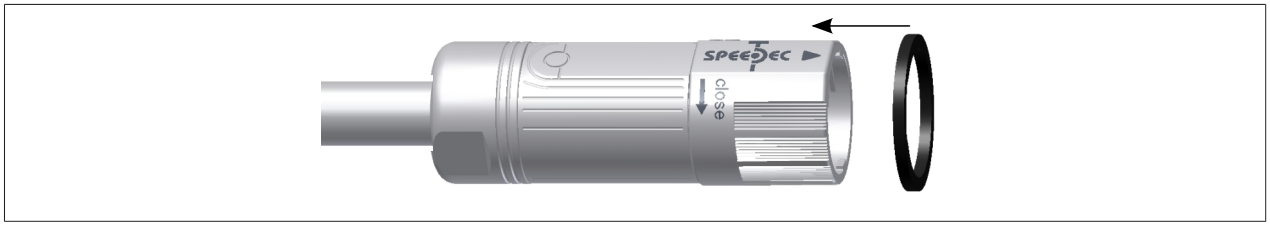


1 Sealing ring

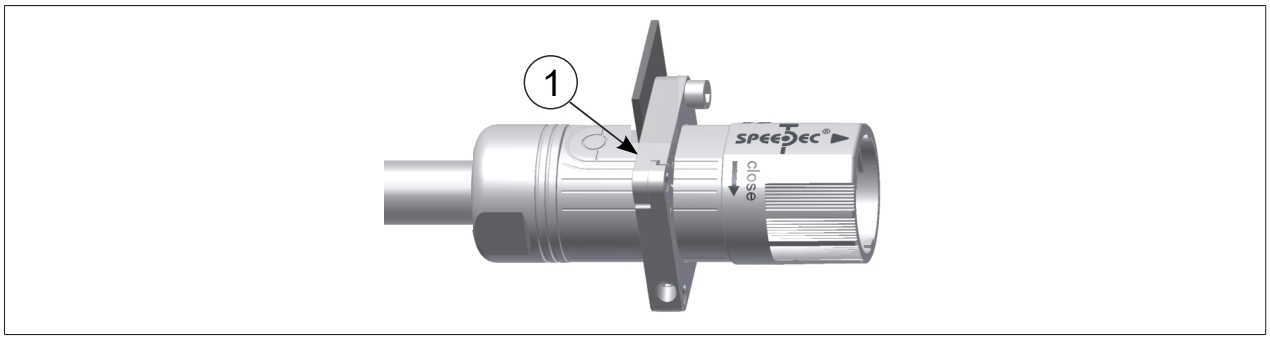
Procedure

Front panel installation

1. Step 1 is the same as for rear panel installation.



2. For steps 2-6, see Rear panel installation (note that the sealing ring must be on the other side of the metal flange for front panel installation).
3. Installing the connector in the control cabinet panel:



1 Sealing ring

a) Guide the connector from the outside of the control cabinet through the installation window of the control cabinet panel to the inside until the metal flange is in contact with the control cabinet panel.

b) Screw the metal flange to the control cabinet panel using 4x M3 screws (minimum length: 6.5 mm + Thickness of the control cabinet panel) as shown in the illustration.

Information:

Due to varying characteristics of non-B&R components, deviations from these instructions may be necessary. Trained qualified personnel must therefore check before installation whether a different installation must be carried out.

2.3.6.7.3 8BXC013.0000-00

2.3.6.7.3.1 General information

Metal flange 8BXC013.0000-00 is used to feed a B&R cable through a control cabinet panel.
Both front panel installation and rear panel installation are possible.

In the installed state, the cable grommet achieves IP67 protection.[9)]

Metal flange 8BXC013.0000-00 can be used for the following B&R cable assemblies:

Order number	Description
8BCMxxxx.1523A-0	ACOPOSmulti motor cable, length x m, 4x 10 mm² + 2x 0.75 mm² + 2x 1.5 mm², 8-pin female speedtec motor connector size 1.5, integrated shield plate, can be used in cable drag chains
8BCMxxxx.1525B-0	ACOPOSmulti motor cable, length x m, 4x 10 mm² + 2x 0.75 mm² + 2x 1.5 mm², 8-pin female speedtec motor connector size 1.5, integrated shield plate, M8 ring terminal ends on the servo side, can be used in cable drag chains
8BCMxxxx.1625B-0	ACOPOSmulti motor cable, length x m, 4x 16 mm² + 2x 1.5 mm² + 2x 0.75 mm², 8-pin female motor connector size 1.5, integrated shield plate, M8 ring terminal ends on the servo side, can be used in cable drag chains
8ECMxxxx.1523C-0	ACOPOS P3 motor cable, length x m, 4 x 10.0 mm² + 2 x 0.75 mm² + 2 x 1.5 mm², 8-pin female speedtec motor connector size 1.5, can be used in cable drag chains
8CMxxx.19-3	Motor cable, length x m, 4x 4 mm² + 2x 0.75 mm² + 2x 1 mm², 8-pin female Intercontec motor connector size 1.5, medium wire stripping length, can be used in cable drag chains
8CMxxx.12-5	Motor cable, length x m, 4x 10 mm² + 2x 0.75 mm² + 2x 1.5 mm², 8-pin female Intercontec motor connector size 1.5, can be used in cable drag chains
8CMxxx.12-6	Motor cable, length x m, 4x 16 mm² + 2x 1.5 mm² + 2x 0.75 mm², 8-pin female Intercontec motor connector, prepared for 8V128M can be used in cable drag chains
8BCMxxxx.1322A-0	ACOPOSmulti motor cable, length x m, 4x 4 mm² + 2x 0.75 mm² + 2x 1 mm², 8-pin female speedtec motor connector size 1.5, integrated shield plate, can be used in cable drag chains
8ECHxxxx.1D52C-0	ACOPOS P3 hybrid motor cable EnDat3, length x m, 4x 4 mm² + 2x 1 mm² + (2x 26 AWG or 24 AWG), hybrid motor Speedtec 8-pin female connector size 1.5, can be used in cable drag chains

2.3.6.7.3.2 Order data

Order number	Short description	Figure
	Metal Flanges	
8BXC013.0000-00	Metal flange for feeding a size 1.5 speedtec connector (type 940) through a control cabinet panel, front or rear panel installation possible	

Table 304: 8BXC013.0000-00 - Order data

2.3.6.7.3.3 Technical data

Order number	8BXC013.0000-00
Mechanical properties	
Housing	
Material	Zinc casting, nickel-plated
Dimensions	
Width	55 mm
Height	55 mm
Depth	7 mm
Weight	56 g
Gasket	FPM

Table 305: 8BXC013.0000-00 - Technical data

9) Observe the instructions in the installation instructions!

2.3.6.7.3.4 Dimension diagram and installation dimensions

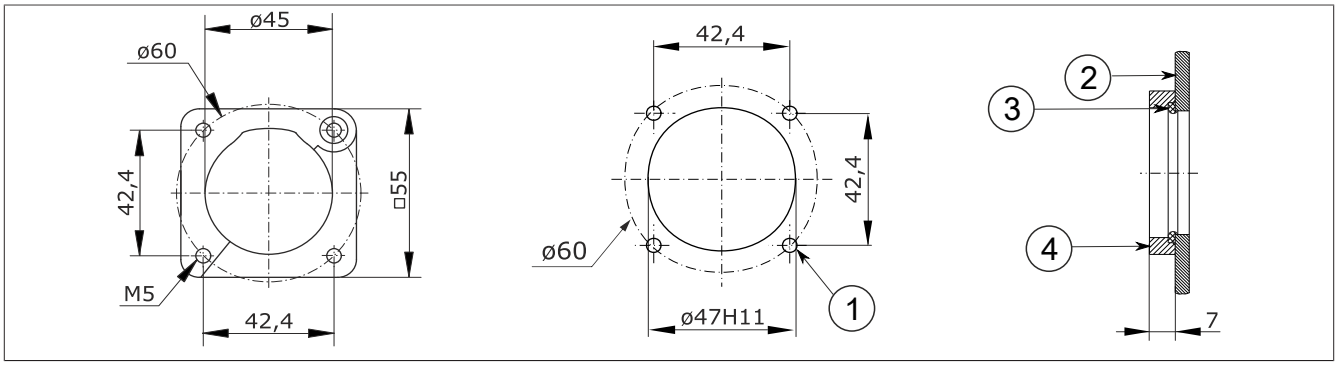


Figure 104: BXC013.0000-00 - Dimension diagram

1 Front panel installation: M4
Rear panel installation: ø 5.2
2 Housing, cabinet
3 Gasket
4 Metal flange BXC013.0000-00

2.3.6.7.3.5 Installation

Requirements

Installation window per Dimension diagram and installation dimensions (take the desired mounting type into account). For the B&R cable assemblies to be used for this purpose, see General information.

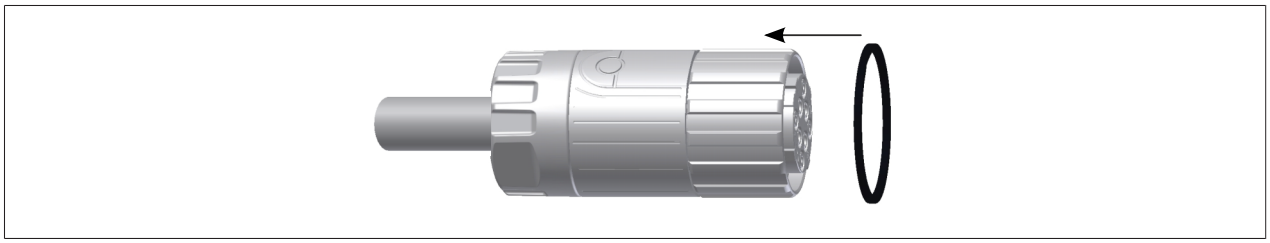
Required tools

Hex key size 2

Procedure

Rear panel installation

1. Slide the sealing ring over the connector.



2. Open the metal flange and attach it to the connector as shown. The mounting type must be taken into account (the illustration shows rear panel installation). The sealing ring must always be located between the metal flange and control cabinet panel.

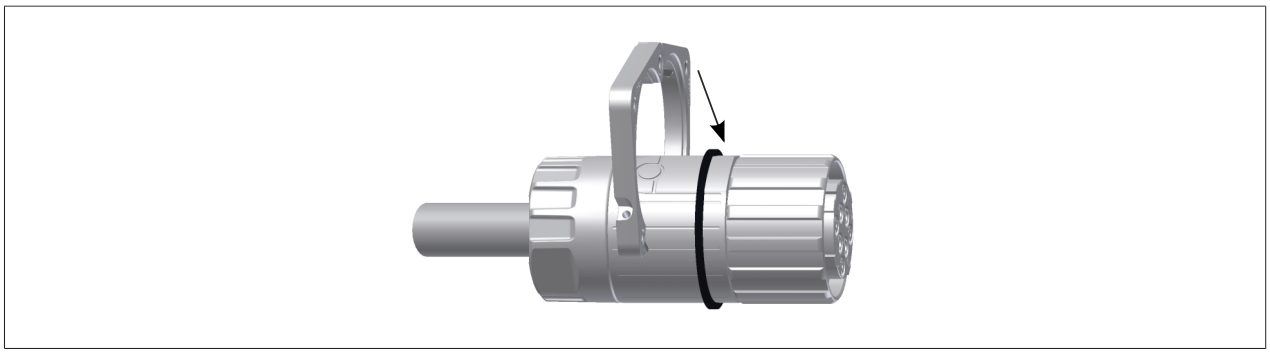


Figure 105: Attaching the metal flange to the connector (rear panel installation)

3. Close the metal flange.

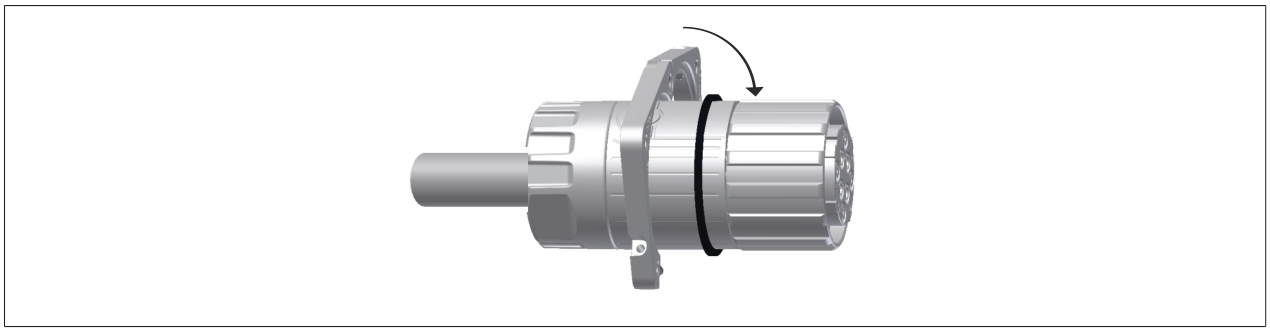


Figure 106: Attaching the metal flange to the connector (rear panel installation)

4. Slide the metal flange over the sealing ring.

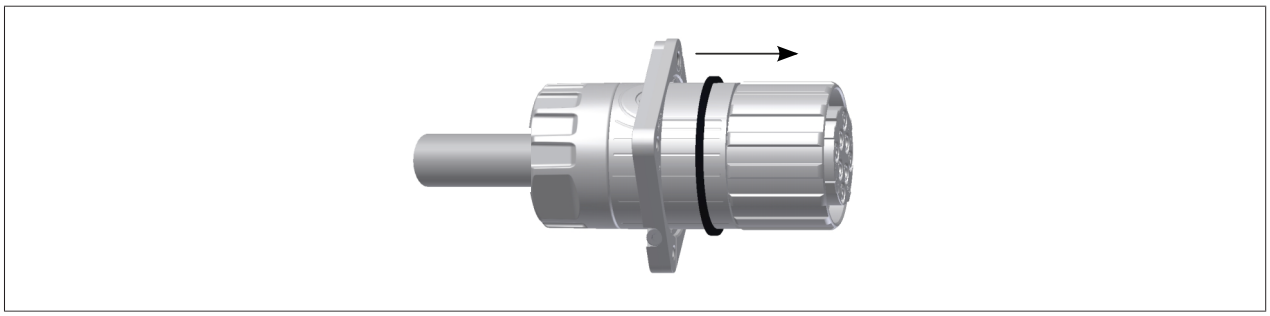


Figure 107: Attaching the metal flange to the connector (rear panel installation)

5. Position the metal flange on the connector (the position of the metal flange determines the length of the connector outside or inside the control cabinet).

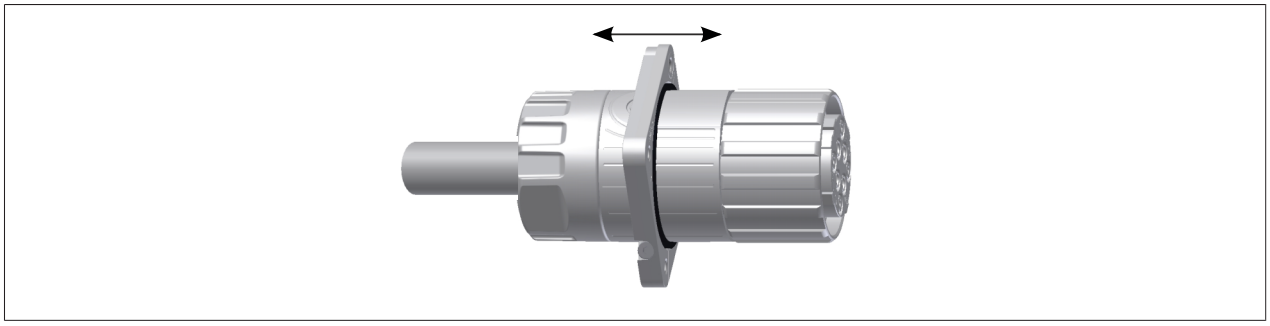


Figure 108: Attaching the metal flange to the connector (rear panel installation)

6. Secure the metal flange to the connector with a hex key.

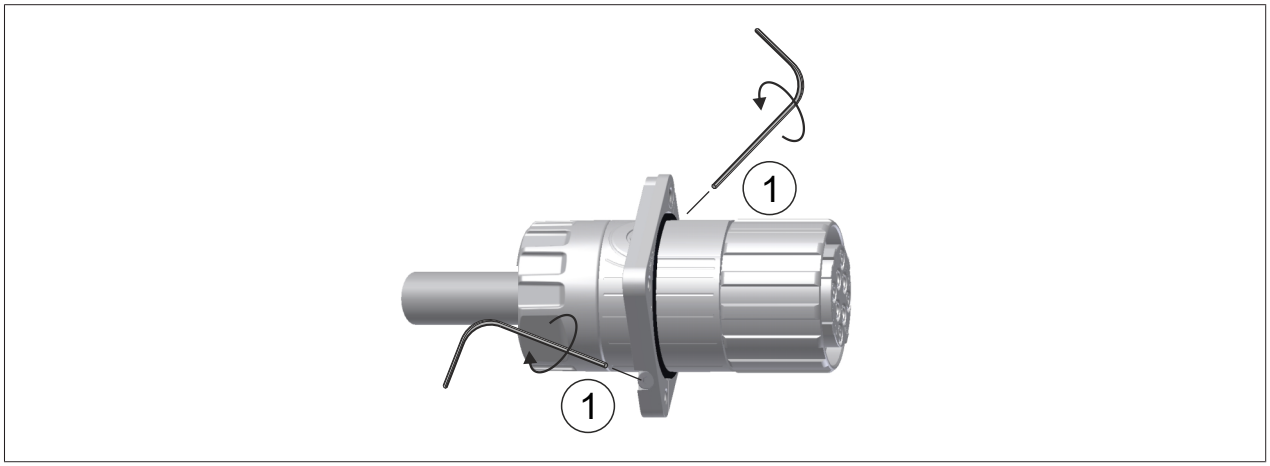
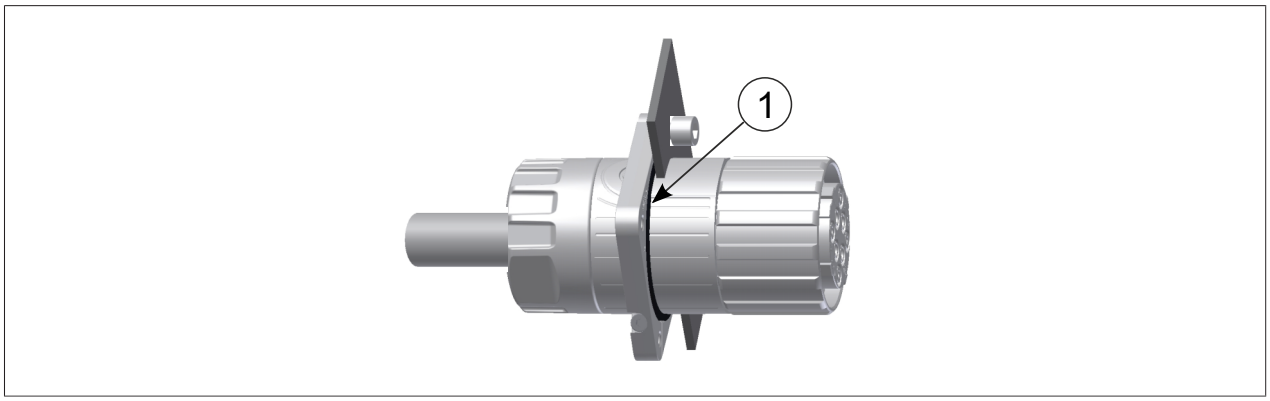


Figure 109: Attaching the metal flange to the connector (rear panel installation)

1 Screws (max. 1.2 Nm tightening torque)

7. Installing the connector in the control cabinet panel:

a) Guide the connector from the inside of the control cabinet through the installation window of the control cabinet panel to the outside until the metal flange is in contact with the control cabinet panel.
b) Screw the control cabinet panel to the metal flange using 4x M4 screws (minimum length: 7 mm + Thickness of the control cabinet panel) as shown in the illustration.

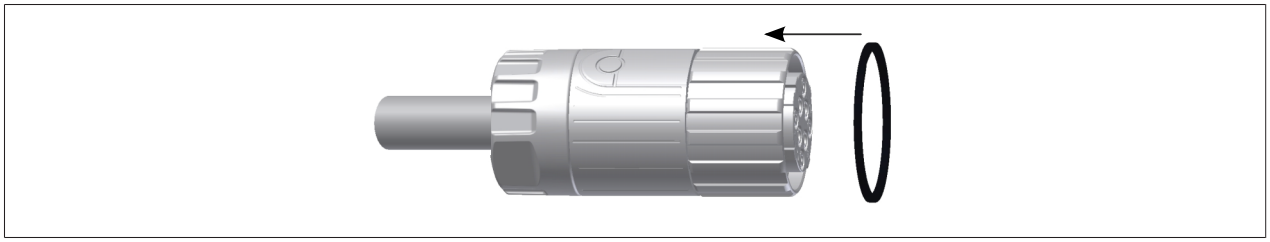


1 Sealing ring

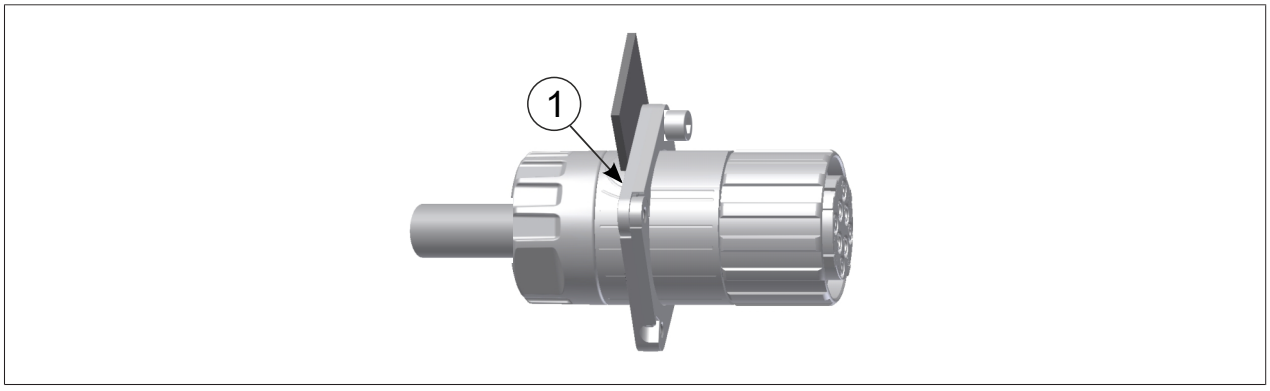
Procedure

Front panel installation

1. Step 1 is the same as for rear panel installation.



2. For steps 2-6, see Rear panel installation (note that the sealing ring must be on the other side of the metal flange for front panel installation).
3. Installing the connector in the control cabinet panel:



1 Sealing ring

a) Guide the connector from the outside of the control cabinet through the installation window of the control cabinet panel to the inside until the metal flange is in contact with the control cabinet panel.
b) Screw the metal flange to the control cabinet panel using 4x M4 screws (minimum length: 7 mm + Thickness of the control cabinet panel) as shown in the illustration.

Information:

Due to varying characteristics of non-B&R components, deviations from these instructions may be necessary. Trained qualified personnel must therefore check before installation whether a different installation must be carried out.

2.3.6.7.4 8BXC014.0000-00

2.3.6.7.4.1 General information

Metal flange 8BXC014.0000-00 is used to feed a B&R cable with a series 915 power connector / series 615 signal connector / series 915 hybrid connector through a control cabinet panel.

Order number	Description
8BCFxxxx.1221B-0	EnDat 2.2 cable, length x m, 1x 4x 0.14 mm² + 4x 0.35 mm², 12-pin female series 615 signal connector, 9-pin male DSUB servo connector, can be used in cable drag chains
8BCMxxxx.1034C-0	Motor cable, length x m, 4x 0.75 mm² + 2x 2x 0.34 mm², 8-pin female series 915 power connector, can be used in cable drag chains
8BCMxxxx.3034C-0	Motor cable, length x m, 4x 0.75 mm² + 2x 2x 0.34 mm², 8-pin female series 915 power connector
8BCRxxxx.1121A-0	Motor cable, length x m, 4x 0.75 mm² + 2x 2x 0.34 mm², 8-pin female series 915 power connector
8BCRxxxx.3121A-0	Resolver cable, length x m, 3x 2x 24 AWG (19x 0.127), 12-pin female series 615 signal connector, 9-pin male DSUB servo connector
8ECFxxxx.1221C-0	ACOPOS P3 EnDat 2.2 cable, length x m, 1x 4x 0.14 mm² + 4x 0.35 mm², 12-pin female series 615 signal connector, 8-pin Mini I/O male connector, can be used in cable drag chains
8ECMxxxx.1031C-0	ACOPOS P3 motor cable, length x m, 4x 0.75 mm² + 2x 2x 0.34 mm², 8-pin female series 915 power connector, can be used in cable drag chains
8ECRxxxx.1121C-0	ACOPOS P3 resolver cable, length x m, 3x 2x 24 AWG (19x 0.127), 12-pin female series 615 signal connector, 8-pin male Mini I/O connector, can be used in cable drag chains
8F1CPxxxx.11110-0	ACOPOStrak / ACOPOS 6D power cable, length x m, 1x 8-pin female series 915 hybrid connector, 1x 8-pin male series 915 hybrid connector, can be used in cable drag chains
8ECHxxxx.1A21C-0	ACOPOS P3 hybrid motor cable EnDat3, length x m, 4x 0.75 mm² + 2x 0.34 mm² + (2x 26 AWG or 24 AWG), motor hybrid series 915 8-pin female connector, can be used in cable drag chains

Table 306: 8BXC014.0000-00 - Suitable B&R cable assemblies

Both front panel installation and rear panel installation are possible.
IP67 protection is achieved for the cable grommet in an installed state[10)].

2.3.6.7.4.2 Order data

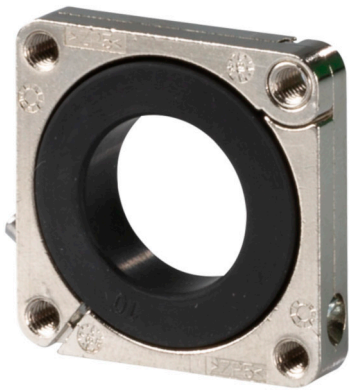
Order number	Short description	Figure
	Metal Flanges	
8BXC014.0000-00	Metal flange for feeding a series 615/915 connector through a control cabinet panel, front or rear panel installation possible	

Table 307: 8BXC014.0000-00 - Order data

2.3.6.7.4.3 Technical data

Order number	8BXC014.0000-00
Mechanical properties	
Housing	
Material	Zinc die-casting, nickel-plated
Dimensions	
Width	35 mm
Height	35 mm
Depth	6.5 mm
Weight	28 g
Gasket	FKM

Table 308: 8BXC014.0000-00 - Technical data

[10)] Observe the information in the installation instructions!

2.3.6.7.4.4 Dimension diagram and installation dimensions

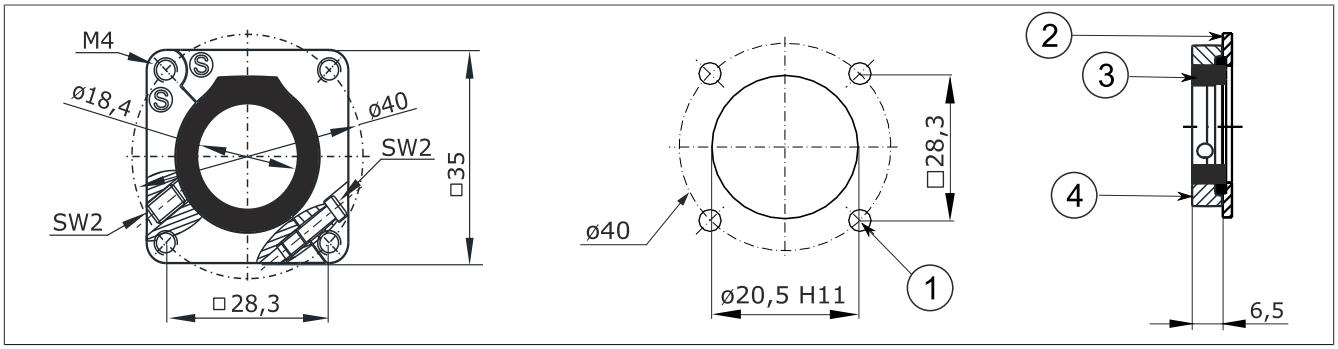


Figure 110: 8BXC014.0000-00 - Dimension diagram

1 Front panel installation: M3
Rear panel installation: ø 4.2
2 Housing, cabinet
3 Gasket
4 Metal flange 8BXC014.0000-00

2.3.6.7.4.5 Installation

Requirements

Installation window per Dimension diagram and installation dimensions (take the desired mounting type into account). For the B&R cable assemblies to be used for this purpose, see General information.

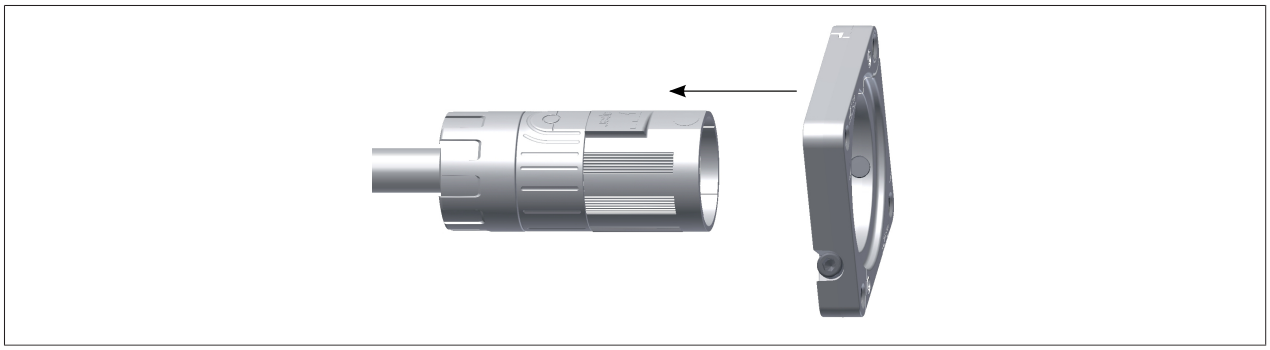
Required tools

Hex key size 2

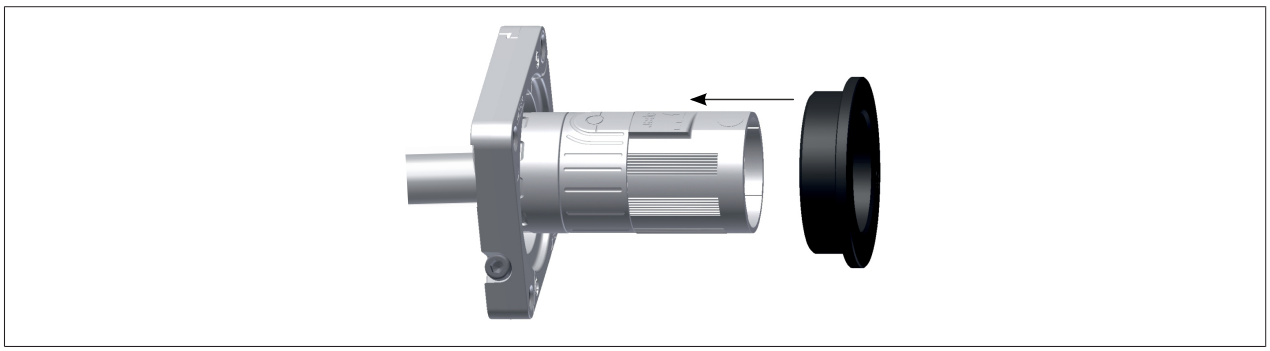
Procedure

Rear panel installation:

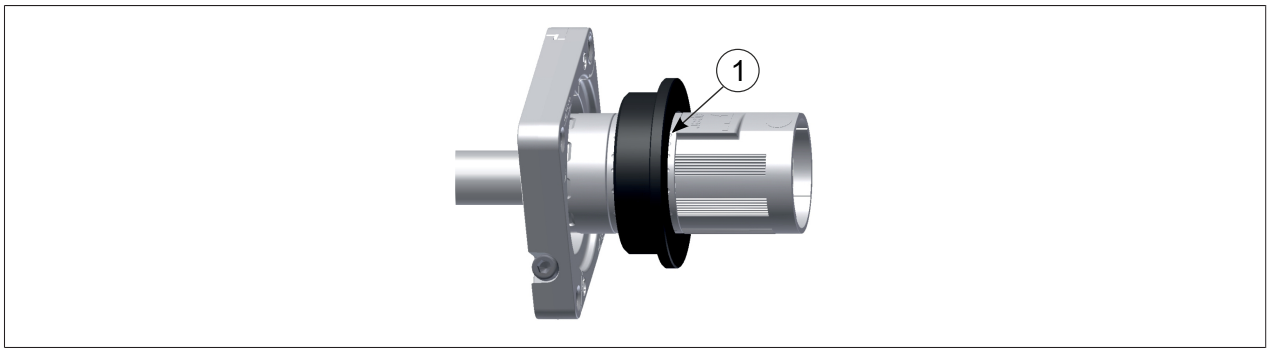
1. Slide the metal flange over the connector as shown.



2. Slide the sealing ring over the connector as shown.

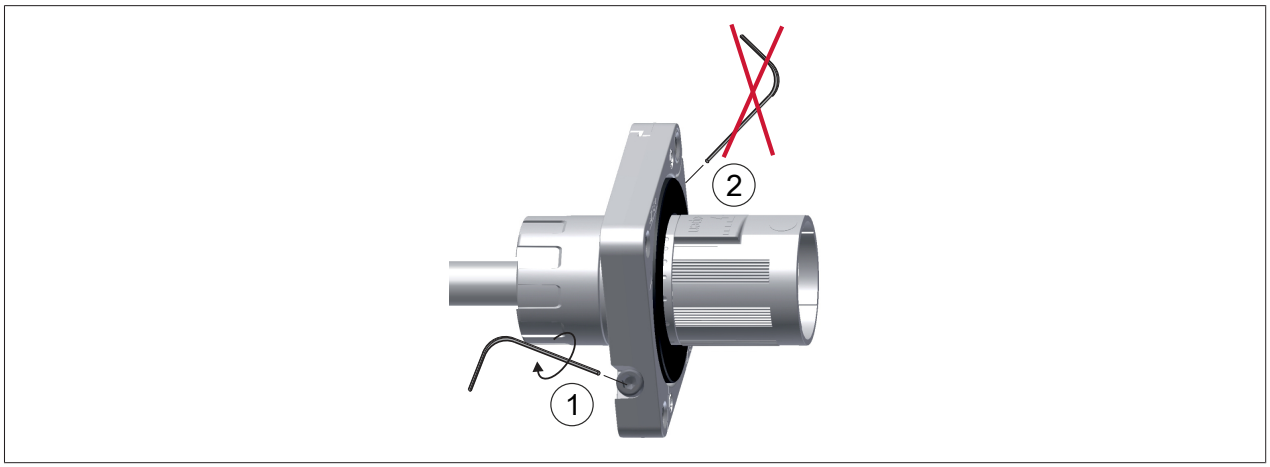


3. The sealing ring must be positioned at a distance of at least 1 mm from the quick-release fastener (rotating part of the connector).



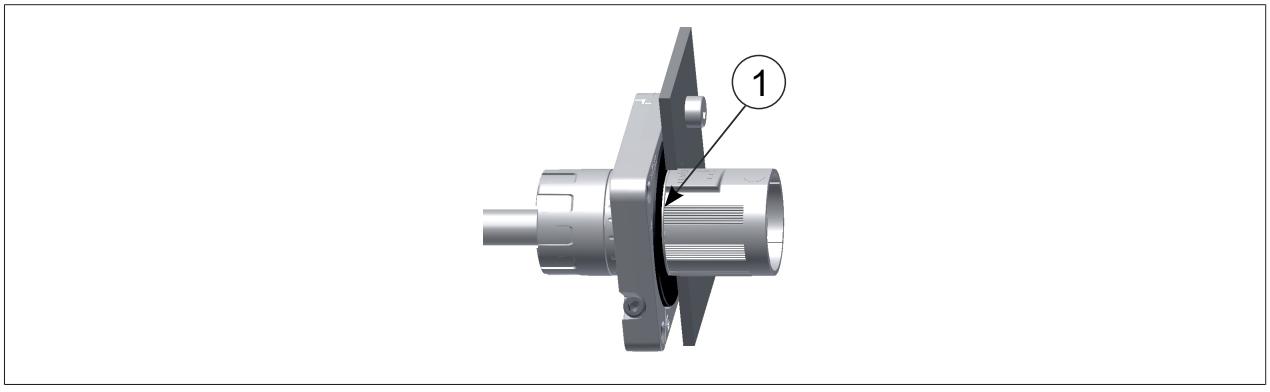
1 Distance at least 1 mm from the quick-release fastener.

4. Slide the metal flange over the sealing ring and screw it on (do not secure it).



1 Flange screw (max. 1.2 Nm tightening torque)
2 Stud bolt (do not secure)

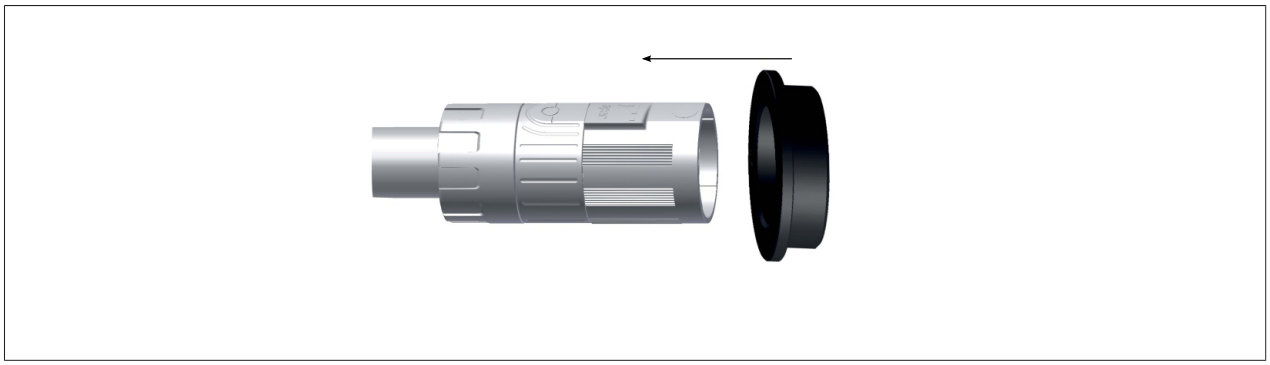
5. Install the connector in the control cabinet panel (the wide side of the sealing ring must always be between the metal flange and the control cabinet panel).
   a) Guide the connector from the inside of the control cabinet through the installation window of the control cabinet panel to the outside until the metal flange is in contact with the control cabinet panel.
   b) Screw the control cabinet wall to the metal flange using 4x M3 screws (minimum length: 6.5 mm + Thickness of the control cabinet panel) as shown in the illustration.



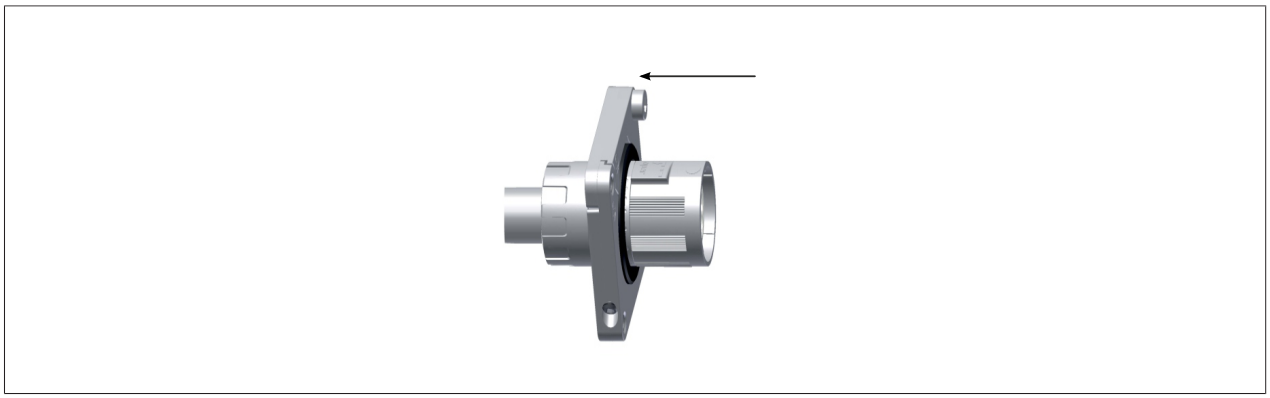
1 Sealing ring

Front panel installation:

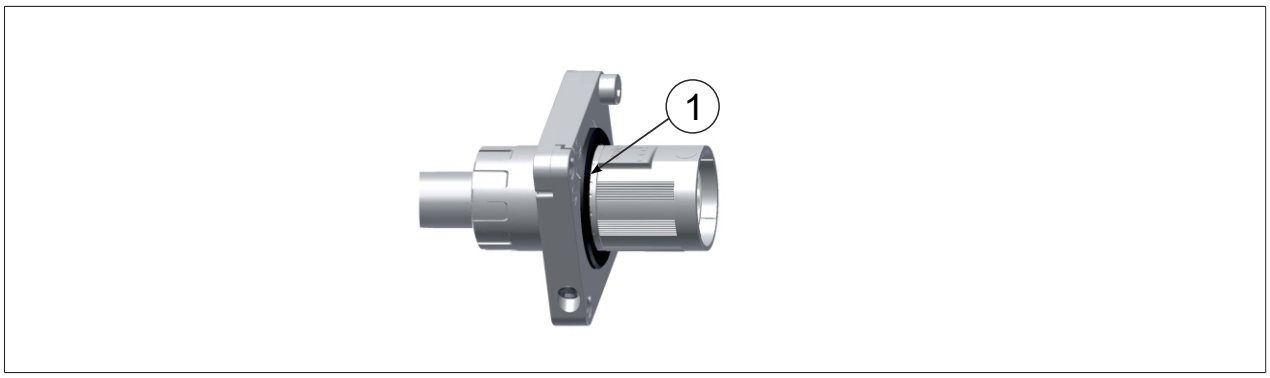
1. Slide the sealing ring over the connector as shown.



2. Slide the metal flange over the connector and sealing ring as shown.

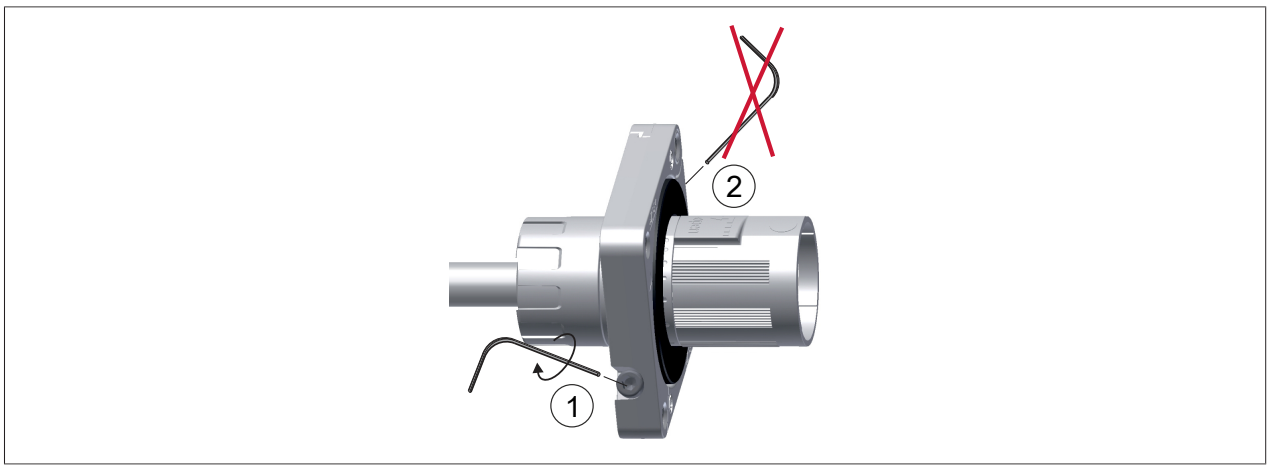


3. The metal flange with the sealing ring must be positioned at a distance of at least 1 mm from the quick-release fastener (rotating part of the connector).



1 Distance at least 1 mm from the quick-release fastener.

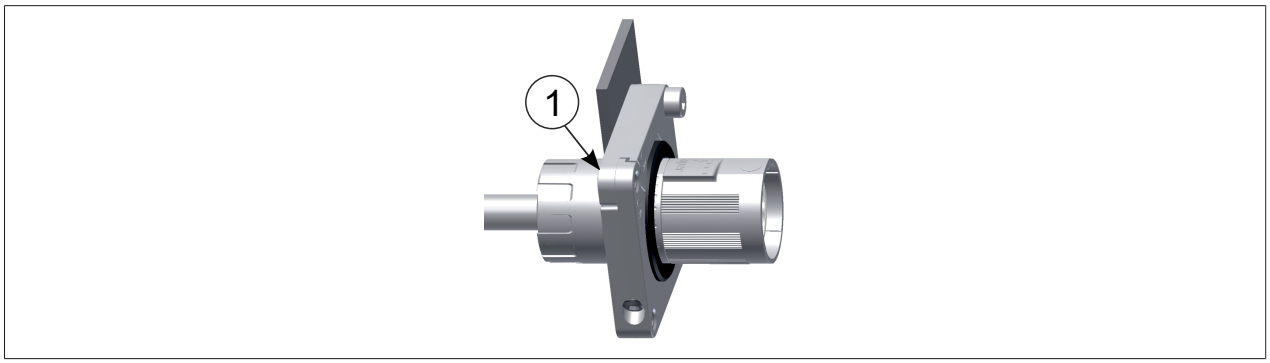
4. Screw the metal flange to the sealing ring (do not secure).



1 Flange screw (max. 1.2 Nm tightening torque)
2 Stud bolt (do not secure)

5. Install the connector in the control cabinet panel (the wide side of the sealing ring must always be between the metal flange and the control cabinet panel).

a) Guide the connector from the outside of the control cabinet through the installation window of the control cabinet panel to the inside until the metal flange is in contact with the control cabinet panel.
b) Screw the metal flange to the control cabinet panel using 4x M3 screws (minimum length: 6.5 mm + Thickness of the control cabinet panel) as shown in the illustration.



1 Sealing ring

Information:

Due to varying characteristics of non-B&R components, deviations from these instructions may be necessary. Trained qualified personnel must therefore check before installation whether a different installation must be carried out.

2.3.7 Differential chokes

2.3.7.1 8ER0880H300.000-1

2.3.7.1.1 General information

Differential choke 8ER0880H300.000-1 is used to dampen compensating currents when two ACOPOS P3 servo drives are connected in parallel to one motor.

Information:

Differential choke 8ER0880H300.000-1 is only permitted to be used in combination with two identical servo drives of type 8EI044HxSx0.xxxx-1, 8EI034HxSx0.xxxx-1 or 8EI024HxSx0.xxxx-1.

2.3.7.1.2 Order data

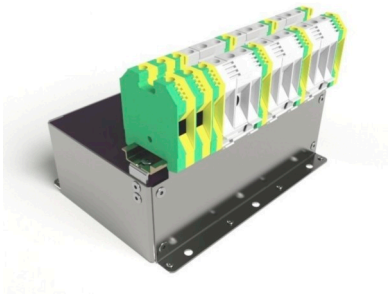
Order number	Short description	Figure
	Differential choke	
8ER0880H300.000-1	ACOPOS P3 differential choke, 88 A, 480 V, 2 mH, terminal block	

Table 309: 8ER0880H300.000-1 - Order data

2.3.7.1.3 Technical data

Order number	8ER0880H300.000-1
General information	
Certifications	
CE	Yes
UL	cULus E225616 Power conversion equipment
Module input [1]	
Quantity	2
Maximum input voltage	3x 480 VAC
Continuous power	18 kW per module input
Nominal current	44 A_{eff} per module input
Reduction of continuous current at ambient temperatures starting at 40°C	1.6 A_{eff} per °C
Reduction of continuous current depending on installation elevation	
Starting at 500 m above sea level	4.4 A_{eff} per 1000 m
Terminal connection cross section	
Flexible and fine-stranded wires	
With wire end sleeve	1.5 to 16 mm²
Module output	
Quantity	1
Max. output voltage	3x 480 VAC
Continuous power	36 kW
Nominal current	88 A_{eff}
Reduction of continuous current at ambient temperatures starting at 40°C	3.2 A_{eff} per °C
Reduction of continuous current depending on installation elevation	
Starting at 500 m above sea level	8.8 A_{eff} per 1000 m
Terminal connection cross section	
Flexible and fine-stranded wires	
With wire end sleeve	2.5 to 35 mm²
Inductance	2 mH
Power dissipation at nominal current	120 W

Table 310: 8ER0880H300.000-1 - Technical data

Technical data

Order number	8ER0880H300.000-1
Operating conditions	
Permissible mounting orientations	
Hanging vertically	Yes
Standing horizontally	Yes
Installation elevation above sea level	
Nominal	0 to 500 m
Maximum [2]	4000 m
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)
Overvoltage category per EN 61800-5-1	III
Degree of protection per EN 60529	IP20
Ambient conditions	
Temperature	
Operation	
Nominal	-25 to 40°C
Maximum [3]	55°C
Storage	-25 to 55°C
Transport	-25 to 70°C
Relative humidity	
Operation	5 to 85%, non-condensing
Storage	5 to 95%
Transport	95% at 40°C
Mechanical properties	
Dimensions	
Width	228 mm
Height	148 mm
Depth	166 mm
Weight	8.6 kg

Table 310: 8ER0880H300.000-1 - Technical data

1) The module input is only permitted to be connected to motor connection X51 of an ACOPOS P3 8EI servo drive.
2) Continuous operation at an installation elevation of 500 m to 4,000 m above sea level is possible taking the specified reduction of continuous current into account. Requirements that go beyond this must be arranged with B&R.
3) Continuous operation at ambient temperatures from 40°C to max. 55°C is possible when taking the specified continuous power reductions into account.

2.3.7.1.4 Dimension diagram and installation dimensions

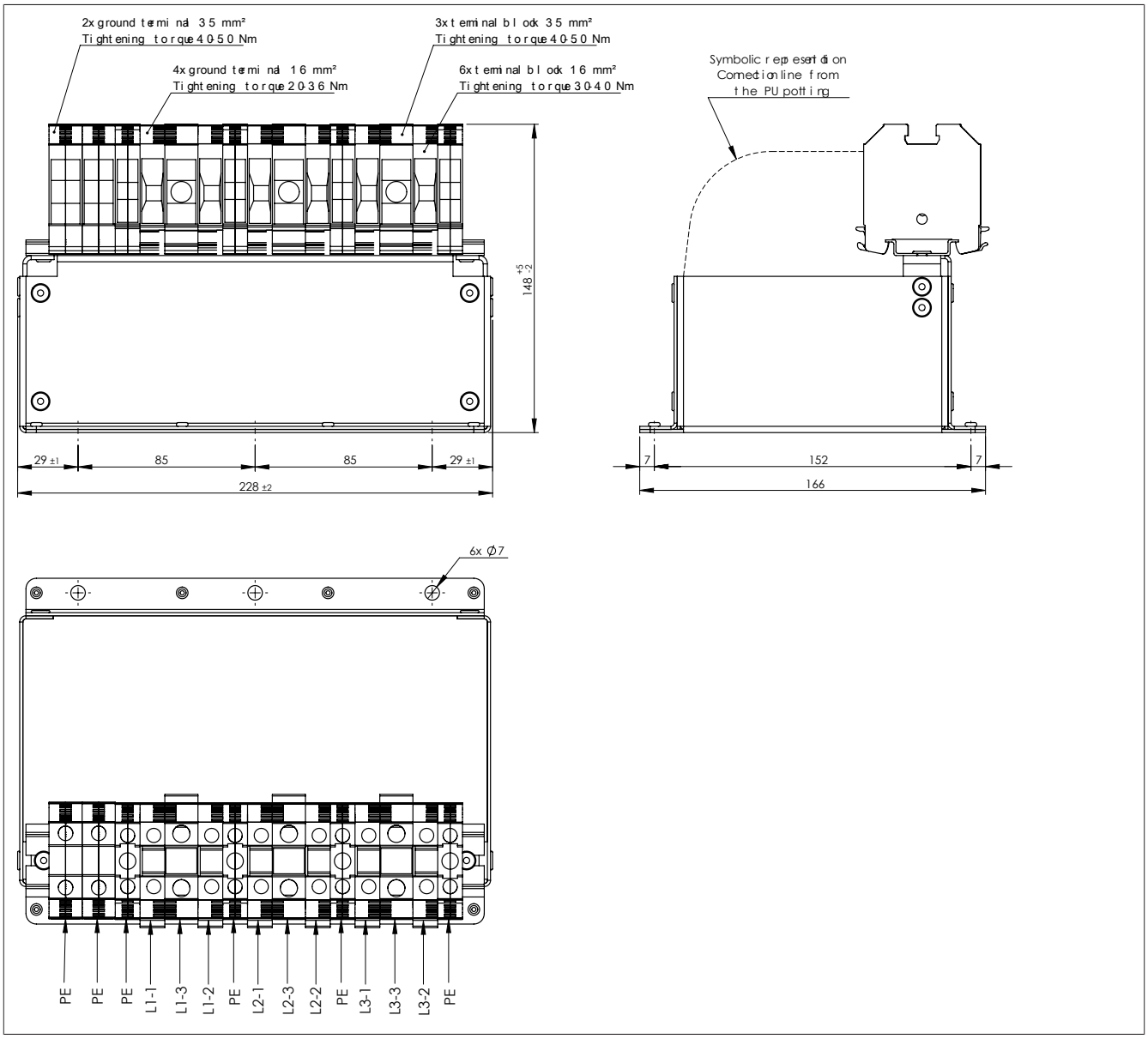


Figure 111: 8ER0880H300.000-1 - Dimension diagram and installation dimensions

Warning!

When installing ACOPOS P3 differential chokes, it is important to ensure that reinforced insulation is also implemented from the windings and connection wires to neighboring electrically conductive components (e.g. control cabinet panel). If this reinforced insulation is implemented solely through the use of an air gap, a minimum distance to adjacent conductive parts of 8 mm (or 12.7 mm per cULus) is required.

Caution!

Depending on the mounting orientation, the warning labels affixed to the differential choke may not be clearly visible. Two additional warning labels are therefore included in delivery that the user can affix to the differential choke in this case so that they are clearly visible. These warning labels are attached directly to the differential choke with a cable tie and must always be removed before commissioning since the backing film of the warning stickers is not sufficiently heat-resistant!

2.3.7.1.5 Wiring

Pinout

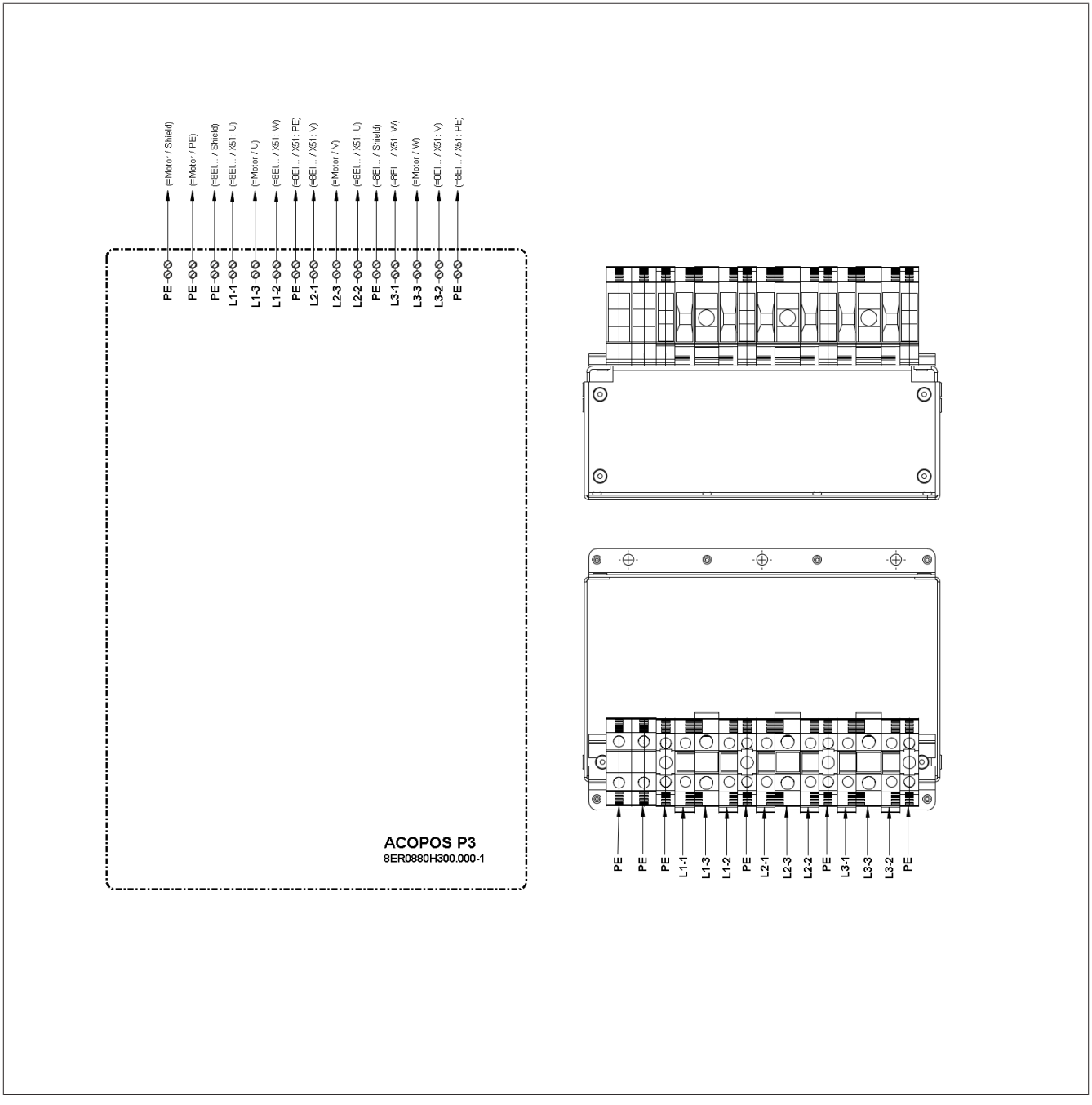


Figure 112: 8ER0880H300.000-1 - Pinout overview

Input/Output circuit diagram

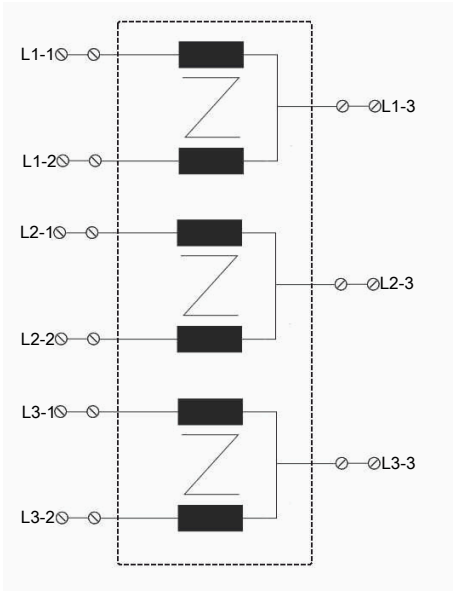


Figure 113: 8ER0880H300.000-1 - Input/output circuit diagram

Warning!

When installing ACOPOS P3 differential chokes, it is important to ensure that reinforced insulation is also implemented from the windings and connection wires to neighboring electrically conductive components (e.g. control cabinet panel). If this reinforced insulation is implemented solely through the use of an air gap, a minimum distance to adjacent conductive parts of 8 mm (or 12.7 mm per cULus) is required.

Wiring the ACOPOS P3 to a differential choke

The ACOPOS P3 slave is wired to the choke shifted by one phase, which allows the non-measured currents (phase W of the individual servo drives) to be estimated more accurately. The wiring sequence must be strictly observed.

Observe when wiring:

ACOPOS P3 Master	Phase U ---- U	L1-1	Differential choke
ACOPOS P3 Slave	Phase W ---- U	L1-2	Differential choke
ACOPOS P3 Master	Phase V ---- V	L2-1	Differential choke
ACOPOS P3 Slave	Phase U ---- V	L2-2	Differential choke
ACOPOS P3 Master	Phase W ---- W	L3-1	Differential choke
ACOPOS P3 Slave	Phase V ---- W	L3-2	Differential choke

Shielded cables that have a cross section of at least 10 mm² must be used. Two motor cables of type 8ECM0005.1523C-0 can be used for this purpose, for example. The cable has UL certification (E170315). The connector is removed for the installation on the differential choke.

Information:

Only motor cables with a permissible conductor temperature of at least 75°C (at an ambient temperature from 40°C to max. 55°C) are permitted to be used.

The ground and shield connection from the cable must also be connected.

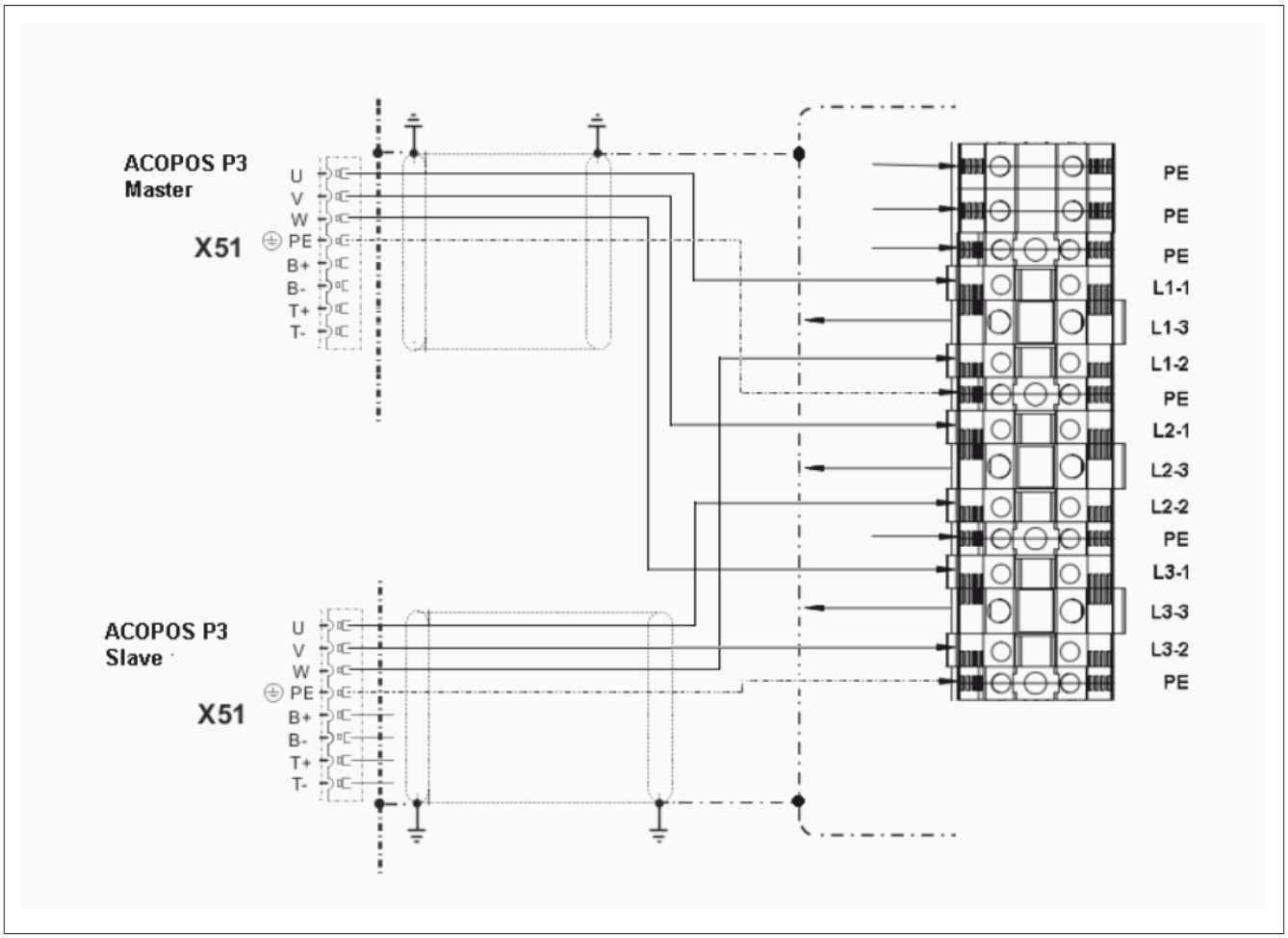


Figure 114: Wiring an ACOPOS P3 to a differential choke

Wiring the motor

A shielded cable (8CMxxx.12-8) with a cross section of 35 mm^2 must be used. The PE and shield connection from the motor cable must be connected.

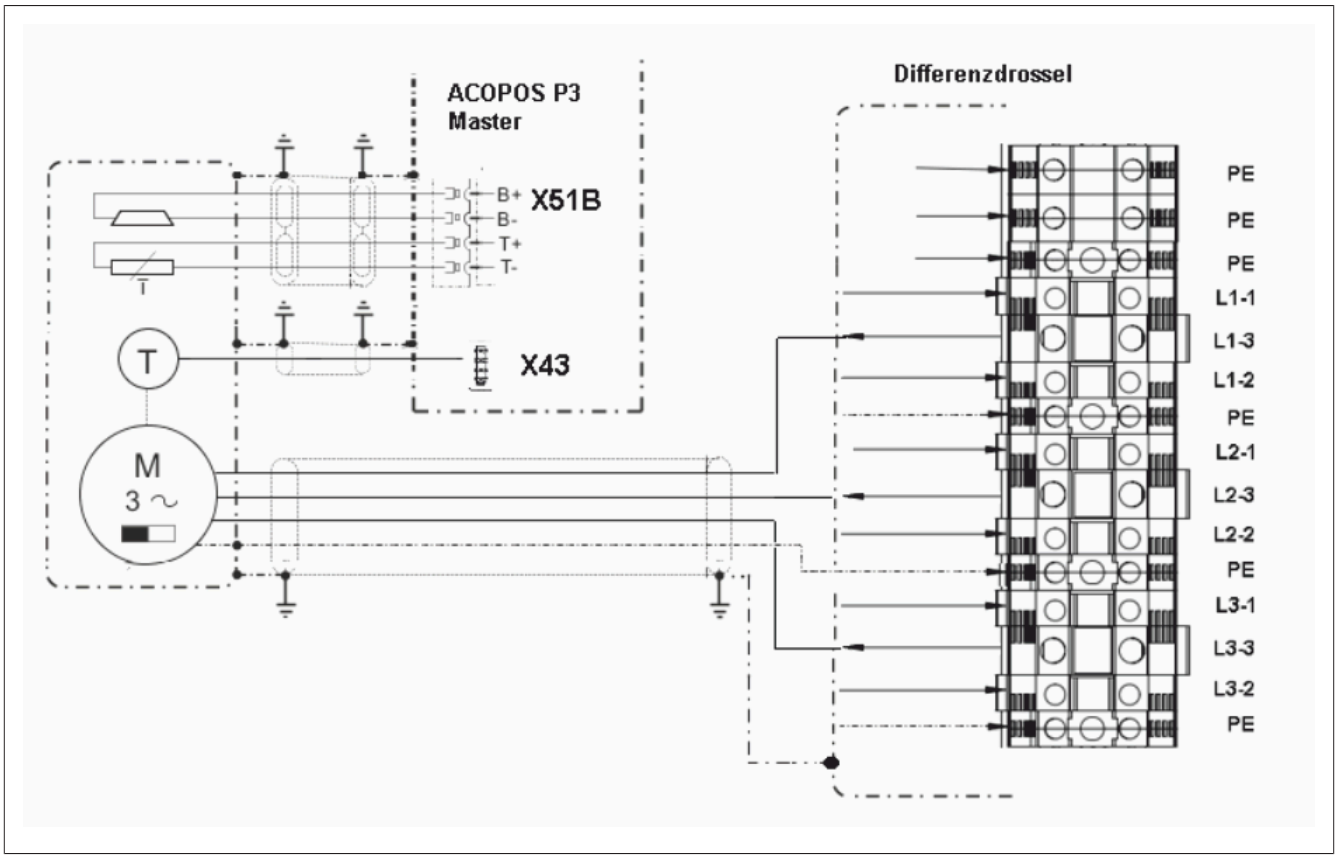


Figure 115: Wiring the differential choke to a motor

3 Installation

3.1 General information

ACOPOS P3 drive systems must be installed in control cabinets that – taking into account the location and physical environmental conditions – provide adequate physical protection against the ingress of solid foreign objects (dust, metal cuttings, etc.) and liquids (coolant, etc.). [11)]

Warning!

The information listed in section "Handling and installation" on page 12 must be observed!

Quality of the mounting surface

The mounting surface for ACOPOS P3 8EI servo drives must be non-flammable, sufficiently stable, level and free of contaminants.

The type and quantity of mounting holes as described in section "Dimension diagrams" on page 371 must be observed.

Information:

M5x16 screws are included in the content of delivery for installing ACOPOS P3 8EI servo drives (tightening torque: 5.5 Nm).

Proper spacing specifications for installation and ventilation are listed in the dimension diagrams of the individual modules.

[11)] For details, see EN 60204-1.

3.2 Dimension diagrams and installation dimensions

3.2.1 8EI servo drives

3.2.1.1 Dimension diagrams

8EI1X6xWSxx.xxxx-x / 8EI2X2xWSxx.xxxx-x / 8EI4X5xWSxx.xxxx-x / 8EI8X8xWSxx.xxxx-x

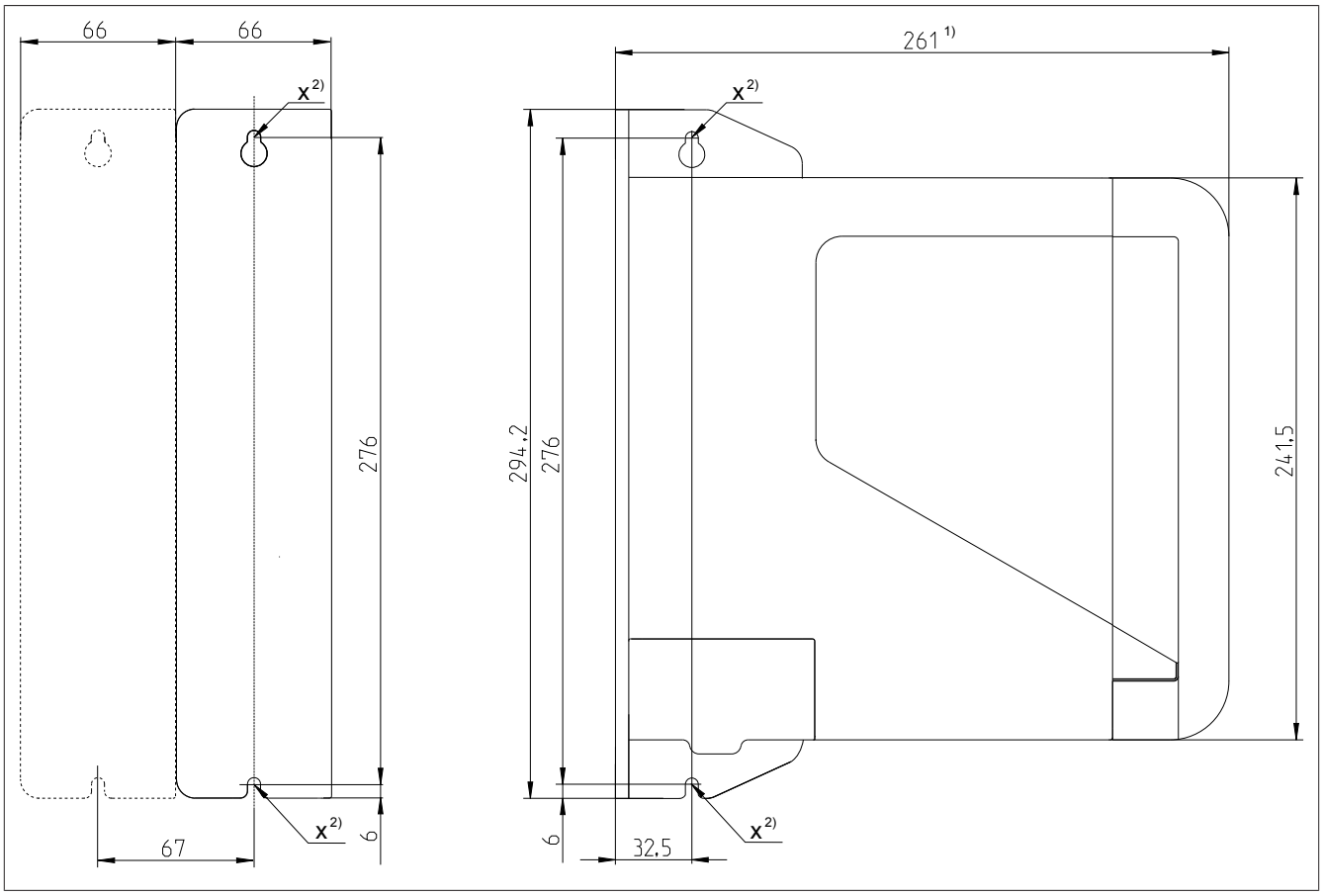


Figure 116: 8EI1X6xWSxx.xxxx-x / 8EI2X2xWSxx.xxxx-x / 8EI4X5xWSxx.xxxx-x / 8EI8X8xWSxx.xxxx-x - Dimension diagram

1) Without front cover: 258.5 mm
2) Hole for M5 screws

8EI2X2xWDxx.xxxx-x / 8EI2X2xWTxx.xxxx-x / 8EI4X5xWDxx.xxxx-x / 8EI4X5xWTxx.xxxx-x / 8EI8X8xWDxx.xxxx-x / 8EI8X8xWTxx.xxxx-x / 8EI013HWSxx.xxxx-x / 8EI017HWSxx.xxxx-x

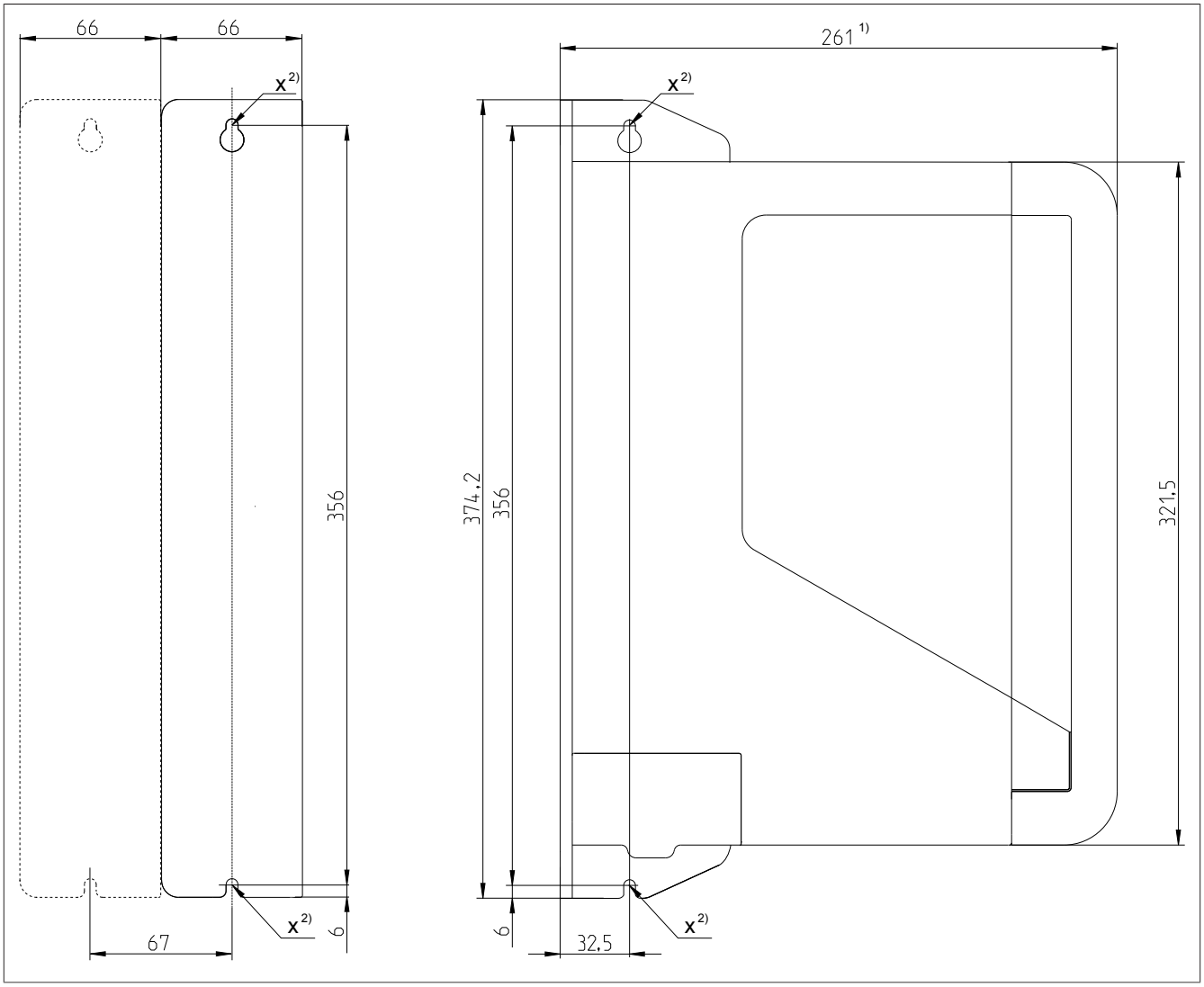


Figure 117: 8EI2X2xWDxx.xxxx-x / 8EI2X2xWTxx.xxxx-x / 8EI4X5xWDxx.xxxx-x / 8EI4X5xWTxx.xxxx-x / 8EI8X8xWDxx.xxxx-x / 8EI8X8xWTxx.xxxx-x / 8EI013HWSxx.xxxx-x / 8EI017HWSxx.xxxx-x - Dimension diagram

1) Without front cover: 258.5 mm
2) Hole for M5 screws

8EI017HWDxx.xxxx-x / 8EI022HWDxx.xxxx-x / 8EI024HWSxx.xxxx-x / 8EI034HWSxxxx-xx / 8EI044H-WSxx.xxxx-x

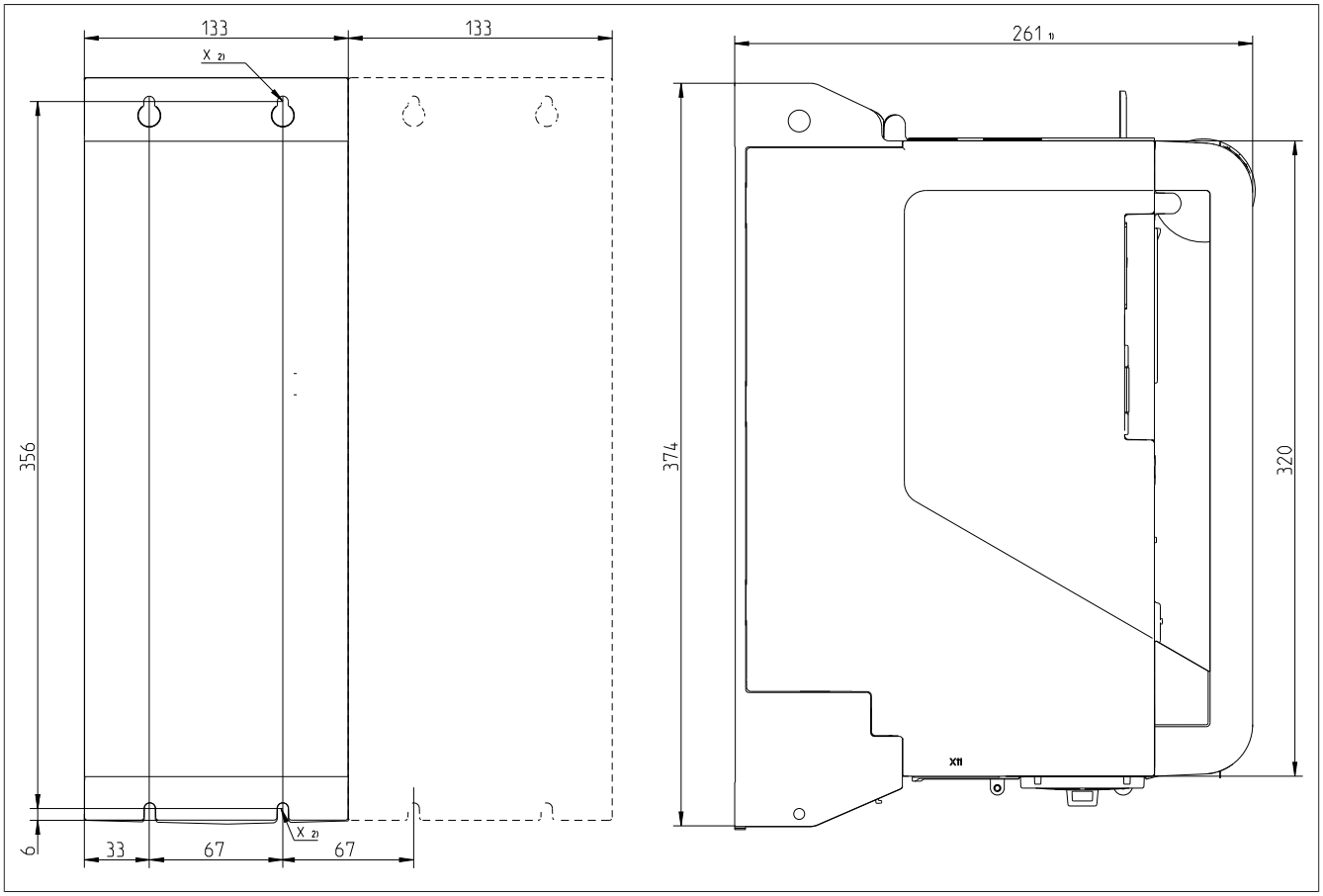


Figure 118: 8EI017HWDxx.xxxx-x / 8EI022HWDxx.xxxx-x / 8EI024H-WSxx.xxxx-x / 8EI034HWSxxxx-xx / 8EI044HWSxx.xxxx-x - Dimension diagram

1) Without front cover: 258.5 mm
2) Hole for M5 screws.

3.2.1.2 Installation dimensions

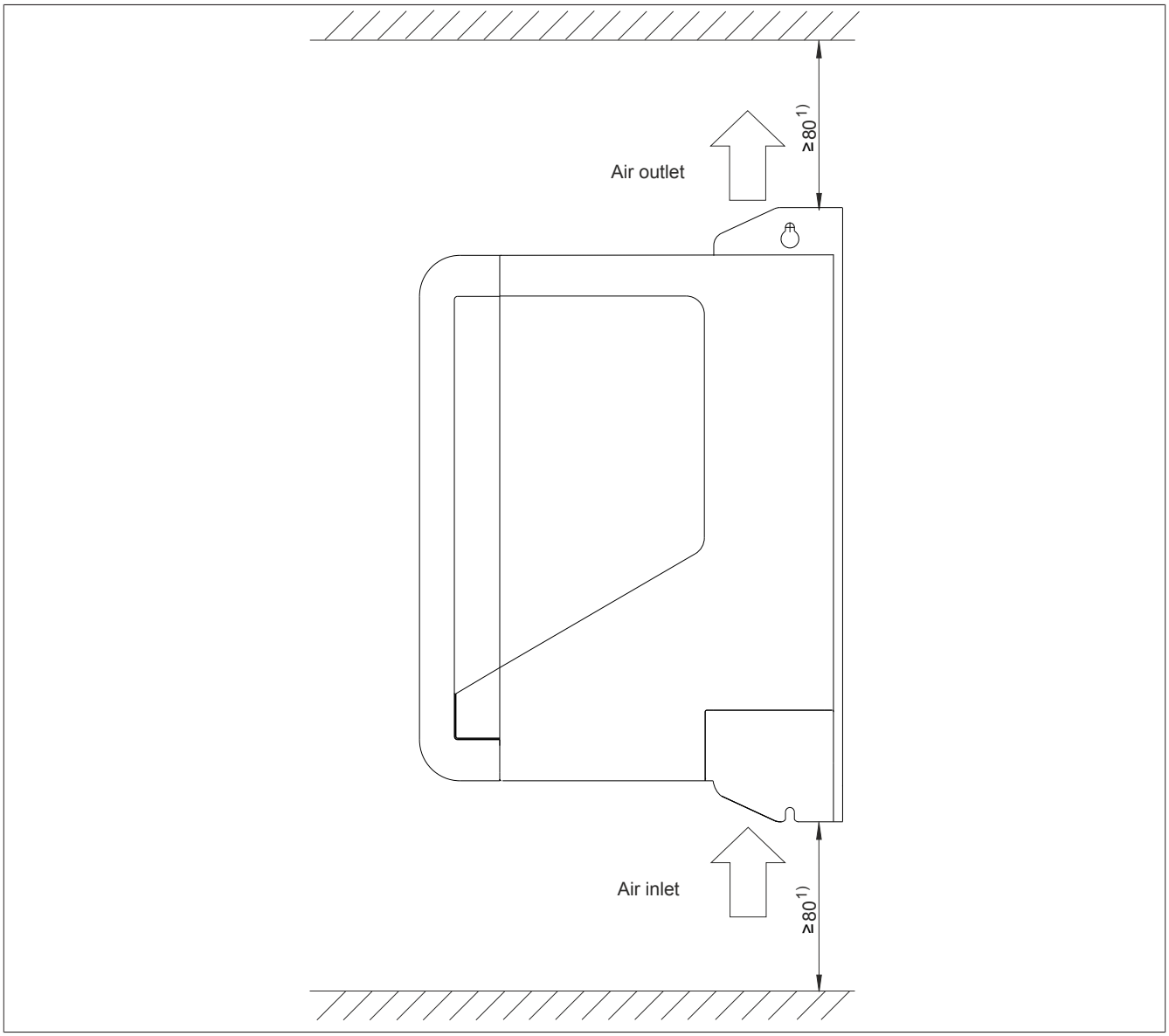


Figure 119: ACOPOS P3 8EI servo drives - Installation dimensions

1) For sufficient air circulation, a clearance of at least 80 mm must be provided above and below the module.
In order to connect display module 8EAD0000.000-1 to the module without problems, spacing of at least 100 mm is necessary above the module.
In order to ensure easy wiring (taking all minimum bend radii into account), spacing of at least 200 mm is necessary below the module.

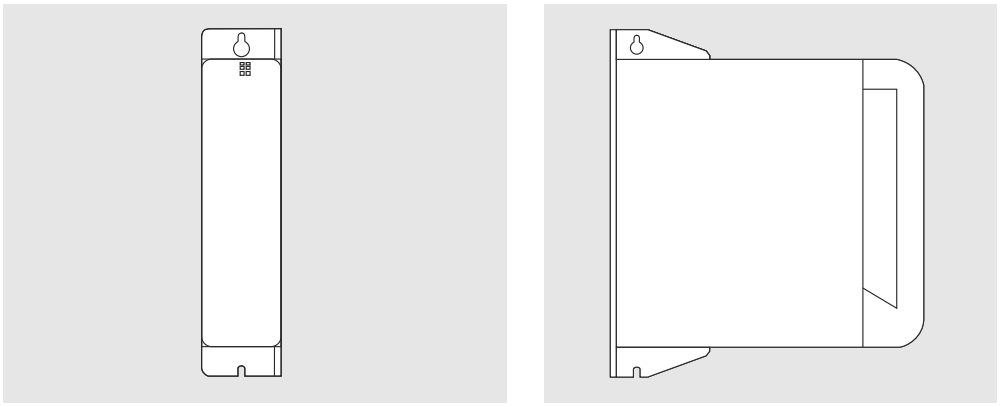
Caution!

Cooling air exiting the 8EI servo drive can have a temperature up to 90°C. Any components installed near the air outlet must be designed to withstand these high temperatures!

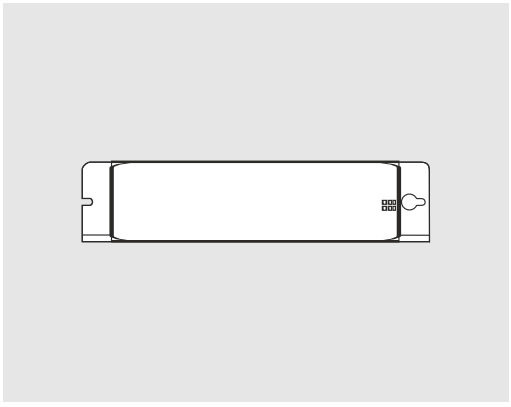
3.2.1.3 Permissible mounting orientations

The gray areas in the following figures represent the rear panel of the control cabinet.

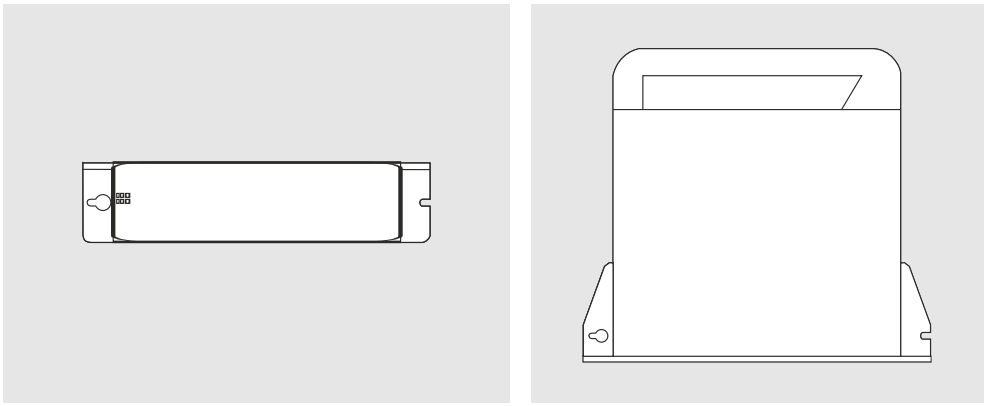
8EIxXxHWxxx.xxxx-1 / 8EI01xHWSxx.xxxx-1 - Permissible mounting orientations



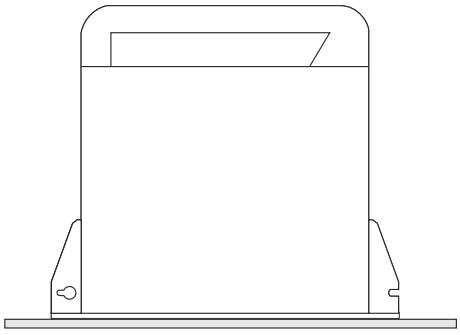
Hanging vertically 0°



Hanging vertically 90°



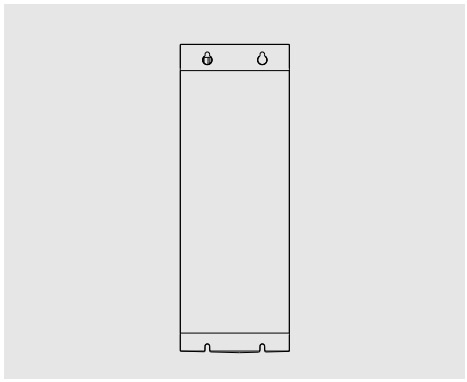
Hanging vertically 270°



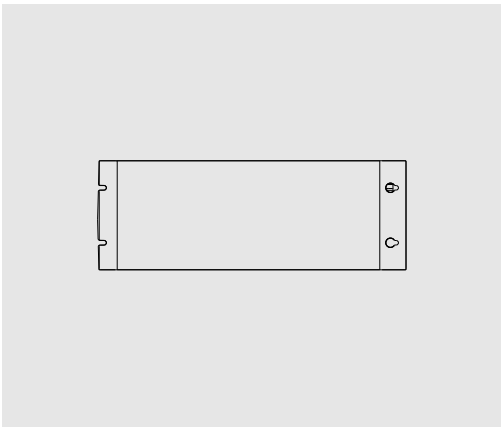
Standing horizontally 0°

Figure 120: 8EIxXxHWxxx.xxxx-1 / 8EI01xHWSxx.xxxx-1 - Permissible mounting orientations

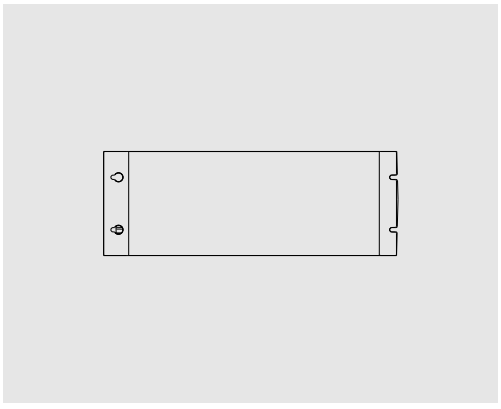
8EI0x4HWSxx.xxxx-1 / 8EI0xxHWDxx.xxxx-1 - Permissible mounting orientations



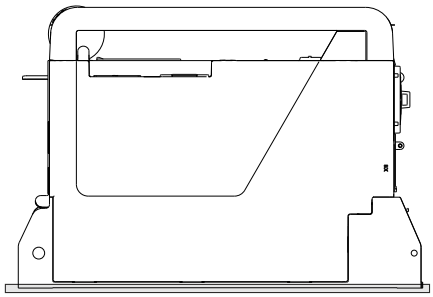
Hanging vertically 0°



Hanging vertically 90°



Hanging vertically 270°



Standing horizontally 0°

Figure 121: 8EI0x4HWSxx.xxxx-1 / 8EI0xxHWDxx.xxxx-1 - Permissible mounting orientations

3.2.2 Display module 8EAD0000.000-1

The 8EAD display module is connected to connector X9 of an 8EI servo drive. A guide rail behind connector X9 on the 8EI servo drive allows optimal positioning of the 8EAD display module. The corresponding recess is located on the back of the 8EAD display module.

Information:

The 8EAD display module supports hot plugging.

Observe all safety guidelines in section "Safety guidelines" on page 10!

Connecting the 8EAD display module

1. Slide the 8EAD display module into the guide rail on the 8EI servo drive.
2. Slide the 8EAD display module down until the 8EAD display module's connector is inserted in connector X9 on the 8EI servo drive.

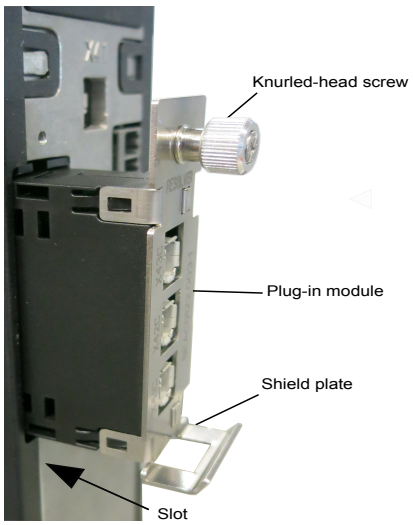
Removing the 8EAD display module

1. Slide the 8EAD display module up until the 8EAD display module's connector is disconnected from connector X9 on the 8EI servo drive.
2. Slide the 8EAD display module up and off of the guide rail on the 8EI servo drive.

3.3 Installation and removal of 8EAC plug-in modules

3.3.1 General information

ACOPOS P3 8EI servo drives are equipped with a slot for installing 8EAC plug-in modules.



Caution!

Observe the guidelines listed in section "Protection against electrostatic discharge" on page 11 when installing and removing plug-in modules!

Information:

Plug-in module 8EAC is not capable of hot plugging. An 8EAC plug-in module is only permitted to be connected to or disconnected from an ACOPOS P3 8EI servo drive when power to the servo drive is switched off.

3.3.2 Preparation

The pin contacts of ACOPOS P3 8EAC plug-in modules are protected by a connector cover. This connector cover must be removed before installing an 8EAC plug-in module in the slot of an 8EI servo drive.

Procedure

- Pull the connector cover back from the rear of the 8EAC plug-in module.

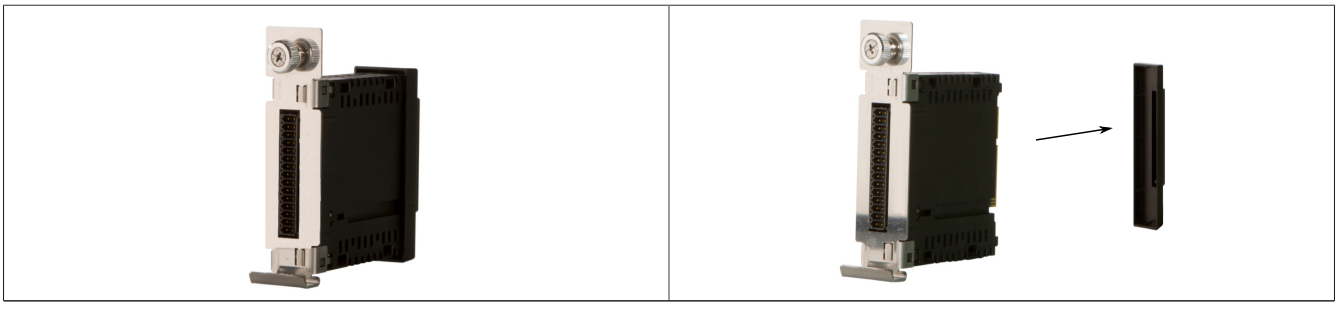


Table 311: 8EAC plug-in module - Removing the connector cover

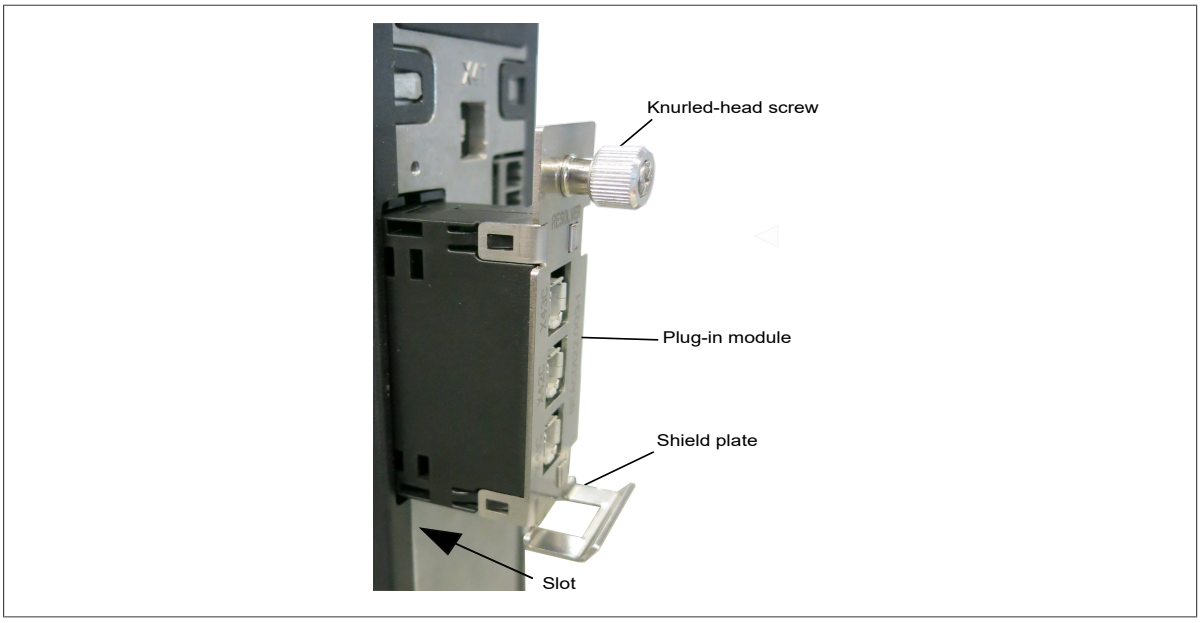
Caution!

Do not touch the pins on the 8EAC plug-in module! There is a risk of damage due to electrostatic discharge.

3.3.3 Installation

1. Disconnect the ACOPOS P3 8EI servo drive from the power system and safeguard it from being restarted.
2. Switch off the 24 VDC supply voltage.
3. If there is no plug-in module in the ACOPOS P3 8EI servo drive:
   a) Disconnect and remove the slot cover from the servo drive using a suitable screwdriver:

   b) Slide the new plug-in module into the available slot until it makes an audible click and fits securely.

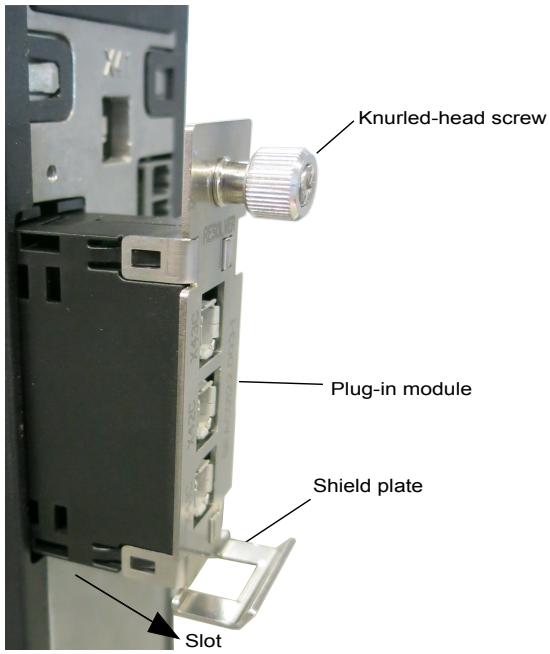


   c) Fasten the shield plate to the ACOPOS P3 8EI servo drive with the knurled-head screw. Firmly tighten the knurled-head screw!
4. If an 8EAC plug-in module is already installed in the ACOPOS P3 8EI servo drive:
   a) Loosen the shield plate of the installed 8EAC plug-in module from the ACOPOS P3 8EI servo drive with the knurled-head screw.
   b) Remove the installed 8EI servo drive on the shield plate and knurled-head screw from the ACOPOS P3 8EI servo drive.
   c) Insert the new 8EAC plug-in module into the available slot until it makes an audible click and fits securely.
   d) Fasten the shield plate to the ACOPOS P3 8EI servo drive with the knurled-head screw. Firmly tighten the knurled-head screw!

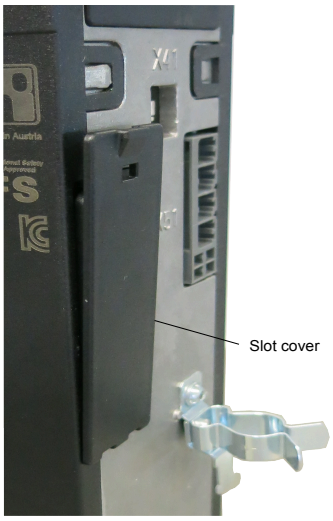
5. Switch on the 24 VDC supply voltage.
6. Connect the ACOPOS P3 8EI servo drive to the power system.

3.3.4 Removal

1. Disconnect the ACOPOS P3 8EI servo drive from the power system and safeguard it from being restarted.
2. Switch off the 24 VDC supply voltage.
3. Loosen the shield plate of the installed 8EAC plug-in module from the ACOPOS P3 8EI servo drive with the knurled-head screw.
4. Remove the installed 8EI servo drive on the shield plate and knurled-head screw from the ACOPOS P3 8EI servo drive.



5. Slide the slot cover into the available slot until it makes an audible click and fits securely:



Information:

In order for the ACOPOS P3 8EI servo drive to meet IP20 requirements, either the slot cover must be installed or an 8EAC plug-in module must be installed in the servo drive.

6. Switch on the 24 VDC supply voltage.
7. Connect the ACOPOS P3 8EI servo drive to the power system.

3.4 Using cooling systems in control cabinets

Cooling systems are usually necessary to maintain a permissible ambient temperature for the ACOPOS P3 8EI servo drives in control cabinets.

3.4.1 Natural convection

The power dissipation is radiated outwards via the control cabinet walls.

Warning!

Only use well-sealed control cabinets. Otherwise, contaminated ambient air can penetrate the control cabinet! [12)]

3.4.2 Using filter fans

Filter fans and outlet filters should be arranged on the control cabinet so that air is taken in from below and exits above.

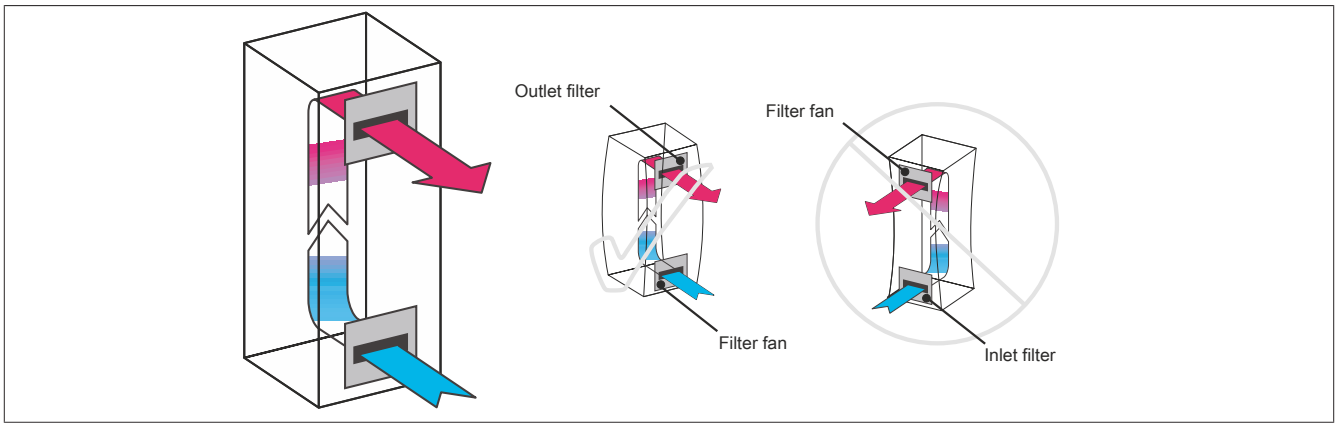


Figure 122: Filter fans - Function diagram

Caution!

Contaminated air can penetrate improperly sealed control cabinets when using a fan intake! This type of air flow is to be avoided.

Warning!

Only use well-sealed control cabinets. Otherwise, contaminated ambient air can penetrate the control cabinet! [13)]

[12)] Control cabinets that – taking into account the location and physical environmental conditions – provide adequate protection against the ingress of solid foreign objects (dust, metal cuttings, etc.) and liquids (coolant, etc.). For details, see EN 60204-1.

[13)] Control cabinets that – taking into account the location and physical environmental conditions – provide adequate protection against the ingress of solid foreign objects (dust, metal cuttings, etc.) and liquids (coolant, etc.). For details, see EN 60204-1.

3.4.3 Using air/air heat exchangers

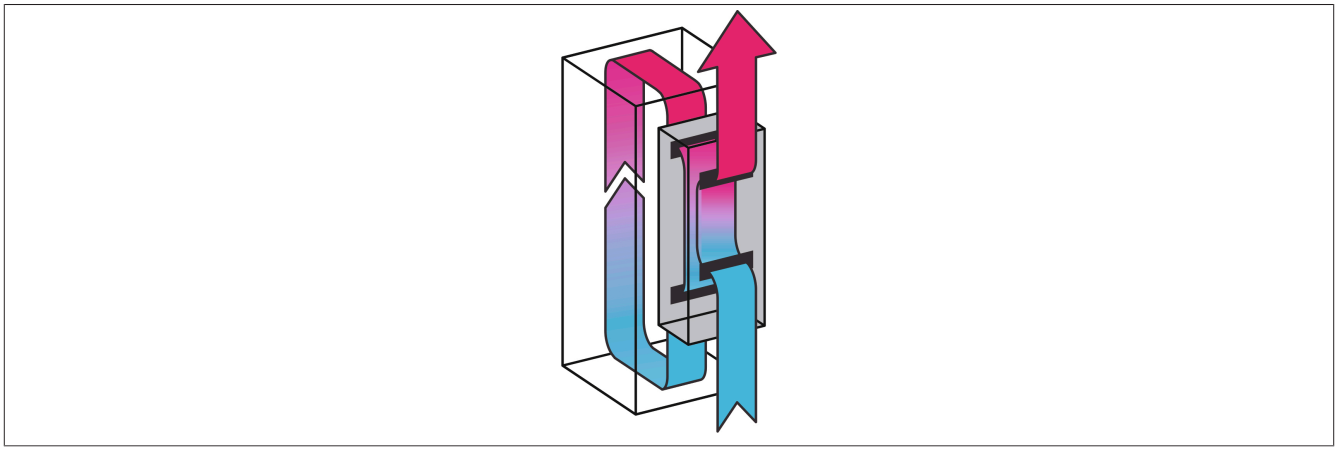


Figure 123: Air/Air heat exchangers - Function diagram

Caution!

Uniform air circulation must be ensured in the control cabinet. Air inlets and outlets for the internal circulation of the air/air heat exchanger are not permitted to be covered since this would prevent sufficient air circulation in the control cabinet.

Sufficient clearance (>200 mm) in front of air inlets and outlets is recommended.

Caution!

If the control cabinet contains modules or electronic components with their own fans, make sure that the direction of air flow does not go against the cooling system's flow of cool air. This can create air short circuits that prevent sufficient cooling inside the control cabinet.

Warning!

Only use well-sealed control cabinets. Otherwise, contaminated ambient air can penetrate the control cabinet!

Installing air/air heat exchangers behind mounting plates should generally be avoided. If this is necessary, however, then corresponding ventilation plates must be used. Air inlets and outlets must also be made in the mounting plate.

3.4.4 Using air/water heat exchangers

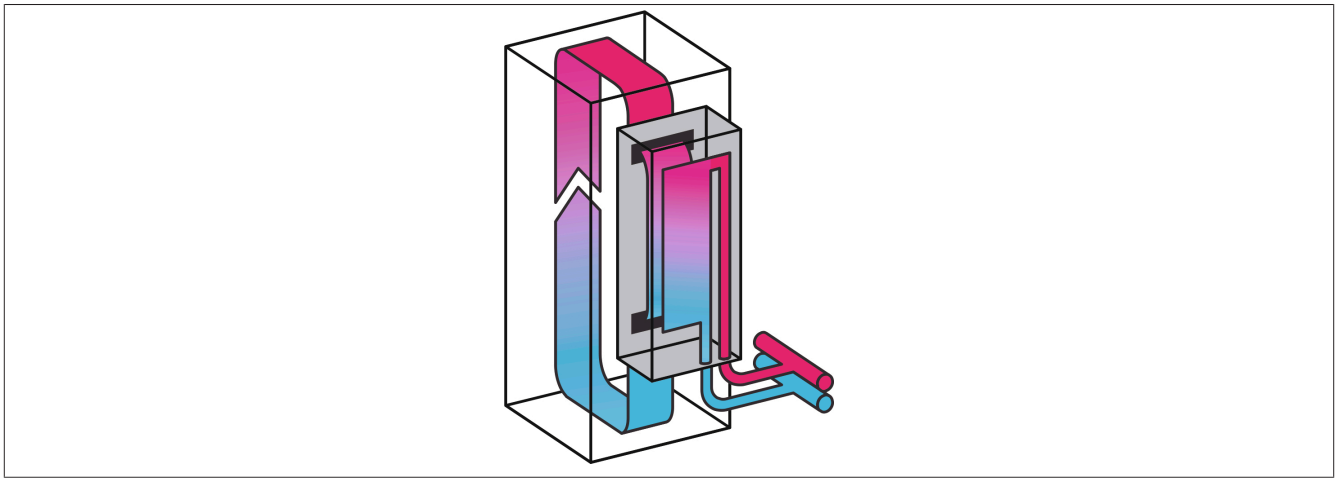


Figure 124: Air/Water heat exchangers - Function diagram

Caution!

Uniform air circulation must be ensured in the control cabinet. Air inlets and outlets for the internal circulation of the air/water heat exchanger are not permitted to be covered since this would prevent sufficient air circulation in the control cabinet.

Sufficient clearance (>200 mm) in front of air inlets and outlets is recommended.

Caution!

If the control cabinet contains modules or electronic components with their own fans, make sure that the direction of air flow does not go against the cooling system's flow of cool air. This can create air short circuits that prevent sufficient cooling inside the control cabinet.

Warning!

Only use well-sealed control cabinets. Otherwise, contaminated ambient air can penetrate the control cabinet!

Installing air/water heat exchangers behind mounting plates should generally be avoided. If this is necessary, however, then corresponding ventilation plates must be used. Air inlets and outlets must also be made in the mounting plate.

3.4.5 Using cooling units

3.4.5.1 General information

Caution!

The incorrect arrangement and use of cooling units may cause condensation and condensate, which can damage installed ACOPOS P3 8EI servo drives!

Condensate can be included in the cooled air flow and penetrate ACOPOS P3 8EI servo drives!

Warning!

Only use well-sealed control cabinets. Otherwise, ambient air can penetrate and cause condensation!

During operation with the control cabinet doors open (e.g. service call), ACOPOS P3 8EI servo drives are not permitted to be cooler than the air in the control cabinet at any time after the doors are closed. Otherwise, condensation will occur.

To maintain the temperature of ACOPOS P3 8EI servo drives and the control cabinet at the same level, the cooling unit must remain in operation even while the system is switched off.

Cooling units must be arranged in a way that prevents forming condensate from dripping into the ACOPOS P3 8EI servo drives. This should be considered when selecting the control cabinet to be used (special construction for using cooling units on top of the control cabinet).

Also make sure that any condensate that forms in the cooling unit fan when it is not running cannot be sprayed onto the ACOPOS P3 8EI servo drives.

Make sure the temperature of the cooling unit is set correctly! Set the control cabinet's internal temperature only as low as is necessary.

Observe the operating guidelines provided in the cooling unit is user's manual!

3.4.5.2 Installing a cooling unit on top of the control cabinet

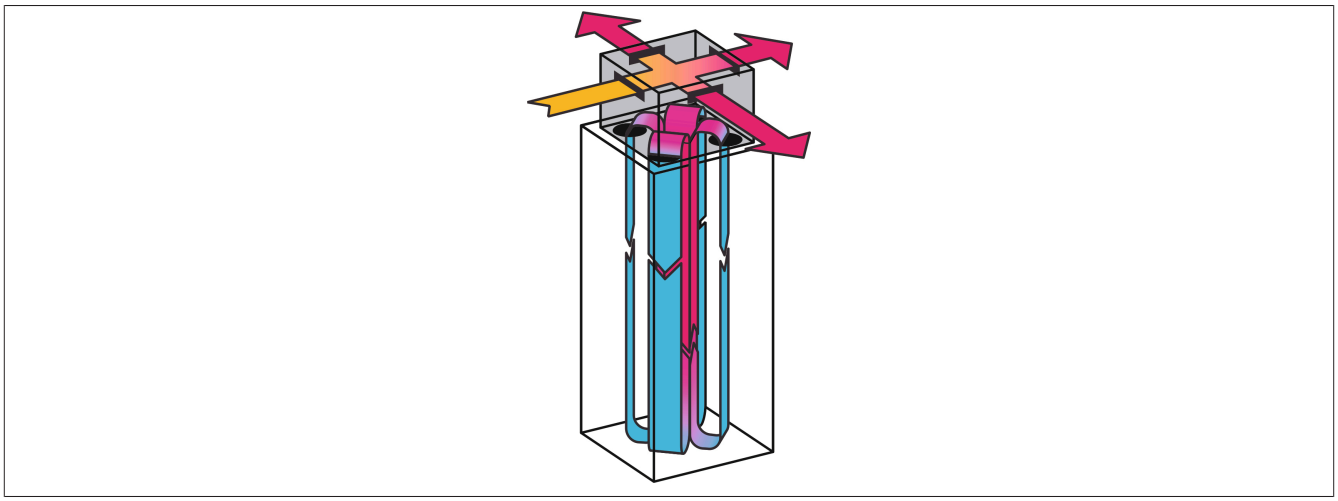


Figure 125: Installing a cooling unit on top of the control cabinet

Caution!

When installing cooling units on top of the control cabinet, particular attention must be paid to targeted air routing! The flow of cool air must be directed by the airflow systems to the lowest possible point in the control cabinet (see figure above).

Caution!

It is important to ensure that the flow of cool air in the cooling system is not directed against the airflow from the fans in the ACOPOS P3 8EI servo drives. This can create air short circuits that prevent sufficient cooling of the ACOPOS P3 8EI servo drives.

Condensate forming on the cooling unit must be drained off according to the manufacturer's specifications so that it does not penetrate the ACOPOS P3 8EI servo drives.

3.4.5.3 Installing a cooling unit on the front of the control cabinet

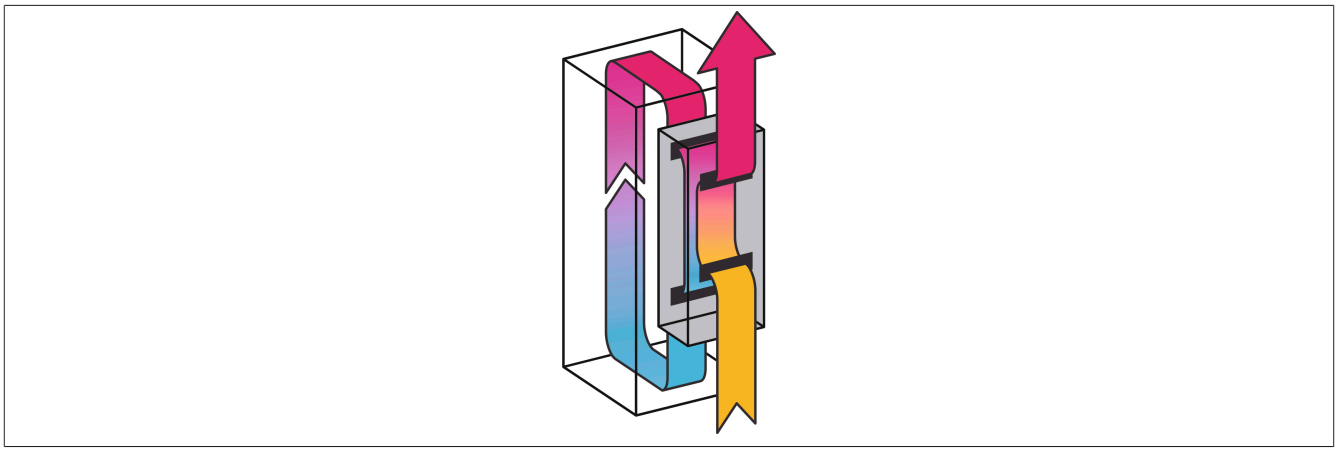


Figure 126: Installing a cooling unit on the front of the control cabinet

Caution!

The flow of cool air from the cooling unit must be directed by the airflow systems to the lowest possible point in the control cabinet (see figure above).

Caution!

Make sure that the flow of cool air in the cooling system is not directed against the air flow from the fans in the ACOPOS P3 8EI servo drives. This can create air short circuits that prevent sufficient cooling of the ACOPOS P3 8EI servo drives.

Condensate forming on the cooling unit must be drained off according to the manufacturer's specifications so that it does not penetrate the ACOPOS P3 8EI servo drives.

4 Dimensioning

4.1 Mains connection

4.1.1 General information

4.1.1.1 Network configurations

The mains connection of the ACOPOS P3 drive system is made via terminals X1 / L1, L2, L3 and PE of the line filter (e.g. 8B0Fxxx...).

In environments or networks in which the use of a mains filter is not mandatory or not permitted, the connection is made via terminals X1 / L1, L2, L3, PE (8EIxxxxH...) or X1 / L1, L2(N), L3, PE (8EIxxxxM....) of the ACOPOS P3 servo drive 8EI.[14)]

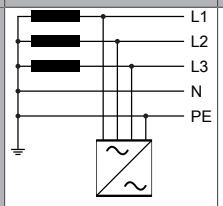
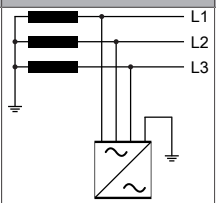
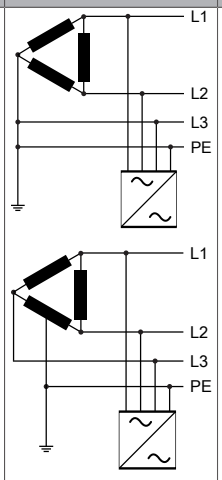
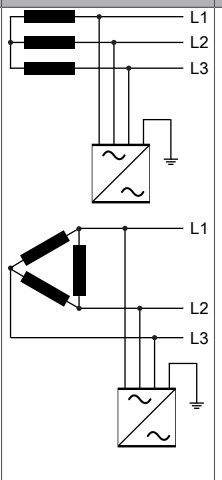
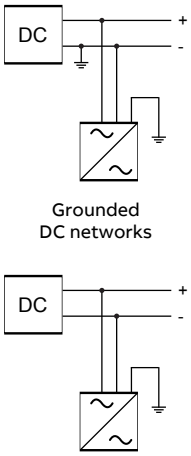
Conditions	Network configurations				
	Star-point grounded TN power systems (TN-S power systems), i.e. center-grounded networks	Star-point grounded TT power systems [1)]	Phase-grounded/Center-grounded delta systems (TT or TN power systems) [1)]	IT power systems (ungrounded or grounded with high impedance) [1)]	DC networks
					
Remove jumper X10?	No	No	No	Yes	Grounded: No Ungrounded: Yes
EMC requirements met?	Yes	Yes	No [2)]	No [2)]	Grounded: Yes Ungrounded: No [2)]
Max. installation elevation	4000 m above sea level	4000 m above sea level	2000 m above sea level	2000 m above sea level	2000 m above sea level
Support for safety functions SBT, SSO and SLT?	Yes	Yes	No	No	Grounded: Yes Ungrounded: No
Certification per UL 61800-5-1?	Yes	No	TN power systems only	Yes	Yes
Can 8B0F and 8EF line filters be used?	Yes	Yes	No	No	No

Table 312: Network configuration-dependent conditions

1) Operation in these networks is only permitted for 8EI servo drives with 8ZELxxxx Rev. D0 or E0 and higher, depending on the respective device type (see technical data). The revision can also be seen on the left side cover of the 8EI servo drive.
2) Compliance with EMC requirements must be ensured by the user.

Caution!

Connect the protective ground connection (PE) to all 8EI servo drives! Operation without protective ground is not permitted under any circumstances!

14) For a power supply of 24 to 120 VDC, the mains connection is made via terminals X1 / L1, L2 (8EIxxxxH...) or X1 / L1, L2(N) (8EIxxxxM...) of the ACOPOS P3 servo drive 8EI.

Information:

The electrical installation must be carried out in accordance with relevant national regulations (e.g. line cross section, fuse protection, protective ground connection, fault protection).

ACOPOS P3 drive systems are suitable for power systems that can provide a maximum short-circuit current (SCCR) of 5 kA_{eff} at 480 V_{eff} and that are protected with class gG / class J fuses or circuit breakers compliant with IEC/EN 60947-2 / UL 489 requirements.

Warning!

The integrated protection against short circuit does not replace the external fuse protection of the mains power supply. The fuse protection of the mains power supply must comply with the manufacturer's specifications as well as national and international regulations and laws.

Warning!

If there is a sufficiently low-impedance ground fault within a TN or TT power system, an upstream fuse or the short-circuit monitoring system is triggered.

In the event of a high-impedance ground fault, however, the upstream fuse does not respond, meaning that these ground currents (fault currents) can be potentially dangerous.

Information:

When using the ACOPOS P3 drive system in residential areas, commercial areas or small businesses, additional protective and filter measures must be implemented by the user.

4.1.1.2 Mains voltage range

The permissible mains voltage ranges for ACOPOS P3 8EI servo drives is listed in the following table:

Order number	Mains input voltage			
	1x 110 to 230 VAC ±10%	3x 200 to 230 VAC ±10%	3x 200 to 480 VAC ±10%	1x: 24 to 120 VDC[1)2)]
8EIxxxM...	Yes	Yes	No	Yes
8EI1X6H... 8EI2X2H... 8EI4X5H... 8EI8X8H...	No	No	Yes	Yes
8EI0xxH...	No	No	Yes	No

Table 313: Mains voltage ranges for ACOPOS P3 8EI servo drives

1) Only for ACOPOS P3 servo drives for which this mains input voltage is specified in the device information on the left side cover (Input: ... 24 - 120 VDC ...).
2) Operation on 1x 24 to 120 VDC is only permitted if both connections (L1, L2) are individually fused (see also table Maximum permissible fuse protection for the mains connection).

Corresponding matching transformers must be used for other mains voltages. In grounded power systems, autotransformers can also be used for this voltage adjustment; the star point does not have to be connected in this case.

4.1.2 Dimensioning

In general, dimensioning the mains power input, fuse protection and (if necessary) line contactor depends on the structure of the mains connection.

4.1.2.1 Design

4.1.2.1.1 8B0F line filters

The cross section of the mains power input and rated current of the fuse I_B must be dimensioned for average expected current load I_{Mains} (see also "Dimensioning the mains power inputs and fuse protection" on page 391).

Information:

It is possible to operate several ACOPOS P3 8EI servo drives on one 8B0F line filter.

For details, see section "ACOPOS P3 in a network" on page 398.

8EIxxxHxxxx.xxxx-1

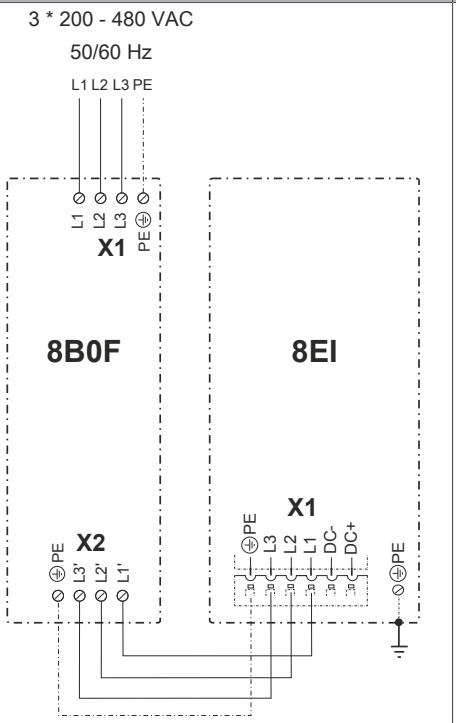
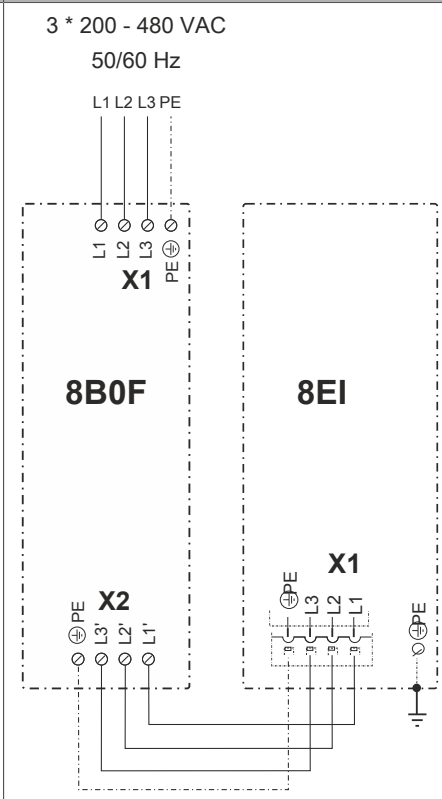
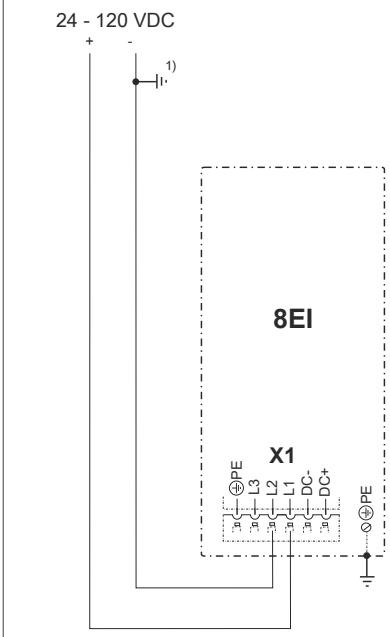
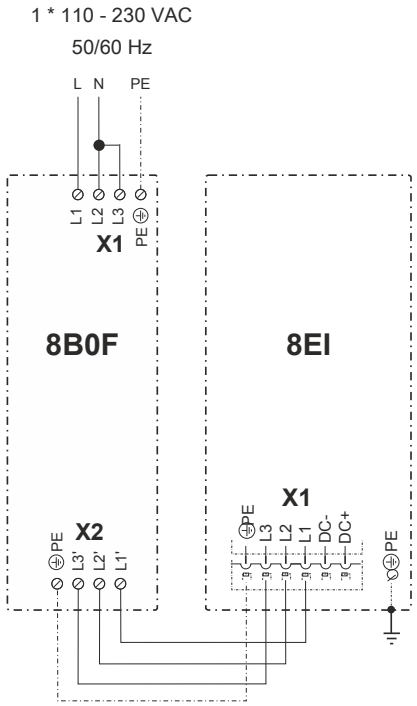
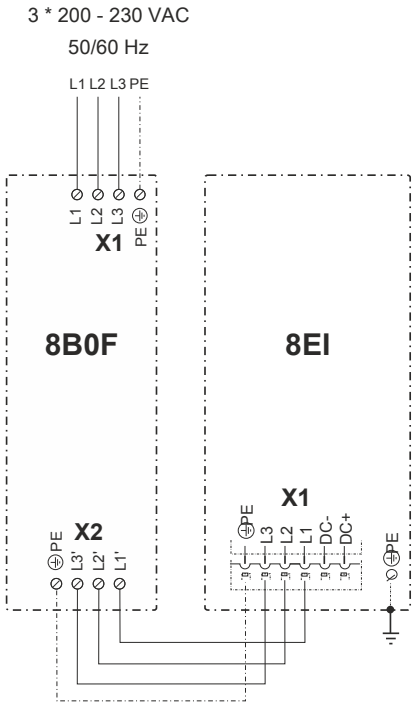
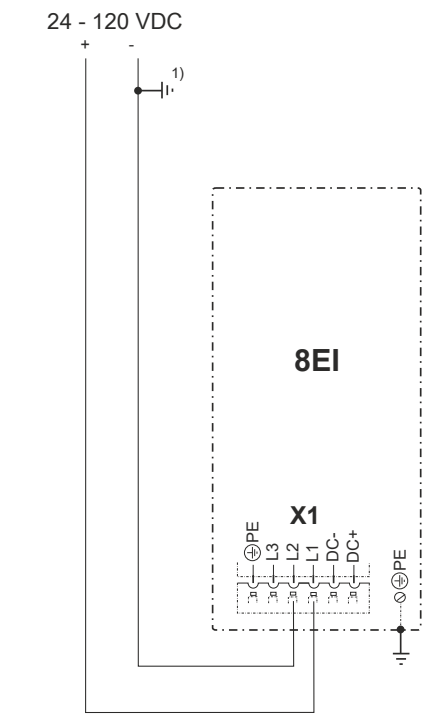
Mains input voltage - 3x 200 to 480 VAC		Mains input voltage 24 to 120 VDC
8EI1X6H.../2X2H.../4X5H.../8X8H.../013H.../017HxS...	8EI017HxD/022H.../024H.../034H.../044H...	8EI1X6H.../2X2H.../4X5H.../8X8H...
		 1) For DC sources whose DC_IN- (0V) potential is not already at ground potential, the ground connection from DC_IN- can be made to the X1/PE connection on the ACOPOS P3 servo drive.

Table 314: Mains connection for 8EIxxxHxxxx.xxxx-1 - Design

8EIxxxMxxxx.xxxx-1

Mains input voltage - 1x 110 to 230 VAC	Mains input voltage - 3x 200 to 230 VAC	Mains input voltage 24 to 120 VDC
		

1) For DC sources whose DC_IN-(0V) potential is not already at ground potential, the ground connection from DC_IN- can be made to the X1/PE connection on the ACOPOS P3 servo drive.

Table 315: Mains connection for 8EIxxxMxxxx.xxxx-1 - Design

4.1.2.1.2 8EF line filters

Information:

Only <u>one</u> 8EI ACOPOS P3 servo drive is permitted to be operated on an 8EF line filter. [15)]

[15)] A DC bus network of several 8EI ACOPOS P3 servo drives on one 8EF line filter may be permitted under certain conditions.

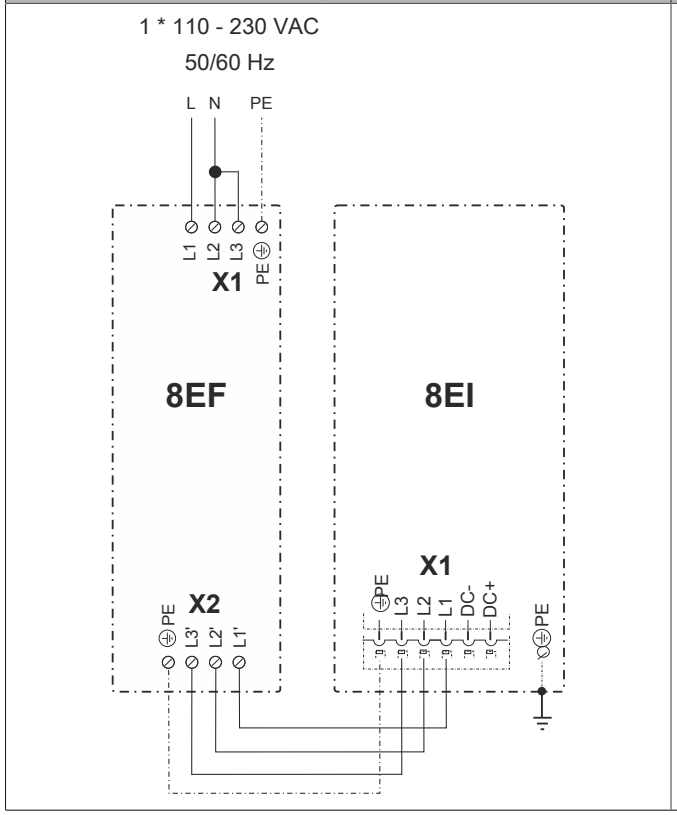
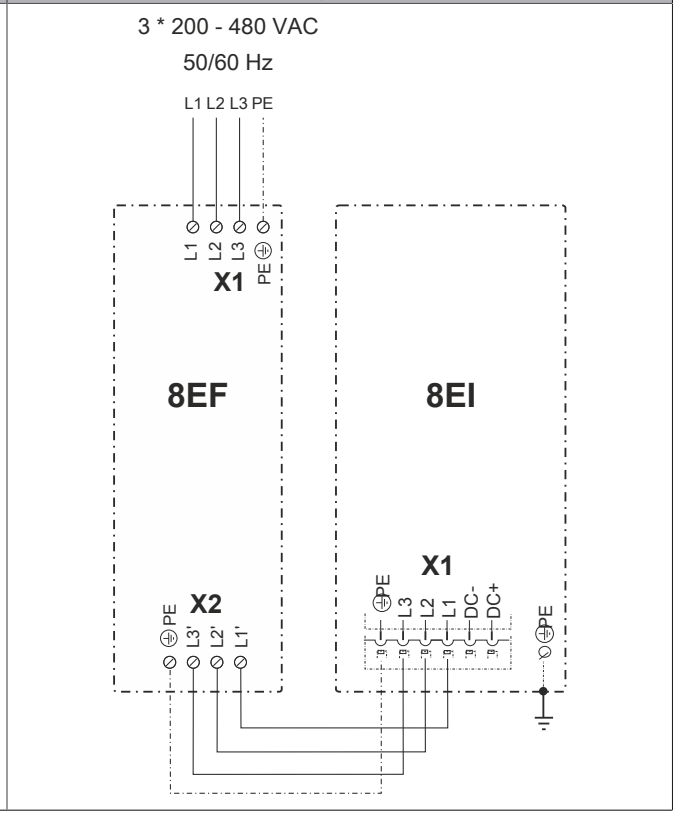
Mains input voltage - 1x 110 to 230 VAC	Mains input voltage - 3x 200 to 480 VAC
	

Table 316: Mains connection design

4.1.2.2 Dimensioning the mains power inputs and fuse protection

Information:

When choosing a suitable fuse, the user must also account for characteristics such as aging effects, temperature derating, overcurrent capacity and the definition of the rated current, which can vary by manufacturer and type. In addition, the fuse that is selected must also be able to handle application-specific characteristics (e.g. overcurrent that occurs in acceleration cycles).

The cross section of the mains power input and rated current of the fuse I_B must be dimensioned for average expected current load I_{Mains}.

Average expected current load I_{Mains} can be calculated as follows:

3 * 200 - 480 VAC / 3 * 200 - 230 VAC	1 * 110 - 230 VAC
$I_{Mains}[A] = \frac{S[VA]}{\sqrt{3}.U_{Mains}[V]}$	$I_{Mains}[A] = \frac{S[VA]}{U_{Mains}[V]}$

Table 317: Current load I_{Mains} depending on the mains input voltage

Apparent power S can be estimated as follows for each axis: [16)]

$$S[VA] = M_{eff}[Nm].k.\frac{2.\pi.n_{Avg}[min^{-1}]}{60}$$

16) If information concerning load torque, inertias and the friction situation is available, the effective torque or effective force are calculated using the following formulas:

$$M_{eff}[Nm] = \sqrt{\frac{1}{T_{Cycle}[s]}.\sum_{1} M_i[Nm]^2.t_i[s]}$$

To calculate n_{Avg}, corresponding information about the positioning cycle must be available.
n_{Avg} is calculated using the following formulas:

$$n_{Avg}[min^{-1}] = \frac{1}{T_{Cycle}[s]}.\sum_{i} n_i[min^{-1}].t_i[s]$$

If n_{Avg} takes on very small values, this can result in inaccurate results under certain circumstances. In this case, different calculation formulas or approaches should be used after consultation with B&R.

For 2- and 3-axis modules, the sum of the apparent power of the individual axes must be taken into account for the calculation of I_{Mains}.

The following estimation applies to linear motors: [17]:[18]

$$S[VA] = F_{eff}[N].k.v_{Avg}[m/s]$$

For 2- and 3-axis modules, the sum of the apparent power of the individual axes must be taken into account for the calculation of I_{Mains}.

Constant k depends on the ACOPOS P3 servo drive used and can be taken from the following table:

Servo drive	Mains input voltage		
1-axis modules	**3 * 400 VAC**	**3 * 230 VAC**	**1 * 230 VAC**
8EI1X6HWS...	2.5	2.5	---
8EI1X6MWS...	---	2.8	2.55
8EI2X2HWS...	2.9	2.8	---
8EI2X2MWS...	---	2.75	2.5
8EI4X5HWS...	2.65	2.4	---
8EI4X5MWS...	---	2.6	2.3
8EI8X8HWS...	2.2	2.05	---
8EI8X8MWS...	---	2.45	2.2
8EI013HWS...	2.1	2	---
8EI017HWS...	1.95	1.95	---
8EI024HWS...	2.15	1.9	---
8EI034HWS...	1.9	1.8	---
8EI044HWS...	1.65	1.65	---
2- and 3-axis modules	**3 * 400 VAC**	**3 * 230 VAC**	**1 * 230 VAC**
8EI2X2HWD... / 8EI2X2HWT...	2.45	2.15	---
8EI2X2MWD... / 8EI2X2MWT...	---	2.5	2.25
8EI4X5HWD... / 8EI4X5HWT...	2.2	2.05	---
8EI4X5MWD... / 8EI4X5MWT...	---	2.45	2.2
8EI8X8HWD... / 8EI8X8HWT...	2.2	2.05	---
8EI8X8MWD... / 8EI8X8MWT...	---	2.45	2.2
8EI017HWD...	1.9	1.8	---
8EI022HWD...	1.65	1.65	---

Table 318: Constant k

Rated current of the fuse protection I_B is selected so that it is greater than or equal to average expected current load I_{Mains}.

$$I_B \geq I_{Mains}$$

The cable cross section of the mains power input must be selected so that the permissible current-carrying capacity of cable cross section I_Z is greater than or equal to the selected rated current of fuse protection I_B (see Tab. 318 "Current-carrying capacity of PVC-insulated three-phase cables or single conductors " on page 393).

$$I_Z \geq I_B$$

[17] If corresponding information about load torques, mass inertia and the friction situation is available, the effective torque or effective force is calculated using the following formulas

[18]

$$F_{eff}[N] = \sqrt{\frac{1}{T_{Cycle}[s]} \cdot \sum_1 F_i[N]^2.t_i[s]}$$

To calculate v_{Avg}, corresponding information about the positioning cycle must be available.
v_{Avg} is calculated using the following formulas:

$$v_{Avg}[m/s] = \frac{1}{T_{Cycle}[s]} \cdot \sum_i v_i[m/s].t_i[s]$$

If v_{Avg} takes on very small values, this can result in inaccurate results under certain circumstances. In this case, different calculation formulas or approaches should be used after consultation with B&R.

The following table shows the current-carrying capacity of PVC-insulated three-phase cables (or three current-carrying single conductors) per IEC 60204-1 at an ambient temperature of 40°C [19] and 70°C maximum conductor temperature (current-carrying capacity for installation type F and cross sections greater than 35 mm² for installation types B1 and B2 were taken from DIN VDE 0298-4).

Line cross section [mm²]	Current-carrying capacity of the cable cross section I_Z / Rated current of the fuse I_B [A] depending on the type of installation				
	Three single conductors in the installation conduit or cable duct	Three-phase cable in the installation conduit or cable duct	Three-phase cables on walls	Three-phase cables in a cable tray	Three single conductors in a cable tray
	B1	B2	C	E	F
1.5	13.5 / 13	13.1 / 10	15.2 / 13	16.1 / 16	---
2.5	18.3 / 16	17.4 / 16	21 / 20	22 / 20	---
4	25 / 25	23 / 20	28 / 25	30 / 25	---
6	32 / 32	30 / 25	36 / 32	37 / 32	---
10	44 / 32	40 / 32	50 / 50	52 / 50	---
16	60 / 50	54 / 50	66 / 63	70 / 63	---
25	77 / 63	70 / 63	84 / 80	88 / 80	96 / 80
35	96 / 80	86 / 80	104 / 100	110 / 100	119 / 100
50	117 / 100	103 / 100	125 / 100	133 / 100	145 / 125
70	149 / 125	130 / 125	160 / 125	171 / 125	188 / 160
95	180 / 160	156 / 125	194 / 160	207 / 160	230 / 200

Table 319: Current-carrying capacity of PVC-insulated three-phase cables or single conductors

When determining the cross section for the mains power input, it is important to ensure that the cross section selected is within the range that can be used with mains connection terminal X1.

Overcurrent protection in the form of a circuit breaker or a fuse is required. Circuit breakers (slow-trip) with type C tripping characteristics (per IEC/EN 60947-2) or fuses (slow-blow) with type gG tripping characteristics (per IEC 60269-1) must be used. [20]

Servo drive	gG fuses per IEC 60269-1	Class CC, J fuses	Circuit breakers per IEC/EN 60947-2	Circuit breakers per UL 489
8EI1X6... 8EI2X2... 8EI4X5... 8EI8X8... 8EI013... 8EI017HxS...	45 A		32 A	
8EI017HxD... 8EI022...	80 A		32 A	
8EI024... 8EI034... 8EI044...	80 A		32 A	

Table 320: Maximum permissible fuse protection for the mains connection

Dimensioning of the line contactor

The rated current of the line contactor is based on the fuse protection of the mains connection. The line contactor is designed so that the rated operating current specified by the line contactor manufacturer for utilization category AC-1 per EN 60947-4-1 corresponds to approx. 1.3 times the rated current of the fuse protection.

4.1.3 Residual current protective devices (RCD)

Residual current protective devices are permitted to be used with ACOPOS P3 servo drives. It is important to note the following, however:

ACOPOS P3 servo drives have a power rectifier. In the event of a short circuit to an exposed conductive part, a smooth residual direct current can occur that prevents tripping of an AC or pulse current sensitive RCD (type A or AC) and thus cancels the protective function for all consumers connected to it.

[19] Current-carrying capacity is specified in IEC 60204-1 for an ambient temperature of 40°C. This reference temperature is 30°C in DIN VDE 0298-4. The values from DIN VDE 0298-4 specified in table "Current-carrying capacity of PVC-insulated three-phase cables or single conductors" are also converted for 40°C using the factor k_{Temp} = 0.87 specified in the standard.
The specified current-carrying capacity does not take into account a reduction factor for group of cables and single conductors. If necessary, this must be taken from the relevant standards and additionally calculated.

[20] Circuit breakers are available on the market with a rated current of 6 A to 63 A. In addition, only fuses can be used.

Danger!

Where a residual current protective device (RCD) is used for protection in case of direct or indirect contact, only a type B RCD (AC/DC-sensitive per IEC 60755) is permitted for the mains connection of the ACOPOS P3 servo drive. Otherwise, another protective measure must be used, such as neutralization or disconnection from the mains power supply by means of an isolation transformer.

4.1.3.1 Estimating leakage currents

Depending on the connection situation of the ACOPOS P3 servo drives, various leakage currents occur via the protective ground conductor (PE) to ground.

8EI servo drives	Typical leakage current I_A [mA] depending on the mains voltage / mains frequency [1]	
	3x 400 VAC / 50 Hz	1x 230 VAC / 50 Hz
8EI1X6M... / 8EI2X2M... / 8EI4X5M... / 8EI8X8M...	---	11.8
8EI1X6H... / 8EI2X2H... / 8EI4X5H... / 8EI8X8H... /8EI013H... / 8EI017HxS...	3	---
8EI017HxD... / 8EI022... / 8EI024... / 8EI034... / 8EI044...	6.5	---
Line filter		
8B0F*.000-	36.8 [2]	94.2 [3]
8B0F*.100-1	46.5 [4]	119.1 [5]
8EF0160H300.1-1	1.95 [6]	3.68 [7]

Table 321: Leakage currents (typical)

1) During the switch-on or switch-off procedure, current peaks may occur that exceed the value of typical leakage current I_A. However, the pulse duration of these current peaks is usually so short that a residual current protective device (RCD) does not react to them. These values refer to 3% mains asymmetry at nominal voltage without mains fluctuation.
2) For deviating mains voltages, the leakage current can be determined as follows: I_A [µA] = 1.84 µA * Mains voltage [VAC] * Mains frequency [Hz]
3) For deviating mains voltages, the leakage current can be determined as follows: I_A [µA] = 8.16 µA * Mains voltage [VAC] * Mains frequency [Hz]
4) For deviating mains voltages, the leakage current can be determined as follows: IA [µA] = 2.32 µA * Mains voltage [VAC] * Mains frequency [Hz]
5) For deviating mains voltages, the leakage current can be determined as follows: IA [µA] = 10.36 µA * Mains voltage [VAC] * Mains frequency [Hz]
6) For deviating mains voltages, the leakage current can be determined as follows: I_A [nA] = 72.5 nA * Mains voltage [VAC] * Mains frequency [Hz]
7) For deviating mains voltages, the leakage current can be determined as follows: I_A [nA] = 320.4 nA * Mains voltage [VAC] * Mains frequency [Hz]

Information:

The leakage currents of the connected components must be added together for each mains connection of an ACOPOS P3 drive system.

Example

An ACOPOS P3 drive system consisting of line filter 8B0F0160H000.A00-1 and servo drive 8EI4X5H-WS0.0B00-1 is supplied with a line voltage of 3x 400 VAC / 50 Hz.

Leakage current I_A of the drive system is therefore calculated as follows:
I_A = Leakage current of line filter + Leakage current of servo drive = 36.8 mA + 3 mA = 39.8 mA

4.1.3.2 Rated residual current

Information:

For ACOPOS P3 servo drives, residual current protective devices (RCD) with a rated residual current[21] ≥100 mA are recommended.

In the following cases, however, increased leakage currents and subsequently false tripping of the residual current protective device (RCD) may occur:

- When connecting servo drives to the power system (short-term single-phase or two-phase operation due to contact bounce in the line contactor).
- Due to the higher-frequency leakage currents that occur during operation with long motor cables.
- Due to strong imbalances in the three-phase system.

21) The rated residual currents specified by the circuit breaker manufacturer are maximum values at which the circuit breaker will trip safely. As a rule, the circuit breakers trip at approx. 60% of the rated residual current.

8EI servo drives	Leakage current$_{IA}$ [mA] depending on the mains voltage / mains frequency [1]	
	3x 400 VAC / 50 Hz	1x 230 VAC / 50 Hz
8EI1X6M... / 8EI2X2M... / 8EI4X5M... / 8EI8X8M...	---	21.15
8EI1X6H... / 8EI2X2H... / 8EI4X5H... / 8EI8X8H... /8EI013H... / 8EI017HxS...	21.15	---
8EI017HxD... / 8EI022... / 8EI024... / 8EI034... / 8EI044...	45.7	---
Line filter		
8B0F*.000-1	157 [2]	157 [3]
8B0F*.100-1	184.5 [4]	184.5 [5]
8EF0160H300.1-1	8.5 [6]	8.5 [7]

Table 322: Leakage currents (worst case)

1) The values are worst-case indications during the switch-on or switch-off procedures. These values refer to 3% mains asymmetry at nominal voltage without mains fluctuation.
2) For deviating mains voltages, the leakage current can be determined as follows: I_A [µA] = 7.85 µA * Mains voltage [VAC] * Mains frequency [Hz]
3) For deviating mains voltages, the leakage current can be determined as follows: I_A [µA] = 13.6 µA * Mains voltage [VAC] * Mains frequency [Hz]
4) For deviating mains voltages, the leakage current can be determined as follows: IA [µA] = 9,225 µA * Mains voltage [VAC] * Mains frequency [Hz]
5) For deviating mains voltages, the leakage current can be determined as follows: IA [µA] = 16.22 µA * Mains voltage [VAC] * Mains frequency [Hz]
6) For deviating mains voltages, the leakage current can be determined as follows: I_A [nA] = 425 nA * Mains voltage [VAC] * Mains frequency [Hz]
7) For deviating mains voltages, the leakage current can be determined as follows: I_A [nA] = 736.1 nA * Mains voltage [VAC] * Mains frequency [Hz]

4.1.3.3 Usable brand

For example, the all-current sensitive, 4-pole residual-current F 204 circuit breaker from ABB can be used (residual current: 300 mA, nominal current: 63 A).

4.1.4 Protective ground connection (PE)

The following information concerning the protective ground connection corresponds to section "Connection elements for the protective ground conductor" in IEC 61800-5-1 and must be observed.

A protective ground conductor must be connected to line filter 8x0F as well as to the ACOPOS P3 8EI servo drive.

Line cross section

The line cross section of the protective ground conductor is oriented to the line conductors and must be selected according to the following table:

Line cross section for line conductor A [mm²]	Minimum wire cross section for the protective ground connection A_{PE} [mm²] 1)
A ≤ 16	A_{PE} = A
16 < A ≤ 35	A_{PE} = 16
35 < A	A_{PE} = A / 2

Table 323: Selecting the cross section of the protective ground conductor

1) Any protective ground conductor that is not part of a cable must have a minimum wire cross section of 4 mm².

Increased leakage current

Warning!

ACOPOS P3 servo drives are devices with increased leakage current (greater than 3.5 mA AC or 10 mA DC). A fixed (immobile) protective ground connection is therefore required on the servo drive.

The following condition must also be met depending on the ACOPOS P3 servo drive:

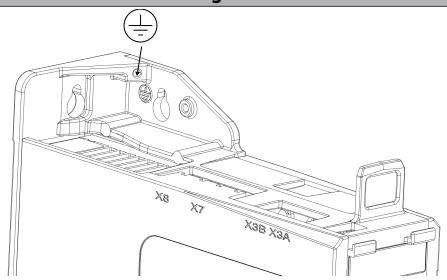
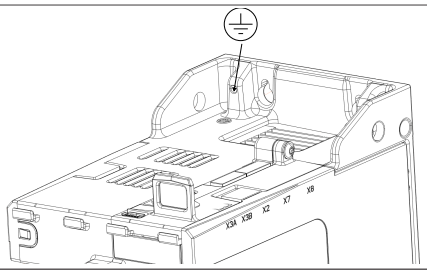
Servo drive	Condition	Figure
8EI1X6... 8EI2X2... 8EI4X5... 8EI8X8... 8EI013... 8EI017HxS...	In addition to connecting the first protective ground conductor to terminal X1 / PE, a second protective ground conductor with the same cross section must be secured at the position provided for this purpose using the supplied M4x8 screw (see figure on the right, tightening torque: 2.8 Nm).	
8EI017HxD... 8EI022... 8EI024... 8EI034... 8EI044...	In addition to connecting the first protective ground conductor to terminal X1 / PE, a second protective ground conductor with the same cross section must be secured at the position provided for this purpose using the supplied M5x8 screw (see figure on the right, tightening torque: 5.5 Nm).	

Table 324: Protective ground conductor condition depending on ACOPOS P3 servo drive

Warning!

This product can cause direct current in the protective ground conductor.

Danger!

Where a residual current protective device (RCD) is used for protection in case of direct or indirect contact, only a type B RCD (AC/DC-sensitive per IEC 60755) is permitted for the mains connection of ACOPOS P3 8EI servo drives.

Otherwise, another protective measure must be used, such as neutralization or disconnection from the mains power supply by means of an isolation transformer.

4.2 24 VDC connection

4.2.1 General information

The 24 VDC power supply for an ACOPOS P3 drive system is provided by an external 24 V power supply. The 24 VDC connection is made using the X2 / 24 V, COM terminals of the ACOPOS P3 8EI servo drive.

Information:

The COM connection on connector X2 must be grounded to achieve a defined relationship between the signal ground and ground potential!

Information:

B&R recommends the use of B&R 0PSxxxx.x power supplies.

Caution!

Connector X2 for the 24 VDC power supply from the ACOPOS P3 8EI servo drives is not equipped with an inrush current limitation! If an external 24 VDC power supply in a switched-on state is connected to connector X2 (hot plugging), there is a risk of damage to the servo drive or power supply due to high current peaks!

4.2.2 Design

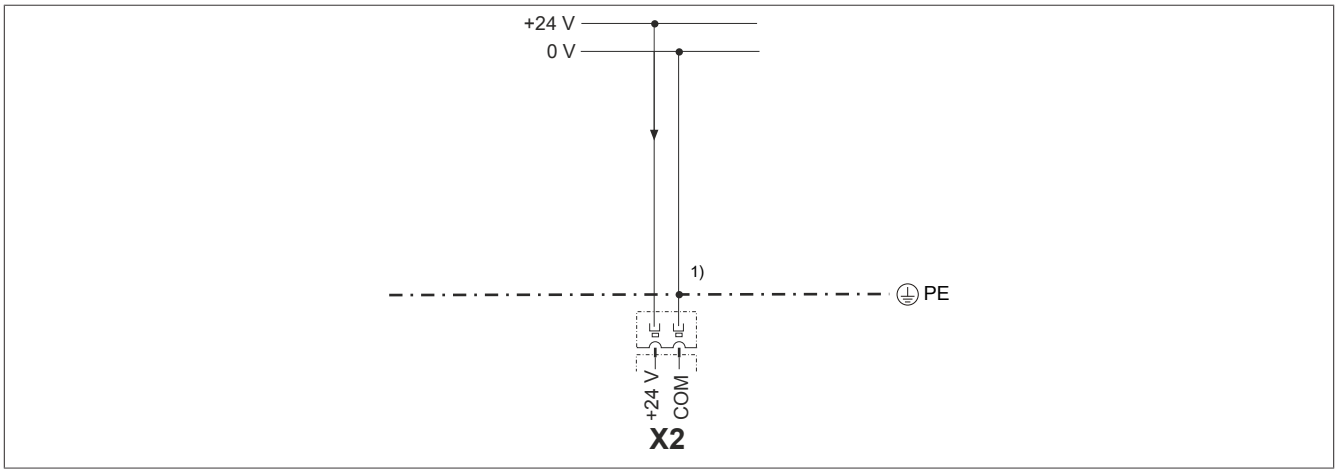


Figure 127: ACOPOS P3 8EI servo drives - 24 VDC connection

1) The COM connection on connector X2 must be grounded to achieve a defined relationship between the signal ground and ground potential!

4.2.3 Dimensioning

The 24 VDC power consumption of an ACOPOS P3 8EI servo drive is put together as follows:

- 24 VDC power consumption of the 8EI servo drive itself (see the technical data of the respective 8EI servo drive)
- If present:
  24 VDC power consumption of the 8EAC plug-in module (see the technical data of the respective 8EAC plug-in module)
- If present:
  24 VDC power consumption of the holding brakes of connected motors (see the data sheet for the holding brake of the respective motor)

4.3 DC bus

4.3.1 ACOPOS P3 in a network

AC power network

Several ACOPOS P3 8EI servo drives can be connected to an 8B0F line filter under certain conditions.

This enables simplified wiring and reduces the number of line filters required.

DC bus network

Several ACOPOS P3 8EI servo drives can be connected via the DC bus.

This makes it possible to balance the braking and drive energy of several axes or to distribute braking energy to several braking resistors.

4.3.1.1 Fuse protection

Caution!

Only supply a network of ACOPOS P3 8EI servo drives from a single power supply cable (mains fuse). Parallel supply of the network via several power supply cables (mains fuses) is not permitted!

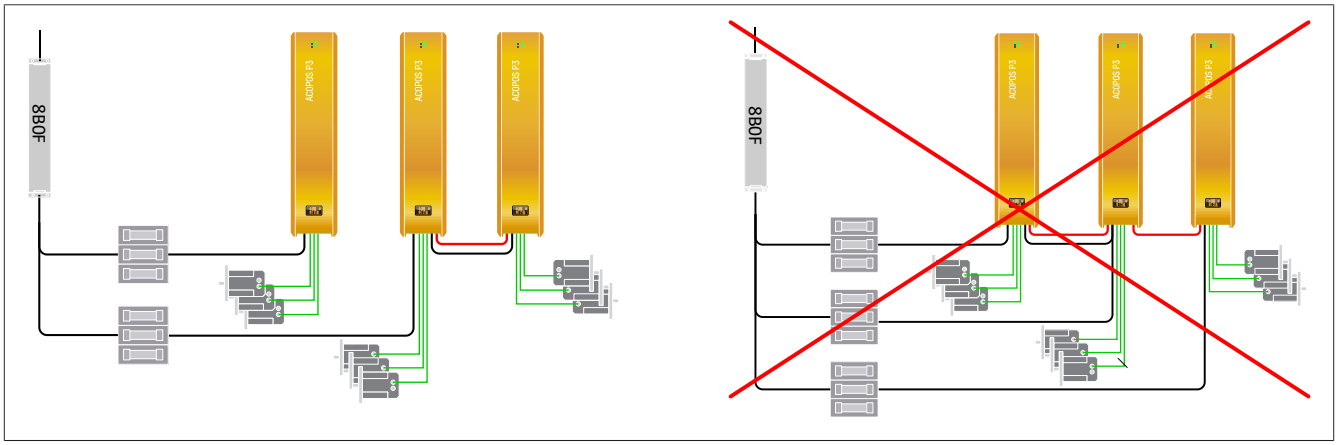


Figure 128: Example of permissible fuse protection (left) and impermissible fuse protection (right) of an ACOPOS P3 system

The smallest rating of all servo drives in the network with a mains connection is decisive for the fuse protection. Servo drives in a network that are supplied exclusively via the DC bus do not need to be taken into account.

Servo drive	gG fuses per IEC 60269-1	Class CC, J fuses	Circuit breakers per IEC/EN 60947-2	Circuit breakers per UL 489
8EI1X6... 8EI2X2... 8EI4X5... 8EI8X8... 8EI013... 8EI017HxS...	45 A		32 A	
8EI017HxD... 8EI022...	80 A		32 A	
8EI024... 8EI034... 8EI044...	80 A		32 A	

Table 325: Maximum permissible fuse protection for the mains connection

Example

Combination of servo drive 8EI1X6H... and servo drive 8EI044H....

Variant 1

- Both servo drives have a mains connection.
- Both servo drives are connected to each other via the DC bus.
  → Fuse protection of the network is permitted with a maximum of a 45 A fuse or a 32 A circuit breaker.

Variant 2

- The mains connection is only established for 8EI044H... servo drives.
- Both servo drives are connected to each other via the DC bus.
  → Fuse protection of the network is permitted with a maximum of a 80 A fuse or a 32 A circuit breaker.

Information:

Ensure that the current-carrying capacity of the wiring from the fuse protection to the servo drive supplying the power and to the downstream servo drives is sufficiently dimensioned for the specific application.

The cable on the DC bus connection is not protected against overcurrent! Energy can be dissipated through the cable up to the continuous power of the DC bus connection specified in the user's manual.

4.3.1.2 Line filter / Number of servo drives in the network

Under certain conditions, it is permissible to connect several ACOPOS P3 servo drives to an 8B0F line filter.

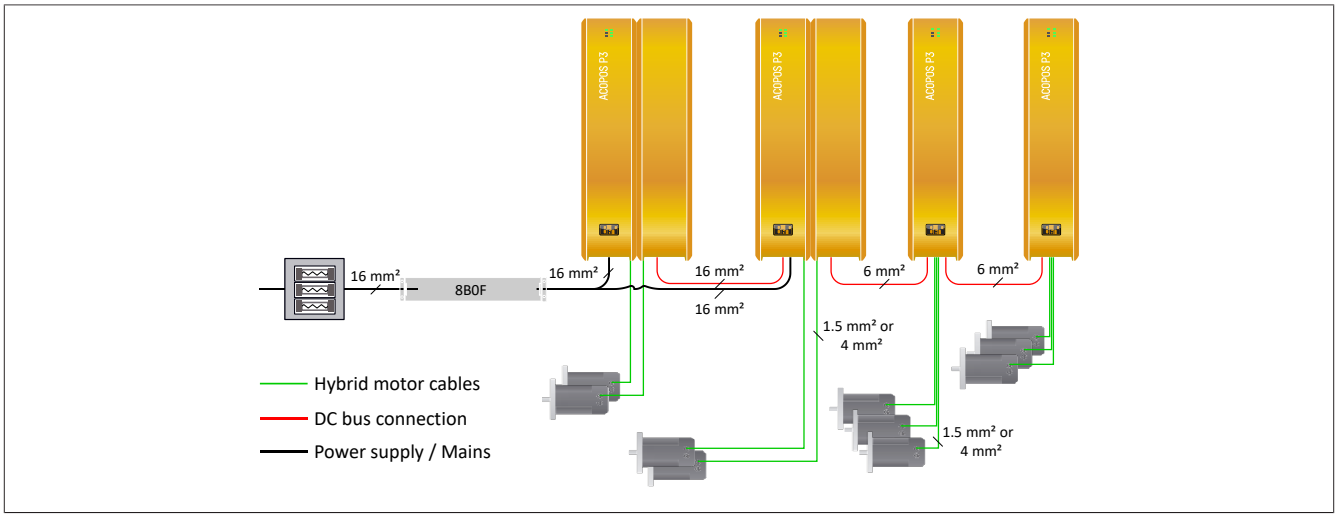


Figure 129: Example illustration of an ACOPOS P3 connection on a 8B0F line filter

Conditions

- A maximum of six 8EI servo drives are permitted to be connected to one 8B0F line filter.
- The total motor cable length of all servo drives in the network is limited:

	Switching frequency [1]			
	2.5 kHz	5 kHz	10 kHz	20 kHz
Permissible total motor cable length [m]	75		38	19

1) If the servo drives in the network are operated with different switching frequencies, the value of the highest switching frequency used applies.

- The servo drives in the network must be arranged in descending order of power.
- The mains power input of the network must be connected to the servo drive with the highest power.

If the nominal current of a single 8B0F line filter is not sufficient for the network, two 8B0F line filters are permitted to be connected in parallel.

- Ensure that the line filters are wired symmetrically since otherwise the current distribution may be asymmetrical.
- A parallel connection of 8B0F line filters does not increase the permissible total motor cable length in the network.

4.3.1.3 Chargeable DC bus capacitance

In an ACOPOS P3 network, the DC bus electrolytic capacitors of servo drives without their own mains connection are charged via the charging circuit of servo drives for which the mains connection has been established.

Servo drive	Max. chargeable DC bus capacitance		
	Mains input voltage 230 VAC	Mains input voltage 400 VAC	Mains input voltage 480 VAC
8EI1X6M... 8EI2X2M... 8EI4X5M... 8EI8X8M...	3760 µF		
8EI1X6H... 8EI2X2H... 8EI4X5H... 8EI8X8H...		2640 µF	1650 µF
8EI013HxS... 8EI017HxS...		3360 µF	2100 µF
8EI017HxD 8EI022H... 8EI024H... 8EI034H... 8EI044H...		6720 µF	4200 µF

Table 326: Overview of maximum chargeable DC bus capacitance of ACOPOS P3 servo drives, 60 s switch-on interval

4.3.1.4 Design of the wiring

Up to six 8EI servo drives can be connected to an 8B0F line filter.

The wiring of an ACOPOS P3 DC bus network is not permitted to exceed a total length of 3 m.

Caution!

The DC bus connectors of ACOPOS P3 8EI servo drives do not have short-circuit protection, ground fault protection or reverse polarity protection. A fuse for the DC bus connection is not provided inside the device. It is therefore very important that the DC bus connections be wired correctly.

All ACOPOS P3 servo drives 8EIxxxM with a single-phase power supply whose DC bus circuits should be connected to each other must be connected to the same mains phase! If this is not taken into account, the DC bus voltage will increase impermissibly. This will result in irreparable damage to the devices!

Notice!

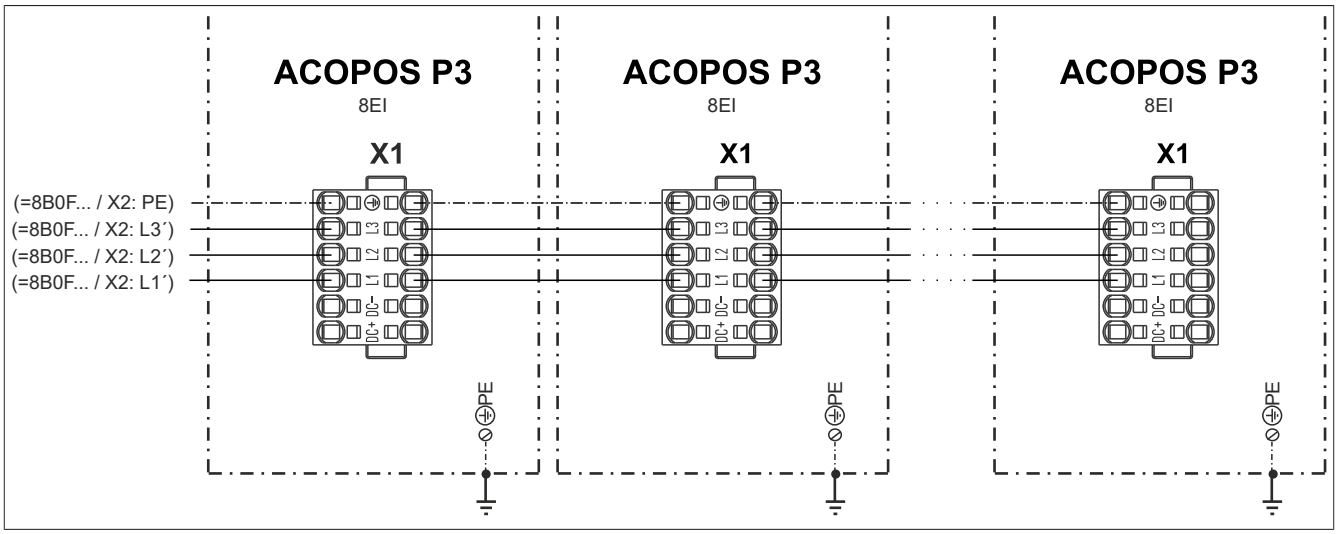
Do not operate ACOPOS P3 8EIxxxHxxx.xxx and 8EIxxxMxxx.xxx servo drives in the same DC bus network since they have different DC bus voltages!

To make the connections on the ACOPOS P3 8EI servo drive, the use of two-row 8TB terminal blocks is recommended.

4.3.1.4.1 Wiring variants

Daisy chain (AC network)

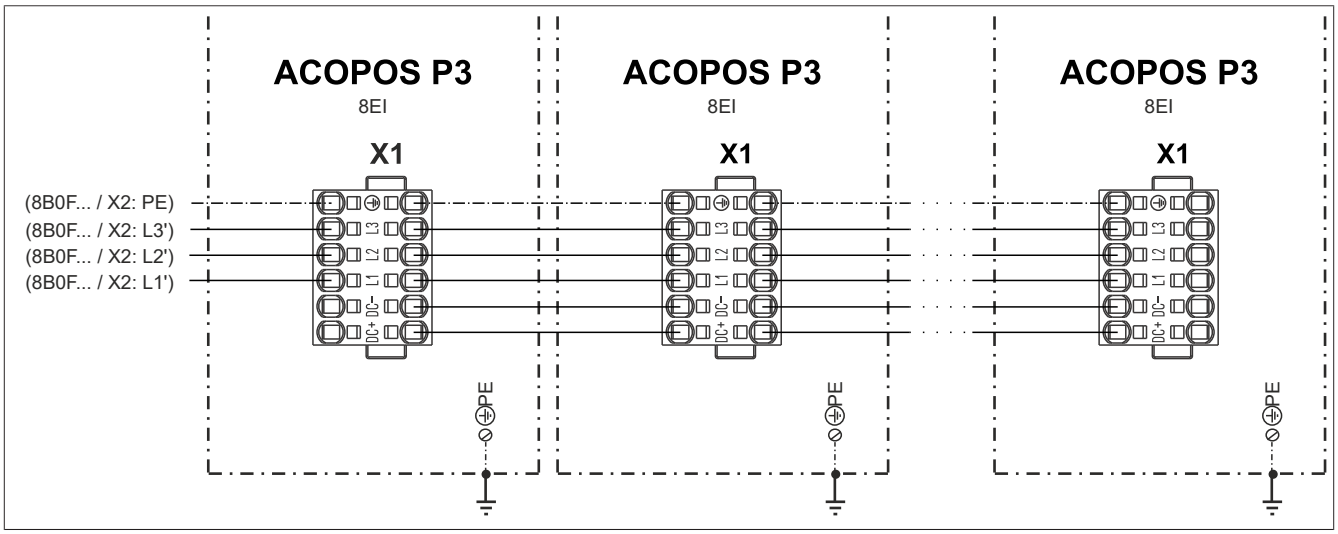
Each servo drive can be individually fused (optimized availability).



Daisy chain (DC and AC connection)

The connection or coupling to the DC bus of ACOPOS P3 8EI servo drives is made via terminals X1 / DC+, DC- or X11 / DC+, DC- using parallel lines with the smallest possible spacing.

It is recommended that the DC bus wiring be as short as possible and with the largest possible wire cross section, taking into account the maximum possible wire cross sections of the DC bus connections.



DC bus only (DC network)

The wiring of the DC bus network connection must be shielded.

Information:

If the DC bus wiring is implemented with shielded cables, the shield connection can be implemented using shield component set 8SCSE01.0100-00 / 8SCSE01.0200-00 or 8SCSE02.0100-00 / 8SCSE02.0200-00.

With regard to the residual current, it is important to note when selecting the residual current device (RCD) that it must be designed for the sum of the residual currents of the servo drives connected to it.

For the typical leakage currents, see the technical data of the respective servo drives.

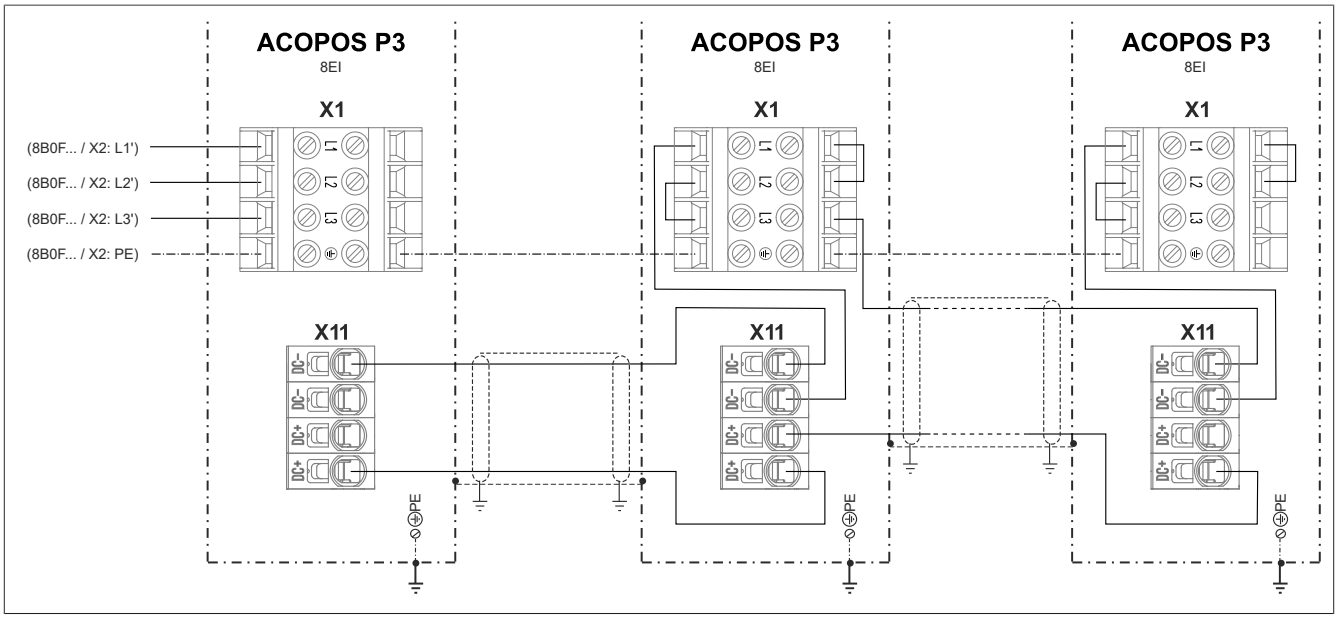


Figure 130: Wiring of ACOPOS P3 servo drives in the >4 kW to 18 kW power class via the DC bus, DC bus only

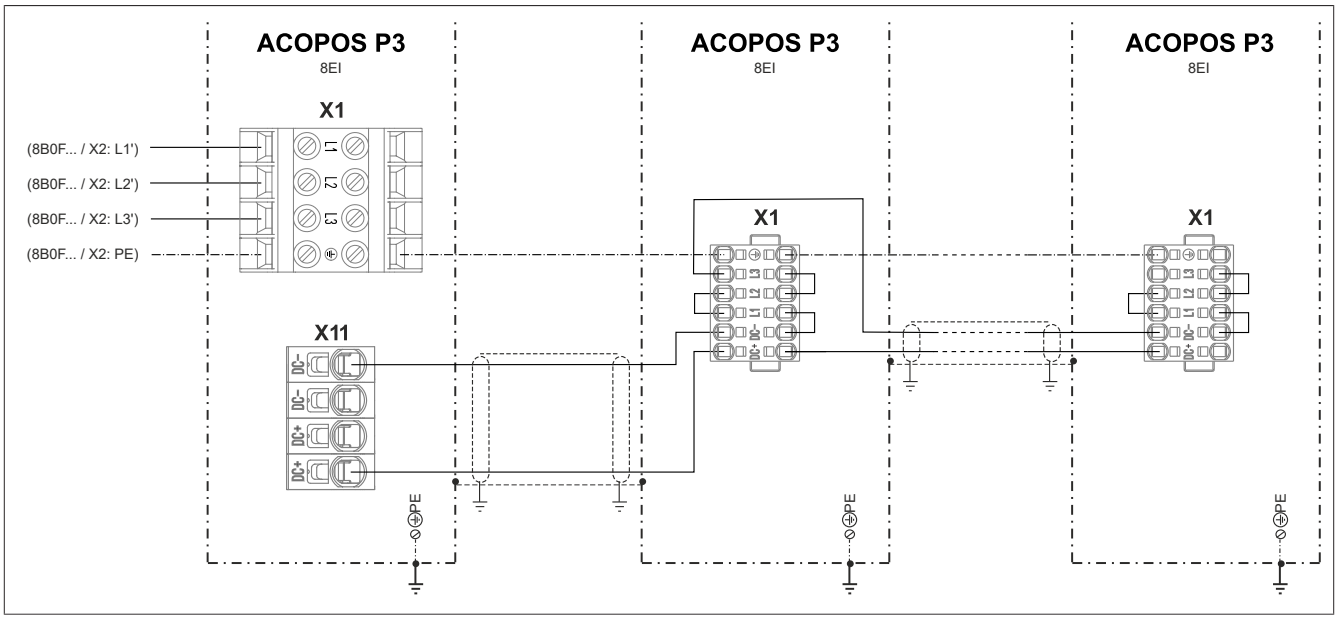


Figure 131: Wiring of an ACOPOS P3 servo drive in the >4 kW to 18 kW power class with ACOPOS P3 servo drives in the power class up to 4 kW via the DC bus, DC bus only

Information:

With this wiring variant, connections L1 to L3 must be connected to DC- so that the device's internal drainage structures remain active.

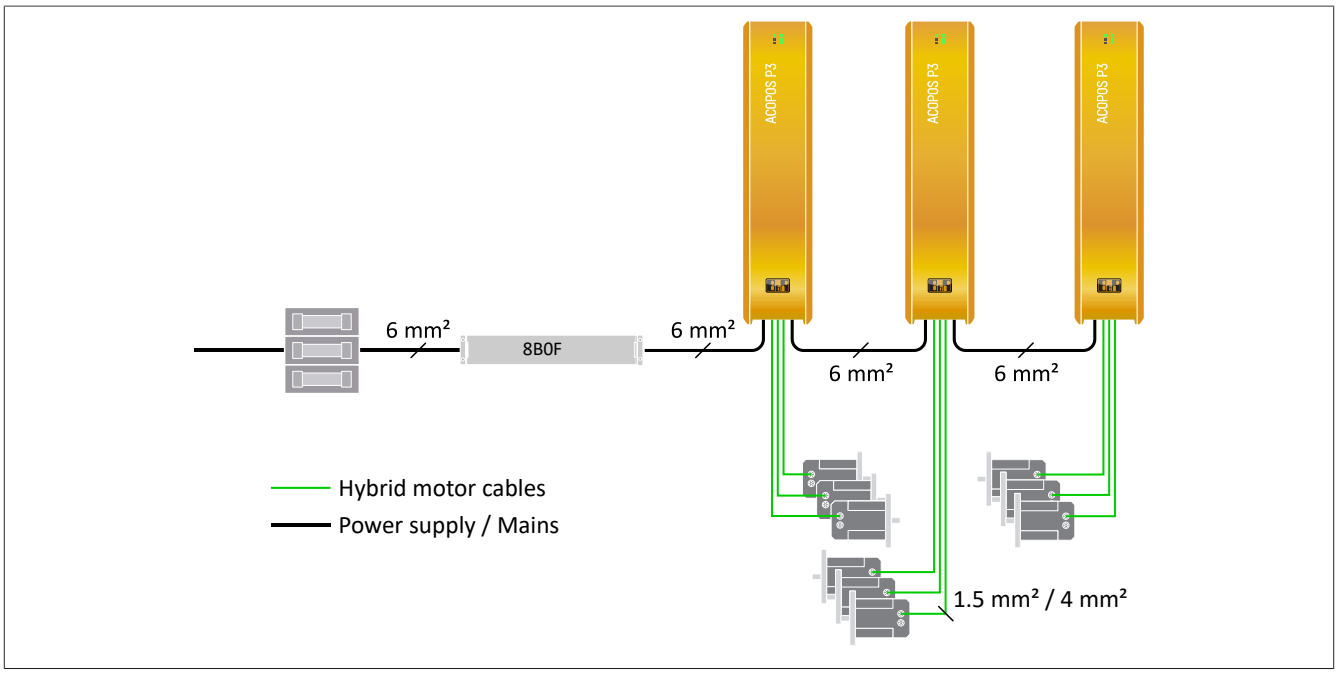
4.3.1.5 Examples of possible connections

Information:

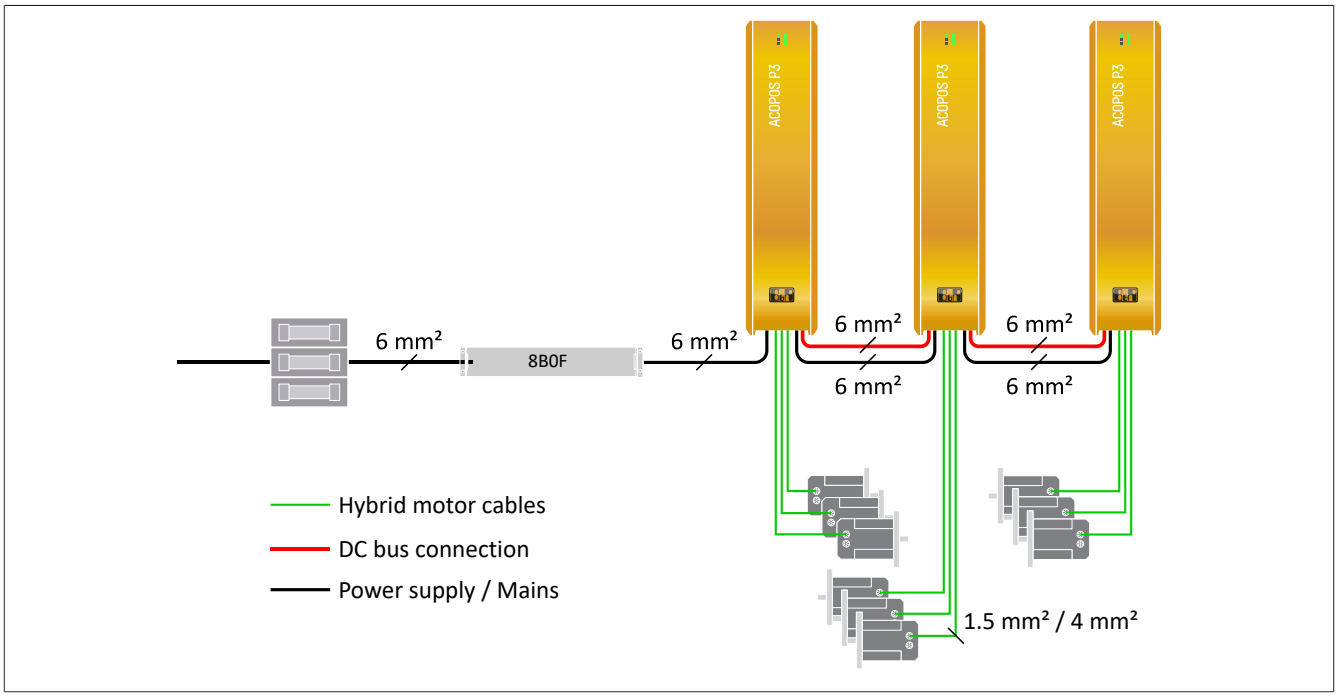
The topologies shown do not contain any wiring recommendations but include the maximum possible wire cross section.

Select the wire cross section according to the required amperage, taking into account ambient conditions, aging, peak loads and the nominal cycles!

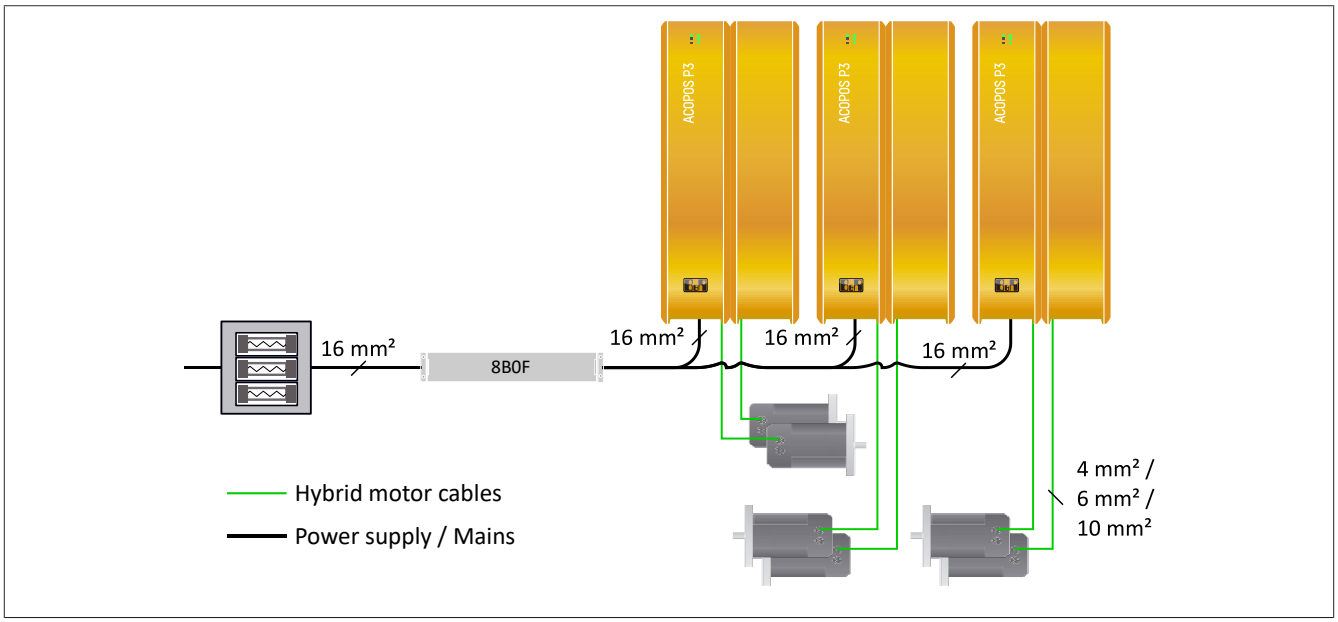
AC network of ACOPOS P3 8EI servo drives in the < 4 kW power output class



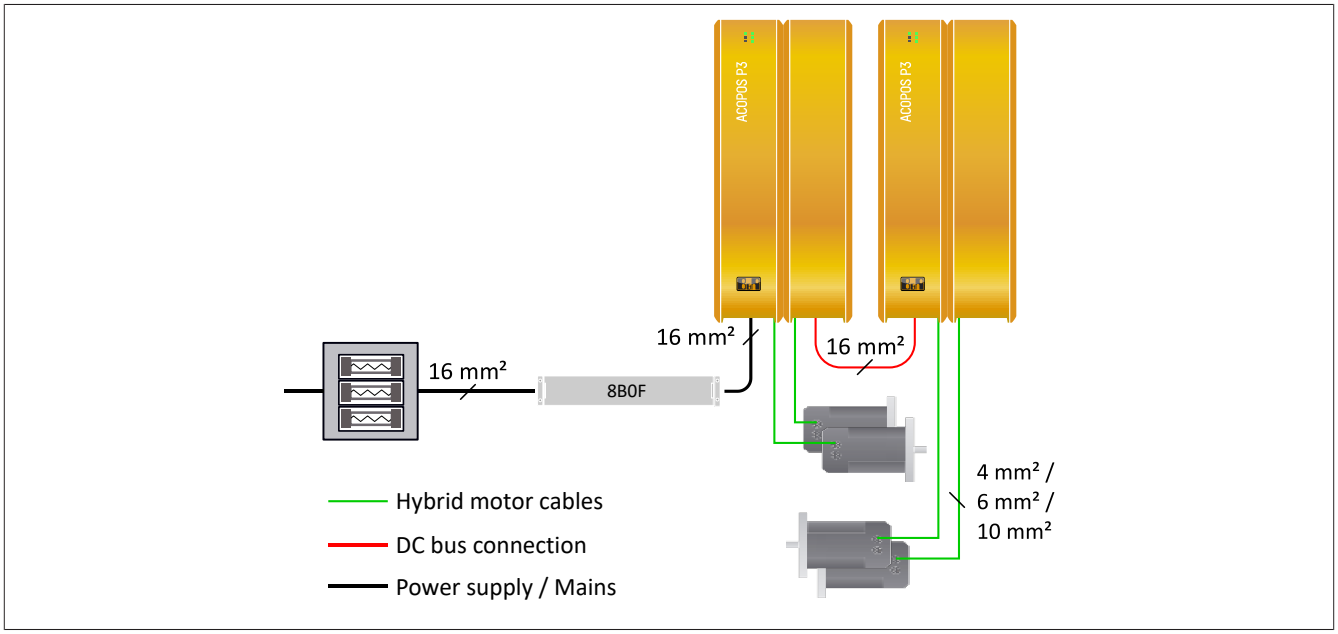
DC bus network of ACOPOS P3 8EI servo drives in the < 4 kW power output class



AC network of ACOPOS P3 8EI servo drives in the power output class >4 kW to 18 kW



DC bus network of ACOPOS P3 8EI servo drives in the power output class >4 kW to 18 kW



4.3.1.6 Equal distribution of the applied power via the power rectifiers

In the DC bus network of ACOPOS P3 8EI servo drives, it is possible in principle that the parallel connection of the power rectifiers of the individual servo drivers results in an inadmissible distribution of the supplied power.

The distribution of the supplied power is monitored via module-internal protection models. If an inadmissible distribution of the supplied power is determined, this will in the worst case cause the affected module to be switched off during operation at the power limit.

Warning!

An inadmissible distribution of the supplied power may occur during operation as well as during startup of ACOPOS P3 servo amplifiers 8EI in the DC bus network!

4.3.1.7 Equal distribution of the brake power on the braking resistors

The braking resistors optionally integrated in ACOPOS P3 8EI servo drives as well as braking resistors that can be connected externally are controlled using a specially developed procedure. This guarantees that the brake power is optimally and equally distributed on the braking resistors when a DC bus connection is made between several units.

When using the optional internal braking resistors, no additional configuration is required on the part of the user. When using external braking resistors, they must be configured appropriately (see "Configuring brake resistors" on page 422).

Caution!

A faulty configuration can result in irreparable damage to the external braking resistor or ACOPOS P3 servo drive!

Information:

The braking power in the DC bus network can be distributed to one or more braking resistors.

Information:

Brake power is distributed in the DC bus network only to those braking resistors connected to 8EI servo drives for which at least one axis controller is enabled at the moment braking takes place.

4.3.2 ACOPOSmulti in combination with ACOPOS P3

ACOPOS P3 8EI servo drives can be supplied with power via the DC bus of an ACOPOS drive system. The ACOPOSmulti drive system is permitted to be supplied via 8BVP active power supply modules as well as 8B0P passive power supply modules.
The connection from the ACOPOS P3 8EI servo drive to the ACOPOS drive system is made via DC cable outlet X4x on an ACOPOSmulti 8BVE expansion module.

The DC bus capacitance of the ACOPOS P3 8EI servo drive must be taken into account when designing the ACOPOSmulti drive system.

Caution!

The power supply via an ACOPOSmulti drive system is only permitted for ACOPOS P3 8EIxxxH... servo drives!

4.3.2.1 Wiring

Permissible cable lengths

- The wiring between the ACOPOSmulti 8BVE expansion module and first ACOPOS P3 8EI servo drive in the DC bus network is not permitted to exceed a length of 5 m.
- Wiring between individual ACOPOS P3 servo drives in the DC bus network is not permitted to exceed a total length of 3 m.

Caution!

If ACOPOS P3 8EI servo drives are supplied via an ACOPOSmulti drive system, the mains connection to these ACOPOS P3 8EI servo drives is not permitted to be established!

8EI1X6..., 8EI2X2..., 8EI4X5..., 8EI8X8..., 8EI013..., 8EI017xxS...

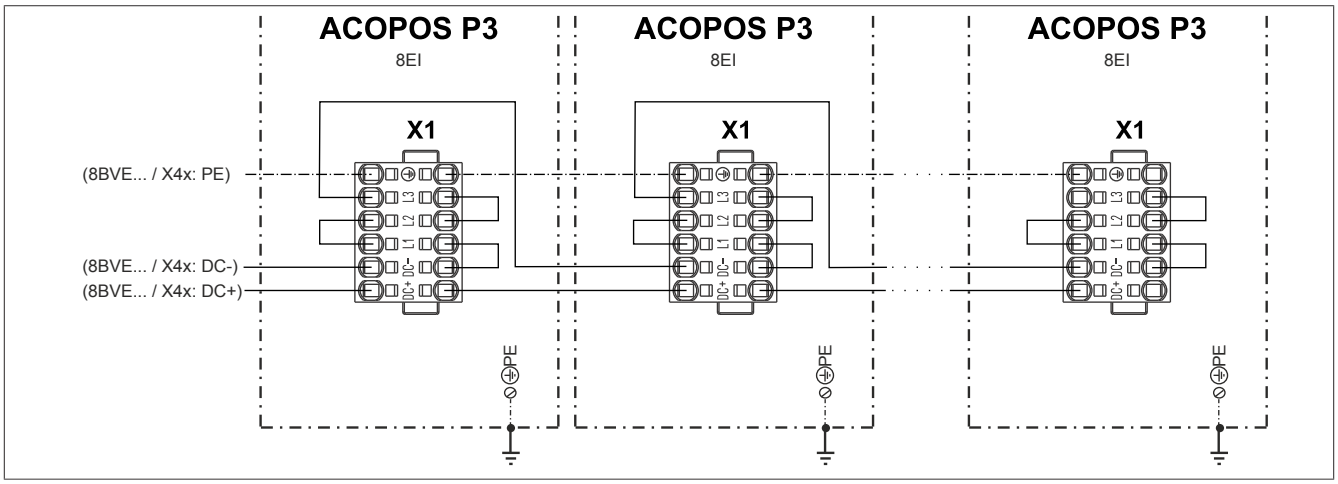


Figure 132: Power supply of ACOPOS P3 8EI1X6..., 8EI2X2..., 8EI4X5..., 8EI8X8..., 8EI013..., 8EI017xxS... servo drives via an ACOPOSmulti drive system - Wiring

4.3.2.2 Fuse protection

Fuse protection for ACOPOS P3 servo drives is provided via the fuses for DC cable outlet X4x on the ACOPOSmulti 8BVE expansion module. Fuse protection must be designed for the smallest wire cross section used in the DC bus network.

4.3.2.3 DC bus capacitance of ACOPOS P3 8EI servo drives

During dimensioning, it must be checked as to whether the chargeable DC bus capacitance of the ACOPOSmulti 8BxP power supply module being used is sufficient (see section "Dimensioning" of the ACOPOSmulti user's manual). The DC bus capacitance of the ACOPOS P3 8EI servo drives must also be taken into account.

Servo drive	DC bus capacitance [µF]
8EI1X6H... 8EI2X2H... 8EI4X5H... 8EI8X8H...	470
8EI013HxS... 8EI017HxS...	940

Table 327: DC bus capacitance of ACOPOS P3 8EI servo drives

4.3.3 DC bus power supply via an ACOPOS P3 servo drive

4.3.3.1 Distributed motion control

ACOPOSremote 8CVI inverters[22], ACOPOSmotor 8DI modules can be supplied with power directly via the DC bus of ACOPOS P3 8EI servo drives. The connection is made using terminals X1 / DC+, DC- of the ACOPOS P3 8EI servo drive.

Caution!

The power supply of distributed motion control via the DC bus is only permitted with ACOPOS P3 8EIxxxH... servo drives!

Information:

DC bus connections X1 / DC+ and DC- on ACOPOS P3 8EI servo drives are not equipped with fuse protection on the device side!

Information:

To make the connections on the ACOPOS P3 8EI servo drive, the use of 2-row 8TB terminal blocks is recommended.

[22] 8CVI045... Revision I0 or later, 8CVI088... Revision H0 or later, 8CVI155... Revision C0 or later.

4.3.3.1.1 Direct connection of 8CVI/8DI modules

The first 8CVI / 8DI module is connected directly to the ACOPOS P3 8EI servo drive using ACOPOS P3 hybrid cable 8CCHxxxx.11150-1. Additional 8CVI/8DI modules can be connected to the first 8CVI/8DI module using 8CCH hybrid cables.

Example configuration

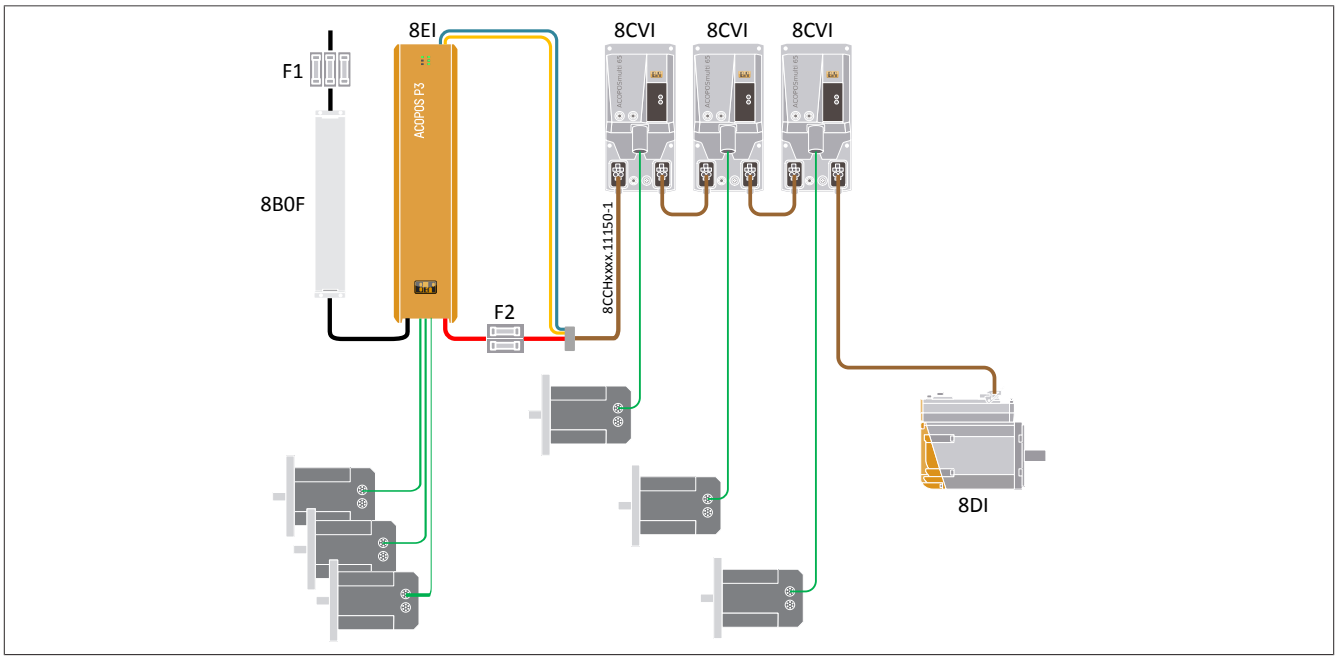


Figure 133: Direct connection of 8CVI / 8DI modules to an ACOPOS P3 DC bus (example configuration)

- Mains connection wiring
- DC bus wiring
- Distributed motion control components wiring (hybrid cable 8CCH)
- Motor cable 8ECM/8CCM
- +24 VDC
- STO

Procedure for dimensioning

- Calculate the average DC bus power of all axes based on the load cycle of the application.
- Select the appropriate ACOPOS P3 servo drive (average DC bus power, number of axes).
- Check whether the chargeable DC bus capacity of the selected ACOPOS P3 servo drive is sufficient for the application (see "Chargeable DC bus capacitance" on page 400).
- Dimension mains fuse F1 according to section "Mains connection" on page 387 taking the apparent power factor into account.
- Check whether the DC bus wiring (hybrid cable 8CCHxxxx.11150-1) is already protected by mains fuse F1. If not, dimension DC bus fuse F2 for the maximum permissible current-carrying capacity of hybrid cable 8CCHxxxx.11150-1.
- Check whether the 24 VDC wiring (hybrid cable 8CCHxxxx.11150-1) is already protected by the installed power supply.

Fuse protection for 8CVI/8DI modules

8CVI / 8DI modules are protected by mains fuse F1 if the tripping current of mains fuse F1 is at most 80% of the maximum permissible current-carrying capacity of hybrid cable 8CCHxxxx.11150-1. Otherwise, DC bus fuse F2 must be dimensioned so that the maximum current-carrying capacity of hybrid cable 8CCHxxxx.11150-1 is not exceeded.

Information:

For information about distributed motion control, see user's manual "Decentralized motion control" (MAACPMDDE-xxx).

4.3.3.2 Chargeable DC bus capacitance

During dimensioning, it must be checked whether the chargeable DC bus capacitance of the ACOPOS P3 servo drive / ACOPOS P3 DC bus network used is sufficient for the application.

For the DC bus capacitance of ACOPOS P3 servo drives, see the technical data of the respective module see "Chargeable DC bus capacitance" on page 400.

Information:

The chargeable DC bus capacitance of an ACOPOS P3 servo drive DC bus network is equal to the sum of the chargeable DC bus capacitances of all ACOPOS P3 servo drives in this DC bus network for which the mains connection is established.

4.4 Motor connection

On B&R motors, the power connections, the connections for the holding brake and the connections for the motor temperature sensor are all made using the same motor connector.[23)]
The motor connection on the ACOPOS P3 8EI servo drive is made using the X5x / U, V, W and PE terminals as well as the X5x / B+, B-, T+ and T- terminals[24)]. The motor connection must be shielded appropriately (see "EMC-compatible installation " on page 424).

The following diagram illustrates how the motor connection is designed:

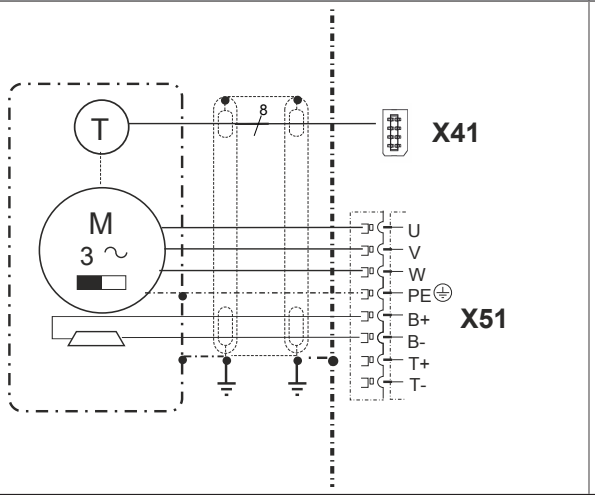
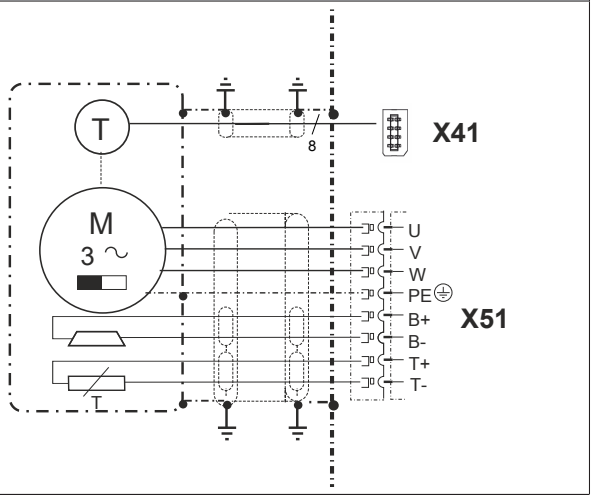
Structure with 8ECH hybrid motor cable	Structure with motor and separate encoder cable
	

Table 328: ACOPOS P3 X51 motor connection - Circuit diagram

The cross section of the motor cable must be dimensioned for the thermal equivalent RMS value of the motor current. [25)]

The cross section of the motor cable is selected for B&R motor cables according to the following table so that the permissible current-carrying capacity of the selected cable cross section is greater than or equal to the thermal equivalent RMS value of the motor current:

$I_Z \geq I_q$

Motor cables - For use in cable drag chains

The following table shows the current-carrying capacity of specially insulated three-phase cables per DIN VDE 0298-4 at an ambient temperature of 40°C[26)] and maximum cable temperature of 90°C:

Wire cross section [mm²]	Current-carrying capacity of the wire I_z [A] depending on type of installation		
	Installation in electrical installation pipes	Installation on a wall	Installation in the air
	B2	C	E
0.75	11.5	13	13.5
1.5	17.8	20	20.9
2.5	23.7	27.3	29.1
4	31.9 [1)]	36.4 [1)]	38.2 [1)]
6	40	47.3	49.1
10	54.6	64.6	68.3
16	72.8	87.4	91
35	116.5	133.8	143.8

Table 329: Current-carrying capacity of specially insulated three-phase cables

1) Pre-assembled 8BCMxxxxxx.1312A-0 motor cables from B&R are only permitted to be loaded with max. 30 A.

23) When using 8ECHxxx motor hybrid cables, the encoder signals are also routed via the same motor connector.
24) A temperature sensor does not need to be connected when using 8ECHxxx hybrid motor cables since the motor temperature is transferred digitally.
25) If information concerning load torques, inertias and friction is available, the thermal equivalent RMS value of the motor current for the motor being used can be calculated as follows:

$$I_q[A] = \sqrt{\frac{1}{T_{Cycle}[s]} \cdot \sum_i I_i[A]^2 . t_i[s]}$$

26) Current-carrying capacity is specified in DIN VDE 0298-4 for an ambient temperature of 30°C. The values listed in the "Current-carrying capacity of PVC-insulated three-phase cables or single conductors" table are converted for use at an ambient temperature of 40°C using the factor k_{Temp} = 0.91 specified in the standard.
The specified current-carrying capacity does not take into account a reduction factor for groups of cables and single conductors. If necessary, this must be taken from the corresponding standards and included in the calculation.

Motor cables - Not for use in cable drag chains

The following table shows the current-carrying capacity of PVC-insulated three-phase cables per DIN VDE 0298-4 at an ambient temperature of 40°C[27] and maximum cable temperature of 70°C:

Wire cross section [mm²]	Current-carrying capacity of the wire I_z [A] depending on type of installation		
	Installation in electrical installation pipes	Installation on a wall	Installation in the air
	B2	C	E
0.75	8.5	9.8	10.4
1.5	13.1	15.2	16.1
2.5	17.4	20.9	21.8
4	23.5	27.9	29.6
6	29.6	35.7	37.4
10	40	51.7	52.2

Table 330: Current-carrying capacity of PVC-insulated three-phase cables

When determining the cross section for the motor cable, make sure that the cross section selected is within the range that can be used with motor connection terminal X5x.

Information:

Observe the minimum permissible supply voltage of the motor holding brake! This value is listed in the data sheet for the motor being used.

4.4.1 Motor overload protection

ACOPOS P3 servo drives have various monitoring mechanisms to ensure motor overload protection. For detailed information about the various mechanisms, see Automation Help.

Caution!

Motor overload protection can only be ensured if there is a motor temperature sensor in the connected motor and it is evaluated on ACOPOS P3 8EI servo drive.

The motor overload protection level can be calculated using the following formula:[28]

$$\text{Level Motor-Überlastschutz [\%]} = \frac{I_L}{I_N} * 100\,\% = \frac{1}{I_N} * 100\,\% * \sqrt{I_0^{\,2}\,\frac{T_{M\_LIM} - T_{M\_AMB}}{T_{M\_LIM} - T_{M\_AMB\_N}} - \frac{n_{avg}}{n_N}\left(I_0^{\,2} - I_N^{\,2}\right)}$$

I_L	Motor overload protection current
I_0	Stall current of the motor
I_N	Nominal current of the motor
T_{M_LIM}	Maximum permissible motor temperature
T_{M_AMB}	Current ambient temperature of the motor
$T_{M\_AMB\_N}$	Nominal ambient temperature of the motor
n_{avg}	Average motor speed
n_N	Nominal speed of the motor

[27] Current-carrying capacity is specified in DIN VDE 0298-4 for an ambient temperature of 30°C. The values listed in the "Current-carrying capacity of PVC-insulated three-phase cables or single conductors" table are converted for use at an ambient temperature of 40°C using the factor k_{Temp} = 0.91 specified in the standard.
The specified current-carrying capacity does not take into account a reduction factor for groups of cables and single conductors. If necessary, this must be taken from the corresponding standards and included in the calculation.

[28] Valid for motor temperature model 2 (MOTOR_TEMPMODEL_MODE).

4.5 Braking resistors

4.5.1 General information

When braking servo motors, energy is returned to the ACOPOS P3 8EI servo drive. This causes the capacitors in the DC bus to be charged to higher voltages.

Starting at a defined DC bus voltage, the ACOPOS P3 8EI servo drive can enable a braking resistor to the DC bus via the brake chopper and in this way convert the braking energy to heat.

All ACOPOS P3 8EI servo drives are equipped with a connection for external braking resistors. Certain ACOPOS P3 8EI servo drives are optionally available with an integrated braking resistor. For detailed information, see the technical data of the respective ACOPOS P3 8EI servo drive.

4.5.2 Braking resistor connection

Internal braking resistor[29)]

The internal braking resistor is pre-wired at the factory via terminals X6 / RB+ and RB-.

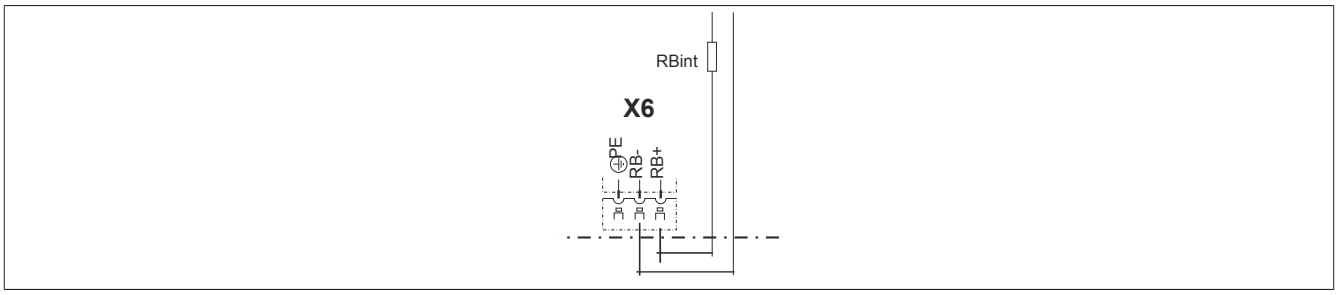


Figure 134: ACOPOS P3, pre-wiring the internal braking resistor

Information:

The internal braking resistor is preconfigured at the factory. The user does not need to make any settings or configurations.

External braking resistors

External braking resistors are connected via terminals X6 / RB+, RB- and PE.

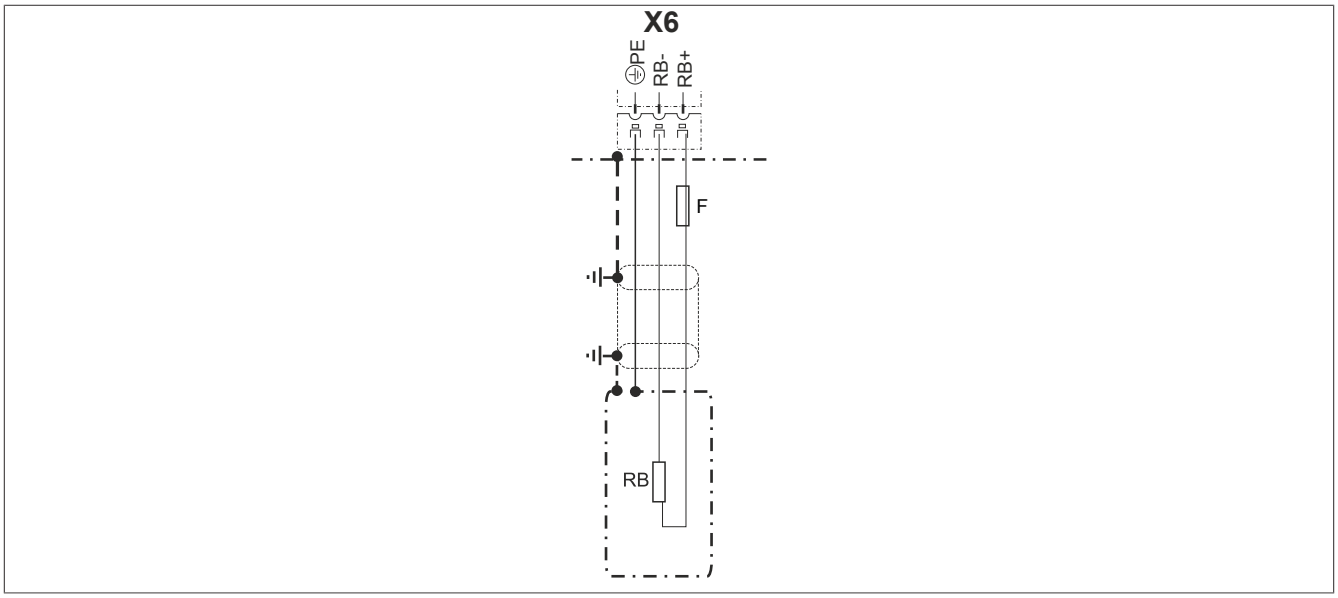


Figure 135: ACOPOS P3 connection for X6 external braking resistor - Circuit diagram

4.5.2.1 Fusing and wiring of an external braking resistor

The braking resistor connection X6 is protected internally as follows:

[29)] The internal braking resistor is optional and must be selected during configuration of the 8EI servo drive.

- **Protection against short circuit**
  The device's internal monitoring of the IGBT detects a short circuit at X6 and switches the servo drive off.
- **Protection against thermal overload**
  If the external braking resistor is configured correctly in Automation Studio, thermal overload of the braking resistor is prevented by the device's internal temperature model.

Information:

The cable to the braking resistor is not protected against overcurrent – if the connected braking resistor has a resistance value that is too low, for example.

To protect the braking resistor or the cable to the braking resistor from thermal overload in the event of a possible misconfiguration, an external fuse can be used on the system side.[30)]

The rated current of the fuse must be selected so that the attachment cable is protected and should be selected with the resistance value taken into account.

Rated current I_F for fuse F results from the smaller value of the thermal equivalent RMS value of braking current I_q as well as continuous current I_D of the braking resistor used and is limited upwards with the value of max. permissible current-carrying capacity I_Z of the cable to the braking resistor.

$$I_q[A] = \sqrt{\frac{1}{T_{Cycle}[s]} \cdot \sum_i I_i[A]^2 . t_i[s]} \qquad I_D[A] = \sqrt{\frac{P_{BR}}{R_{BR}}} \qquad I_Z > I_F \geq min\ (I_q; I_D)$$

Caution!

Incorrect configuration of the braking resistor in Automation Studio, incorrect dimensioning of the cable to the braking resistor or improper operation can result in destruction of the ACOPOS P3 servo drive or the braking resistor without a fuse on the system side!

An intrinsically safe braking resistor must be used.[31)]

4.5.3 Dimensioning braking resistors

4.5.3.1 Basis for calculation

The basis for dimensioning an external braking resistor is the sum of the movement and load profiles of all axes connected via the DC bus to the ACOPOS P3 8EI servo drive to which the external braking resistor should be connected:

30) The applicable fuses must be fast-acting melting fuses Ø10 x 38 mm for 600 VAC/VDC. For example, type KLKD0xx (xx is the rated current of the fuse in amperes, e.g. KLKD030) from Littelfuse (www.littelfuse.com) can be used.

31) Braking resistors are considered intrinsically safe if they disconnect without short circuits and ground faults and without fire in the event of a continuous overloading. The housing of an intrinsically safe braking resistor is not permitted melt in the event of continuous overloading. It is important to note the information in the data sheet of the respective braking resistor!

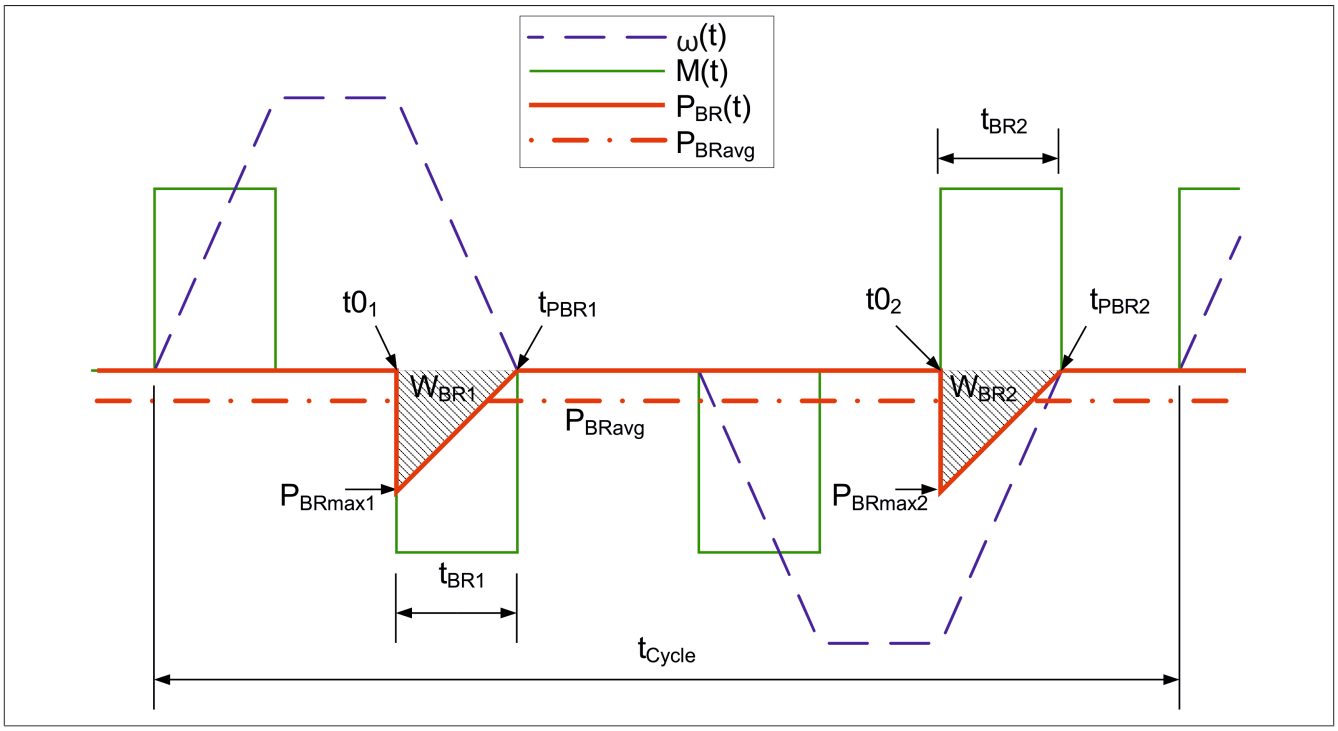


Figure 136: Sum of the movement and load profiles in an example application

ω(t)	Angular velocity
$P_{BR}(t)$	Brake power
P_{BRavg}	Average braking power over one cycle
M(t)	Torque
t_{Cycle}	Cycle duration
$t0_1$	Starting time of braking procedure 1
t_{PBR1}	End time of braking procedure 1
P_{BRmax1}	Maximum braking power of braking procedure 1
W_{BR1}	Braking energy of braking procedure 1
t_{BR1}	Duration of braking procedure 1
$t0_2$	Starting time of braking procedure 2
t_{PBR2}	End time of braking procedure 2
P_{BRmax2}	Maximum braking power of braking procedure 2
W_{BR2}	Braking energy of braking procedure 2
t_{BR2}	Duration of braking procedure 2

Power calculation

$P(t) = M(t).\omega(t)$

All instances of P(t) <0 will be labeled as brake power ratings $P_{BR}(t)$.

Braking energy per braking procedure (responsible for heating up the braking resistor during a braking procedure)

$$W_{BR_i} = \int_{t0_i}^{tP_{BR_i}} P_{BR_i}(t)dt$$

W_{BR_{i}} = stack{tP_{BR_{i}} # int P_{BR_{i}} # t0_{i}} (t)dt

$P_{BR_i} < 0$

Braking energy for one cycle (responsible for average heating of the braking resistor)

$$W_{BRges} = \sum_{N}^{i=1} W_{BR_i}$$

Maximum braking energy within one cycle (determinant variable for selecting the braking resistor value)

$$W_{BRges} = \sum_{N}^{i=1} W_{BR_i}$$

Average brake power for one cycle (determinant variable for the required continuous power of the braking resistor)

$$P_{BRavgAPPL} = \frac{W_{BRges}}{t_{Cycle}}$$

Total braking time within one cycle (determinant variable for determining the duty cycle ratio)

$$t = \sum_{0}^{t_{Cycle}} t_{BRi}$$

Determining braking resistance data

The following parameters must be determined for the external braking resistor to suit the application:

- Resistance value (R_{BR})
- Maximum power (P_{BRmax})
- Nominal continuous power (P_{BRN})

For additional parameters concerning external braking resistors, see the data sheet of the respective manufacturer:

- Thermal capacity (c_{th})
- Thermal resistance (R_{th})
- Maximum permissible temperature of the braking resistor (T_{BRmax}) or absorbed heat up to T_{BRmax} (Q_{BRmax})

Data for B&R 8B0W braking resistors

Model number	Mounting orientation	R_{BR} [Ω]	T_{BRmax} [°C] 1) 2)	R_{th} [K/W]	c_{th} [J/K]	Q_{BRmax} [J] 1) 2)	P_{BRN} [W] 1) 2)
8B0W0045H000.00x-1	Vertical	50 ±10%	683	1.517	30.88	16.3	424
	Horizontal	50 ±10%	683	1.657	30.88	16.3	388
8B0W0079H000.00x-1	Vertical	33 ±10%	637	0.852	40.68	22.6	701
	Horizontal	33 ±10%	637	0.9395	40.68	22.6	636

Table 331: Overview of braking resistor data - 8B0W

1) T_{BRmax} can be reduced by application-related limitations (contact protection, warming of neighboring components, maximum warming of the control cabinet, installation position, etc.). In this case, the values for Q_{BRmax} and P_{BRN} will also change; these must be recalculated for the maximum value of T_{BRmax} permitted in the application!

2) Values for T_{amb} = 40°C.

Series and parallel connection of braking resistors

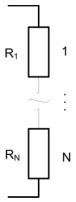
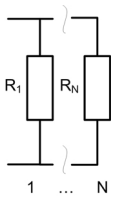
Parameter	Serial connection		Parallel connection	
Resistance value	$R_{ges} = \sum_{i=1}^{N} R_i$		$\frac{1}{R_{ges}} = \sum_{i=1}^{N} \frac{1}{R_i}$	
Thermal resistance	$\frac{1}{R_{thges}} = \sum_{i=1}^{N} \frac{1}{Rth_i}$		$\frac{1}{R_{thges}} = \sum_{i=1}^{N} \frac{1}{Rth_i}$	
Thermal capacity	$C_{th} = \sum_{i=1}^{N} C_{th_i}$		$C_{th} = \sum_{i=1}^{N} C_{th_i}$	
Max. permissible temperature	$T_{max} = T_{max}$		$T_{max} = T_{max}$	
Absorbed heat up to T_{max}	Q_{maxTot} = sum from{i = 1} to{N} Q_{max_{i}} $Q_{maxTot} = \sum_{i=1}^{N} Q_{max_i}$		Q_{maxTot} = sum from{i = 1} to{N} Q_{max_{i}} $Q_{maxTot} = \sum_{i=1}^{N} Q_{max_i}$	

Table 332: Series and parallel connection of braking resistors

Maximum heat that can be absorbed by the braking resistor:

$$Q_{BRmax} = (T_{BRmax} - T_{amb}).c_{th}$$

Maximum temperature in continuous operation:

$$\Delta T_{Lenght} = P_{avg}.R_{th}$$

Average overtemperature in continuous operation:

$$\Delta T_{BR} = \frac{W_{BRges}}{C_{th}}$$

Thermal time constant of the braking resistor:

$$\tau = R_{th}.c_{th}$$

4.5.3.2 Example

Scenario

The following movement and load profiles are available:

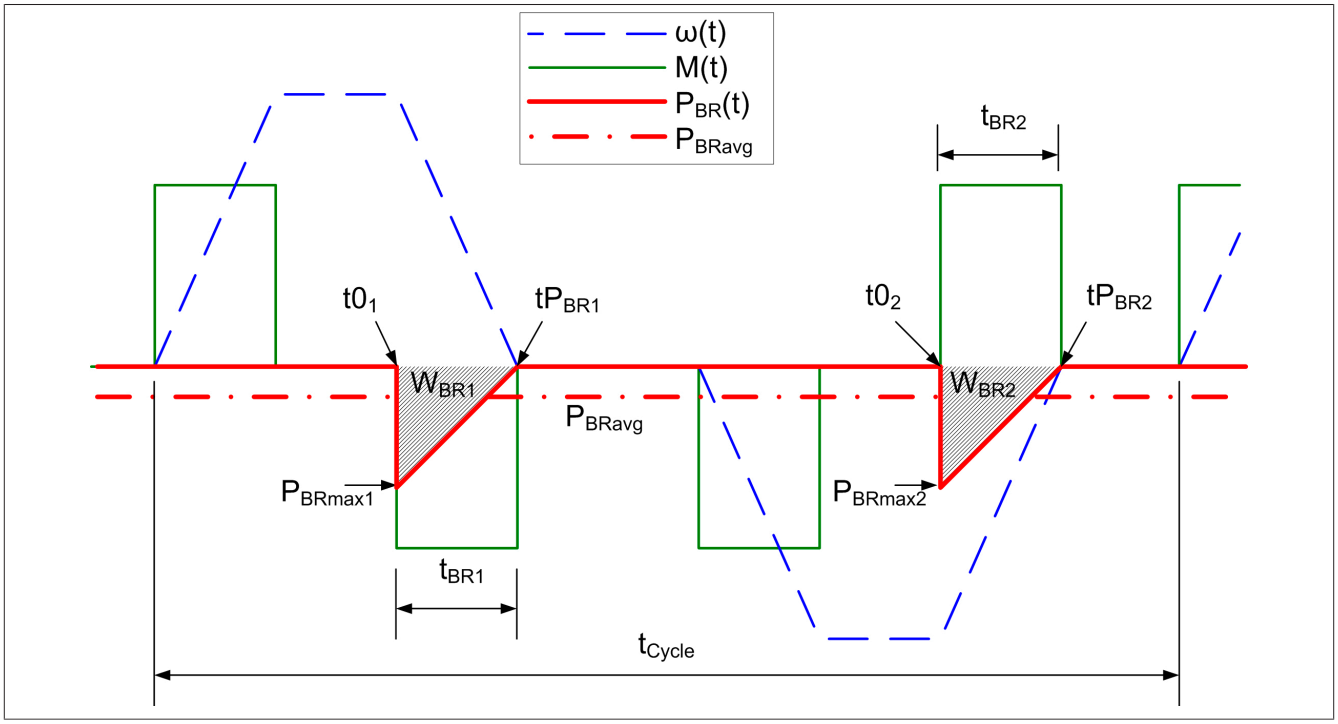


Figure 137: Movement and load profiles - Example

Values
$P_{BRmax1} = P_{BRmax2} = 15$ kW
$t_{BR1} = t_{BR2} = 0.3$ s
$t_{Cycle} = 10$ s

- The ambient temperature is 40°C.
- There are no application-related limitations on the maximum surface temperature of the braking resistor.

Calculation

Step 1: Determine the maximum braking power within the cycle.

$P_{BRmaxAPPL} = P_{BRmax1} = P_{BRmax2} = 15$ kW

Step 2: Determine the average braking power over the cycle.

$$W_{BRTot} = \frac{P_{BRmax1}.t_{BR1}}{2} + \frac{P_{BRmax2}.t_{BR2}}{2} = \frac{15kW.0.3s}{2} + \frac{15kW.0.3s}{2} = 4.5kJ$$

$$P_{BRavgAPPL} = \frac{W_{BRTot}}{t_{Cycle}} = \frac{4.5\ kJ}{10\ s} = 0.45kW = 450W$$

Step 3: Determine the appropriate ACOPOS P3 servo drive.

The following criteria must be met:

$$P_{maxServo} \geq P_{BRmaxAPPL} \Rightarrow P_{maxServo} \geq 15kW$$

$$I_{BRServo} \geq \frac{\sqrt{P_{BRavgAPPL}.P_{BRmaxAPPL}}}{U_{DC}} \Rightarrow I_{BRServo} \geq \frac{\sqrt{450W.15000\ W}}{750\ V} \Rightarrow I_{BRServo} \geq 3.46A$$

ACOPOS P3 8EI024/034/044HWS... servo drives meet these criteria:

- $P_{maxServo} = 45$ kW ≥ 15 kW
- $I_{BRServo} = 15.8$ A ≥ 3.46 A

Can the selected ACOPOS P3 servo drive dissipate the peak power for the required braking time for each individual braking procedure within the cycle?

This can be checked using the following diagram:

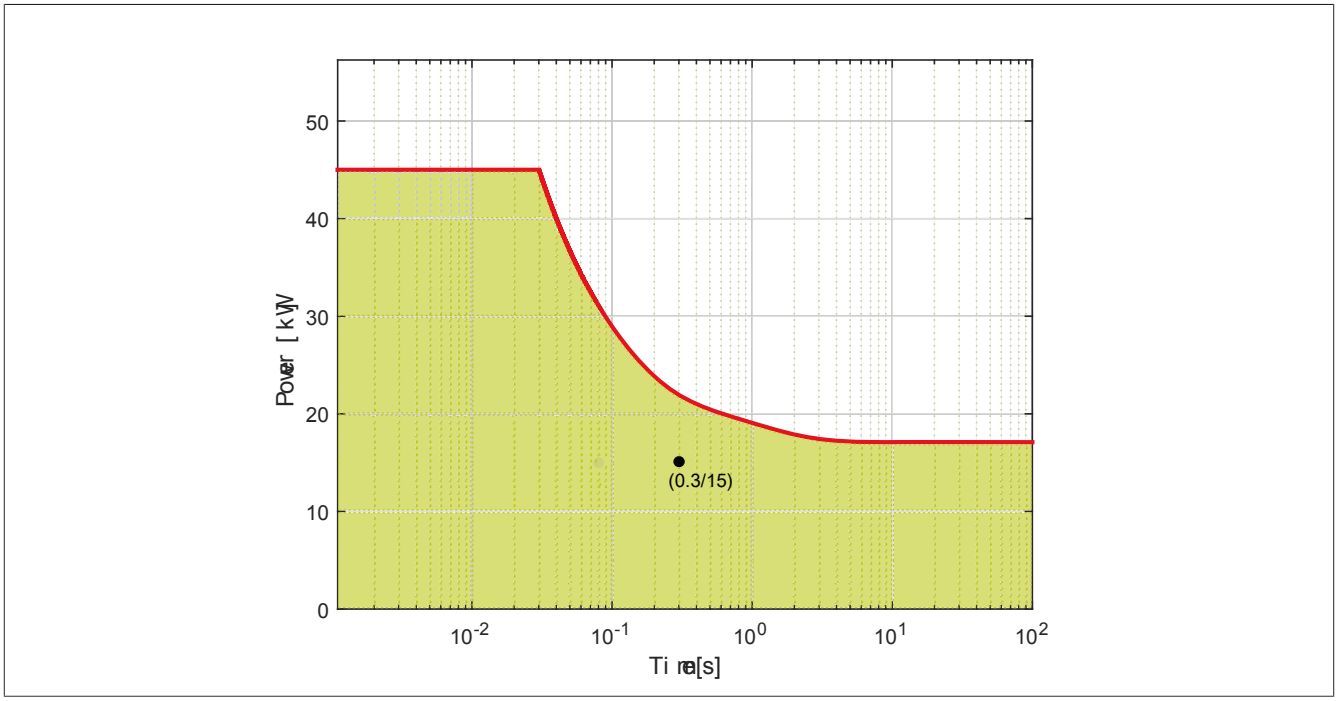


Figure 138: 8EI024/034/044HWS... - Peak load capacity

The individual braking procedures within a cycle are entered in the diagram as points with the coordinates (t_{BR}/P_{BRmax}) and must all be within the permissible range (marked green). If this is not the case, another ACOPOS P3 servo drive must be selected!

The individual braking procedures from the example application are entered in Fig. 138 "8EI024/034/044HWS... - Peak load capacity" (t_{BR} = 0.3 s, P_{BRmax} = 15 kW). These are within the permissible range; the selected ACOPOS P3 servo drive is therefore suitable for the peak power of each individual braking procedure in the application.

Information:

For diagrams concerning other ACOPOS P3 servo drives, see "Peak load capacity when using external braking resistors" on page 475.

Step 4: Determine the value of the required external braking resistor.

Maximum permissible braking resistance for the application:

$$R_{BRmaxAPPL} = \frac{U_{DCmax}^{2}}{P_{BRmaxAPPL}} = \frac{750V^2}{15000W} = 37.5\,\Omega$$

The value of the external braking resistor must meet the following criteria:

- $R_{BR} \geq R_{minServo} \Rightarrow R_{BR} \geq 16\ \Omega$
- $R_{BR} \geq \frac{P_{BRavgAPPL}}{I_{BRServo}^{2}} \Rightarrow R_{BR} \geq \frac{450W}{15.6A^2} \Rightarrow R_{BR} \geq 1.84\,\Omega$
- $R_{BR} \leq R_{BRmaxAPPL} \Rightarrow R_{BR} \leq 37.5\ \Omega$

A braking resistor or combination of braking resistors with a resistance value between 16 Ω and 37.5 Ω must therefore be selected.

Step 5: Select the external braking resistor.

Caution!

If the resistance falls below the minimum permitted value, then the brake chopper in the device could be destroyed!

Danger!

During braking, voltages up to 900 VDC can occur on the external braking resistor. The external braking resistor must be able to handle these voltages.

Information:

It is recommended that the value of the braking resistor be selected such that its resistance value R_{BR} is as close as possible to maximum permissible value RB_{Rmax} for the application in order to keep the current on the braking resistor connection of the ACOPOS P3 servo drive low.

For this purpose, it may be necessary to connect individual braking resistors in parallel or in series. It is important to ensure that the braking power to be dissipated is distributed as evenly as possible over all braking resistors.

To obtain a resistance value suitable for the application, three 8B0W0045H000.001-1 braking resistors (R_{BR} = 50 Ω) are connected in parallel (technical data in 4.5.3.1 "Basis for calculation" on page 412):

- Resistance value:

  $$\frac{1}{R_{BR}} = \sum_{i=1}^{N} \frac{1}{R_{BR_i}} \Rightarrow R_{BR} = 16.67\,\Omega \leq 37.5\,\Omega$$

- Thermal capacity:

  $$c_{th} = \sum_{i=1}^{N} c_{th_i} \Rightarrow c_{th} = 92{,}64\frac{J}{K}$$

Continuous power P_{BRN} and thermal resistance R_{th} of the selected combination of braking resistors depends on the mounting orientation:

- Horizontal mounting orientation:

$$\frac{1}{R_{th}} = \sum_{i=1}^{N} \frac{1}{R_{th_i}} \Rightarrow R_{th} = 0.55 \frac{K}{W}$$

$$P_{BRN} = \sum_{i=1}^{N} P_{BRN_i} \Rightarrow P_{BRN} = 1164 W$$

- Vertical mounting orientation:

$$\frac{1}{R_{th}} = \sum_{i=1}^{N} \frac{1}{R_{th_i}} \Rightarrow R_{th} = 0.51 \frac{K}{W}$$

$$P_{BRN} = \sum_{i=1}^{N} P_{BRN_i} \Rightarrow P_{BRN} = 1272 W$$

Information:

Nominal continuous power P_{BRN} of a braking resistor depends on the ambient temperature as well as on the maximum permissible temperature of the braking resistor.

The braking resistor's nominal power will be decreased if, for application reasons, the ambient temperature is increased and/or the braking resistor's maximum permissible temperature is limited (contact protection, warming of neighboring components, maximum warming of the control cabinet, installation position, etc.)!

Is nominal continuous power P_{BRN} of the selected braking resistor combination sufficient for average braking power of the application $P_{BRavgAPPL}$?

The following condition must be met:

$P_{BRN} \geq P_{BRavgAPPL}$

This condition must be checked for all permissible mounting orientations:

- Horizontal mounting orientation:
  $P_{BRN} \geq P_{BRavgAPPL} \Rightarrow$ 1164 W > 450 W → Nominal continuous power P_{BRN} is sufficient.
- Vertical mounting orientation:
  $P_{BRN} \geq P_{BRavgAPPL} \Rightarrow$ 1272 W > 450 W → Nominal continuous power P_{BRN} is sufficient.

Can the selected braking resistor dissipate the braking energy without exceeding the maximum permissible temperature of the braking resistor for the application?

P_{BRN} >= {{W_{BR_{i}}} over {t_{i}} . k} The following condition must be met for this:

$$P_{BRN} \geq \frac{W_{BR_i}}{t_i} . k$$

Peak load factor k for any braking resistor can be determined graphically with the following diagram:

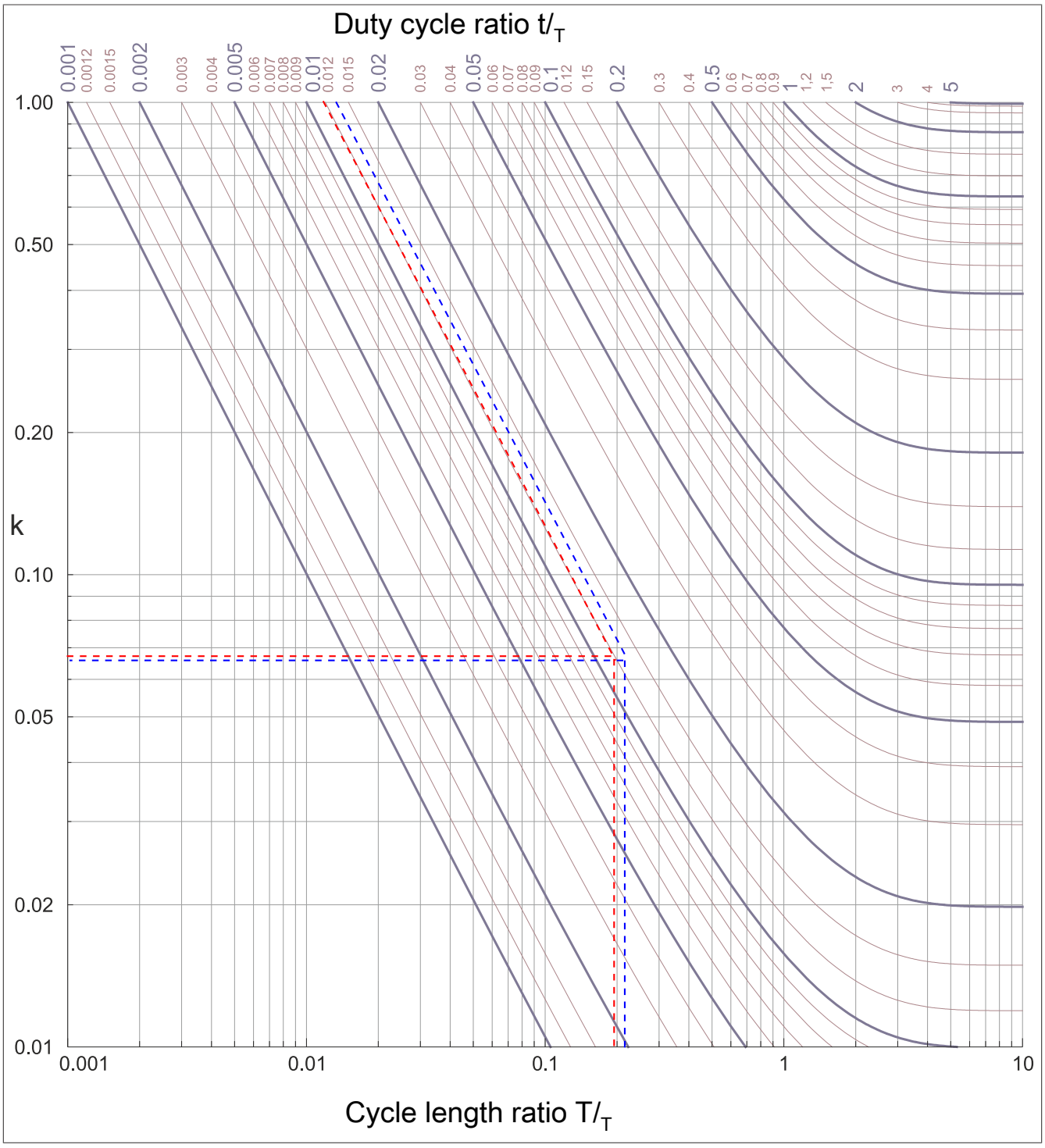


Figure 139: Determining peak load factor k

k ... Peak load factor of the braking resistor
T ... Cycle time of the application (t_{Cycle})
t ... Sum of all braking times (total braking time) within a cycle
τ ... Thermal time constant of the braking resistor ($R_{th} * c_{th}$)

1. Calculating the duty cycle ratio
   - Horizontal mounting orientation:
     $\frac{t}{\tau} = \frac{t_{BR1} + t_{BR2}}{R_{th} * c_{th}} = \frac{0.3 + 0.3}{0.55 * 92.64} = 0.012$
   - Vertical mounting orientation:
     $\frac{t}{\tau} = \frac{t_{BR1} + t_{BR2}}{R_{th} * c_{th}} = \frac{0.3 + 0.3}{0.51 * 92.64} = 0.0127$
2. Calculating the cycle length ratio

- Horizontal mounting orientation:
  $\frac{T}{\tau} = \frac{t_{Cycle}}{R_{th} * c_{th}} = \frac{10}{0.55 * 92.64} = 0.196$
- Vertical mounting orientation:
  $\frac{T}{\tau} = \frac{t_{Cycle}}{R_{th} * c_{th}} = \frac{10}{0.51 * 92.64} = 0.212$

3. Read peak load factor k using the values from 1 and 2 from figure "Determining peak load factor k".
   - Horizontal mounting orientation: k = 0.066
   - Vertical mounting orientation: k = 0.0675

This condition must be checked for all permissible mounting orientations:

- Horizontal mounting orientation:
  $P_{BRN} \geq \frac{W_{BR_i}}{t_i}.k \Rightarrow 1272W \geq \frac{4500J}{0.3s}.0.0675 \Rightarrow 1272W \geq 1013W$
  → Nominal power P_{BRN} of the braking resistor is sufficient for the application.
- Vertical mounting orientation:
  $P_{BRN} \geq \frac{W_{BR_i}}{t_i}.k \Rightarrow 1402W \geq \frac{4500J}{0.3s}.0.075 \Rightarrow 1402W \geq 1125W$
  → Nominal power P_{BRN} of the braking resistor is sufficient for the application.

Results

The mounting orientation of three B&R 8B0W0045H000.001-1 braking resistors connected in parallel on an ACOPOS P3 8EI024/034/044HWS... servo drive meet the requirements of the application.

4.5.4 Configuring brake resistors

4.5.4.1 Using the integrated braking resistors

The user does not need to make any settings or configurations.

4.5.4.2 Using external braking resistors

When using external braking resistors, the following parameters must be set on the drive system using B&R Automation Studio:

ParID	Constant name	Name	Formula symbols	Unit
10	R_BLEEDER_EXT	Ohmic resistance	R_{BR}	[Ω]
11	TEMP_MAX_BLEEDER_EXT	Maximum permissible temperature of the external braking resistor	T_{BRmax}	[°C]
12	RTH_BLEEDER_AMB_EXT	Thermal resistance between braking resistor and environment	R_{th}	[K/W]
13	CTH_BLEEDER_EXT	Heat capacitance of the filament	C_{th}	[Ws/°C]
398	BLEEDER_SELECTOR_EXT	Switching between an internal/external braking resistor 0 ... Internal (default) 1 ... External **Information:** **The switchover is always valid for all axes and only possible when the controllers of the ACOPOS P3 servo drive are switched off.**	---	---

Table 333: ParIDs for configuring external braking resistors

These parameters are usually listed in the data sheet from the respective manufacturer.[32)]

The parameters are based on the following thermal equivalent circuit diagram of the external braking resistor:

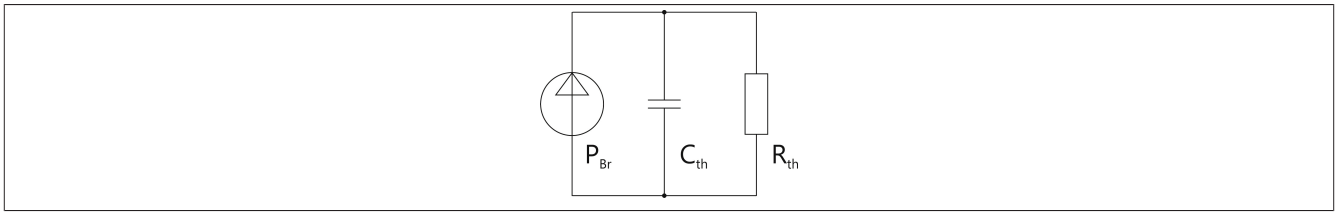


Figure 140: Thermal equivalent circuit diagram of the external braking resistor

If a value for maximum permissible temperature T_{BRmax} of the external braking resistor is not specified, it can be calculated using the following formula:

$$T_{BRmax} = P_{BRN}.R_{th}$$

[32)] Σ SIGMA braking resistors from Danotherm (www.danotherm.com) are an example of reliable braking resistors.

4.6 Formula symbols used

Symbol	Unit	Name
A	mm²	Cross section of the power supply wires
A_{eff}	A	Continuous current
A_{PE}	mm²	Minimum wire cross section of the protective ground connection
C_{th}	Ws/°C	Heat capacitance of the filament
f	---	(Output voltage of encoder interface [V] - Min. permissible supply voltage of connected encoder [V]) * 1.1
I_{AX}	A	RMS value of the current on axis x
I_{BR}	A	Nominal current of the motor holding brake for axis x
I_G	A	Maximum current consumption of the connected encoder
$I_{ENCODER}$	W	Current consumption of the encoder
I_L	A	Current of the motor overload protection
I_{max}	m	Maximum encoder cable length
I_N	A	Nominal current of the motor
I_q	A	Thermal equivalent RMS value of the current
I_Z	A	Permitted current-carrying capacity of a cable
I_0	A	Stall current of the motor
k	VA/W	Constant for calculating the apparent power of a drive from the active power
k_{Temp}	---	Temperature-dependent correction factor for current-carrying capacity
kW	W	Continuous power
n_{avg}	rpm	Average motor speed
n_N	rpm	Nominal speed of the motor
p	Ω mm²/m	Specific resistance
P_{AVG}	kW	Average continuous power of the module
P_{BRmax}	W	Maximum brake power
$P_{ENCODER}$	W	Maximum power consumption per encoder interface
P_{VSLOT}	W	Power dissipation of the 8EAC plug-in module
R_{BR}	Ω	Braking resistance
$R_{minServo}$	Ω	Minimum permissible braking resistance of the servo drive
R_{th}	K/W	Thermal resistance between braking resistor and environment
T_{BRmax}	°C	Maximum permissible overtemperature of the resistor
T_{M_AMB}	°C	Current ambient temperature of the motor
$T_{M\_AMB\_N}$	°C	Nominal ambient temperature of the motor
T_{M_LIM}	°C	Maximum permissible motor temperature
T_{Cycle}	s	Cycle time
U_{24V}	V	Input voltage on +24 VDC input of the module
VAC	V	Nominal voltage

Table 334: Formula symbols used

5 Wiring

5.1 General information

5.1.1 EMC-compatible installation

5.1.1.1 Installation guidelines

1. The control cabinet or system must be constructed properly.
2. To prevent the effects of disturbances, the following lines must be properly shielded:
   - Motor cables
   - Encoder cables
   - Control cables
   - Data cables
3. Inductive switching elements such as contactors or relays must be equipped with corresponding suppressor elements such as varistors, RC elements or damping diodes.
4. All electrical connections must be kept as short as possible.
5. Cable shields must always be attached to designated shield terminals and the connector housing. Twisting the braided shield or extending it with single conductors (pigtail) is not permitted!
6. Shielded cables with copper or tinned copper braiding must be used.
7. Unused cable conductors must be grounded on both sides whenever possible.
8. Do not connect cable conductors to the servo side only! This can lead to EMC problems.

Information:

To satisfy UL/CSA requirements, components of B&R drive systems are only permitted to be wired with copper wires with a permitted wire temperature of at least 75°C.

Ground connections and shield connections must be made as illustrated in the following diagram:

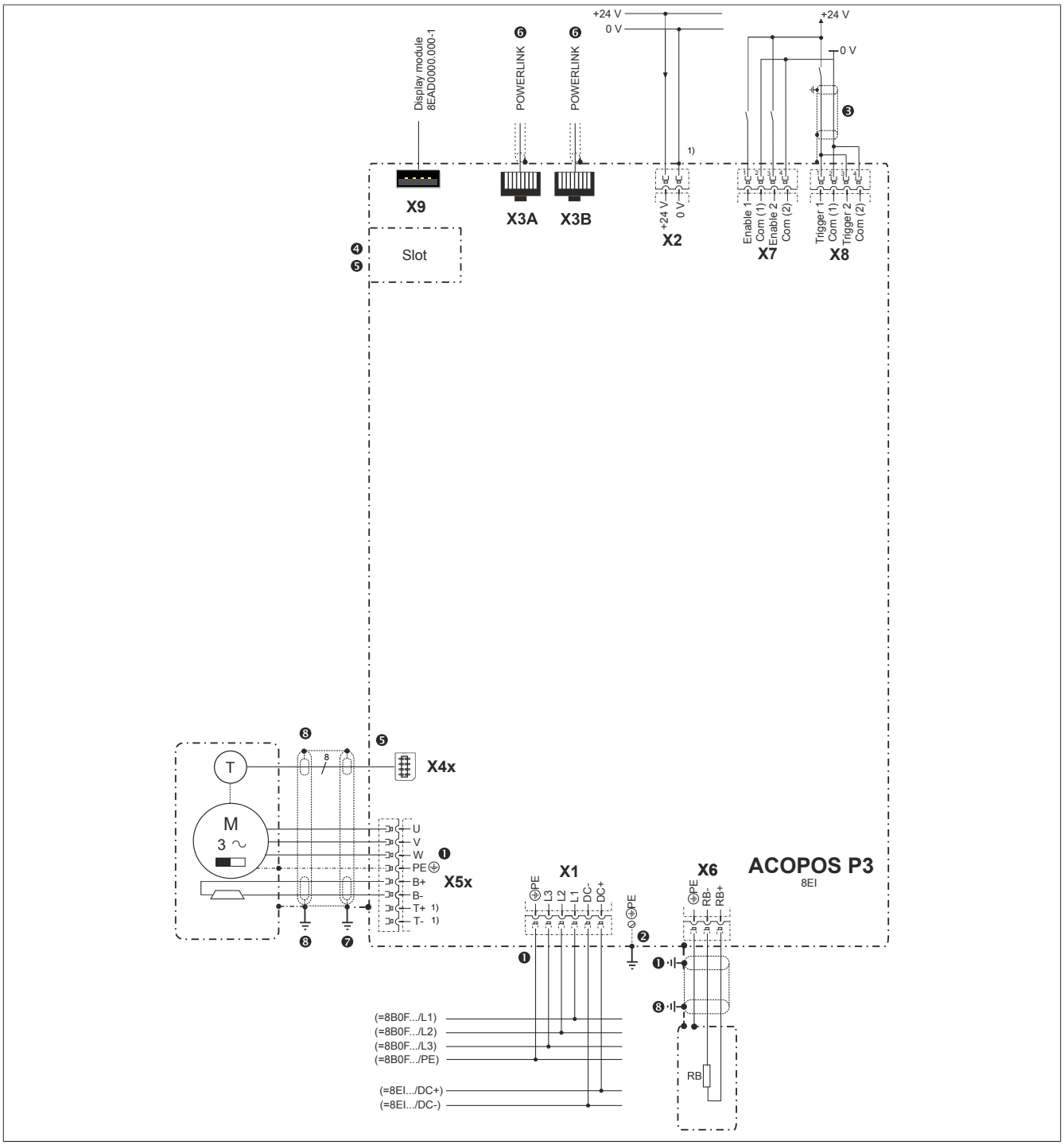


Figure 141: Ground and shield connections - Connection diagram

1) The COM connection on connector X2 must be grounded to achieve a defined relationship between the signal ground and ground potential!

1. The protective ground conductor (PE) for the mains power input, the motor lines and external braking resistor connection is internally connected to the housing of the ACOPOS P3 8EI servo drive. Shielding takes place using an optional shield plate (shield set 8SCSE01.0100-00) as well as – depending on the cable cross section – shield sets 8SCSE02.0100-00 / 8SCSE02.0200-00:

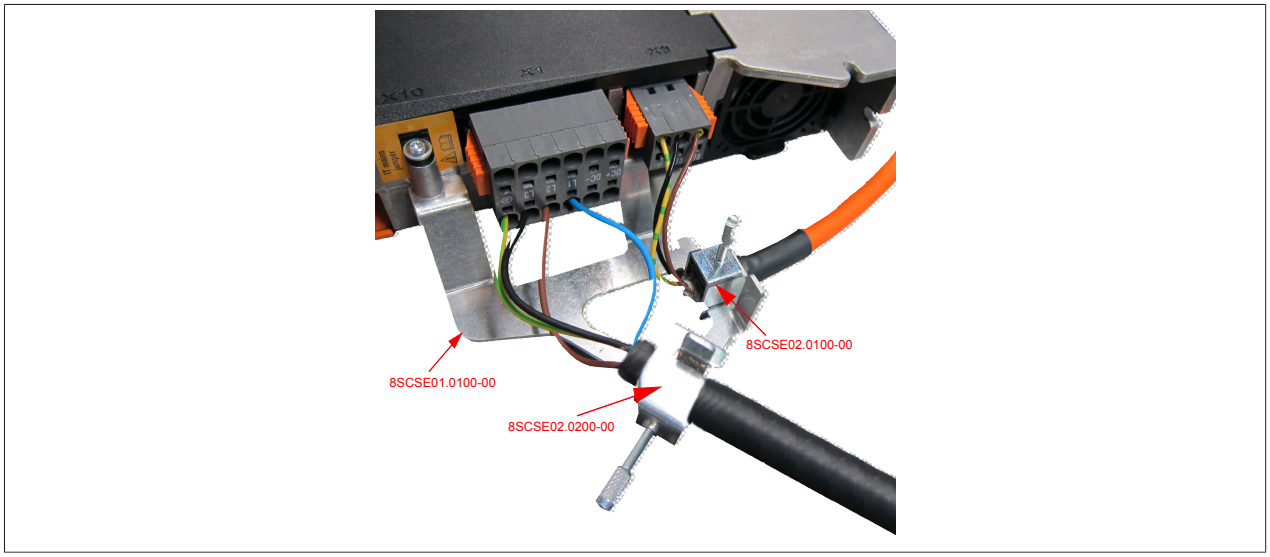


Figure 142: Shielding for power cable / braking resistor connection wiring on the ACOPOS P3 8EI servo drive

2. The second protective ground connection is necessary because of the increased discharge current (>3.5 mA) on ACOPOS P3 8EI servo drives. The same cross section as the protective ground conductor for the mains power input must be used.
3. Both trigger inputs are only filtered internally with approx. 50 µs. Make sure cable shields are grounded properly.
   The 8SCS002.0000-00 shield set can be used to shield I/O cables.
4. The fastening screw on the plug-in module must be tightened so that the front plate of the plug-in module makes contact with the ground potential.
5. Mini I/O connector cable connection:
   The cable shield must be fastened to the respective location on the mini I/O connector over a wide area.

Information:

When cabling mini I/O encoder connections using 8ECH hybrid motor cables or 8ECF EnDat 2.2 cables from B&R, no additional grounding of the cable shield is required to ensure resistance to disturbances per EN 61800-3!

6. Cable connection via RJ45 connector:
   Additional grounding of the cable shield provides improved EMC characteristics. Grounding should take place on both sides, over a wide area and near the connector.

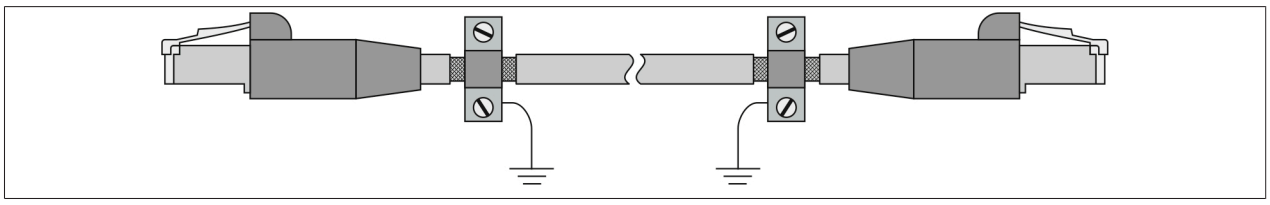
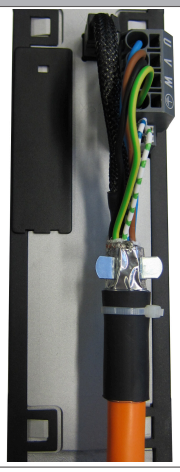


Figure 143: Male RJ45 connector - Grounding the cable shield

Information:

When cabling POWERLINK networks with POWERLINK cables from B&R, no additional grounding of the cable shield is required to ensure resistance to disturbances per EN 61800-3!

7. The cable shield for the motor line is connected to the housing of the ACOPOS P3 8EI servo drive using the designated grounding clamp. The required strain relief is provided by a cable tie attached either to the grounding clamp itself or alternatively to the holding bracket on the bottom front of the module:

Shielding and strain relief on the grounding clamp of the ACOPOS P3 8EI servo drive	Strain relief on the holding bracket of the ACOPOS P3 8EI servo drive
	

8. On the motor side, the cable shield of the motor line is connected to the motor housing via the motor connector and connected to ground via the machine. The cable shield of the attachment cable for the external braking resistor must be connected to the housing of the braking resistor.

   The cable shield of the encoder cable must be connected on motor side to the motor housing via the encoder connector and subsequently connected to ground potential via the machine.

   For external encoders, the cable shield of the encoder cable must be connected on the encoder side to the machine via the encoder connector and subsequently connected to ground potential.

   For ACOPOS P3 8ECH hybrid motor cables, the encoder cable is connected to the motor housing via the hybrid motor connector and subsequently to ground potential via the machine.

5.1.2 Insulation voltage and high-voltage testing

5.1.2.1 Insulation resistance testing per EN 60204

Per EN 60204, the insulation resistance of electrical equipment is measured with 500 VDC between the main circuit conductors and the protective ground conductor system and is not permitted to fall below the value 1 MΩ. Testing individual sections of the system is permitted.

Mains connection of the ACOPOS P3 X1 servo drive (X1)

Insulation resistance testing can be performed on the mains connection (X1) of the ACOPOS P3 servo drive as described above.

Motor connection of the ACOPOS P3 servo drive (X5x)

Warning!

Under no circumstances is insulation resistance testing permitted to be performed on the motor connection (X5x) of the ACOPOS P3 servo drive. This will cause irreparable damage to the ACOPOS P3 servo drive!

B&R motors and B&R motor cables

In principle, insulation resistance measurement can be carried out on B&R motor cables and B&R motors. The insulation resistance can be less than 1 MΩ, however, depending on the motor that is connected.

Warning!

Under no circumstances is insulation resistance testing permitted to be performed on the motor connection (X5x) of the ACOPOS P3 servo drive. This will cause irreparable damage to the ACOPOS P3 servo drive!

The motor cable must be disconnected from the motor connection (X5x) of the ACOPOS P3 servo drive before measuring the insulation resistance!

5.1.2.2 High-voltage testing

Per EN 60204, the electrical equipment must be able to withstand a test voltage connected between the conductors of all circuits and the protective ground conductor system for at least 1 s (exception: all circuits with a voltage < PELV voltage). The test voltage must be 2 times the rated voltage of the equipment, but at least 1000 VAC (50 / 60 Hz). Components that cannot handle this test voltage must be disconnected before carrying out the high voltage test.

Mains connection of the ACOPOS P3 X1 servo drive (X1)

Warning!

It is not possible to perform high-voltage testing on the mains connection (X1) of the ACOPOS P3 servo drive since the internal circuitry can cause flashovers.

Motor connection of the ACOPOS P3 servo drive (X5x)

Warning!

Under no circumstances is high-voltage testing permitted to be performed on the motor connection (X5x) of the ACOPOS P3 servo drive. This will cause irreparable damage to the ACOPOS P3 servo drive!

B&R motors and B&R motor cables

In principle, high-voltage testing can be carried out on B&R motor cables and B&R motors. Depending on the size of the motor and length of the motor cable, increased measurement currents can occur because of capacitive coupling.

Warning!

Under no circumstances is high-voltage testing permitted to be performed on the motor connection (X5x) of the ACOPOS P3 servo drive. This will cause irreparable damage to the ACOPOS P3 servo drive!

The motor cable must be disconnected from the motor connection (X5x) of the ACOPOS P3 servo drive before measuring the high voltage!

5.1.3 Using 8TB push-in terminal blocks

8TB push-in terminal blocks for connectors X1, X2 and X6 on ACOPOS P3 8EI servo drives have a click-and-lock mechanism that provides reliable protection against unintentional disconnection. This is achieved by a locking element on each side of the 8TB push-in terminal block housing.

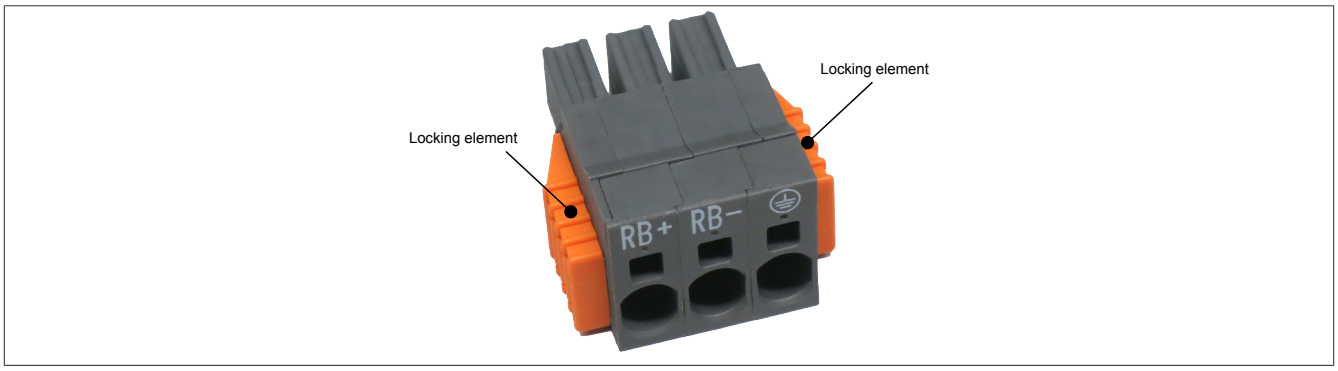


Figure 144: 8TB locking elements (example)

Locking

Insert the 8TB push-in terminal blocks into the respective connector on the ACOPOS P3 8EI servo drive until you hear an audible "click". The 8TB push-in terminal block is now locked in place.

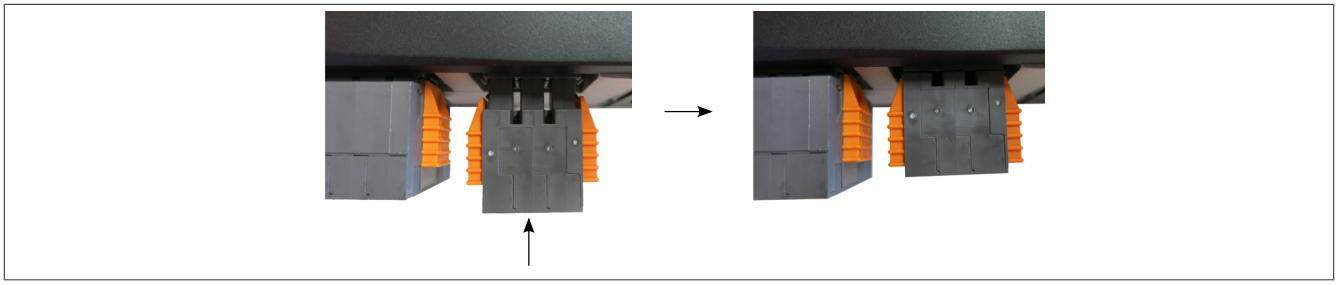


Figure 145: Inserting 8TB push-in terminal blocks

Unlocking

Slide both of the locking elements on the 8TB push-in terminal block parallel to the direction of insertion as far as possible. Pull out the 8TB push-in terminal block.

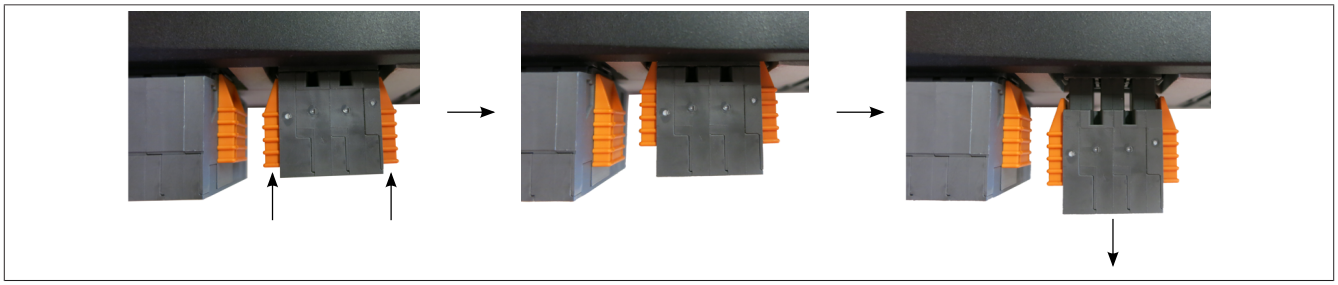


Figure 146: Unlocking and removing 8TB push-in terminal blocks

5.1.4 Using the mini I/O connector

Mini I/O connectors for connectors X41, X42 and X43 on ACOPOS P3 8EI servo drives have a locking mechanism that provides reliable protection against unintentional disconnection. This is achieved by a locking element on the front of the mini I/O connector housing.

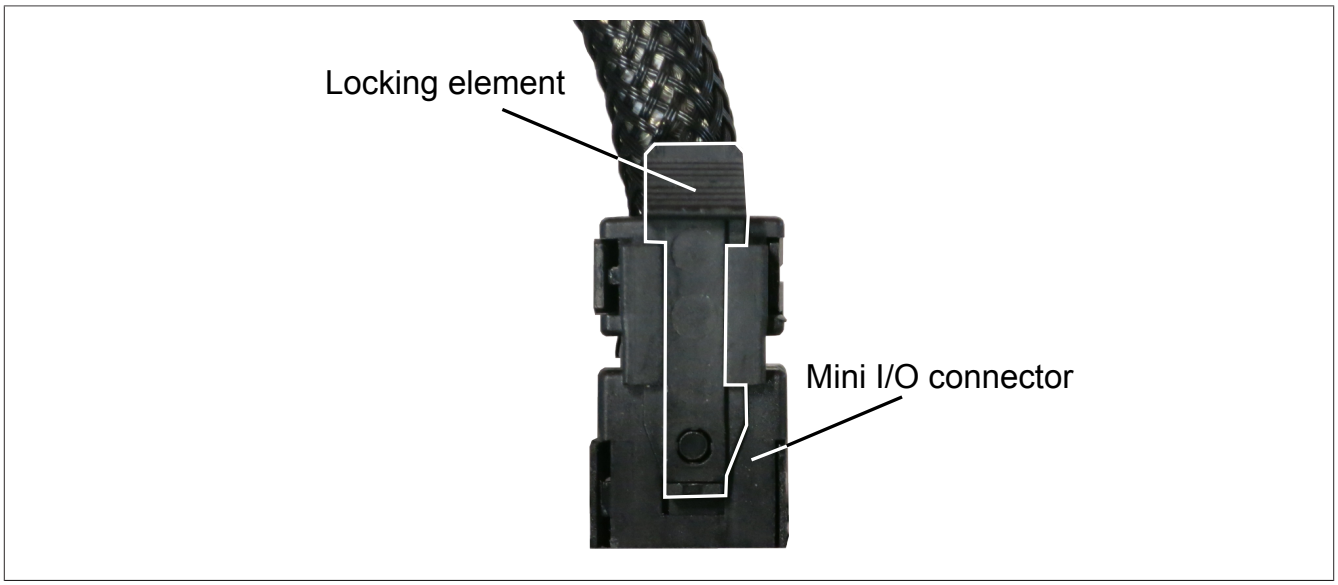


Figure 147: Mini I/O connector

Locking

Mini I/O connectors automatically lock in place when inserted.

Unlocking

Slide the locking element in the direction of insertion as you pull out the mini I/O connector.

Figure 148: Unlocking the mini I/O connector

6 Safety technology

6.1 Standard safety technology ("hardwired safety technology")

B&R ACOPOS P3 servo drives with standard safety technology implement safety function Safe Torque Off (STO) per EN 61800-5-2. The cutoff corresponds to stop category 0 per EN 60204-1.

Safety functions SS1, SS2, SLS, SOS (EN 61800-5-2) and stop categories 1 and 2 (EN 60204-1) can also be implemented through the use of additional components (time relays, speed monitors, etc.). Unexpected restarts (EN 1037) can also be prevented in the same way (see "Wiring the enable inputs according to functionality (STO, SS1, SS2, SLS, SOS)" on page 439).

Caution!

Safety function STO does not protect against faults that occur in non safety-related functions of B&R ACOPOS P3 servo drives with standard safety technology!

Danger!

Especially in the area of safety technology, always consult the most current version of this document on the B&R website for valid specifications (www.br-automation.com)! The specifications in this version of the document are not necessarily current. The user must verify the correctness of specifications before implementing safety functions!

6.1.1 General information

ACOPOS P3 8EI servo drives are equipped with integrated safe pulse disabling for safe stopping and to prevent unexpected startup. This is designed to satisfy the following safety classifications depending on the external circuit: [33)]

Criteria	Characteristic value	
	Single-channel circuit	Dual-channel circuit
Maximum safety category per EN ISO 13849	Cat. 3	Cat. 4
Maximum performance level per EN ISO 13849	PL d	PL e
Maximum safety integrity level per IEC 61800-5-2	SIL 2	SIL 3
Maximum safety integrity level per IEC 62061	SIL 2	SIL 3
Maximum safety integrity level per IEC 61508	SIL 2	SIL 3
PFH (probability of dangerous failure per hour)	$<8 * 10^{-10}$	$<4 * 10^{-10}$
PFD (probability of dangerous failure on demand) depending on the proof test interval (PTI) For a PTI of 20 years	$<1 * 10^{-5}$	$<5 * 10^{-6}$
PTI (proof test interval) [1)]	Max. 20 years	Max. 20 years
SFF (safe failure fraction)	99.9%	99.9%
DC (diagnostic coverage)	99%	99%
MTTFd (mean time to dangerous failure)	10,000 years	10,000 years
Maximum switching delay	See technical data for the ACOPOS P3 8EI servo drive.	See technical data for the ACOPOS P3 8EI servo drive.

Table 335: Safety classifications, criteria and characteristics for safe pulse disabling

1) Corresponds to the mission time of the module.

The following table provides an overview of the individual safety functions that can be implemented:

33) For detailed information about the listed standards and safety functions, see chapter "Standards and certifications".

Name according to standard		Circuit	Short description
EN 61800-5-2	EN 60204-1		
STO (Safe Torque Off)	Stop category 0	Single-channel[1)] Dual-channel	Cuts off the power supply
SS1 (Safe Stop 1)	Stop category 1	Dual-channel	Initiates active braking and activates function STO after a defined amount of time has passed
SS2 (Safe Stop 2)	Stop category 2	Dual-channel	Initiates active braking and activates function SOS after a defined amount of time has passed
SLS (Safely Limited Speed)	---	Dual-channel	Protection against exceeding a defined speed limit
SOS (Safe Operating Stop)	---	Dual-channel	Protection against impermissible position deviation

Table 336: Overview of safety functions per standard

1) This is subsequently referred to as STO1.

Safe pulse disabling interrupts the power supply to the motor by preventing the pulses to the IGBTs. This way, no rotating field and thus no electrical torque can be built up in the synchronous or induction motors controlled with ACOPOS P3 8EI servo drives.

Integrated safe pulse disabling therefore meets the requirements for preventing unexpected startup in accordance with EN 1037 as well as the requirements concerning Category 0 and 1 stop functions in accordance with EN 60204-1. Both stop functions require the power supply to the machine actuators to be switched off (immediately for Category 0 and after reaching standstill for Category 1). The requirements concerning the STO, SS1, SS2, SLS and SOS safety functions are also met in accordance with EN 61800-5-2.

The terminology of EN 61800-5-2 (STO, SS1, SS2, SLS, SOS) will be used in the following.

Danger!

If the safety functions integrated in the drive system are used in an application, the safety functions must be fully validated before switching on for the first time. This could result in death, severe injury or damage to property.

Information:

If module-internal hardware errors occur, safety function STO switches to the safe state and interrupts the supply of power to the drive (failsafe principle). If a hardware defect occurs, then the entire module must be replaced.

6.1.2 Principle - Implementing the safety function

Safe pulse disabling is achieved by interrupting the pulse pattern to the IGBT drivers in the ACOPOS P3 8EI servo drives. Terminals X7 / Enable1 and X7 / COM (1) as well as X7 / Enable2 and X7 / COM (2) are used to control 2 internal DC-to-DC converters. The two DC-to-DC converters generate a supply voltage for an additional driver stage so that the pulse pattern can be transferred to the IGBT drivers.

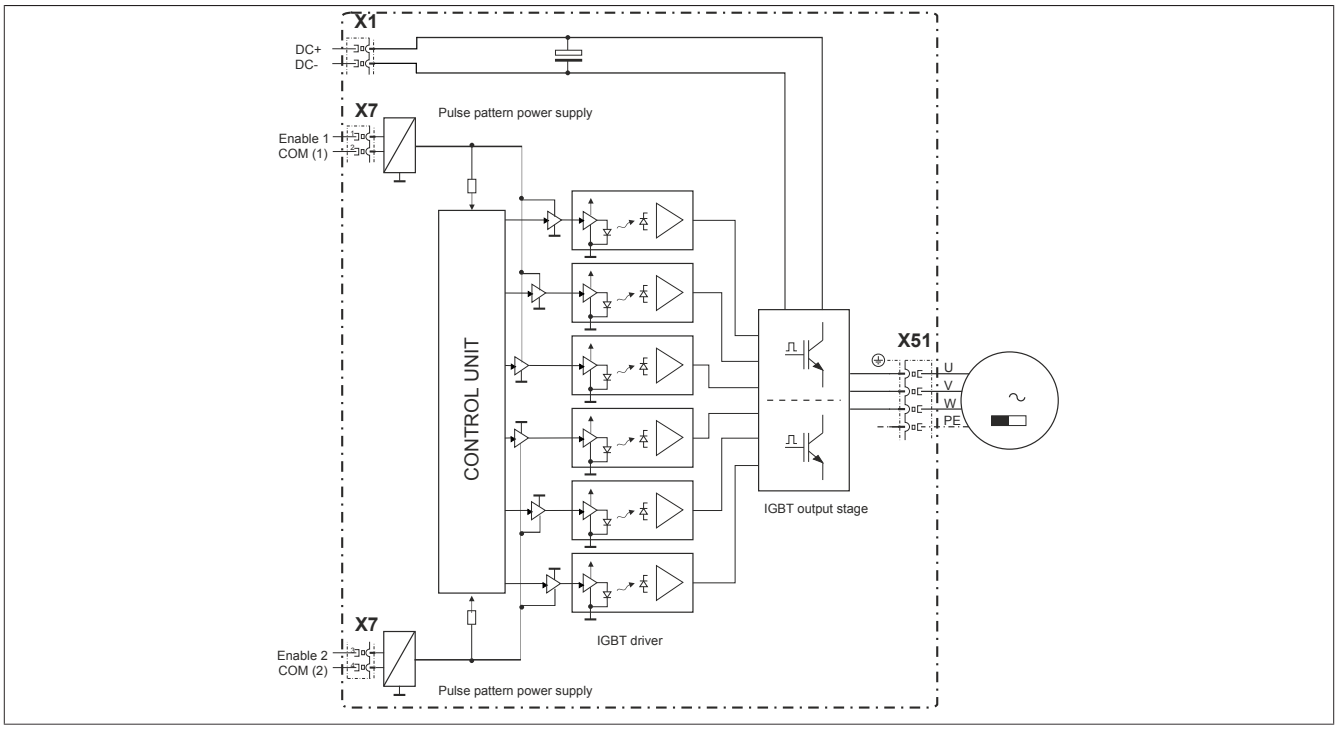


Figure 149: Block diagram for safe pulse disabling

If control for 1 of the 2 DC-to-DC converters is interrupted, then the corresponding pulse patterns are also no longer transferred to the IGBT drivers. It is then no longer possible to transfer the pulse pattern needed to generate the rotating field to the IGBT output stage. This cuts off the supply of power to the motor.

6.1.2.1 Additional function

The control unit checks whether the output voltage of the 2 DC-to-DC converters exists. If no voltage is present on the output of 1 of the 2 DC-to-DC converters, then the control unit additionally prevents the generation of the pulse pattern.

Danger!

After activating safe pulse disabling via terminals X7 / Enable 1 and X7 / COM (1) or X7 / Enable 2 and X7 / COM (2), the motor is de-energized and therefore not generating torque. If the motor was moving before safe pulse disabling is activated, it is only stopped by a safe operational brake (if available) or by the friction of the complete system. The motor is therefore not able to hold hanging loads. Safe holding brakes must be used for this purpose.

Danger!

The switch-off time of the enable inputs must be taken into account since it has a substantial effect on the response time of the safety functions and therefore the remaining distances and times to be considered! In order to calculate the total safety response time, the user must validate the rundown time of the complete system!

The switch-off time for the enable inputs is listed in the technical data for the respective ACOPOS P3 8EI servo drive.

Danger!

Activating safe pulse disabling via terminals X7 / Enable 1 and X7 / COM (1) or X7 / Enable 2 and X7 / COM (3) does not disconnect the drive from the power system and therefore does not provide sufficient protection against electrical shock!

Danger!

Depending on the application, it is possible for the drive to restart after safe pulse disabling is deactivated.

Danger!

The C standards relevant to applications must be observed!

Information:

It is important to note that multiple errors in the IGBT bridge can cause a brief forward movement. Maximum angle of rotation φ of the motor shaft during this forward movement depends on the motor used. The following applies for permanent magnet synchronous motors: φ = 360°/2p (p ... Number of pole pairs). For three-phase induction motors, there is a relatively small angle of rotation between 5° and 15°. [34)]

This short forward movement can be excluded as a fault per EN ISO 13849-1, among other things due to the improbability that this would occur and due to general technical experience.

[34)] The specifications for maximum angle of rotation φ are only valid for a dual-channel circuit (STO). With a single-channel circuit (STO1), maximum angle of rotation φ can be twice as high.

6.1.3 Wiring the enable inputs to the required safety category / SIL / PL

This section uses the example of safety function STO to illustrate the different circuit variations of the enable inputs on ACOPOS P3 8EI servo drives to achieve the required safety category / SIL / PL.

Danger!

All faults (e.g. cross faults) that are not detected can result in the loss of the safety function.

Appropriate measures must be taken to justify the exclusion of errors. For instance, faults caused by a short circuit between any two wires can be excluded per EN ISO 13849-2, appendix D.5, if one of the following conditions is met:

- **The wires are permanently installed and protected against external damage (e.g. using a cable duct or armored conduit).**
- **The wires are installed in different plastic-sheathed cables or within an area for electrical equipment[35)].**
- **The wires are each individually protected by a ground connection.**

For more fault exclusions, see EN ISO 13849-2, appendix D.5.

Danger!

In order to achieve safety category 4 / SIL 3 / PL d, it must be ensured that an accumulation of faults does not result in loss of the safety function.

To achieve safety category 3 / SIL 2 / PL d, it must be ensured that a single fault does not lead to the loss of safety functionality.

6.1.3.1 STO, category 4 / SIL 3 / PL e (variant A)

An enable input on the ACOPOS P3 8EI servo drive is supplied with +24 V via a switching contact of a safe emergency stop switching device. The COM of the second enable input on the ACOPOS P3 8EI servo drive is supplied with 0 V via an additional switching contact of a safe emergency stop switching device. Activating emergency stop switch S1 opens both switching contacts on the emergency stop switching device, cutting off the enable input as well as the COM of the second enable input.

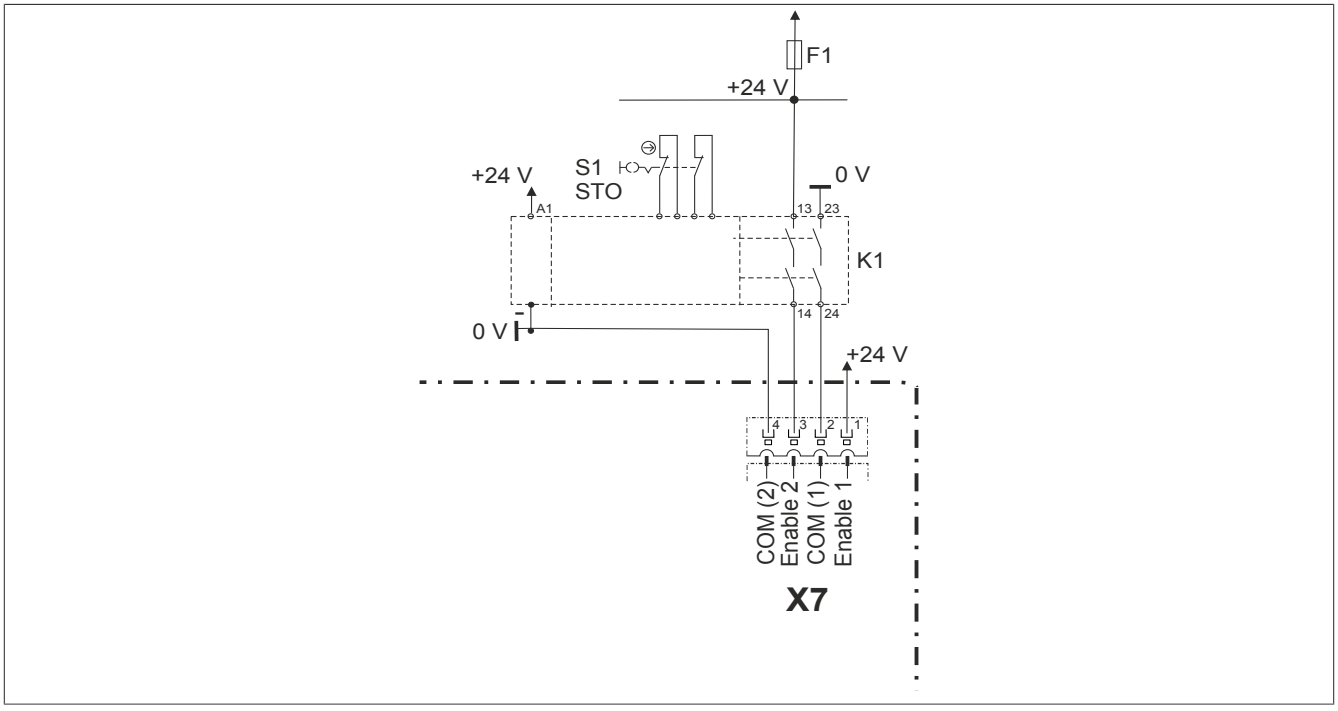


Figure 150: STO, category 4 / SIL 3 / PL e (variant A)

This circuit covers a majority of the wiring and insulation faults for the supply lines to the emergency stop switching device and to the enable inputs.

35) Prerequisite: Both the lines and the area for electrical equipment must meet the respective requirements (see IEC 60204-1).

The following fault events can occur in the external wiring:[36)]

Fault event	Error description	Effects	Safety functionality maintained per category 4 / SIL 3 / PL e?
1	Interruption of the supply line to connection 13	Power cut off to motor	Yes
2	Interruption of the supply line to connection 23	Power cut off to motor	Yes
3	Short circuit between connection 13 and 23	F1 fuse triggered immediately	Yes
4	Short circuit between connection 13 and 0 V	F1 fuse triggered immediately	Yes
5	Short circuit between connection 23 and +24 V	F1 fuse triggered immediately	Yes
6	Short circuit between connection 13 and 24	F1 fuse triggered when safety function requested	Yes
7	Short circuit between connection 23 and 14	F1 fuse triggered when safety function requested	Yes
8	**Short circuit between connection 13 and 14**	**Error not detected**	**No, safety function falls back to category 3 / SIL 2 / PL d**
9	**Short circuit between connection 23 and 24**	**Error not detected**	**No, safety function falls back to category 3 / SIL 2 / PL d**
10	Interruption of the supply line to connection 14	Power cut off to motor	Yes
11	Interruption of the supply line to connection 24	Power cut off to motor	Yes
12	Short circuit between connection 14 and 0 V	F1 fuse triggered when safety function requested	Yes
13	Short circuit between connection 24 and +24 V	F1 fuse triggered when safety function requested	Yes
14	**Short circuit between connection 14 and +24 V**	**Error not detected**	**No, safety function falls back to category 3 / SIL 2 / PL d**
15	**Short circuit between connection 24 and +0 V**	**Error not detected**	**No, safety function falls back to category 3 / SIL 2 / PL d**
16	Short circuit between connection 14 and 24	F1 fuse triggered when safety function requested	Yes

Table 337: List of possible fault events

Danger!

A 2-pole category 4 / SIL 3 / PL e switching device with a positively driven normally closed contact must be used for the shown S1 switch per EN 60947-5-1. A 2-pole category 4 / SIL 3 / PL e switching device must be used for the shown K1 relay.

The information in the user documentation for the switching devices must be observed!

It must be possible to exclude the following fault events according to "List of possible fault events" on page 436 by taking sufficient wiring measures (short circuit protected wiring):

- **Fault event 8**
- **Fault event 9**
- **Fault event 14**
- **Fault event 15**

[36)] The numbers for the connections refer to "STO, category 4 / SIL 3 / PL e (variant A)" on page 435.

6.1.3.2 STO, category 4 / SIL 3 / PL e (variant B)

The 2 enable inputs on the ACOPOS P3 8EI servo drive are supplied via a safe digital output (Out1+, Out1-). If the safety function is requested, then the safe digital output cuts off the 2 enable inputs.

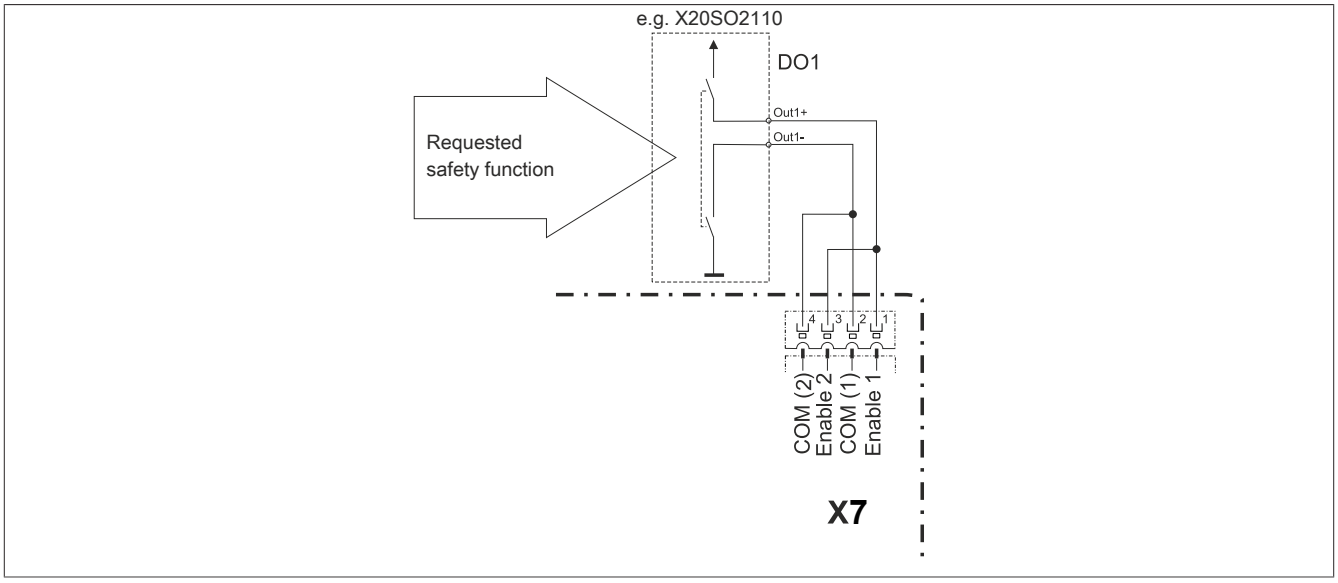


Figure 151: STO, category 4 / SIL 3 / PL e (variant B)

The consideration of fault events in the external wiring for fault exclusion purposes is not necessary since faults are detected by the safe digital output.

Danger!

A safe category 4 / SIL 3 / PL e digital output module must be used for the shown DO1 safe digital output.

The information in the user documentation for the safe digital output module must be observed!

6.1.3.3 STO1, category 3 / SIL 2 / PL d

Actuating an emergency switching-off device disconnects one of the two enable inputs on the ACOPOS P3 8EI servo drive from the +24 V power supply via a switch, thereby cutting off the supply of power to the motor.

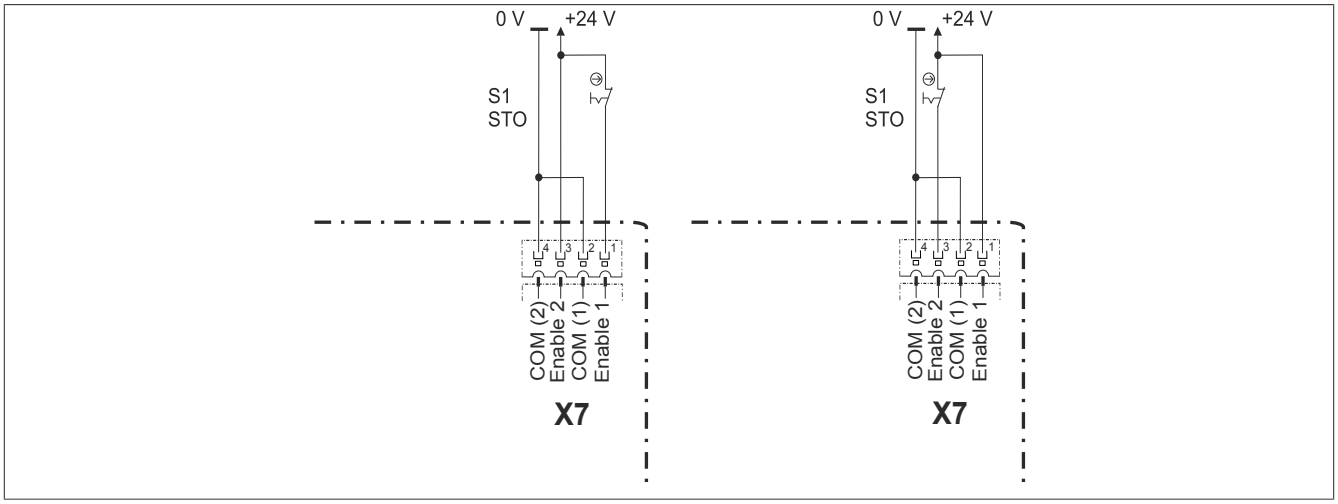


Figure 152: STO1, category 3 / SIL 2 / PL d

With this single-channel cutoff of the enable inputs, the motor can still be decelerated by means of the short-circuit braking integrated in the ACOPOS P3 servo drive.

Danger!

The short-circuit braking integrated in the ACOPOS P3 servo drive cannot be used for safety purposes and can therefore only be used for machine protection. If the disconnection of energy to the motor can result in dangerous situations (e.g. with suspended loads), mechanical protective equipment must additionally be provided.

Danger!

If only 1 of the 2 enable inputs is cut off from the +24 V supply via a switch, it must be possible to exclude a short circuit between the X7 / Enable1 and X7 / Enable2 connections by taking sufficient wiring measures in order to guarantee compliance with the safety category!

Danger!

A 1-pole category 3 / SIL 2 / PL d switching device with a positively driven normally closed contact must be used for the shown S1 switch per EN 60947-5-1.

The information in the user documentation for the switching device must be observed!

Danger!

It is important to note that an error in the IGBT bridge can result in a forward movement. Maximum angle of rotation φ during this forward movement depends on the motor used. The following applies for permanent magnet synchronous motors: φ = 360°/2p (p ... Number of pole pairs).

With a single-channel cutoff of the enable inputs, this movement can be up to 2φ. Within this angle, the drive can accelerate as much as possible before an error occurs and it coasts to a stop. The dangerous movement must be assessed in a risk analysis!

6.1.4 Wiring the enable inputs according to functionality (STO, SS1, SS2, SLS, SOS)

This section provides some possible suggestions for the external wiring of the enable inputs of ACOPOS P3 8EI servo drives. They vary in their safety classification per EN 60204-1, ISO 13849 and EN 61800-5-2 as well as with regard to the safety function (STO, SS1, SS2, SLS, SOS).

Information:

The following wiring suggestions do not include a line contactor since one is not necessary to comply with the required safety category / SIL / PL.

6.1.4.1 STO, SLS, SOS - Safety category 4 / SIL 3 / PL e

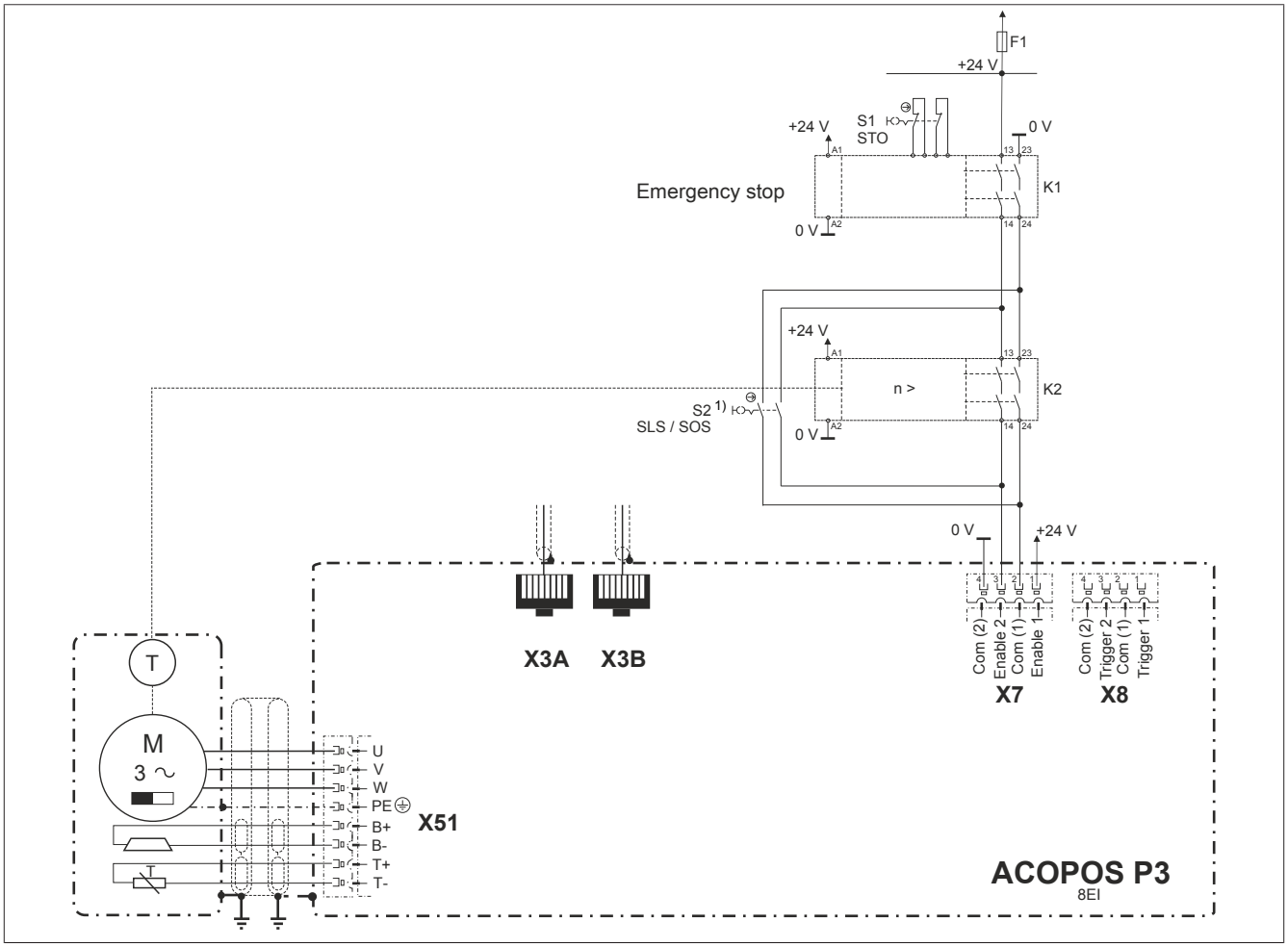


Figure 153: STO, SLS, SOS - Safety category 4 / SIL 3 / PL e

1) Limit speed of K2 according to the requirements of the application.

K2 including the encoder is part of the safety function.

Danger!

The shown brake as well as the brake control provided by the ACOPOS P3 8EI servo drive are not part of the safety function!

Description:

STO

Activating emergency stop switch S1 de-energizes the switching contacts of emergency stop switching device K1. This cuts off the 2 enable inputs of the ACOPOS P3 8EI servo drive. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is cut off immediately in every case.

Safe restart interlock

Opening and latching emergency switch-off S1 prevents unexpected startup.

SLS

Safety function SLS is activated by opening switch S2. The switching contacts of overspeed monitor K2 are opened if the monitor's set speed limit is exceeded. This cuts off the 2 enable inputs of the ACOPOS P3 8EI servo drive. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is cut off immediately in every case when the speed limit set on overspeed monitor K2 is exceeded.

SOS

Safety function SOS is activated by opening switch S2. The switching contacts of standstill monitor K2 are opened when the standstill monitor is activated. This cuts off the 2 enable inputs of the ACOPOS P3 8EI servo drive. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is cut off immediately in every case if standstill monitor K2 is activated.

Information:

Safety function SLS or SOS can be implemented depending on the function of switching device K2 (overspeed monitor or standstill monitor)

Danger!

2-pole category 4 / SIL 3 / PL e switching devices with a positively driven normally closed contact must be used for the shown S1 and S2 switches per EN 60947-5-1. 2-pole category 4 / SIL 3 / PL e switching devices must be used for the shown K1 and K2 relays.

The information in the user documentation for the switching devices must be observed!

6.1.4.2 SS1, SLS, SS2 - Safety category 4 / SIL 3 / PL e (variant A)

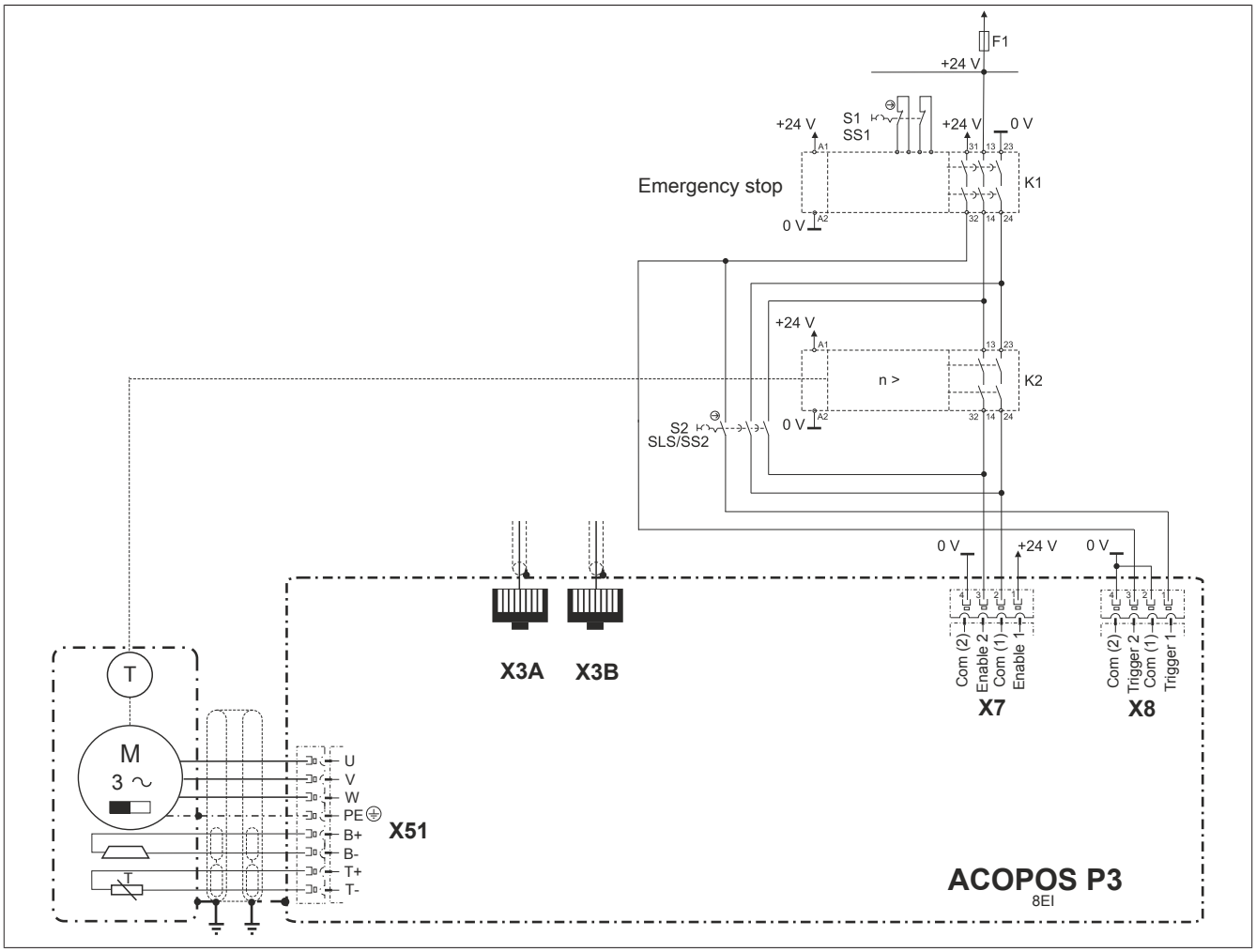


Figure 154: SS1, SLS, SS2 - Safety category 4 / SIL 3 / PL e (variant A)

Danger!

The shown brake as well as the brake control provided by the ACOPOS P3 8EI servo drive are not part of the safety function!

Description:

SS1

Activating emergency stop switch S1 triggers an active braking procedure via an undelayed switching contact of emergency stop switching device K1 on input X8/Trigger2 of the ACOPOS P3 8EI servo drive. After a defined amount of time, the delayed switching contacts of emergency stop switching device K1 are de-energized. This cuts off the 2 enable inputs of the ACOPOS P3 8EI servo drive. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is cut off in every case after a defined amount of time.

Safe restart interlock

Opening and latching emergency switch-off S1 prevents unexpected startup.

SLS

Opening switch S2 activates safety function SLS and triggers an active braking procedure on input X8/Trigger1 of the ACOPOS P3 8EI servo drive. After a defined amount of time, speed monitoring is activated on overspeed monitor K2. If the configured speed limit is exceeded, then the two enable inputs of the ACOPOS P3 8EI servo drive are cut off via the undelayed switching contacts of overspeed monitor K2. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is cut off immediately in every case when the speed limit set on overspeed monitor K2 is exceeded.

SS2

Opening switch S2 activates safety function SS2 and triggers an active braking procedure on input X8/Trigger1 of the ACOPOS P3 8EI servo drive. After a defined amount of time, standstill monitoring is activated on standstill monitor K2. If the configured tolerance limit is exceeded (standstill monitor K2 is activated), then the two enable inputs of the ACOPOS P3 8EI servo drive are cut off via the undelayed switching contacts of standstill monitor K2. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is cut off immediately in every case if standstill monitor K2 is activated.

Information:

Safety function SLS or SS2 can be implemented depending on the function of switching device K2 (overspeed monitor or standstill monitor).

Danger!

2-pole category 4 / SIL 3 / PL e switching devices with a positively driven normally closed contact must be used for the shown S1 and S2 switches per EN 60947-5-1. 2-pole category 4 / SIL 3 / PL e switching devices must be used for the shown K1 and K2 relays.

The information in the user documentation for the switching devices must be observed!

6.1.4.3 SS1, SLS, SS2 - Safety category 4 / SIL 3 / PL e (variant B)

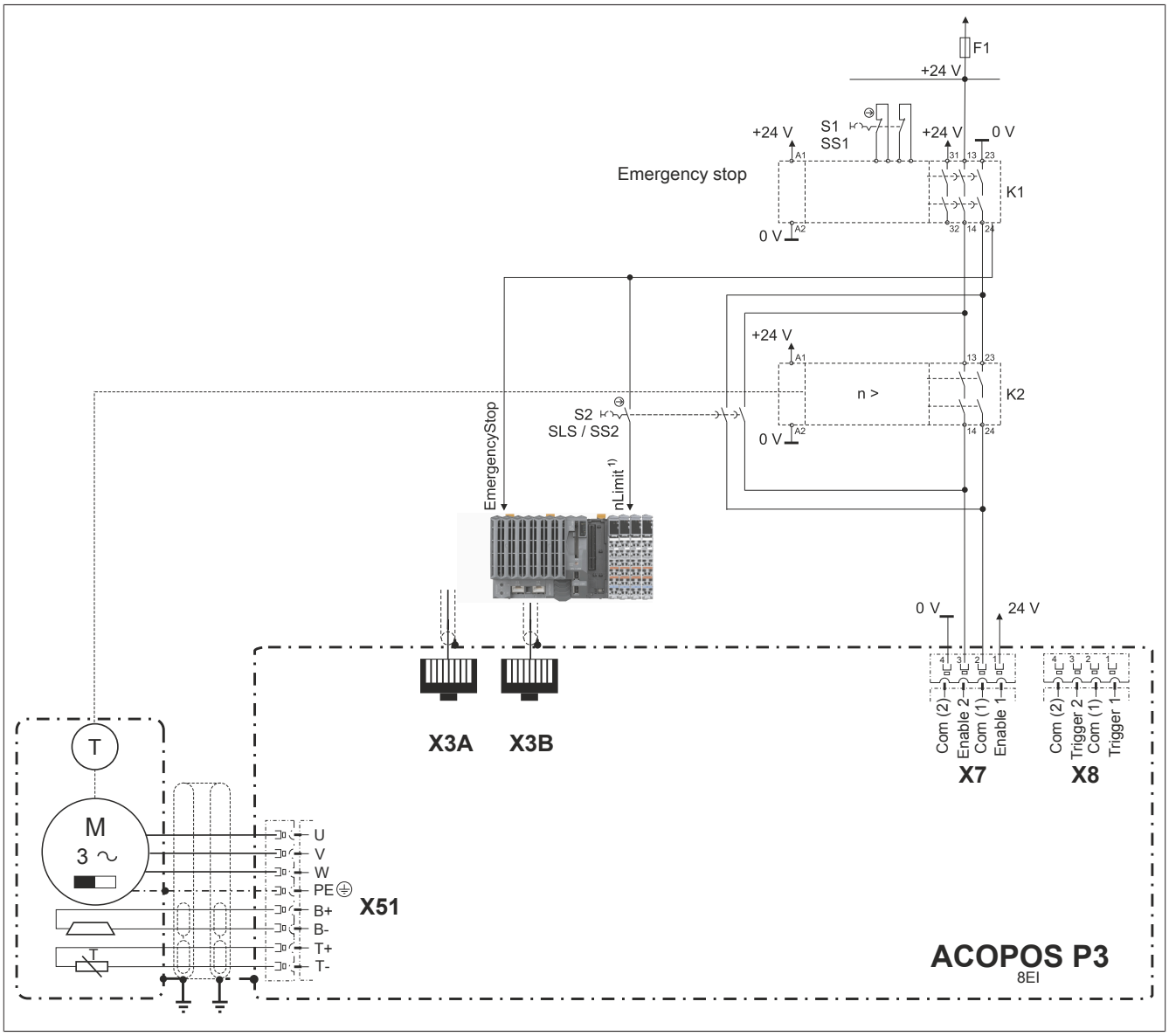


Figure 155: SS1, SLS, SS2 - Safety category 4 / SIL 3 / PL e (variant B)

1) Information about the state of digital input "EmergencyStop" is also contained in the state of digital input "nLimit".

Danger!

The shown brake as well as the brake control provided by the ACOPOS P3 8EI servo drive are not part of the safety function!

Description:

SS1

Activating emergency stop switch S1 triggers an active braking procedure over the POWERLINK network via an undelayed switching contact of emergency stop switching device K1 on the digital input "EmergencyStop" on the controller (see "Example code" on page 445). After a defined amount of time, the delayed switching contacts of emergency stop switching device K1 are de-energized. This cuts off the 2 enable inputs of the ACOPOS P3 8EI servo drive. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is cut off in every case after a defined amount of time.

Safe restart interlock

Opening and latching emergency switch-off S1 prevents unexpected startup.

SLS

Opening switch S2 activates safety function SLS and triggers active braking ia the POWERLINK network on digital input "nLimit" on the controller (see "Example code" on page 445). After a defined amount of time, speed monitoring is activated on overspeed monitor K2. If the configured speed limit is exceeded, then the two enable inputs of the ACOPOS P3 8EI servo drive are cut off via the undelayed switching contacts of overspeed monitor K2. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is cut off immediately in every case when the speed limit set on overspeed monitor K2 is exceeded.

SS2

Opening switch S2 activates safety function SS2 and triggers an active braking procedure via the POWERLINK network on digital input "nLimit" on the controller (see "Example code" on page 445). After a defined amount of time, standstill monitoring is activated on standstill monitor K2. If the configured tolerance limit is exceeded (standstill monitor K2 is activated), then the two enable inputs of the ACOPOS P3 8EI servo drive are cut off via the undelayed switching contacts of standstill monitor K2. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is cut off immediately in every case if standstill monitor K2 is activated.

Information:

Safety function SLS or SS2 can be implemented depending on the function of switching device K2 (overspeed monitor or standstill monitor).

Danger!

2-pole category 4 / SIL 3 / PL e switching devices with a positively driven normally closed contact must be used for the shown S1 and S2 switches per EN 60947-5-1. 2-pole category 4 / SIL 3 / PL e switching devices must be used for the shown K1 and K2 relays.

The information in the user documentation for the switching devices must be observed!

Example code

Issuing the stop command via POWERLINK:

```
if ( ! statStopActive )
{
    /* Move stop not active: check move stop inputs */
    if ( DI_EmergencyStop == INPUT_LEVEL_LOW )
    {
        /* Move stop with emergency stop deceleration */
        MC_Stop_0.Deceleration = E_STOP_DECELERATION;
        MC_Stop_0.Execute = 1;
        statStopActive = 1;
    }
    else if ( cmdStopAxis1 )
    {
        /* Move stop with application deceleration */
        MC_Stop_0.Deceleration = APPLICATION_DECELERATION;
        MC_Stop_0.Execute = 1;
        statStopActive = 1;
    }
}
else
{
    /* Move stop is active, wait until it is finished */
    if ( DI_EmergencyStop == INPUT_LEVEL_HIGH &&
        cmdStopAxis1 == 0 &&
        MC_Stop_0.Done == 1 )
    {
        /* Move stop complete */
        MC_Stop_0.Execute = 0;
        statStopActive = 0;
    }
}
...
MC_Stop_0.Axis = AxisRef1;
MC_Stop( &MC_Stop_0 );
...
```

6.1.4.4 STO, SLS, SOS - Safety category 3 / SIL 2 / PL d

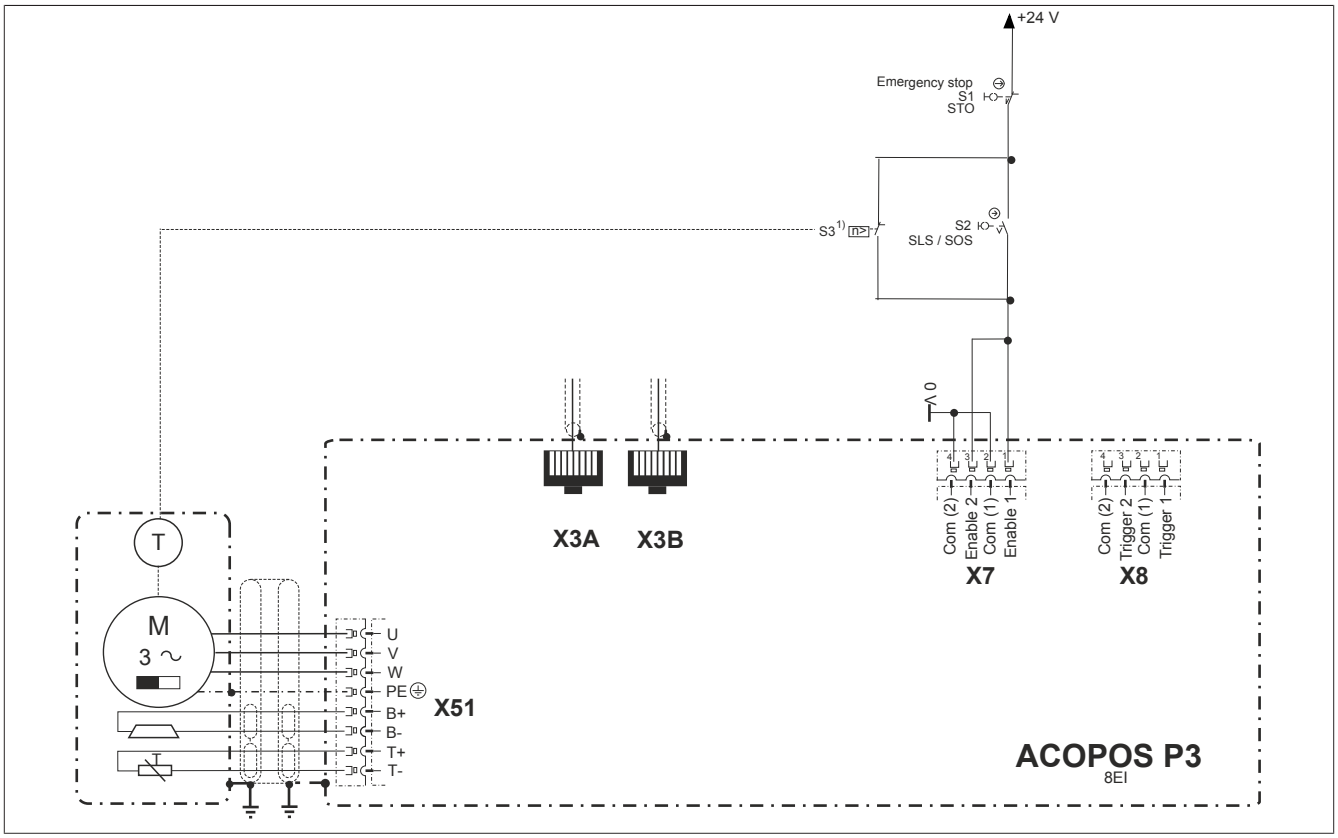


Figure 156: STO, SLS, SOS - Safety category 3 / SIL 2 / PL d

1) Limit speed of S3 according to the requirements of the application.
S3 including the encoder is part of the safety function.
Implementation of S3 including the encoder must therefore meet Category 3 / SIL 2 / PL d.

Danger!

The brake shown in this image as well as the brake control provided by the ACOPOS P3 8EI servo drive are not part of the safety function!

Description:

STO

Activating the S1 emergency stop switch cuts off the 2 enable inputs of the ACOPOS P3 8EI servo drive. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is cut off immediately in every case.

Safe restart interlock

Opening and latching emergency switch-off S1 prevents unexpected startup.

SLS

Safety function SLS is activated by opening switch S2. The switching contact of overspeed monitor S3 is opened if the monitor's configured speed limit is exceeded. This cuts off the 2 enable inputs of the ACOPOS P3 8EI servo drive. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is cut off immediately in every case when the speed limit set on overspeed monitor S3 is exceeded.

SOS

Safety function SOS is activated by opening switch S2. If standstill monitor S3 is activated, then the switching contact of the standstill monitor is opened. This cuts off the 2 enable inputs of the ACOPOS P3 8EI servo drive. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is cut off immediately in every case if standstill monitor S3 is activated.

Information:

Safety function SLS or SOS can be implemented depending on the function of switching device S3 (overspeed monitor or standstill monitor)

Danger!

1-pole category 3 / SIL 2 / PL d switching devices with a positively driven normally closed contact must be used for the shown S1 and S2 switches per EN 60947-5-1. A 1-pole category 3 / SIL 2 / PL d switching device must be used for the shown S3 switching device.

The information in the user documentation for the switching device must be observed!

6.1.4.5 SS1, SLS, SS2 - Safety category 3 / SIL 2 / PL d (variant A)

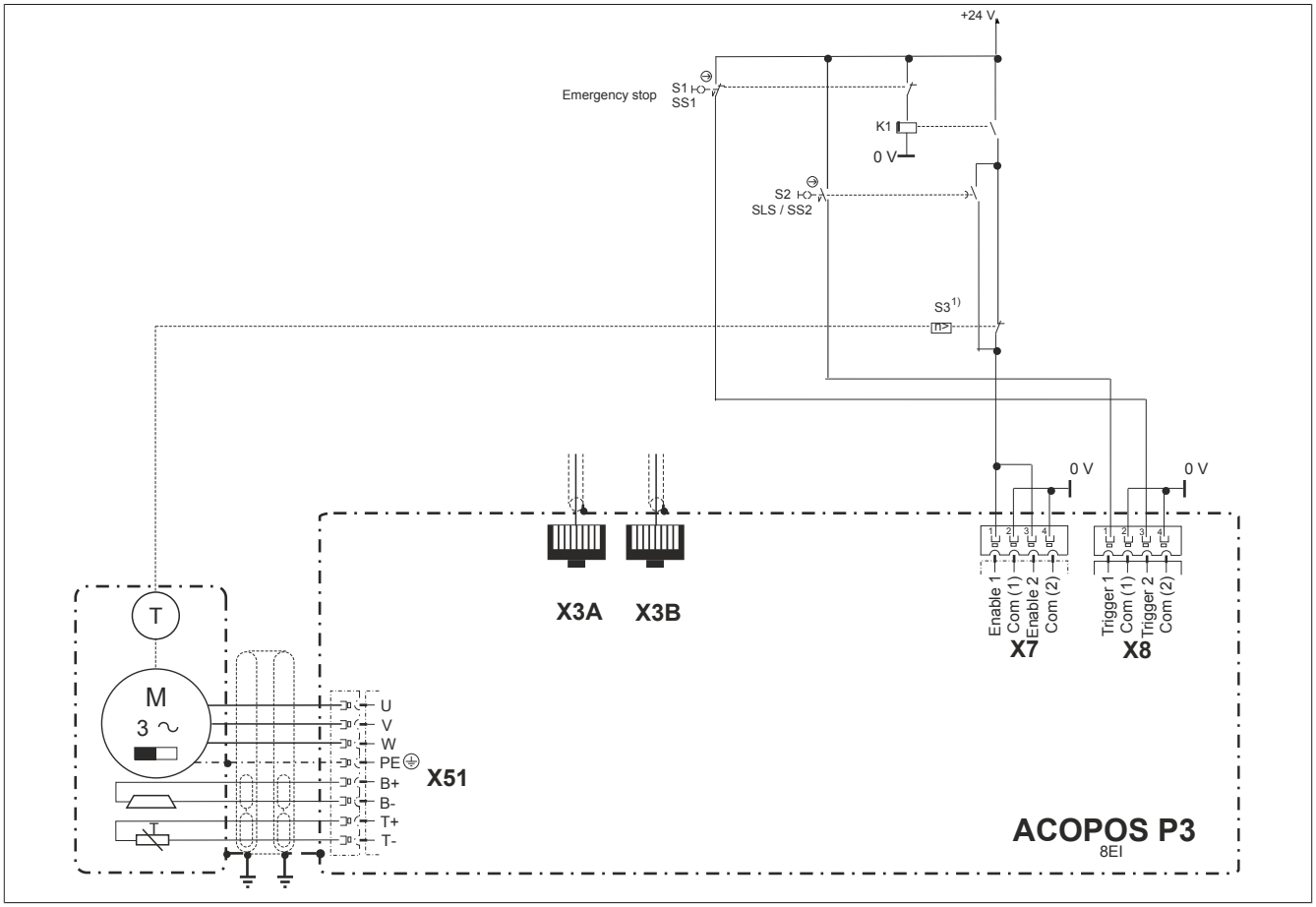


Figure 157: SS1, SLS, SS2 - Safety category 3 / SIL 2 / PL d (variant A)

1) Limit speed of S3 according to the requirements of the application. S3 including the encoder is part of the safety function. Implementation of S3 including the encoder must therefore meet Category 3 / SIL 2 / PL d.

Danger!

The brake shown in this image as well as the brake control provided by the ACOPOS P3 8EI servo drive are not part of the safety function!

Information:

For this circuit, the X8 / Trigger 2 input of the ACOPOS P3 8EI servo drive must be configured as a quickstop input.

Description:

SS1

Activating emergency stop switch S1 triggers an active braking procedure via input X8 / Quickstop/Trigger 2 of the ACOPOS P3 8EI servo drive.

After a defined amount of time, auxiliary dropout delay relay K1 is de-energized. This cuts off the 2 enable inputs of the ACOPOS P3 8EI servo drive. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is cut off in every case after a defined amount of time.

Safe restart interlock

Opening and latching emergency switch-off S1 prevents unexpected startup.

SLS

Opening switch S2 activates safety function SLS and triggers an active braking procedure via input X8/ Trigger1 of the ACOPOS P3 8EI servo drive. After a defined amount of time, speed monitoring is activated on overspeed monitor S3. If the configured speed limit is exceeded, then the 2 enable inputs of the ACOPOS P3 8EI servo drive are cut off via the switching contact of overspeed monitor S3. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is cut off immediately in every case when the speed limit set on overspeed monitor S3 is exceeded.

SS2

Opening switch S2 activates safety function SS2 and triggers an active braking procedure via input X8/ Trigger1 of the ACOPOS P3 8EI servo drive. After a defined amount of time, standstill monitoring is activated on standstill monitor S3. If the configured tolerance limit is exceeded (standstill monitor S3 is activated), then the two enable inputs of the ACOPOS P3 8EI servo drive are cut off via the switching contact of standstill monitor S3. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is cut off immediately in every case if standstill monitor S3 is activated.

Information:

Safety function SLS or SS2 can be implemented depending on the function of switching device S3 (overspeed monitor or standstill monitor).

Danger!

1-pole category 3 / SIL 2 / PL d switching devices with a positively driven normally closed contact must be used for the shown S1 and S2 switches per EN 60947-5-1. 1-pole category 3 / SIL 2 / PL d switching devices must be used for the shown K2 relay and switching device S3.

The information in the user documentation for the switching devices must be observed!

6.1.4.6 SS1, SLS, SS2 - Safety category 3 / SIL 2 / PL d (variant B)

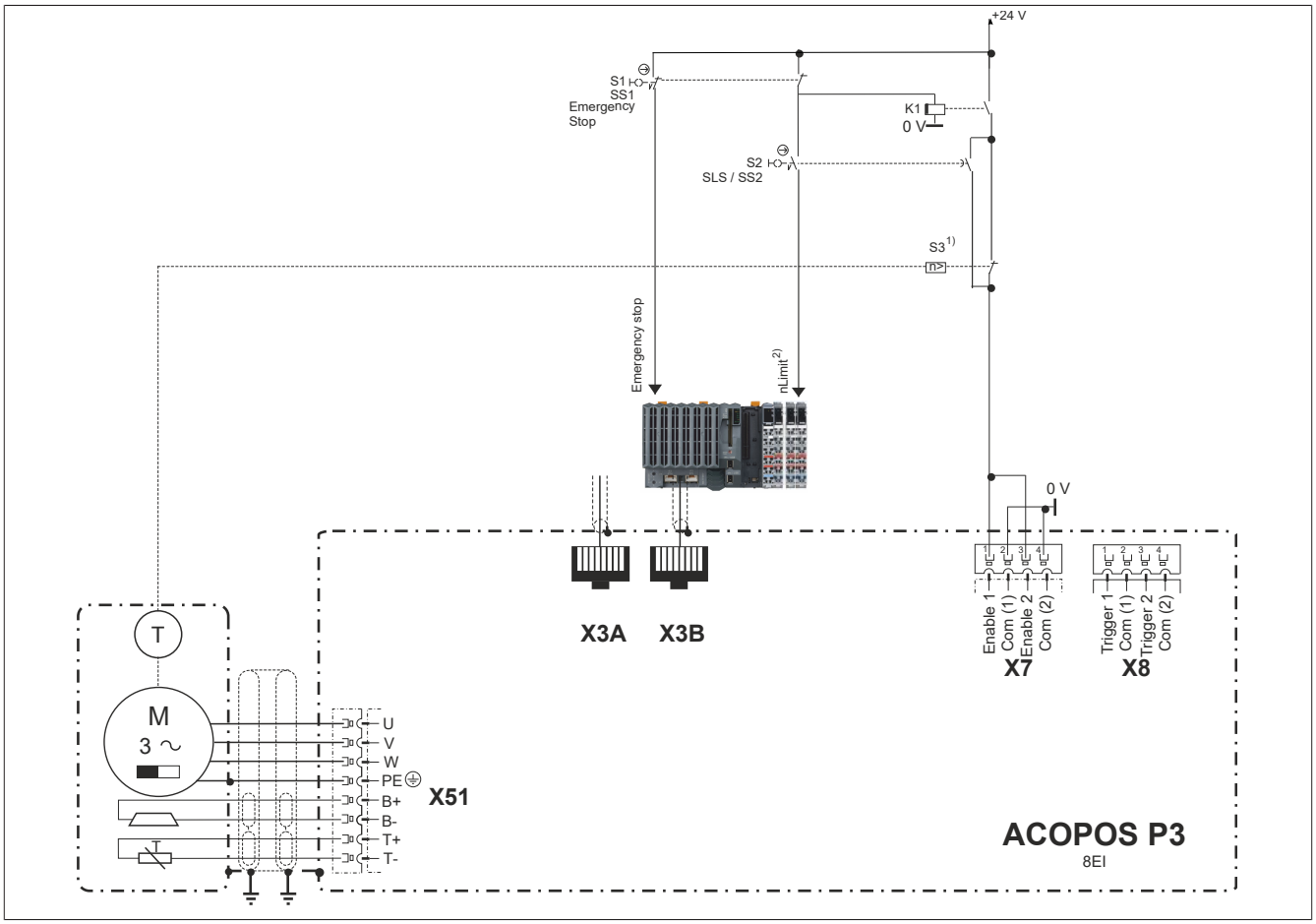


Figure 158: SS1, SLS, SS2 - Safety category 3 / SIL 2 / PL d (variant B)

1) Dropout delay of K1 and limit speed of S3 according to the requirements of the application.
Auxiliary dropout delay relay K1 and S3 including encoder are part of the safety function. The implementation of K1 and S3 including encoder must therefore meet the requirements of category 3 / SIL 2 / PL d.

2) Information about the status of the "EmergencyStop" digital input is also contained in the status of the "nLimit" digital input.

Danger!

The brake shown in this figure as well as the brake control provided by the ACOPOS P3 8EI servo drive are not part of the safety function!

Description:

SS1

Activating emergency switch-off S1 triggers an active braking procedure via digital input "EmergencyStop" on the controller (see "Example code" on page 451).

After a defined amount of time, auxiliary dropout delay relay K1 is de-energized. This cuts off the 2 enable inputs of the ACOPOS P3 8EI servo drive. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is cut off in every case after a defined amount of time.

Safe restart interlock

Opening and latching emergency switch-off S1 prevents unexpected startup.

SLS

Opening switch S2 activates safety function SLS and triggers an active braking procedure via digital input "nLimit" on the controller (see "Example code" on page 451). After a defined amount of time, speed monitoring is activated on overspeed monitor S3. If the configured speed limit is exceeded, then the 2 enable inputs of the ACOPOS P3 8EI servo drive are cut off via the switching contact of overspeed monitor S3. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is cut off immediately in every case when the speed limit set on overspeed monitor S3 is exceeded.

SS2

Opening switch S2 activates safety function SS2 and triggers an active braking procedure via digital input "nLimit" on the controller (see "Example code" on page 451). After a defined amount of time, standstill monitoring is activated on standstill monitor S3. If the configured tolerance limit is exceeded (standstill monitor S3 is activated), then the two enable inputs of the ACOPOS P3 8EI servo drive are cut off via the switching contact of standstill monitor S3. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is cut off immediately in every case if standstill monitor S3 is activated.

Information:

Safety function SLS or SS2 can be implemented depending on the function of switching device S3 (overspeed monitor or standstill monitor).

Danger!

2-pole or 1-pole category 3 / SIL 2 / PL d switching devices with a positively driven normally closed contact must be used for the shown S1 and S2 switches per EN 60947-5-1. 1-pole category 3 / SIL 2 / PL d switching devices must be used for the shown K1 relay and switching device S3.

The information in the user documentation for the switching devices must be observed!

Example code

Issuing the stop command via POWERLINK:

```
if ( ! statStopActive )
{
    /* Move stop not active: check move stop inputs */
    if ( DI_EmergencyStop == INPUT_LEVEL_LOW )
    {
        /* Move stop with emergency stop deceleration */
        MC_Stop_0.Deceleration = E_STOP_DECELERATION;
        MC_Stop_0.Execute = 1;
        statStopActive = 1;
    }
    else if ( cmdStopAxis1 )
    {
        /* Move stop with application deceleration */
        MC_Stop_0.Deceleration = APPLICATION_DECELERATION;
        MC_Stop_0.Execute = 1;
        statStopActive = 1;
    }
}
else
{
    /* Move stop is active, wait until it is finished */
    if ( DI_EmergencyStop == INPUT_LEVEL_HIGH &&
        cmdStopAxis1 == 0 &&
        MC_Stop_0.Done == 1 )
    {
        /* Move stop complete */
        MC_Stop_0.Execute = 0;
        statStopActive = 0;
    }
}
...
MC_Stop_0.Axis = AxisRef1;
MC_Stop( &MC_Stop_0 );
...
```

6.2 SafeMOTION - Functional safety technology

Further information about SafeMOTION - Functional safety technology:

- Integrated safety technology user's manual - mapp Safety
- SafeMOTION user's manual MAACPMSAFEMC-xxx, chapter 5 "System properties" and chapter 6 "Safety technology" (sections 6.1 to 6.4)

7 International and national certifications

Products and services from B&R comply with applicable regulations, directives and standards. These are national, European and international regulations, mainly from organizations such as ISO, IEC and CENELEC. We are committed to ensuring the reliability of our products in industrial environments.

Information:

Certifications that apply to a particular module are available at the following places:

- **The data sheet's technical data under "General information → Certifications"**
- **At www.br-automation.com under "Products" in the "General information → Certifications" area of the technical data**
- **On the side of the module housing**

7.1 Marks

Mark	Explanation	Region
CE	CE marking	Europe (EU)
open SAFETY certified product	Functional safety (CE)	Europe (EU)
c UL us LISTED	Underwriters Laboratories Inc. (UL)	Canada USA
KC	Korean Conformity (KC)	Korea
UK CA	UK Conformity Assessed (UKCA)	Great Britain, Scotland, Wales

7.2 EU directives and standards (CE)

CE marking

Europe (EU)

The respective product complies with all applicable EU directives and relevant harmonized standards.

Certification of these products is performed in cooperation with accredited testing laboratories.

EMC Directive 2014/30/EU

All devices meet the protection requirements of the "Electromagnetic Compatibility" directive and are designed for typical industrial use.

Applicable standards from this directive:

EN 61800-3	Adjustable speed electrical power drive systems - Part 3: EMC requirements and specific test methods

Low Voltage Directive 2014/35/EU

The low voltage directive applies to electrical equipment with a nominal voltage from 50 to 1000 VAC and from 75 to 1500 VDC.
All devices within the area of application of this directive satisfy the its protection requirements.

Applicable standard from this directive:

EN 61800-5-1	Adjustable speed electrical power drive systems - Part 5-1: Safety requirements - Electrical, thermal and energy

The corresponding declaration of conformity is available for download from the B&R website. For information about the versions of applicable standards, see the declaration of conformity.

Declaration of conformity

Website > Downloads > Certificates > Declarations of conformity > Declaration of conformity - ACOPOS P3 servo drives

Machinery directive 2006/42/EC

Standard safety technology	Functional safety
No mark	open SAFETY certified product
Europe (EU)	**Europe (EU)**

In accordance with the machinery directive, safety technology products are designed, developed, tested and labeled for special applications providing protection to machinery and personnel.

Certification of these products is performed exclusively in cooperation with EU-authorized bodies (Notified Bodies).

Applicable standards from this directive:

IEC 61508-1	Functional safety of electrical / electronic / programmable electronic safety-related systems - Part 1: General requirements
IEC 61508-2	Functional safety of electrical / electronic / programmable electronic safety-related systems - Part 2: Requirements for electrical/electronic/programmable electronic safety-related systems
IEC 61508-3	Functional safety of electrical / electronic / programmable electronic safety-related systems - Part 3: Software requirements
IEC 61508-4	Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 4: Definitions and abbreviations
EN 61800-5-2	Adjustable speed electrical power drive systems - Part 5-2: Safety requirements - Functional safety
EN 62061	Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems
EN ISO 13849-1	Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design

Declarations of conformity, certificates and any other safety-related documentation can be downloaded from the B&R website. For information about the versions of applicable standards, see the declaration of conformity.

Declaration of conformity

Website > Downloads > Certificates > Declarations of conformity > Declaration of conformity - ACOPOS P3 FS

Certificates

Website > Downloads > Certificates > Safety technology > ACOPOS P3 > TÜV certificate - Function "Safe pulse disabling" for ACOPOS P3

Website > Downloads > Certificate > Safety technology > ACOPOS P3 > TÜV certificate - Functional safety ACOPOS P3 SafeMOTION

SafeMOTION user's manual

Website > Downloads > Safety technology > ACOPOS P3 > SafeMOTION user's manual

Integrated safety technology user's manual - mapp Safety

Website > Downloads > Safety technology

7.2.1 Overview of standards

The following overview contains standards that are partially or completely taken into account for product certification.

Standard	Description
EN ISO 13849-1	Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design
EN ISO 4180	Packaging - Complete, filled transport packages - General rules for the compilation of performance test schedules
EN 55011 (CISPR 11)	Industrial, scientific and medical equipment - Radio frequency disturbance characteristics - Limits and methods of measurement
EN 60068-2-6	Environmental testing - Part 2-6: Procedures - Test Fc: Vibration (sinusoidal)
EN 60068-2-27	Environmental testing - Part 2-27: Tests - Test Ea and guidance: Shock
EN 60068-2-31[1)]	Environmental testing - Part 2-31: Tests - Test Ec: Rough handling shocks, primarily for equipment-type specimens
EN 60529	Degrees of protection provided by enclosures (IP code)
EN 60721-3-1	Classification of environmental conditions - Part 3-1: Classification of groups of environmental parameters and their severities, section 1: Storage
EN 60721-3-2	Classification of ambient conditions - Part 3: Classification of groups of environmental parameters and their severities, section 2: Transport and handling
EN 60721-3-3	Classification of ambient conditions - Part 3: Classification of groups of environmental parameters and their severities - section 3: Stationary use at weather-protected locations
EN 61000-2-4	Electromagnetic compatibility (EMC) - Part 2-4: Environmental conditions - Compatibility levels in industrial plants for low-frequency conducted disturbances
EN 61000-4-2	Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test
EN 61000-4-3	Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test
EN 61000-4-4	Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test
EN 61000-4-5	Electromagnetic compatibility (EMC) - Part 4-5: Testing and measuring techniques - Surge immunity test
EN 61000-4-6	Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields
EN 61000-4-8	Electromagnetic compatibility (EMC) - Part 4-8: Testing and measuring techniques - Power frequency magnetic field immunity test
EN 61000-4-11	Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests
EN 61000-4-29	Electromagnetic compatibility (EMC) - Part 4-29: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations on DC input power port immunity tests
EN 61000-4-34	Electromagnetic compatibility (EMC) - Part 4-34: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current more than 16 A per phase
EN 61000-6-2	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity standard for industrial environments
IEC 61508-1	Functional safety of electrical / electronic / programmable electronic safety-related systems - Part 1: General requirements
IEC 61508-2	Functional safety of electrical / electronic / programmable electronic safety-related systems - Part 2: Requirements for electrical/electronic/programmable electronic safety-related systems
IEC 61508-3	Functional safety of electrical / electronic / programmable electronic safety-related systems - Part 3: Software requirements
IEC 61508-4	Functional safety of electrical / electronic / programmable electronic safety-related systems - Part 4: Definitions and abbreviations
EN 61800-3	Adjustable speed electrical power drive systems - Part 3: EMC requirements and specific test methods
EN 61800-5-1	Adjustable speed electrical power drive systems - Part 5-1: Safety requirements - Electrical, thermal and energy
EN 61800-5-2	Adjustable speed electrical power drive systems - Part 5-2: Safety requirements - Functional safety
EN 62061	Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems

1) Replacement for EN 60068-2-32

7.2.2 Requirements for immunity to disturbances

- EN 61800-3 requirements apply.
- For all modules that have certified safety functions, stricter requirements apply for section "High-frequency disturbances" per EN 61800-5-2.

Immunity	Testing performed per	Requirements per
Electrostatic discharge (ESD)	EN 61000-4-2	EN 61800-3: Product standard - Adjustable speed electrical power drive systems
		EN 61800-5-2: Product standard - Adjustable speed electrical power drive systems
High-frequency electromagnetic fields (HF field)	EN 61000-4-3	EN 61800-3: Product standard - Adjustable speed electrical power drive systems
		EN 61800-5-2: Product standard - Adjustable speed electrical power drive systems
High-speed transient electrical disturbances (Burst)	EN 61000-4-4	EN 61800-3: Product standard - Adjustable speed electrical power drive systems
		EN 61800-5-2: Product standard - Adjustable speed electrical power drive systems
Surge voltages (Surge)	EN 61000-4-5	EN 61800-3: Product standard - Adjustable speed electrical power drive systems
		EN 61800-5-2: Product standard - Adjustable speed electrical power drive systems
Conducted disturbances	EN 61000-4-6	EN 61800-3: Product standard - Adjustable speed electrical power drive systems
		EN 61800-5-2: Product standard - Adjustable speed electrical power drive systems
Voltage dips	EN 61000-4-34	EN 61800-3: Product standard - Adjustable speed electrical power drive systems
Short-term interruptions	EN 61000-4-34	EN 61800-3: Product standard - Adjustable speed electrical power drive systems
Voltage deviations	EN 61000-2-4	EN 61800-3: Product standard - Adjustable speed electrical power drive systems
Voltage unbalance	EN 61000-2-4	EN 61800-3: Product standard - Adjustable speed electrical power drive systems
Frequency changes	EN 61000-2-4	EN 61800-3: Product standard - Adjustable speed electrical power drive systems

Evaluation criteria for performance

Criteria (PC)	During test	After test
A	The system shall continue to operate as intended. No loss of function or performance.	The system shall continue to operate as intended.
B	Degradation of performance accepted. The operating mode is not permitted to change. Irreversible loss of stored data is not permitted.	The system shall continue to operate as intended. Temporary degradation of performance must be self-recoverable.
C	Loss of functions accepted, but no destruction of hardware or software (program or data).	The system shall continue to operate as intended automatically, after manual restart or power off / power on.
FS	Functional safety - Behavior of test object per EN 61800-5-2, item 6.2.5.3	

7.2.2.1 High-frequency interference

The following limit values are applicable for industrial environments (category C3).

Electrostatic discharge (ESD)

Testing performed per EN 61000-4-2	Requirements per EN 61800-3	PC	Requirements per EN 61800-5-2 [1] Increased immunity to interference	PC
Contact discharge (CD) on conductive accessible parts	±4 kV	B	±6 kV	FS
Air discharge (AD) on insulating accessible parts	±8 kV		±15 kV	

1) The total number of discharges depends on the required safety integrity level (SIL) and listed in EN 61800-5-2.

High-frequency electromagnetic fields (HF field)

Testing performed per EN 61000-4-3	Requirements per EN 61800-3	PC	Requirements per EN 61800-5-2 Increased immunity to interference	PC
Housing, completely wired	80 MHz to 1 GHz 10 V/m 80% amplitude modulation (1 kHz)	A	80 MHz to 1 GHz 20 V/m 80% amplitude modulation (1 kHz)	FS
	1.4 GHz to 2 GHz 3 V/m 80% amplitude modulation (1 kHz)		1.4 GHz to 2 GHz 10 V/m 80% amplitude modulation (1 kHz)	
	2 GHz to 2.7 GHz 1 V/m 80% amplitude modulation (1 kHz)		2 GHz to 6 GHz 3 V/m 80% amplitude modulation (1 kHz)	

High-speed transient electrical disturbances (Burst)

Testing performed per EN 61000-4-4	Requirements per EN 61800-3	PC	Requirements per EN 61800-5-2 [1] Increased immunity to interference	PC
Power supply connections	±2 kV 1 min Direct coupling	B	±4 kV Direct coupling	FS
Connections for process measurement, open-loop and closed-loop process control	±2 kV 1 min		±4 kV	
Signal interfaces	±1 kV 1 min		±2 kV	

1) The duration of the effect depends on the required safety integrity level (SIL) and listed in EN 61800-5-2.

Surge voltages (Surge)

Testing performed per EN 61000-4-5	Requirements per EN 61800-3	PC	Requirements per EN 61800-5-2 [1] Increased immunity to interference	PC
Power supply connections	±1 kV DM Symmetrical	B	±2 kV DM Symmetrical	FS
	±2 kV CM Asymmetrical		±4 kV CM Asymmetrical	
Connections for process measurement, open-loop and closed-loop process control	±1 kV CM Asymmetrical		±2 kV CM Asymmetrical	
Signal interfaces	---		±0.5 kV CM Asymmetrical	

1) The number of pulses depends on the required safety integrity level (SIL) and listed in EN 61800-5-2.

Conducted disturbances

Testing performed per EN 61000-4-6	Requirements per EN 61800-3	PC	Requirements per EN 61800-5-2 Increased immunity to interference	PC
Power supply connections	150 kHz to 80 MHz 10 V 80% amplitude modulation (1 kHz)	A	150 kHz to 80 MHz 20 V 80% amplitude modulation (1 kHz)	FS
Connections for process measurement, open-loop and closed-loop process control				
Signal interfaces				

7.2.2.2 Low-frequency interference

The following limit values are applicable for industrial environments (category C3).

Voltage dips

Testing performed per EN 61000-4-34 / class 3	Requirements per EN 61800-3		PC
	Residual voltage	Periods	
AC power inputs	0%	1 (50/60 Hz)[1)]	C
	40%	10/12 (50/60 Hz)[1)]	
	70%	25/30 (50/60 Hz)[1)]	
	80%	250/300 (50/60 Hz)[1)]	

1) Mains frequency per manufacturer data

Short-term interruptions

Testing performed per EN 61000-4-34 / class 3	Requirements per EN 61800-3		PC
	Residual voltage	Periods	
AC power inputs	0%	250/300 (50/60 Hz)[1)]	C

1) Mains frequency per manufacturer data

Voltage deviations

Testing performed per EN 61000-2-4 / class 2	Requirements per EN 61800-3	PC
Voltage deviations	±10%	A

Voltage unbalance

Testing performed per EN 61000-2-4 / class 3	Requirements per EN 61800-3	PC
Voltage unbalance	3% of negative component	A

Frequency changes

Testing performed per EN 61000-2-4	Requirements per EN 61800-3	PC
Frequency changes	±2% (±4% if the power supply is isolated from public power supply networks)	A
Speed of frequency change	±1% (±2% if the power supply is isolated from public power supply networks)	

7.2.3 Emission requirements

Phenomenon	Testing performed per	Limit values per
Emissions related to lines	EN 55011	EN 61800-3: Product standard - Adjustable speed electrical power drive systems
Radiated emissions	EN 55011	EN 61800-3: Product standard - Adjustable speed electrical power drive systems

The following limit values are applicable for industrial environments (category C3).

Emissions related to lines

Testing performed per EN 55011	Limit values per EN 61800-3		
	Frequency band	Quasi-peak value	Mean
AC mains connection 150 kHz to 30 MHz I ≤ 100 A	150 kHz to 500 kHz	100 dB (µV)	90 dB (µV)
	500 kHz to 5 MHz	86 dB (µV)	76 dB (µV)
	5 MHz to 30 MHz	90 dB (µV) Decreases with the logarithm of the frequency to 70	80 dB (µV) Decreases with the logarithm of the frequency to 60
AC mains connection 150 kHz to 30 MHz I > 100 A	150 kHz to 500 kHz	130 dB (µV)	120 dB (µV)
	500 kHz to 5 MHz	125 dB (µV)	115 dB (µV)
	5 MHz to 30 MHz	115 dB (µV)	105 dB (µV)

Radiated emissions

Testing performed per EN 55011	Limit values per EN 61800-3	
	Frequency band	Quasi-peak value
Electric field / Measured from 10 m 30 MHz to 1 GHz	30 MHz to 230 MHz	50 dB (µV/m)
	230 MHz to 1 GHz	60 dB (µV/m)

7.2.4 Mechanical conditions

Testing	Testing performed per	Requirements per
Vibration (sinusoidal) / Operation	EN 60068-2-6	EN 61800-2: Product standard - Adjustable speed electrical power drive systems
		EN 60721-3-3 / class 3M4
Shock / Operation	EN 60068-2-27	EN 61800-2: Product standard - Adjustable speed electrical power drive systems
		EN 60721-3-3 / class 3M4
Vibration (sinusoidal) / Transport (packaged)	EN 60068-2-6	EN 61800-2: Product standard - Adjustable speed electrical power drive systems
		EN 60721-3-2 / class 2M2
Free fall / Transport (packaged)	EN 60068-2-31[1)]	EN 61800-2: Product standard - Adjustable speed electrical power drive systems
		EN ISO 4180

1) Replacement for EN 60068-2-32

Vibration (sinusoidal) / Operation

Testing performed per EN 60068-2-6	Requirements per EN 61800-2 and EN 60721-3-3 / class 3M4	
	Frequency band	Amplitude
Vibration (sinusoidal) / Operation	2 to 9 Hz	3 mm
	9 to 200 Hz	Acceleration 1 g [1)]

1) 1 g = 10 m/s²

Shock / Operation

Testing performed per EN 60068-2-27	Requirements per EN 61800-2 and EN 60721-3-3 / class 3M4
Shock / Operation	Acceleration 10 g [1)]

1) 1 g = 10 m/s²

Vibration (sinusoidal) / Transport (packaged)

Testing performed per EN 60068-2-6	Requirements per EN 61800-2 and EN 60721-3-2 / class 2M2	
	Frequency	Amplitude
Vibration (sinusoidal) / Transport (packaged)[1)]	2 to 9 Hz	3.5 mm
	9 to 200 Hz	Acceleration 1 g[2)]
	200 to 500 Hz	Acceleration 1.5 g[2)]

1) The values in Vibration (sinusoidal) / Operation apply to modules that are not in their original packaging.
2) 1 g = 10 m/s²

Free fall / Transport (packaged)

Testing performed per EN 60068-2-31	Requirements per EN 60721-3-2 / class 2M2 and EN ISO 4180	
	Weight	Height [1)]
Free fall / Transport (packaged)	<10 kg	0.8 m
	10 to 40 kg	0.6 m

1) Height per EN ISO 4180.

7.2.5 Climate conditions

Testing	Testing performed per	Requirements per
Operation	---	EN 61800-2: Product standard - Adjustable speed electrical power drive systems
		EN 60721-3-3 / class 3K3
Storage	---	EN 61800-2: Product standard - Adjustable speed electrical power drive systems
		EN 60721-3-1 / class 1K4 / class 1K3
Transport	---	EN 61800-2: Product standard - Adjustable speed electrical power drive systems
		EN 60721-3-2 / class 2K3

Operation

	Requirements per EN 60721-3-3 / class 3K3
Ambient temperature during operation	5 to 55°C
Relative humidity during operation	5 - 85%, non-condensing

Storage

	Requirements per EN 60721-3-1 / class 1K4	Requirements per EN 60721-3-1 / class 1K3
Storage temperature	-25 to 55°C	---
Relative humidity during storage	---	5 to 95%, non-condensing

Transport

	Requirements per EN 60721-3-2 / class 2K3
Transport temperature	-25 to 70°C
Relative humidity during transport	Max. 95% at 40°C

7.2.6 Electrical safety

Overvoltage category

Requirement per EN 61800-2	Explanation
Overvoltage category III	Equipment supplied from the power mains and permanently connected in fixed installations (including and downstream of the main distribution board).

Pollution degree

Requirement per EN 61800-2	Explanation
Pollution degree 2	Usually only non-conductive pollution occurs; however, temporary conductivity due to condensation must occasionally be expected when the module is not in operation.

Protection rating provided by enclosure (IP code)

Requirement	Meaning of codes per EN 60529	Meaning for the protection of equipment	Meaning for the protection of personnel
IP 20	First number IP**2**x	Protected against solid foreign bodies with a diameter ≥12.5 mm.	Protected against touching dangerous parts with fingers.
	Second number IPx**0**	Not protected.	---

7.3 UL / CSA

UL

Power Conversion Equipment E225616

Canada / USA

Underwriters Laboratories (UL)
Products with this mark are tested by Underwriters Laboratories and listed as "power conversion equipment" in category NMMS (power conversion equipment) with file number E225616.

The mark is valid for the USA and Canada and facilitates the certification of your machines and systems in this economic area.

Standards applied:

UL 61800-5-1	Standard for adjustable speed electrical power drive systems
CSA-C22.2 No. 274	Adjustable speed drives

Certificate
Website > Downloads > Certificates > UL > ACOPOS P3 > E225616 UL certificate of compliance - ACOPOS P3

7.4 KC

KC

Korean Conformity (KC)

Products with this marking have been tested by an accredited testing laboratory and approved for import to the Korean market (based on EU compliance).

Certificate
Website > Downloads > Certificates > KC > ACOPOS P3

7.5 UKCA

UK Conformity Assessed (UKCA)
All directives applicable to the respective product and their relevant standards are met.
Products with this marking are permitted to be imported into Great Britain (England, Wales, Scotland).
Certification of these products is carried out exclusively in cooperation with accredited testing laboratories.

The corresponding UK declaration of conformity is available for download on the B&R website. For information about the editions of applicable standards, see the UK declaration of conformity.

UK Declaration of Conformity
Website > Downloads > Declarations of conformity > ACOPOS P3

7.5.1 Supply of machinery (safety) regulations

Supply of machinery (safety) regulations 2008

Standard safety technology	Functional safety
No mark	open SAFETY certified product

In accordance with the "Supply of machinery (safety) regulations 2008", safety technology products are designed, developed, tested and labeled for special applications providing protection to machinery and personnel.

Certification of these products is carried out exclusively in cooperation with UK Approved Bodies.

UK (England, Scotland, Wales)

Standards applied from these UK laws:

IEC 61508-1	Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 1: General requirements
IEC 61508-2	Functional safety of electrical / electronic / programmable electronic safety-related systems - Part 2: Requirements for electrical/electronic/programmable electronic safety-related systems
IEC 61508-3	Functional safety of electrical / electronic / programmable electronic safety-related systems - Part 3: Software requirements
IEC 61508-4	Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 4: Definitions and abbreviations
EN 61800-5-2	Adjustable speed electrical power drive systems - Part 5-2: Safety requirements - Functional
EN 62061	Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems
EN ISO 13849-1	Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design

The UK declaration of conformity, certificates and additional safety-related information are available for download on the B&R website. For information about the editions of applicable standards, see the UK declaration of conformity.

UK Declaration of Conformity

Website > Downloads > Declarations of conformity > ACOPOS P3

Certificates

Website > Downloads > Certificates > Safety technology > ACOPOS P3 > TÜV certificate - Function "Safe pulse disabling" for ACOPOS P3

Website > Downloads > Certificate > Safety technology > ACOPOS P3 > TÜV certificate - Functional safety ACOPOS P3 SafeMOTION

SafeMOTION user's manual

Website > Downloads > Safety technology > ACOPOSmotor > SafeMOTION user's manual

7.6 Standards and definitions for safety technology

Stop functions per EN 60204-1 (Electrical equipment of machines, Part 1: General requirements)

There are three categories of stop functions:

Category	Description
0	Stopping by immediate removal of power to the machine actuators (i.e. an uncontrolled stop).
1	A controlled stop with power left available to the machine actuators to allow for stopping. Power is only interrupted when standstill is achieved.
2	A controlled stop with power left available to the machine actuators.

Table 338: Overview of stop function categories

The necessary stop functions must be determined based on a risk assessment of the machine. Category 0 and category 1 stop functions must be functional regardless of operating mode. A category 0 stop must have priority. Stop functions must have priority over assigned start functions. Resetting the stop function is not permitted to trigger a dangerous state.

Emergency stops per EN 60204-1 (Electrical equipment of machines - Part 1: General requirements)

In addition to the requirements for stop functions, the emergency stop function has the following requirements:

- It must have priority over all other functions and operations in all operating modes.
- Power to the machine actuators that can cause a hazardous situation shall be removed as quickly as possible without creating other hazards.
- A reset is not permitted to initiate a restart.

Emergency stops must be category 0 or category 1 stop functions. The necessary stop function must be determined based on a risk assessment of the machine.

Performance levels (PL) per EN ISO 13849-1 (Safety of machinery - Safety-related parts of control systems, Part 1: General principles for design)

The safety-related parts of control systems must meet one or more of the requirements for five defined performance levels. These performance levels define the required behavior of safety-related controller parts with regard to their resistance to errors.

Performance level (per EN ISO 13849-1)	Safety integrity level - SIL (per IEC 61508-2)	Short description	System behavior
a	---	Safety-related components must be designed and built in such away that they can meet the expected operational requirements (no specific safety measures are implemented).	**Caution!** **The occurrence of a fault can result in the loss of the safety function.**
b	1	Safety-related components must be designed and built in such a way that only reliable components and safety principles are used (e.g. preventing short circuits by using sufficient distances, reducing the probability of errors by using oversized components, defining the failure route, idle current principle).	**Caution!** **The occurrence of a fault can result in the loss of the safety function.**
c	1	Safety-related components must be designed so that their safety functions are checked at suitable intervals by the machine control system (e.g. automatic or manual check during startup).	**Caution!** **An error between checks can result in the loss of the safety function. The loss of the safety function is detected during the check.**
d	2	Safety-related parts shall be designed so that a single fault does not result in the loss of the safety function. Individual errors should – if possible – be detected the next time (or before) the safety function is required.	**Caution!** **The safety function is always retained when a fault occurs. Some but not all errors are detected. An accumulation of undetected errors can result in loss of the safety function.**
e	3	Safety-related parts shall be designed so that a single fault does not result in the loss of the safety function. Individual errors must be detected the next time (or before) the safety function is required. If this type of detection is not possible, an accumulation of faults is not permitted to result in the loss of the safety function.	**Information:** **The safety function is always retained when a fault occurs. The faults are detected in time to prevent loss of the safety function.**

Table 339: Overview of performance levels (PL)

A suitable performance level must be selected separately for each drive system (or for each axis) based on a risk assessment. This risk assessment is a part of the total risk assessment for the machine.

The following risk graph (per EN ISO 13849-1, appendix A) provides a simplified procedure for risk assessment:

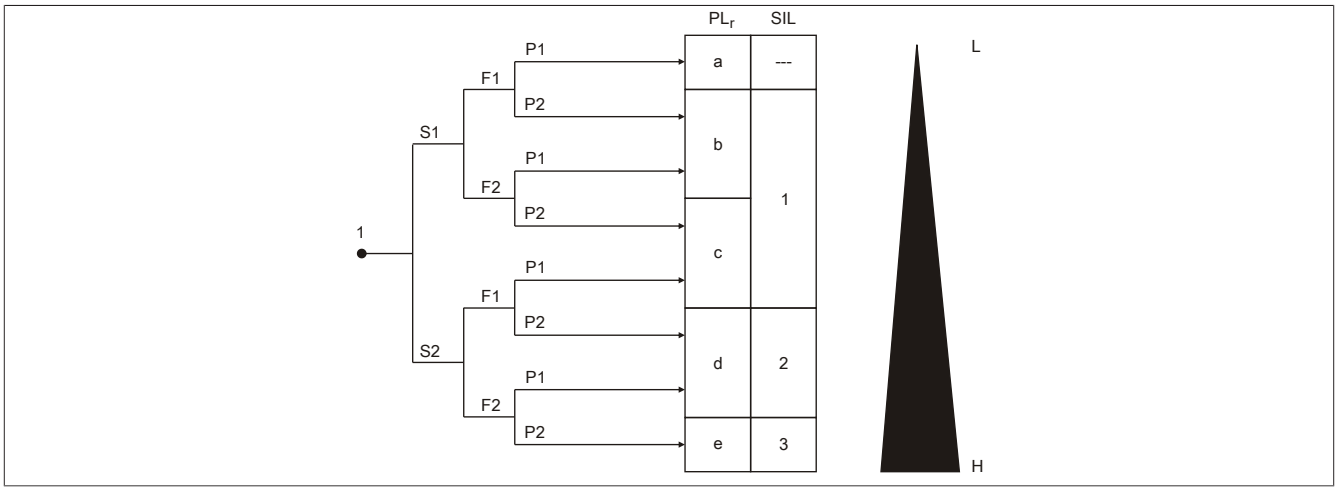


Figure 159: Risk diagram for determining the PL_r for each safety function per EN ISO 13849-1, appendix A

Legend

1 Starting point for assessing the impact on risk reduction
L Low contribution to risk reduction

H High contribution to risk reduction
PL_r Required performance level
SIL Safety Integrity Level per IEC 61508-2

Risk parameters

S Severity of injury
S1 Slight (normally reversible injury)
S2 Serious (normally irreversible injury or death)
F Frequency and/or duration of the exposure to the hazard
F1 Seldom to less often and/or exposure time is short.
F2 Frequent to continuous and/or exposure time is long.
P Possibility of avoiding hazard or limiting harm
P1 Possible under specific conditions
P2 Scarcely possible

The performance level to be used is determined by starting at the specified starting point and taking the risk parameters S, F and P into account.

Appendix A Accessories included in delivery

A.1 ACOPOS P3 8EI servo drive

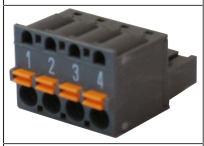
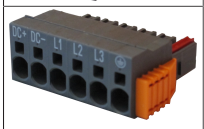
Figure	Quantity	Name	Model number	Position j - ACOPOS P3 model number												Number of axes		
				0	1	2	3	4	5	6	7	A	B	C	D	S	D	T
	1	Front cover Single-width, height 1, B&R orange	8EXA100.0010-00			X	X			X	X		X		X	X 1X6 2X2 4X5 8X8		
	1	Front cover Single-width, height 2, B&R orange	8EXA200.0010-00			X	X			X	X		X		X	X 013 017	X 2X2 4X5 8X8	X 2X2 4X5 8X8
	1	Front cover Double-width, height 2, B&R orange	8EXA300.0010-00			X	X			X	X		X		X	X 024 034 044	X 017 022	
	1	1-row terminal 5.08 mm, 4-pin, push-in connection, standard	8TB2104.2210-00	X	X	X	X	X	X	X	X					X	X	X
	1	1-row terminal 5.08 mm, 4-pin, push-in connection, safety	8TB2104.2210-50	X		X		X		X						X	X	X
	1	1-row terminal 7.62 mm, 2-pin, push-in connection, standard with interlock	8TB3102.222C-20	X		X		X		X						X	X	X
	1	1-row terminal 7.62 mm, 6-pin, push-in connection, standard with interlock	8TB3106.222B-20	X		X		X		X						X 1X6H 2X2H 4X5H 8X8H 013 017	X 2X2H 4X5H 8X8H	X 2X2H 4X5H 8X8H

Table 340: ACOPOS P3 8EI servo drive - Content of delivery

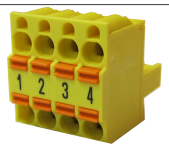
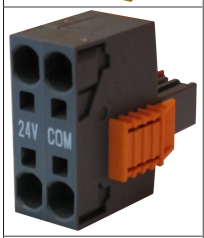
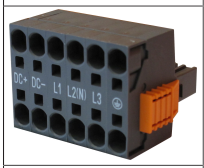
Figure	Quantity	Name	Model number	Position j - ACOPOS P3 model number												Number of axes		
				0	1	2	3	4	5	6	7	A	B	C	D	S	D	T
	1	1-row terminal 7.62 mm, 6-pin, push-in connection, standard with interlock	8TB3106.223C-20	X		X		X		X						X 1X6M 2X2M 4X5M 8X8M	X 2X2M 4X5M 8X8M	X 2X2M 4X5M 8X8M
	1	1-row terminal 10.16 mm, 4-pin, push-in connection, standard	8TB4104.222L-10	X		X		X		X						X 024 034 044	X 017 022	
	1	1-row terminal 7.62 mm, 3-pin, push-in connection, standard with interlock	8TB3103.222A-20	X	X	X	X	X[2)]	X[2)]	X[2)]	X[2)]			X[2)]	X[2)]	X 1X6 2X2 4X5 8X8 013 017	X 2X2 4X5 8X8	X 2X2 4X5 8X8
	1	1-row terminal 10.16 mm, 3-pin, push-in connection, standard	8TB4103.222A-10	X	X	X	X									X 024 034 044	X 017 022	
	1	2-row terminal 5.08 mm, 4-pin, push-in connection, safety	8TB2204.2210-50		X		X		X		X					X	X	X
	1	2-row terminal 7.62 mm, 2-pin, push-in connection, standard with interlock	8TB3202.222C-40		X		X		X		X					X	X	X
	1	2-row terminal 7.62 mm, 6-pin, push-in connection, standard with interlock	8TB3206.222B-40		X		X		X		X					X 1X6H 2X2H 4X5H 8X8H 013 017	X 2X2H 4X5H 8X8H	X 2X2H 4X5H 8X8H
	1	2-row terminal 7.62 mm, 6-pin, push-in connection, standard with interlock	8TB3206.223C-40		X		X		X		X					X 1X6M 2X2M 4X5M 8X8M	X 2X2M 4X5M 8X8M	X 2X2M 4X5M 8X8M
	1	2-row terminal 10.16 mm, 4-pin, screw connection, standard	8TB4204.202L-10		X		X		X		X					X 024 034 044	X 017 022	
	X[1)]	Hybrid connector 7.62 mm, 4+4-pin, push-in connection, standard	8TB3308.222A-00	X	X	X	X	X	X	X	X					1 1X6 2X2 4X5 8X8 013 017	2 2X2 4X5 8X8 017 022	3 2X2 4X5 8X8
	1	1-row terminal 10.16 mm, 4-pin, push-in connection, standard	8TB4104.224G-10	X	X	X	X	X	X	X	X					X 024 034 044		

Table 340: ACOPOS P3 8EI servo drive - Content of delivery

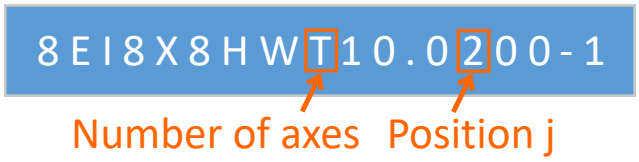
Figure	Quantity	Name	Model number	Position j - ACOPOS P3 model number												Number of axes		
				0	1	2	3	4	5	6	7	A	B	C	D	S	D	T
	1	1-row terminal 5.08 mm, 4-pin, push-in connection, standard	8TB2104.223L-00	X	X	X	X	X	X	X	X					X 024 034 044		
	1	1-row terminal 10.16 mm, 4-pin, push-in connection, standard	8TB4104.227F-10	X	X	X	X	X	X	X	X					X 024 034 044	X 017 022	
	1	Safety guidelines	MAACPSH-X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	1	Accessory set for ACOPOS P3 servo drives Quantity: 2 — Torx M5x16 4.8 tinned T25 Quantity: 1 — Torx M4x8 8.8 tinned T20	---	X	X	X	X	X	X	X	X	X	X	X	X	X 1X6 2X2 4X5 8X8 013 017	X 2X2 4X5 8X8	X 2X2 4X5 8X8
	1	Accessory set for ACOPOS P3 servo drives, double-width Quantity: 4 — Torx M5x16 4.8 tinned T25 Quantity: 1 — Torx M5x8 8.8 tinned T25	---	X	X	X	X	X	X	X	X	X	X	X	X	X 024 034 044	X 017 022	

Table 340: ACOPOS P3 8EI servo drive - Content of delivery

1) The number of connectors depends on the number of axes.
2) The internal braking resistor is connected to the connector at the factory; the connector is already connected to the ACOPOS P3 servo drive.

Example for ACOPOS P3 content of delivery

The following model number serves as an example:



"2" is listed for position "j"; "T" is listed for position "Number of axes". According to table ACOPOS P3 8EI servo drive - Content of delivery, the following is included in the accessories:

- 1x 8EXA200.0010-00
- 1x 8TB2104.2210-00
- 1x 8TB2104.2210-50
- 1x 8TB3102.222C-20
- 1x 8TB3106.222B-20
- 1x 8TB3106.223C-20
- 1x 8TB3103.222A-20
- 3x 8TB3308.222A-00
- 1x MAACPSH-X
- 1x accessory set (screws)

Appendix B Forming DC bus capacitors

Introduction

Electrolytic capacitors (DC bus capacitors) are installed in the DC bus of B&R servo drives and B&R inverter modules (referred to as B&R modules in the following sections). In electrolytic capacitors, the oxide layer acting as dielectric can be weakened by electrochemical processes when stored for a longer period (>1 year) in a voltage-free state. In the worst case, this can cause a short circuit and subsequent destruction of the electrolytic capacitors during commissioning of the B&R modules.

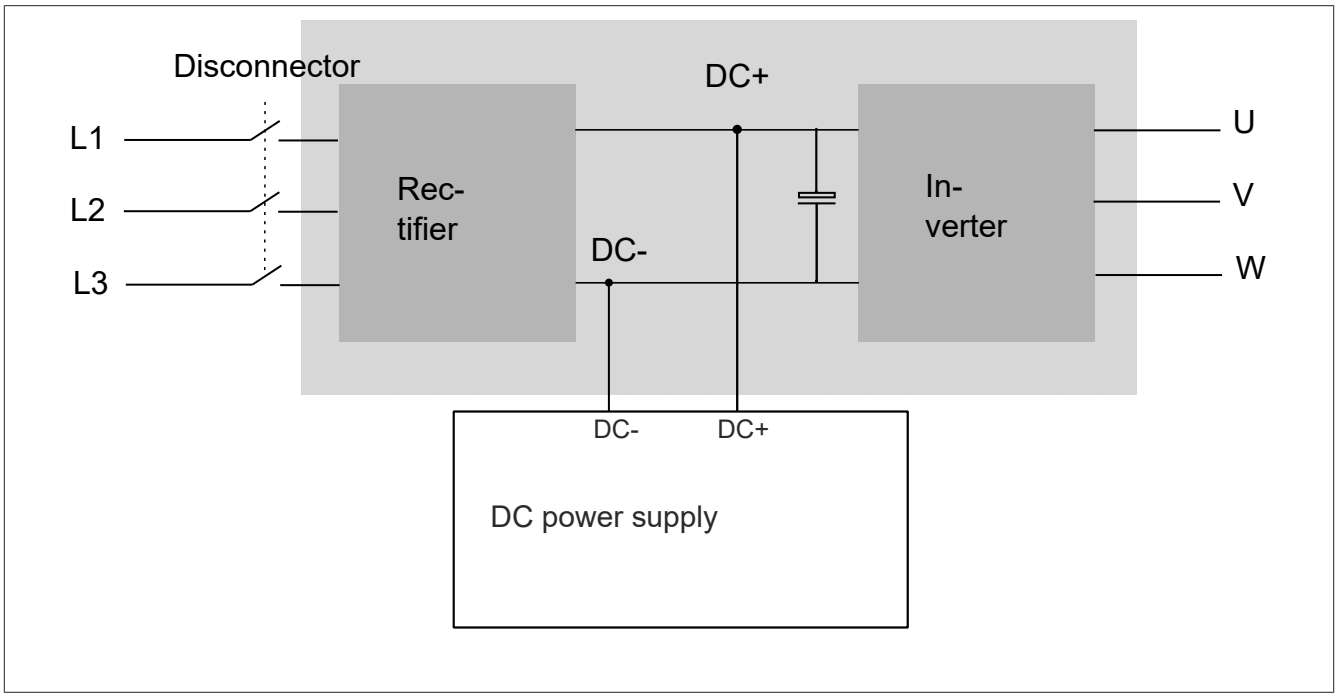
Caution!

After a storage period greater than 1 year without prior forming of the DC bus capacitors, a short circuit can occur in unfavorable cases while commissioning a B&R module. This can result in irreparable damage to the DC bus capacitors and subsequently in irreparable damage to the B&R module!

Forming of the DC bus capacitors must therefore be carried out according to the Forming requirements depending on the actual storage period.

During the forming procedure, it is important to ensure that the DC power supply is grounded and the B&R modules are protected against contact.

Wiring principle



B.1 Forming requirements

Storage period	Forming required?	Forming measures
<1 year	No	No measures required
1 to <2 years	Yes	Supply the B&R module with nominal voltage for 1 hour before initial commissioning.
2 to <3 years	Yes	Supply the B&R module with an adjustable DC power supply with current limiting and gradually increase the voltage. Observe the following sequence: 1. Completely disconnect the B&R module from the mains. 2. Check the B&R module for absence of voltage (ensure by measurement). 3. Connect the adjustable DC power supply with current limiting to the B&R module according to section Module-specific values. 4. Set the current limit of the adjustable DC power supply to a value that is between 30 and 50 mA higher than the expected forming current (see section Module-specific values). 5. Switch on the adjustable DC power supply and gradually increase the voltage according to the following scheme: a) Supply with 25% of the forming voltage for 30 minutes. b) Supply with 50% of the forming voltage for 30 minutes. c) Supply with 75% of the forming voltage for 30 minutes. d) Supply with 100% of the forming voltage for 30 minutes. ✓ The electrical properties of the DC bus capacitors are restored when the forming current (leakage current) for the capacitors is within the range as specified in the data sheets (see section Module-specific values). The current can be monitored via the DC power supply or via an ammeter. 6. Switch off the adjustable DC power supply. 7. Wait until the DC bus capacitors in the B&R module are voltage-free (about 5-10 minutes). Check for absence of voltage using a multimeter to avoid the risk of electric shock. 8. Disconnect the adjustable DC power supply from the B&R module. ✓ The B&R module is now ready for operation.
>3 years	Yes	Supply the B&R module with an adjustable DC power supply with current limiting and gradually increase the voltage. Observe the following sequence: 1. Completely disconnect the B&R module from the mains. 2. Check the B&R module for absence of voltage (ensure by measurement). 3. Connect the adjustable DC power supply with current limiting to the B&R module according to section Module-specific values. 4. Set the current limit of the adjustable DC power supply to a value that is between 30 and 50 mA higher than the expected forming current (see section Module-specific values). 5. Switch on the adjustable DC power supply and gradually increase the voltage according to the following scheme: a) Supply with 25% of the forming voltage for 2 hours. b) Supply with 50% of the forming voltage for 2 hours. c) Supply with 75% of the forming voltage for 2 hours. d) Supply with 100% of the forming voltage for 2 hours. ✓ The electrical properties of the DC bus capacitors are restored when the forming current (leakage current) for the capacitors is within the range as specified in the data sheets (see section Module-specific values). The current can be monitored via the DC power supply or via an ammeter. 6. Switch off the adjustable DC power supply.

Storage period	Forming required?	Forming measures
		7. Wait until the DC bus capacitors in the B&R module are voltage-free (about 5-10 minutes). Check for absence of voltage using a multimeter to avoid the risk of electric shock. 8. Disconnect the adjustable DC power supply from the B&R module. ✓ The B&R module is now ready for operation.

Information:

For B&R modules stored for a long period of time, forming is recommended once a year for 1 hour at nominal voltage.

B.2 Module-specific values

B.2.1 ACOPOS P3 8EI servo drive

Module	Forming voltage [VDC]	Forming current (leakage current) [mA]
8EIxxxM...	400	10
8EIxxxH...	800	10

Table 341: Forming voltage and forming current (leakage current)

Wiring

The DC voltage supply is connected via the DC+ and DC- connections on the 8EI servo drive.

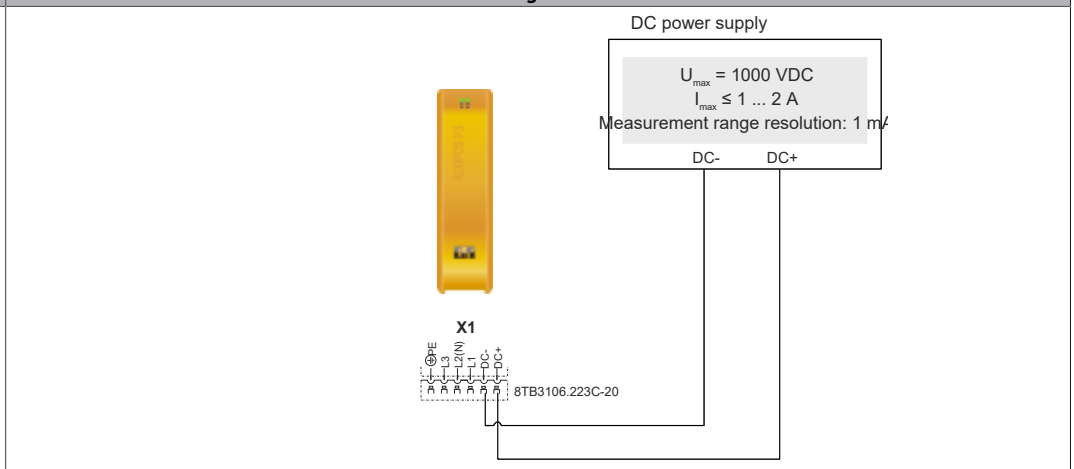
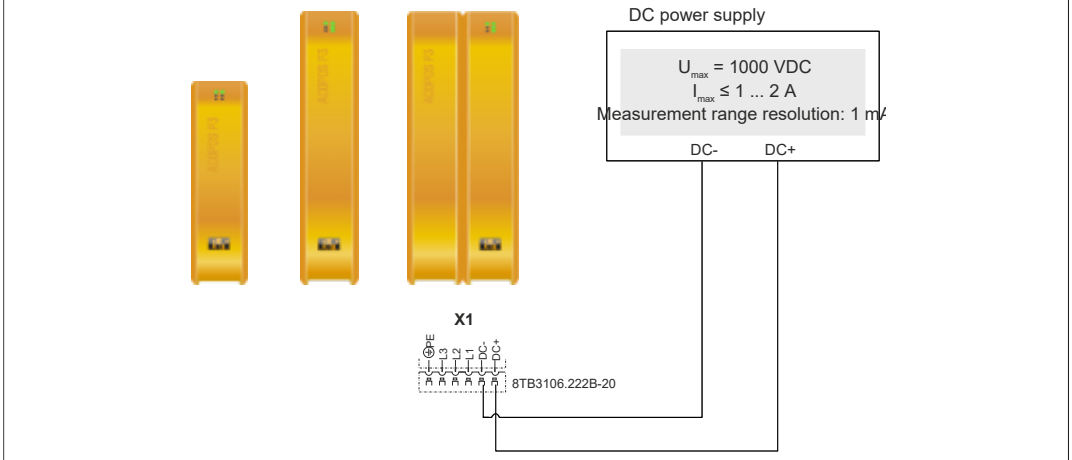
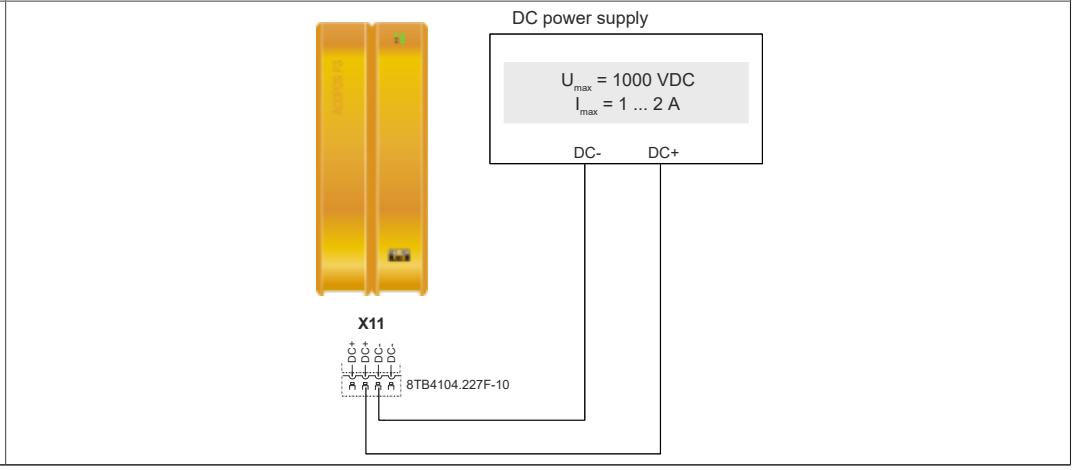
Module	Figure
8EI1X6MWS... 8EI2X2MWx... 8EI4X5MWx... 8EI8X8MWx...	
8EI1X6HWS... 8EI2X2HWx... 8EI4X5HWx... 8EI8X8HWx... 8EI013HWS... 8EI017HWx..	
8EI024HWS... 8EI034HWS... 8EI044HWS... 8EI0xxHWD...	

Table 342: ACOPOS P3 8EI servo drive forming - Wiring

Notice!

The appropriate accessories for the 8EI servo drive must be used for wiring (terminals, cables).

Appendix C Peak load capacity when using external braking resistors

8EI1X6/2X2/4X5/8X8M...

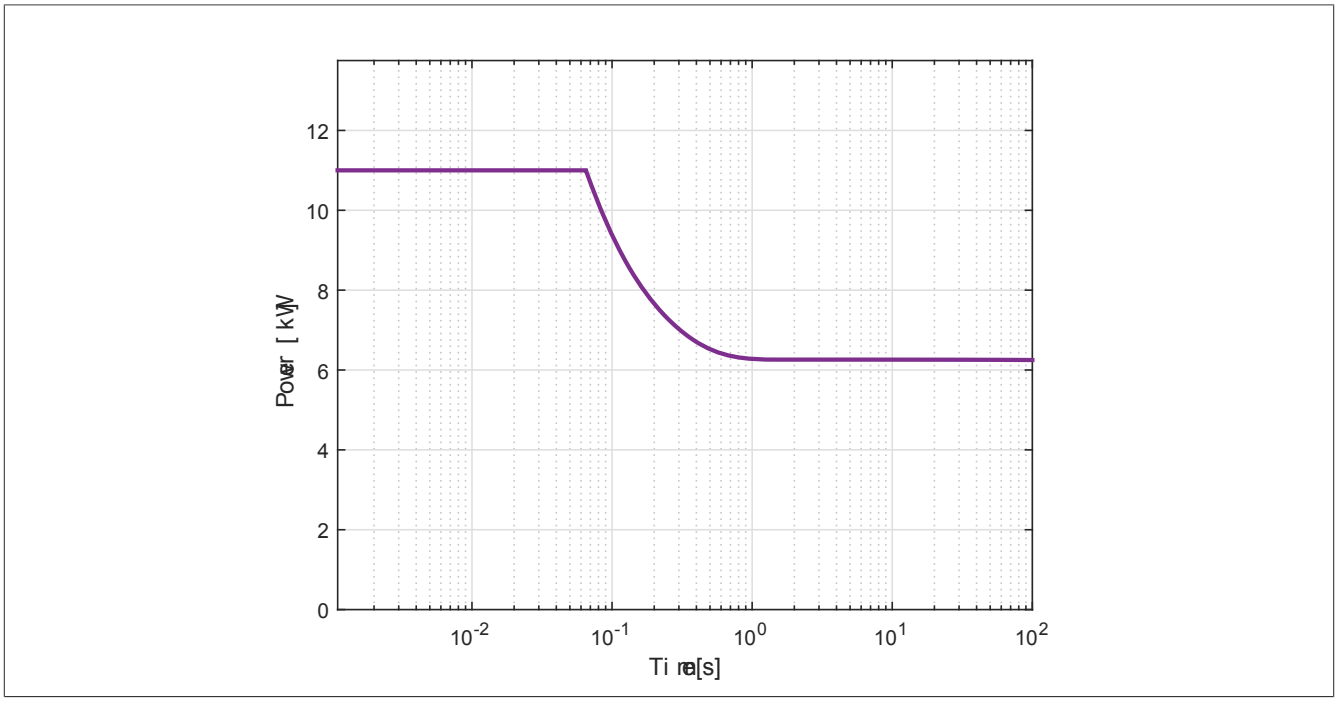


Figure 160: 8EI1X6/2X2/4X5/8X8M... - Peak load capacity

8EI1X6/2X2/4X5/8X8H...

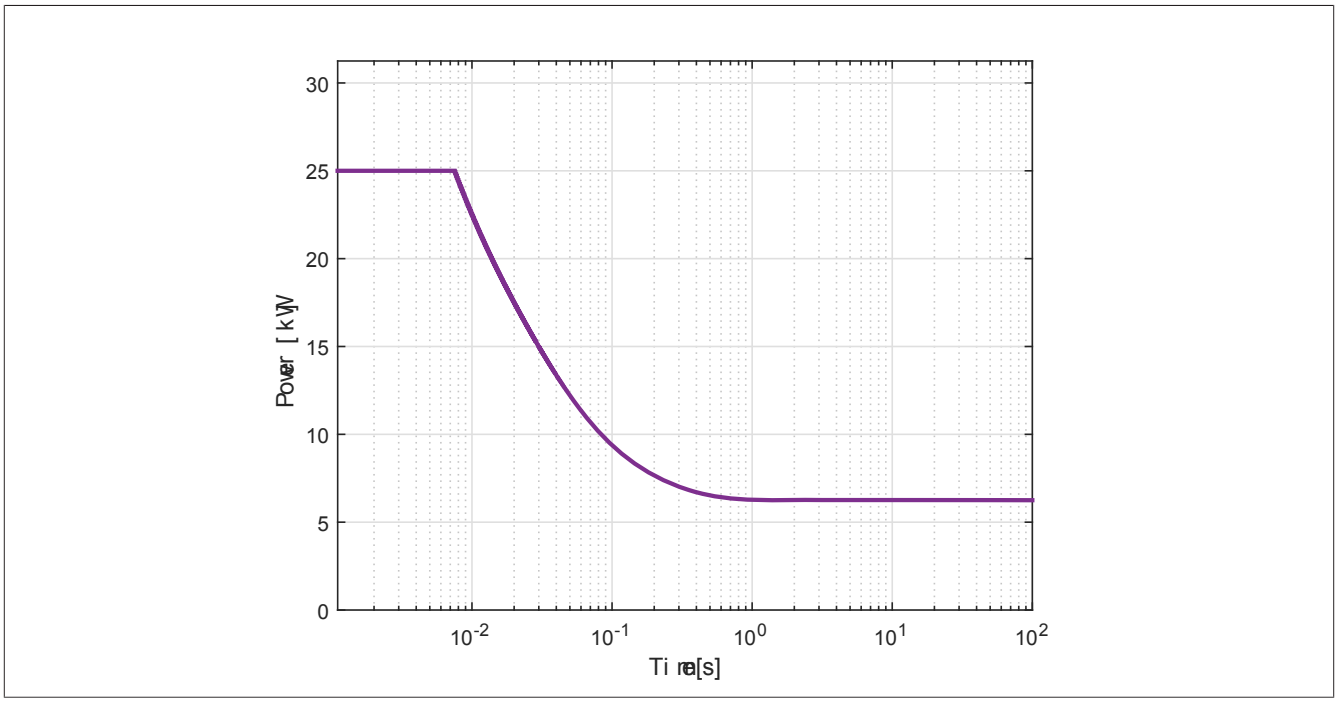


Figure 161: 8EI1X6/2X2/4X5/8X8H... - Peak load capacity

8EI013/017H...

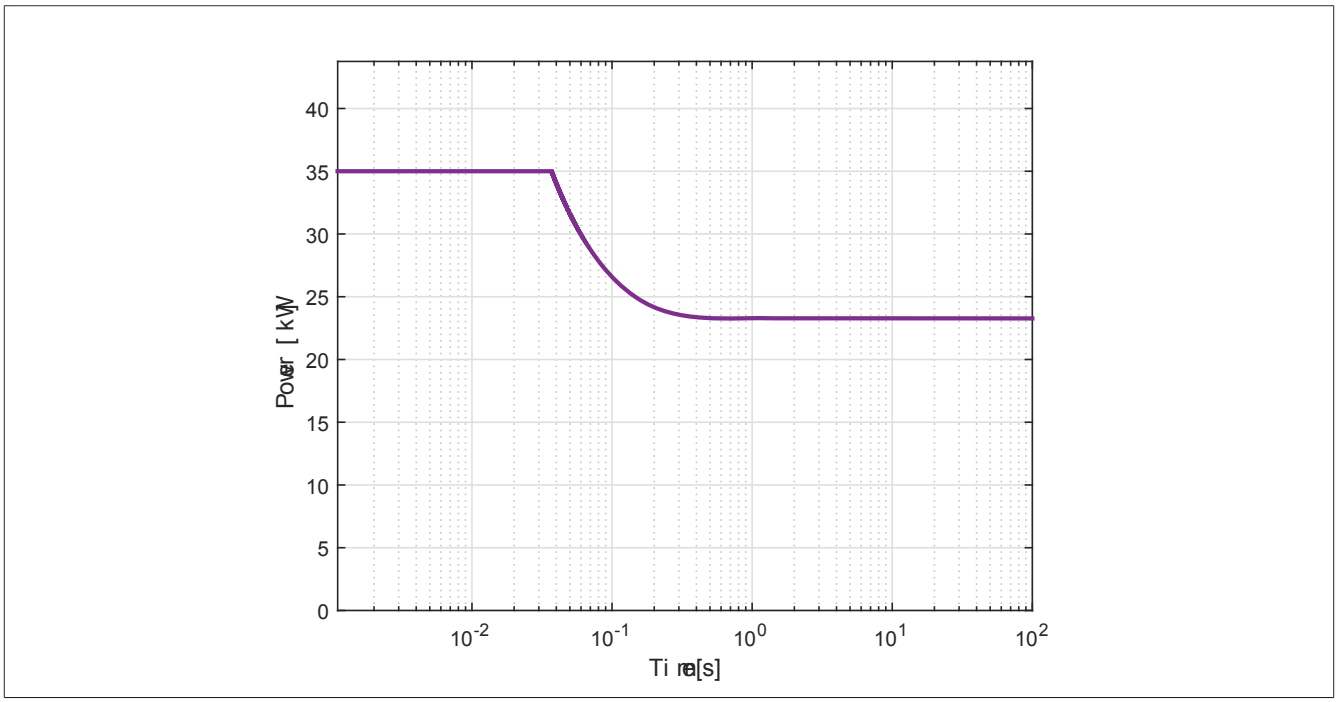


Figure 162: 8EI013/017H... - Peak load capacity

8EI022/024/034/044H...

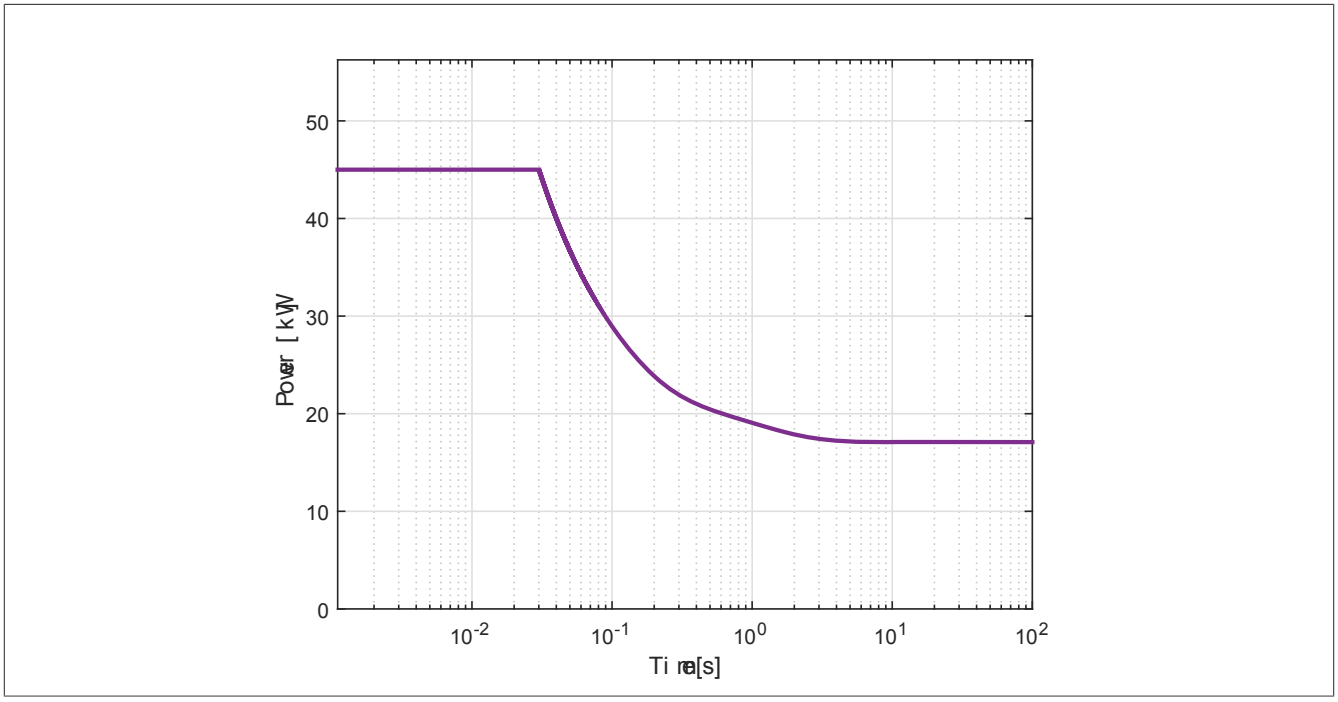


Figure 163: 8EI022/024/034/044H... - Peak load capacity

Appendix D UL Markings

- Max. surrounding air temperature is 55°C.
- Use 75°C wires only at 55°C surrounding air temperature.
  Use 60°C / 75°C wires only at 40°C surrounding air temperature.
- Use copper conductors only.
- Suitable for use on a circuit capable of delivering not more than 5000 rms symmetrical Amperes, 480 Volts maximum, when protected by:

  a) J Class fuses rated maximum as described in table below or
  b) A circuit breaker having an interrupting rating not less than 5000 rms symmetrical Amperes, 480 Volts maximum, rated maximum as described in table below.

  Models 1X6, 2X2, 4X5, 8X8 are additionally suitable for use on a circuit capable of delivering not more than 5000 ADC, 120 VDC Maximum, when Protected by:

  a) J Class fuses rated maximum as described in table below and suitable for DC or
  b) A circuit breaker having an interrupting rating not less than 5000 ADC, 120 VDC maximum, rated maximum as described in table below and suitable for DC.

Drive output rating [A]	Type of branch circuit protective device	Maximum current rating [A]
1X6 2X2 4X5 8X8 013 017HxS	Class CC, J fuse	45 A
	Circuit breaker	32 A
017HxD 022HxD 024 034 044	Class CC, J fuse	80 A
	Circuit breaker	32 A

- ACOPOS P3 may be supplied via common DC bus from listed ACOPOSmulti devices when protected by R/C (JFHR2) fuse 50 201 06, or 50 118 06, manufactured by Siba (installed in dc+ and dc-).
- ACOPOS P3 may be supplied via DC bus from listed ACOPOS P3 devices when protected by J, CC Class fuses or circuit breaker (installed in AC mains).
- ACOPOS P3 1X6, 2X2, 4X5, 8X8 may be supplied via 24-120 VDC at supply terminals (L1, L2) when protected by fuses installed in DC+ and DC-.
- Motor overtemperature sensing is not provided by the drive.
- Integral solid state short circuit protection does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the Manufacturer Instructions, National Electrical Code and any additional local codes.
- For use in Pollution Degree 2 Environment only, Overvoltage Category III
- Max. altitude:
  - max. 4000 m when supplied from wye sources where the max. voltage to ground does not exceed 277 V
  - max. 2000 m when supplied from delta sources where the max. voltage to ground exceeds 277 V
- For 8EXF400 and 8EXF500 and 8B0M0040HFF0 in combination with push-through heatsink 8EMF and Enclosure Type 12 rating only:
  Suitable for connection to isolated power supply rated 24 VDC only. Fuse rated max. 4 A shall be connected between the power source and device supply input.
- For models provided with liquid-cooled heatsink 8EMC only: Maximum working pressure 5bar.
- Level of motor overload protection level is indicated in the user manual.
- The protective earthing conductor shall be sized as specified in Article 250.122 and table 250.122 of the National Electrical Code, ANSI/NFPA 70.

Appendix E ACOPOS P3 cable assignments

E.1 Motors

E.1.1 8LS motors

8LS...-3, 8LSN...-0

Motor connections					Cables		Servo drive
Figure	Name		Variant	Type	Order number [1]	Wire cross section [2]	Order number
	Power connection		Built-in connector	speedtec size 1.0 Series 923	--- [3]	0.75 mm²	8EI1X6xxSxx.xxxx-1 8EI2X2xxxxx.xxxx-1 8EI4X5xxxxx.xxxx-1 8EI8X8xxxxx.xxxx-1
					8ECMxxxx.1111C-0	1.5 mm²	
					8ECMxxxx.1312C-0	4 mm²	8EI013xxSxx.xxxx-1 8EI017xxSxx.xxxx-1 8EI017xxDxx.xxxx-1 8EI022xxDxx.xxxx-1 8EI024xxSxx.xxxx-1 8EI034xxSxx.xxxx-1 8EI044xxSxx.xxxx-1
				speedtec size 1.5 Series 940	8ECMxxxx.1523C-0	10 mm²	8EI024xxSxx.xxxx-1 8EI034xxSxx.xxxx-1 8EI044xxSxx.xxxx-1
	Encoder connec-tion	EnDat 2.2	Built-in connector	itec/ytec Series 615	8ECFxxxx.1221C-0	---	All 8EI servo drives
		Resolver		speedtec size 1.0 Series 623	8ECRxxxx.1111C-0		
	Hybrid connection [4]		Built-in connector	speedtec size 1.0 Series 723	8ECHxxxx.1111A-0	1.5 mm²	8EI1X6xxSxx.xxxx-1 8EI2X2xxxxx.xxxx-1 8EI4X5xxxxx.xxxx-1 8EI8X8xxxxx.xxxx-1
					8ECHxxxx.1312A-0	4 mm²	8EI013xxSxx.xxxx-1 8EI017xxSxx.xxxx-1 8EI017xxDxx.xxxx-1 8EI022xxDxx.xxxx-1 8EI024xxSxx.xxxx-1 8EI034xxSxx.xxxx-1 8EI044xxSxx.xxxx-1

Table 343: 8LS...-3, 8LSN...-0 motors - Assignment of motor connections / cables / ACOPOS P3 8EI servo drives

1) xxx/xxxx ... Cable length (005/0005 corresponds to 5 m, 020/0020 to 20 m, etc.). For available cable lengths, see the B&R website.
2) Wire cross section of the power conductors. The stall current of the respective motor and method used to install the respective cable must be taken into account for the wire cross section.
3) Assembly not available - use 8ECMxxxx.1111C-0.
4) Not for 8LSN... motors.

E.1.2 8LT motors

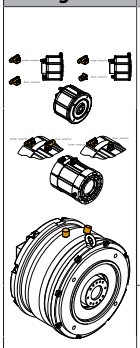
Motor connections					Cables		Servo drive
Figure	Name		Variant	Type	Order number [1]	Wire cross section [2]	Order number
	Power connection		Built-in connector	speedtec size 1.0 Series 923	8ECMxxxx.1111C-0	1.5 mm²	8EI1X6xxSxx.XXXX-1 8EI2X2xxxxx.XXXX-1 8EI4X5xxxxx.XXXX-1 8EI8X8xxxxx.XXXX-1
					8ECMxxxx.1312C-0	4 mm²	8EI013xxSxx.XXXX-1 8EI017xxSxx.XXXX-1 8EI017xxDxx.XXXX-1 8EI022xxDxx.XXXX-1 8EI024xxSxx.XXXX-1 8EI034xxSxx.XXXX-1 8EI044xxSxx.XXXX-1
	Encoder connec-tion	EnDat 2.2	Built-in connector	itec/ytec Series 615	8ECFxxxx.1221C-0	---	All 8EI servo drives
		Resolver		speedtec size 1.0 Series 623	8ECRxxxx.1111C-0		

Table 344: 8LT motors - Assignment of motor connections / cables / ACOPOS P3 8EI servo drives

1) xxx/xxxx ... Cable length (005/0005 corresponds to 5 m, 020/0020 to 20 m, etc.). For available cable lengths, see the B&R website.
2) Wire cross section of the power conductors. The stall current of the respective motor and method used to install the respective cable must be taken into account for the wire cross section.

E.1.3 8LV motors

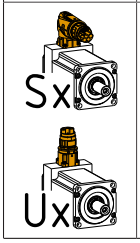
Motor connections					Cables		Servo drive
Figure	Name		Variant	Type	Order number [1]	Wire cross section [2]	Order number
	Power connection		Built-in connector	itec/ytec Series 915	8ECMxxxx.1031C-0	0.75 mm²	8EI1X6MxSxx.XXXX-1 8EI2X2Mxxxx.XXXX-1 8EI4X5Mxxxx.XXXX-1 8EI8X8Mxxxx.XXXX-1
	Encoder connec-tion	EnDat 2.2	Built-in connector	itec/ytec Series 615	8ECFxxxx.1221C-0	---	All 8EI servo drives
		Resolver			8ECRxxxx.1121C-0		
	Hybrid connection		Built-in connector	speedtec size 1.0 Series 723	8ECHxxxx.1111A-0	1.5 mm²	8EI1X6MxSxx.XXXX-1 8EI2X2Mxxxx.XXXX-1 8EI4X5Mxxxx.XXXX-1 8EI8X8Mxxxx.XXXX-1

Table 345: 8LV motors - Assignment of motor connections / cables / ACOPOS P3 8EI servo drives

1) xxx/xxxx ... Cable length (005/0005 corresponds to 5 m, 020/0020 to 20 m, etc.). For available cable lengths, see the B&R website.
2) Wire cross section of the power conductors. The stall current of the respective motor and method used to install the respective cable must be taken into account for the wire cross section.

E.1.4 8LW motors

Motor connections					Cables		Servo drive
Figure	Type		Variant	Type	Order number [1]	Wire cross section [2]	Order number
	Power connection		Built-in connector	itec/ytec Series 915	8ECMxxxx.1031C-0	0.75 mm²	8EI1X6MxSxx.XXXX-1 8EI2X2MxxxxSxx.XXXX-1 8EI4X5MxxxxSxx.XXXX-1 8EI8X8MxxxxSxx.XXXX-1
	Encoder connection	EnDat 2.2	Built-in connector	itec/ytec Series 615	8ECFxxxx.1221C-0	---	All 8EI servo drives
		Resolver	Built-in connector	itec/ytec Series 615	8ECRxxxx.1121C-0		
	Hybrid connection		Built-in connector	speedtec size 1.0 Series 723	8ECHxxxx.1111A-0	1.5 mm²	8EI1X6MxSxx.XXXX-1 8EI2X2MxxxxSxx.XXXX-1 8EI4X5MxxxxSxx.XXXX-1 8EI8X8MxxxxSxx.XXXX-1

Table 346: 8LW motors - Assignment of motor connections / cables / ACOPOS P3 8EI servo drives

1) xxx/xxxx ... Cable length (005/0005 corresponds to 5 m, 020/0020 to 20 m, etc.). For available cable lengths, see the B&R website.
2) Wire cross section of the power conductors. The stall current of the respective motor and method used to install the respective cable must be taken into account for the wire cross section.

E.1.5 8JS motors

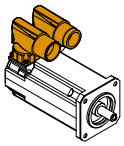
Motor connections					Cables		Servo drive
Figure	Name		Variant	Type	Cables [1]	Wire cross section [2]	Order number
	Power connection		Built-in connector	speedtec size 1.0 Series 923	8ECMxxxx.1111C-0	1.5 mm²	8EI1X6xxSxx.XXXX-1 8EI2X2xxxxxSxx.XXXX-1 8EI4X5xxxxxSxx.XXXX-1 8EI8X8xxxxxSxx.XXXX-1
					8ECMxxxx.1312C-0	4 mm²	8EI013xxSxx.XXXX-1 8EI017xxSxx.XXXX-1 8EI017xxDxx.XXXX-1 8EI022xxDxx.XXXX-1 8EI024xxSxx.XXXX-1 8EI034xxSxx.XXXX-1 8EI044xxSxx.XXXX-1
	Encoder connection	EnDat 2.1	Built-in connector	speedtec size 1.0 Series 623	8ECG00X4.3151D-0 + 8BCExxxx.1111A-0	---	All 8EI servo drives
		Resolver			8ECRxxxx.1111C-0		

Table 347: 8JS motors - Assignment of motor connections / cables / ACOPOS P3 8EI servo drives

1) xxx/xxxx ... Cable length (005/0005 corresponds to 5 m, 020/0020 to 20 m, etc.). For available cable lengths, see the B&R website.
2) Wire cross section of the power conductors. The stall current of the respective motor and method used to install the respective cable must be taken into account for the wire cross section.

E.1.6 8KS motors

Information:

No suitable 8EI servo drive is available for 8KS motors.