

8EI017HCSS0.XXXX-1

1 Order data

Order number	Short description	Figure
	1-axis modules SafeMOTION	
8EI017HCSS0.XXXX-1	ACOPOS P3 servo drive, 3x 200-480 VAC, 17 A, SafeMOTION EnDat 2.2, 1 axis, AS, cold plate or pass-through 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 cover, B&R orange, single-width, height 2	
8EXA200.0020-00	ACOPOS P3 cover, B&R dark gray, single-width, height 2	
	Passive line filter	
8B0F0160H000.A00-1	Passive line filter, 16 A, 3x 480 VAC, 50/60 Hz, IP20	
8B0F0300H000.000-1	Passive line filter, 30 A, 3x 520 VAC, 50/60 Hz, IP20	
8B0F0550H000.000-1	Passive line filter, 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 component set, type SK14	
8SCSE02.0200-00	ACOPOS P3 shield component set: 1x shield component set, type SK20	
	Terminals	
8TB2104.2210-00	Push-in terminal block 4-pin, 1-row, pitch: 5.08 mm, label 1: numbered consecutively	
8TB3102.222C-20	Push-in terminal block, 2-pin, single row, with locking mechanism, spacing: 7.62 mm, label 2: COM 24 V, C keying: 10	
8TB3103.222A-20	Push-in terminal block, 3-pin, 1-row, spacing: 7.62 mm, label 2: PE RB- RB+, A keying: 000	
8TB3106.222B-20	Push-in terminal block, 6-pin, single row, with locking mechanism, spacing: 7.62 mm, label 2: PE L3 L2 L1 DC- DC+, B keying: 000001	
8TB3202.222C-40	Push-in terminal block, 2-pin, 2-row, with locking mechanism, spacing: 7.62 mm, label 2: COM 24 V, C keying: 10	
8TB3206.222B-40	Push-in terminal block, 6-pin, 2-row, with locking mechanism, spacing: 7.62 mm, label 2: PE L3 L2 L1 DC- DC+, C keying: 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	

Table 1: 8EI017HCSS0.XXXX-1 - Order data

2 Technical data

Order number	8EI017HCSS0.XXXX-1
General information	
Slots for plug-in modules	1
Certifications	
CE	In preparation
UL	In preparation
EAC	Yes
KC	In preparation
Mains connection	
Network configurations	TN-S, TN-C-S with grounded neutral
Mains input voltage	3x 200 VAC to 480 VAC ±10%
Frequency	50 / 60 Hz ±4%
Installed load	Max. 18 kVA

Table 2: 8EI017HCSS0.XXXX-1 - Technical data

Order number	8EI017HCSS0.XXXX-1
Inrush current	Max. 50 A
Switch-on interval	Typically 60 s
Integrated line filter per EN 61800-3, category C3	No ¹⁾
Terminal connection cross section	
Flexible and fine-stranded wires	
With wire end sleeves	0.25 to 4 mm ²
Approbation data	
UL/C-UL-US	24 to 8 AWG
CSA	24 to 8 AWG
Power dissipation at device nominal power without braking resistor	In preparation
Max. line length	3 m ²⁾
DC bus connection	
Continuous power ³⁾	8.5 kW
Reduction of continuous power depending on mains input voltage	
Mains input voltage <3x 400 VAC	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 mm ²
Approbation data	
UL/C-UL-US	24 to 8 AWG
CSA	24 to 8 AWG
Max. line length	3 m ⁴⁾
24 VDC power supply	
Input voltage	24 VDC ±25%
Input capacitance	5500 µF
Current consumption	1.2 A + Current for motor holding brake ⁵⁾
Terminal connection cross sections	
Flexible and fine-stranded wires	
With wire end sleeves	0.25 to 4 mm ²
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 ⁶⁾	8.5 kW
Continuous current per motor connection ⁶⁾	17 A _{eff}
Reduction of continuous current depending on switching frequency and mounting type	
Switching frequency 5 kHz	
Cold plate mounting	In preparation
Feed-through mounting	In preparation
Switching frequency 10 kHz	
Cold plate mounting	In preparation
Feed-through mounting	In preparation
Switching frequency 20 kHz	
Cold plate mounting	In preparation
Feed-through mounting	In preparation
Reduction of continuous current depending on installation elevation	
Starting at 500 m above sea level	1.7 A _{eff} per 1000 m
Peak current per motor connection	42.5 A _{eff}
Peak power output	21.25 kW
Nominal switching frequency	5 kHz
Possible switching frequencies ⁷⁾	5 / 10 / 20 kHz
Insulation stress of the connected motor per IEC TS 60034-25:2004	Limit value curve A
Protective measures	
Overload protection	Yes
Short circuit and ground fault protection	Yes
Max. output frequency	598 Hz ⁸⁾
Variant	
U, V, W, PE	Connector
Shield connection	Yes
Terminal connection cross section	
Flexible and fine-stranded wires	
With wire end sleeves	1.5 to 6 mm ²
Approbation data	
UL/C-UL-US	24 to 8 AWG
CSA	24 to 8 AWG

Table 2: 8EI017HCSS0.XXXX-1 - Technical data

Order number	8EI017HCSS0.XXXX-1
Max. motor cable 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 ⁹⁾	Depends on the input voltage on connector X2
Continuous current	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
Protective measures	
Overload and short-circuit protection	Yes
Open circuit monitoring	Yes
Undervoltage monitoring	Yes
Response threshold for open circuit monitoring	In preparation
Response threshold for undervoltage monitoring	Approx. 23 V
Max. line length	75 m ¹⁰⁾
Braking resistor ¹¹⁾	
Peak power output	In preparation
Continuous power	4 kW
Minimum braking resistance (ext.)	25 Ω
Terminal connection cross section	
Flexible and fine-stranded wires	
With wire end sleeves	0.25 to 4 mm ²
Approbation data	
UL/C-UL-US	24 to 8 AWG
CSA	24 to 8 AWG
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 ¹²⁾
Connections	8-pin female Mini I/O connector
Status indicators	None ¹³⁾
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 ¹⁴⁾
Encoder power supply	
Output voltage	Configurable Typ. 11.45 V ±0.1 V / 5.2 V ±0.1 V ¹⁵⁾¹⁶⁾
Load capacity	Max. 300 mA
Protective measures	
Short-circuit proof	Yes
Overload-proof	Yes
Synchronous serial interface	
Signal transmission	RS485 ¹⁷⁾
Data transfer rate	Depends on the configured encoder type
Differential voltage ¹⁸⁾	
Minimum	2.0 V
Maximum	6.0 V
Max. power consumption per encoder interface	$P_{\text{ENCODER}} [\text{W}] = U_{24\text{V}} [\text{V}] * (I_{\text{ENCODER}} [\text{A}] * 0.7) + 0.5 \text{ W}$ ¹⁹⁾
Trigger inputs	
Quantity	2
Circuit	Sink
Electrical isolation	
Input - ACOPOS P3	Yes
Input - Input	Yes
Input voltage	
Nominal	24 VDC
Maximum	30 VDC

Table 2: 8EI017HCSS0.XXXX-1 - Technical data

Order number	8EI017HCSS0.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 sleeves	0.25 to 2.5 mm ²
Approbation data	
UL/C-UL-US	26 to 12 AWG
CSA	26 to 12 AWG
Max. line length	100 m
Support	
Motion system	
mapp Motion	5.03.0 and higher
ACP10/ARNC0	5.03.0 and higher
Electrical properties	
Energy efficiency (IE classification) ²⁰⁾	
Efficiency data	IE2 (10,25) 1.2% IE2 (50,25) 1.3% IE2 (10,50) 1.5% IE2 (50,50) 1.5% IE2 (90,50) 1.7 % IE2 (10,100) 2.2% IE2 (50,100) 2.4% IE2 (90,100) 2.9%
Nominal losses in standby mode	13.5 W
Operating conditions	
Permissible mounting orientations	
Hanging vertically	Yes
Horizontal, face up	No
Standing horizontally	No
Installation elevation above sea level	
Nominal	0 to 500 m
Maximum	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 ²¹⁾
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 %, non-condensing
Storage	5 to 95%
Transport	95% at 40°C
Mechanical properties	
Dimensions ²²⁾	
Width	66 mm
Height	374 mm
Depth	
Cold plate	281.5 mm (with 8EXA front cover: 284 mm)
Feed-through mounting	277.5 mm (with 8EXA front cover: 280 mm)
Weight	5 kg

Table 2: 8EI017HCSS0.XXXX-1 - Technical data

- 1) A line filter must be connected.
CE compliance can only be ensured by connecting a B&R line filter (8x0F...).
In extreme cases, using line filters from 3rd-party manufacturers can result in irreparable damage to the ACOPOS P3 8EI servo drive.
- 2) Maximum line length between line filter and mains connection on the module.
- 3) 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.
- 4) This value applies to unshielded wiring inside a control cabinet.
Maximum length of the DC bus wiring inside a control cabinet.
- 5) 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.
- 6) 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.
- 7) 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.

3.3 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 4: POWERLINK - LED status indicators

3.4 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: <ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> Permanent overcurrent Invalid data in EPROM
			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 5: Ax1/Ax2/Ax3 - LED status indicators

3.5 R/E and SE - LED status indicators

LED	Color	Description	
R/E	Green		
	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. This is only distinguishable when the front cover is open, however.	

Table 6: R/E and SE - LED status indicators

4 Installation

4.1 8EI017HCSxx.xxxx-1 - Dimension diagram

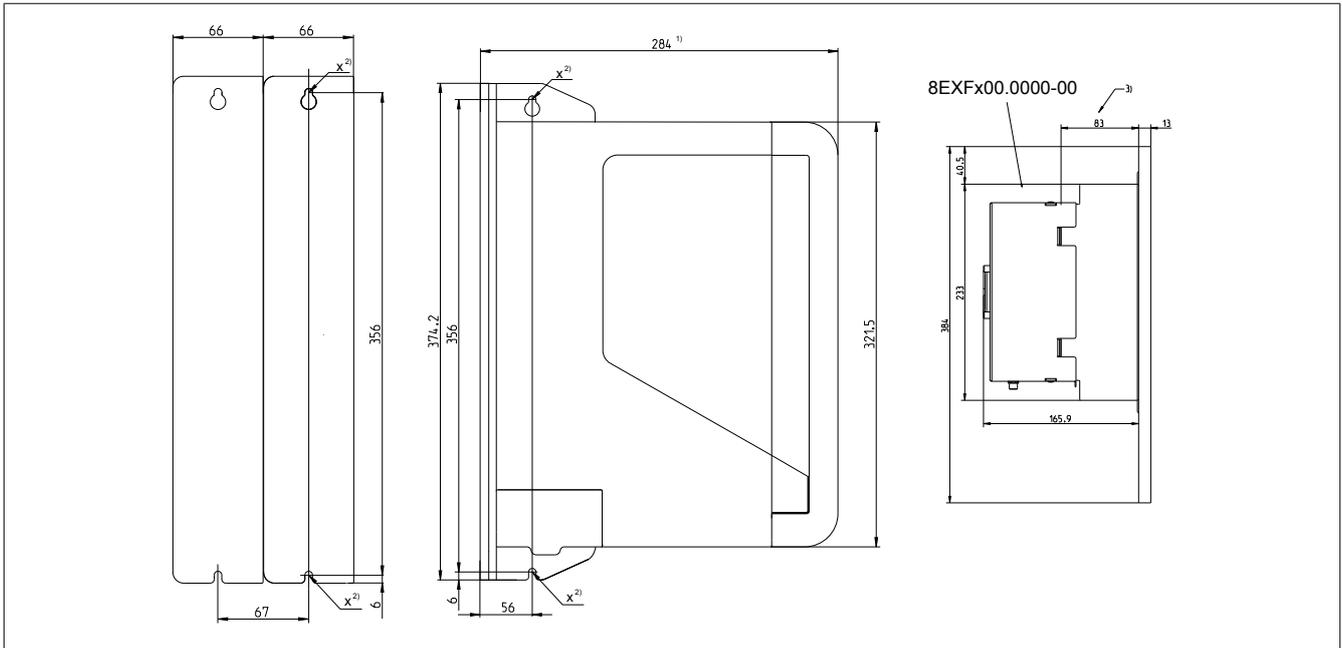


Figure 2: 8EI017HCSxx.XXXX-1 - Dimension diagram

- 1) Without front cover: 281.5 mm
- 2) Hole for M5 screws.
- 3) Fin depth of the feed-through heat sink without installed fan 8EXFx00.0000-00

Cold plate mounting	Feed-through mounting
<p>Permissible mounting orientations</p> <p>Hanging vertically</p>	<p>Permissible mounting orientations</p> <p>Hanging vertically</p>
<p>Impermissible mounting orientations</p> <p>Standing horizontally</p> <p>Horizontal, face up</p>	<p>Impermissible mounting orientations</p> <p>Standing horizontally</p> <p>Horizontal, face up</p>

Table 7: Permissible and impermissible mounting orientations

Information:

When mounting ACOPOS P3 modules for cold-plate or feed-through mounting, be sure not to scratch the backplane. This can impair thermal dissipation to the mounting plate.

4.2 Installation dimensions

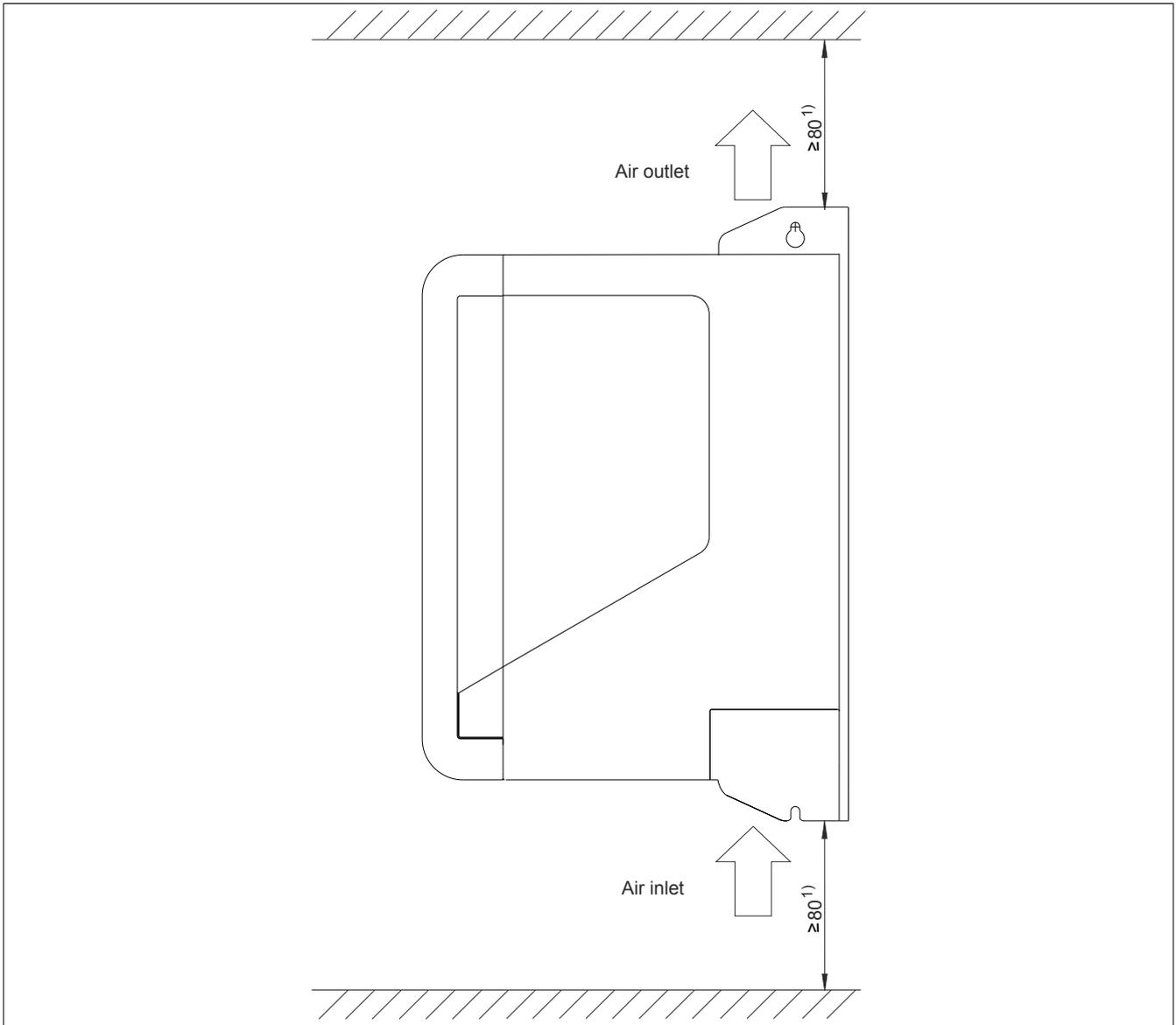


Figure 3: ACOPOS P3 8EI servo drives - Installation dimensions

- 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, at least 100 mm clearance is necessary above the module.
 In order to ensure easy wiring (taking all minimum bend radii into account), at least 200 mm clearance 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!

5.2 Connector X1 - Pinout

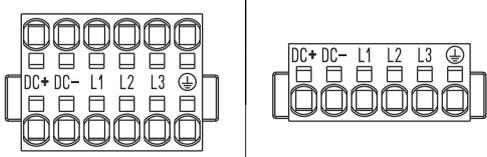
X1		Description	Function
		DC+	DC bus connection DC+
		DC-	DC bus connection DC-
		L1	Mains connection L1
		L2	Mains connection L2
		L3	Mains connection L3
		PE	Protective ground conductor

Table 8: Connector X1 - Pinout

Warning!

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

5.2.1 Mains connection

3x 200 - 480 VAC

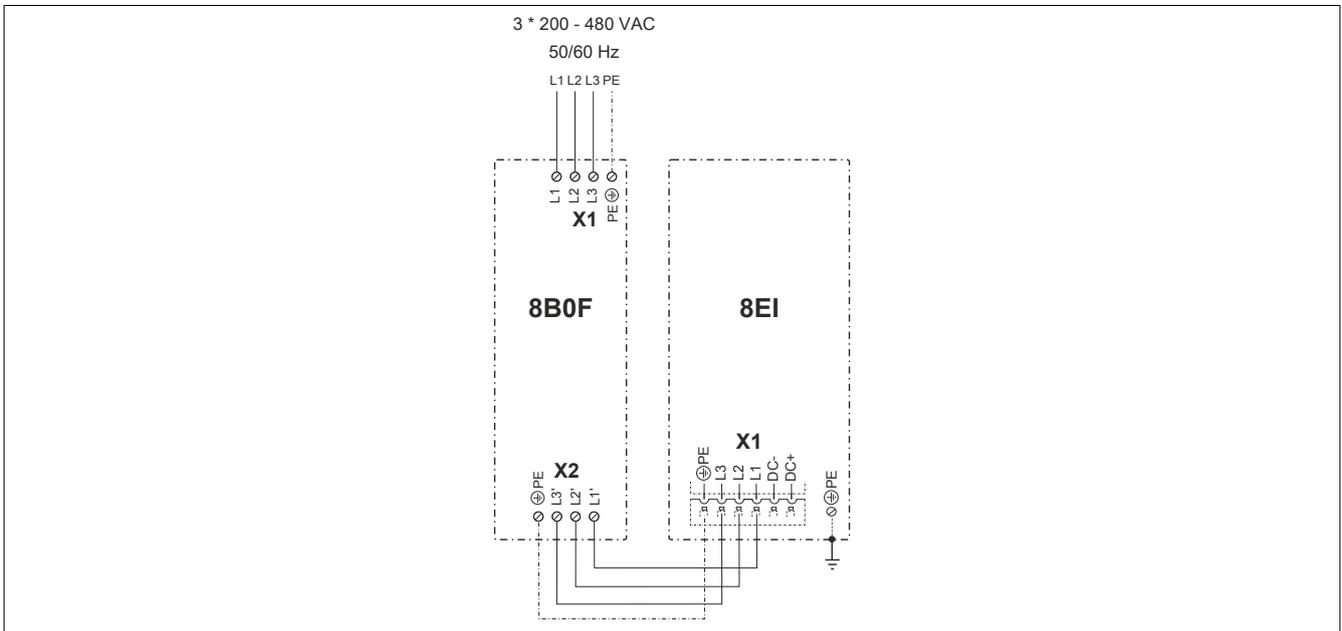


Figure 5: Mains connection 3x 200 - 480 VAC

5.3 Connector X2 - Pinout

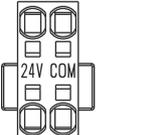
X2		Name	Function
		COM	0 V power supply
		24 V	+24 V power supply

Table 9: Connector X2 - Pinout

5.4 Connectors X3A, X3B - Pinout

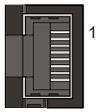
X3A, X3B	Pin	Name	Function
	1	RXD	Receive signal
	2	RXD\	Receive signal inverted
	3	TXD	Transmit signal
	4	Shield	Shield
	5	Shield	Shield
	6	TXD\	Transmit signal inverted
	7	Shield	Shield
	8	Shield	Shield

Table 10: X3A, X3B connectors - Pinout

5.5 SafeMOTION connector X4x - Pinout

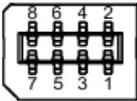
X4x	Pin	Description	Function depending on configured encoder type			
			EnDat SafeMOTION	EnDat 2.2	SSI	BISS
	1	U+	Encoder power supply +			
	2	T	Clock output			
	3	---			Sense input +5 V ¹⁾	
	4	T\	Clock output inverted			
	5	---			Sense input 0 V ¹⁾	
	6	D	Data			
	7	COM	Encoder power supply 0 V			
	8	D\	Data inverted			

Table 11: Connector X4x - Pinout

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

5.6 Connector X53 - Pinout

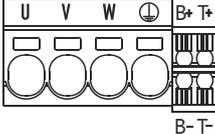
X53	Description	Function
	B+	Brake +
	B-	Brake -
	T+	Temperature sensor + ¹⁾
	T-	Temperature sensor - ¹⁾
	PE	Protective ground conductor
	U	Motor connection U
	V	Motor connection V
	W	Motor connection W

Table 12: Connector X53 - 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 transferred 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.

5.7 Connector X6 - Pinout

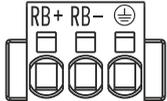
X6	Name	Function
	PE	Protective ground conductor
	RB-	Braking resistor -
	RB+	Braking resistor +

Table 13: 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.

5.8 Connector X8 - Pinout

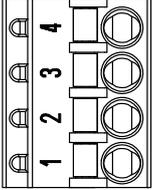
X8	Pin	Name	Function
	1	Trigger 1	Trigger 1
	2	COM (1)	Trigger 1 0 V
	3	Trigger 2	Trigger 2
	4	COM (2)	Trigger 2 0 V

Table 14: Connector X8 - Pinout

5.9 Connector X10 - Pinout

In preparation

6 Setting POWERLINK node numbers

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 8EAD0000.0000-00 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 "Accessories / Display module 8EAD0000.000-1" in the ACOPOS P3 user's manual.