# 8EI2X2HWSS0.XXXX-1

## 1 Order data

| Order number | Short description | Figure |
|---|---|---|
| | **Wall mounting** |  |
| 8EI2X2HWSS0.XXXX-1 | ACOPOS P3 servo drive, 3x 200-480 VAC, 2.2 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 | |
| | **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 | |
| | **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 | |
| | **Terminal blocks** | |
| 8TB2104.2210-00 | 4-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| | **Terminals** | |
| 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: 8EI2X2HWSS0.XXXX-1 - Order data

# 2 Technical data

| Order number | 8EI2X2HWSS0.XXXX-1 |
|---|---|
| **General information** | |
| Slots for plug-in modules | 1 |
| Certifications | |
| CE | Yes |
| UL | cULus E225616<br>Power conversion equipment |
| EAC | Yes |
| KC | Yes |
| **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. 2.5 kVA |
| Inrush current | Max. 45 A |
| Switch-on interval | Typ. 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 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 | $[(40 + 6.9 * P_{AVG}\ [kW] + 7.5 * I_{AX1}\ [A] + 0.25 * I_{BR1}^2\ [A] + P_{VSLOT}) * 1.1]\ [W]$ [2] |
| Max. line length | 3 m [3] |
| **DC bus connection** | |
| Continuous power [4] | 1 kW [5] |
| Reduction of continuous power depending on mains input voltage | |
| Mains input voltage <3x 400 VAC | 1 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 [6] |
| **24 VDC power supply** | |
| Input voltage | 24 VDC ±25% |
| Input capacitance | 5500 µF |
| Current consumption | 0.9 A + Current for motor holding brake [7] |
| 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 [8] | 1 kW [5] |
| Continuous current per motor connection [8] | 2.2 $A_{eff}$ |
| Accuracy of the safe current [9] | |
| Safety function SLT [10] | |
| SIL 2 / PL d / Cat. 3 [11] | Hardware upgrade 1.10.2.x: 1.523 A<br>Hardware upgrade 1.10.3.0 or later: 1.222 A |
| SIL 2 / PL d / Cat. 2 [11] | 0.539 A |
| Safety function SBT [10] | |
| SIL 2 / PL d / Cat. 3 [11] | Hardware upgrade 1.10.2.x: 1.441 A<br>Hardware upgrade 1.10.3.0 or later: 1.136 A |
| SIL 2 / PL d / Cat. 2 [11] | 0.470 A |
| Reduction of continuous current depending on switching frequency [12] | |
| Switching frequency 5 kHz | No reduction |
| Switching frequency 10 kHz | No reduction |
| Switching frequency 20 kHz | No reduction |
| Reduction of continuous current depending on installation elevation | |
| Starting at 500 m above sea level | 0.22 $A_{eff}$ per 1000 m |
| Peak current per motor connection | 6 $A_{eff}$ |

Table 2: 8EI2X2HWSS0.XXXX-1 - Technical data

| Order number | 8EI2X2HWSS0.XXXX-1 |
|---|---|
| Peak power output | 2.5 kW |
| Nominal switching frequency | 5 kHz |
| Possible switching frequencies [13] | 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 [14] |
| 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 mm² |
| Approbation data | |
| UL/C-UL-US | 24 to 8 AWG |
| CSA | 24 to 8 AWG |
| Max. motor cable length depending on switching frequency | |
| Switching frequency 5 kHz | 75 m [15] |
| Switching frequency 10 kHz | 38 m [15] |
| Switching frequency 20 kHz | 19 m [15] |
| **Motor holding brake connection** | |
| Quantity | 1 |
| Output voltage [16] | Depends on the input voltage on connector X2 |
| Continuous current | 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 |
| 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 [17] |
| **Braking resistor [18]** | |
| Peak power int./ext. | 7 kW / 25 kW |
| Continuous power int./ext. | 100 W / 2 kW |
| Minimum braking resistance (ext.) | 25 Ω |
| Terminal connection cross section | |
| 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 |
| Protective measures | |
| Overload protection | No |
| Short circuit and ground fault protection | Short-circuit protection: Yes<br>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 [19] |
| Connections | 8-pin female Mini I/O connector |
| Status indicators | None [20] |
| Electrical isolation | |
| Encoder - ACOPOS P3 | No |
| Max. encoder cable length | 75 m<br>Depends on the cross section of the power supply wires in the encoder cable [21] |

Table 2: 8EI2X2HWSS0.XXXX-1 - Technical data

| Order number | 8EI2X2HWSS0.XXXX-1 |
|---|---|
| Encoder power supply | |
| Output voltage | Configurable<br>Typ. 11.45 V ±0.1 V / 5.2 V ±0.1 V [22)23)] |
| 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 [24)] |
| Data transfer rate | Depends on the configured encoder type |
| Differential voltage [25)] | |
| 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 [26)] |
| **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 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 | 100 m |
| **Support** | |
| Motion system | |
| mapp Motion | 5.03.0 and higher |
| ACP10/ARNC0 | 3.16.1 and higher |
| **Electrical properties** | |
| Energy efficiency (IE classification) [27)] | |
| Efficiency data | IE2 (10,25) 3%<br>IE2 (50,25) 3%<br>IE2 (10,50) 3.1%<br>IE2 (50,50) 3.2%<br>IE2 (90,50) 3.3%<br>IE2 (10,100) 3.5%<br>IE2 (50,100) 3.6%<br>IE2 (90,100) 4% |
| Nominal losses in standby mode | 12.2 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 |
| 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 [28)] |
| **Ambient conditions** | |
| Temperature | |
| Operation | |
| Minimum | -25°C [29)] |
| Nominal | 5 to 40°C |
| Maximum | 55°C |
| Storage | -25 to 55°C |
| Transport | -25 to 70°C |

Table 2: 8EI2X2HWSS0.XXXX-1 - Technical data

| Order number | 8EI2X2HWSS0.XXXX-1 |
|---|---|
| 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 2: 8EI2X2HWSS0.XXXX-1 - Technical data

1) A line filter must be connected.
CE compliance can only be ensured by connecting an upstream 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) $P_{AVG}$ ... 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
3) Maximum line length between line filter and mains connection on the module.
4) 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.
5) The continuous power is reduced as a percentage of the continuous current if the continuous current is subject to derating.
6) This value applies to unshielded wiring inside a control cabinet.
Maximum length of the DC bus wiring inside a control cabinet.
7) 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.
8) 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.
9) 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.
10) 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.
11) These values apply up to the continuous current specified in the technical data (taking into account the respective derating specifications).
12) The temperature specifications refer to the ambient temperature.
13) 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.
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) The sum of the cable lengths of all motor cables connected to this module is not permitted to exceed this value.
16) During configuration, it is necessary to check if the minimum voltage can be maintained on the holding brake with the specified input voltage and wiring. For the operating voltage range of the holding brake, see the user documentation for the motor being used.
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) The encoder type is not predefined from the factory. The encoder type necessary in each case must be configured in Automation Studio.
20) The direction of rotation of the encoder can be displayed on the 8EAD0000.000-1 display module.
21) 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)
22) 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.
23) 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)
24) Except encoder type HIPERFACE DSL.
25) Values valid for clock output and data input. Except encoder type HIPERFACE DSL.
26) $I_{ENCODER}$ ... Current consumption of the encoder
$U_{24V}$ ... Input voltage on the +24 VDC input of the module
27) The IE classification of the module is based on drive losses. This includes components such as EMC filters, etc. The efficiency data was determined at a switching frequency of 5 kHz (factory setting). Classification is performed at 90% of the frequency and at 100% of the 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.
28) 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.
29) 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.

# 3 Status indicators

## 3.1 SafeMOTION 1-axis modules




Figure 1: 8EI SafeMOTION servo drives - Status indicators

## 3.2 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 3: POWERLINK - LED status indicators

## 3.3 Ax1/Ax2/Ax3 - LED status indicators

| Label | Color | Function | Description | |
|---|---|---|---|---|
| Ax1<br>Ax2<br>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.<br>**Examples:**<br>• No signal on one or both enable inputs<br>• DC bus voltage outside the tolerance range<br>• Overtemperature on the motor (temperature sensor)<br>• Motor feedback not connected or defective<br>• Motor temperature sensor not connected or defective<br>• Overtemperature on the module (IGBT junction, heat sink, etc.)<br>• Disturbance on network |
| | Red | Error | Solid red | There is a permanent error on the module.<br>**Examples:**<br>• Permanent overcurrent<br>• 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 4: Ax1/Ax2/Ax3 - LED status indicators

### 3.3.1 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 5: LED state during startup

## 3.4 R/E and SE - LED status indicators

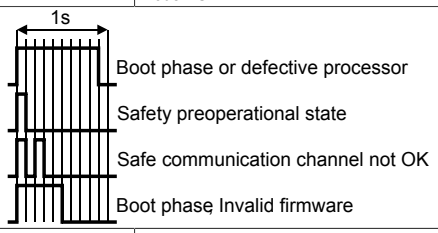
| LED | Color | | Description |
|---|---|---|---|
| R/E | Green | Red | |
| | Off | Off | Module not supplied with power, no communication |
| | Single flash | | Mode "Unlink" |
| | Double flash | | Updating firmware |
| | Blinking | | Mode PREOPERATIONAL |
| | On | | Mode RUN |
| | On | Single flash, 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. This is only distinguishable when the front cover is open, however. | | |

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

# 4 Installation

## 4.1 SafeMOTION 1-axis modules - Dimension diagram

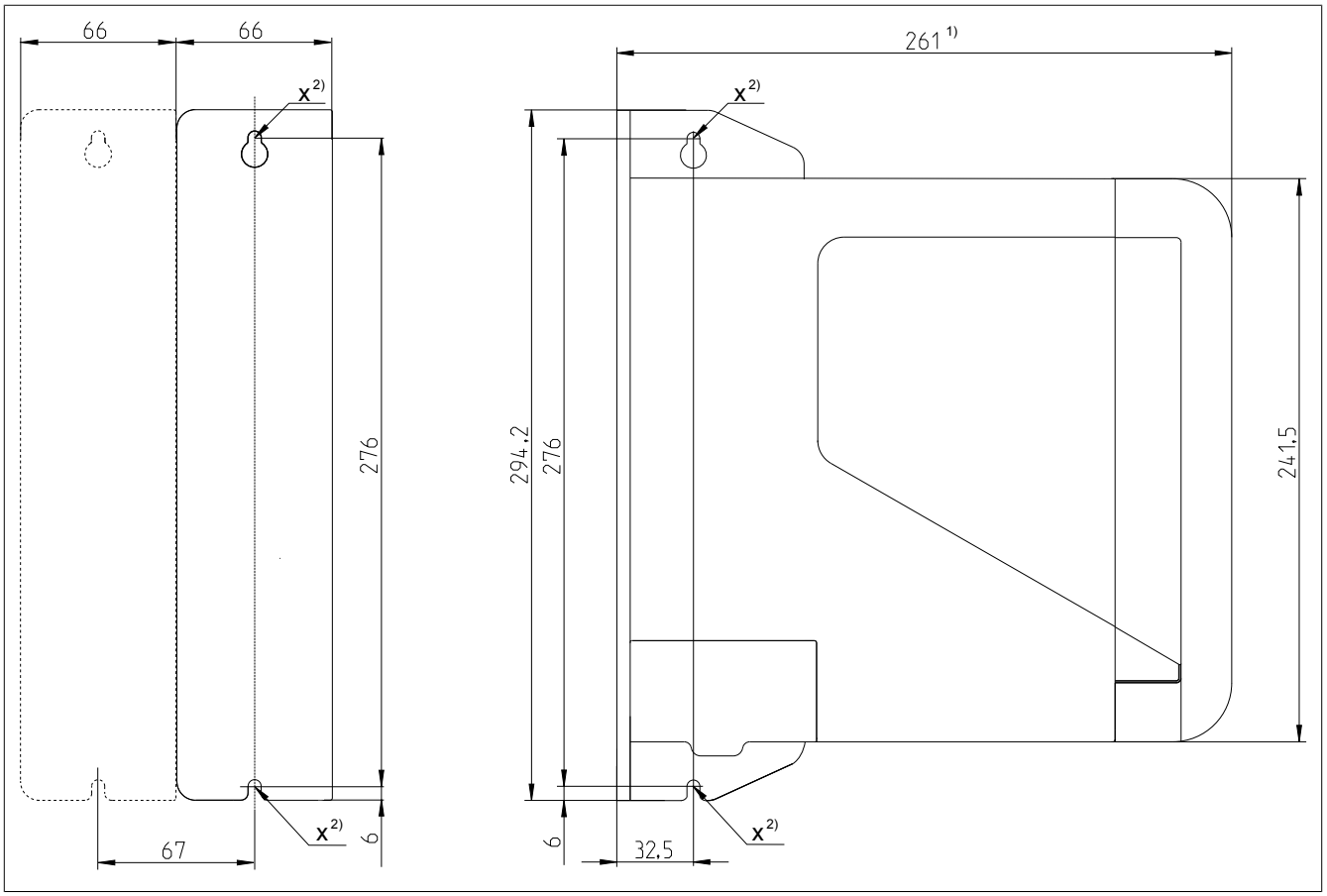



Figure 2: 8EI1X6xWSxx.xxxx-x / 8EI2X2xWSxx.xxxx-x / 8EI4X5xWSxx.xxxx-x / 8EI8X8xWSxx.xxxx-x - Dimension diagram

1) Without front cover: 258.5 mm
2) Hole for M5 screws

## 4.2 Installation dimensions

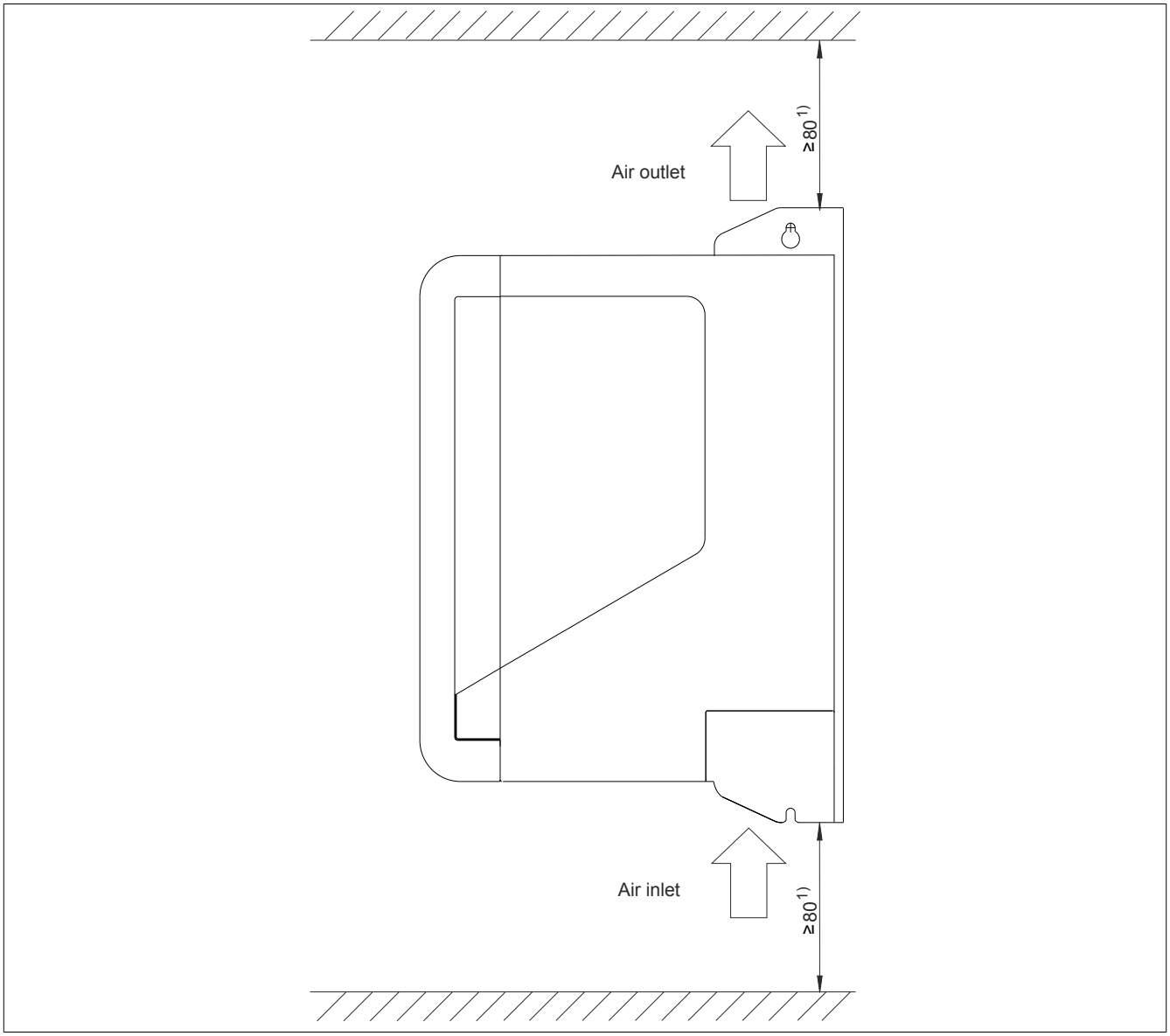



Figure 3: ACOPOS P3 8EI servo drives - Installation dimensions

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 Wiring

## 5.1 Pinout overview

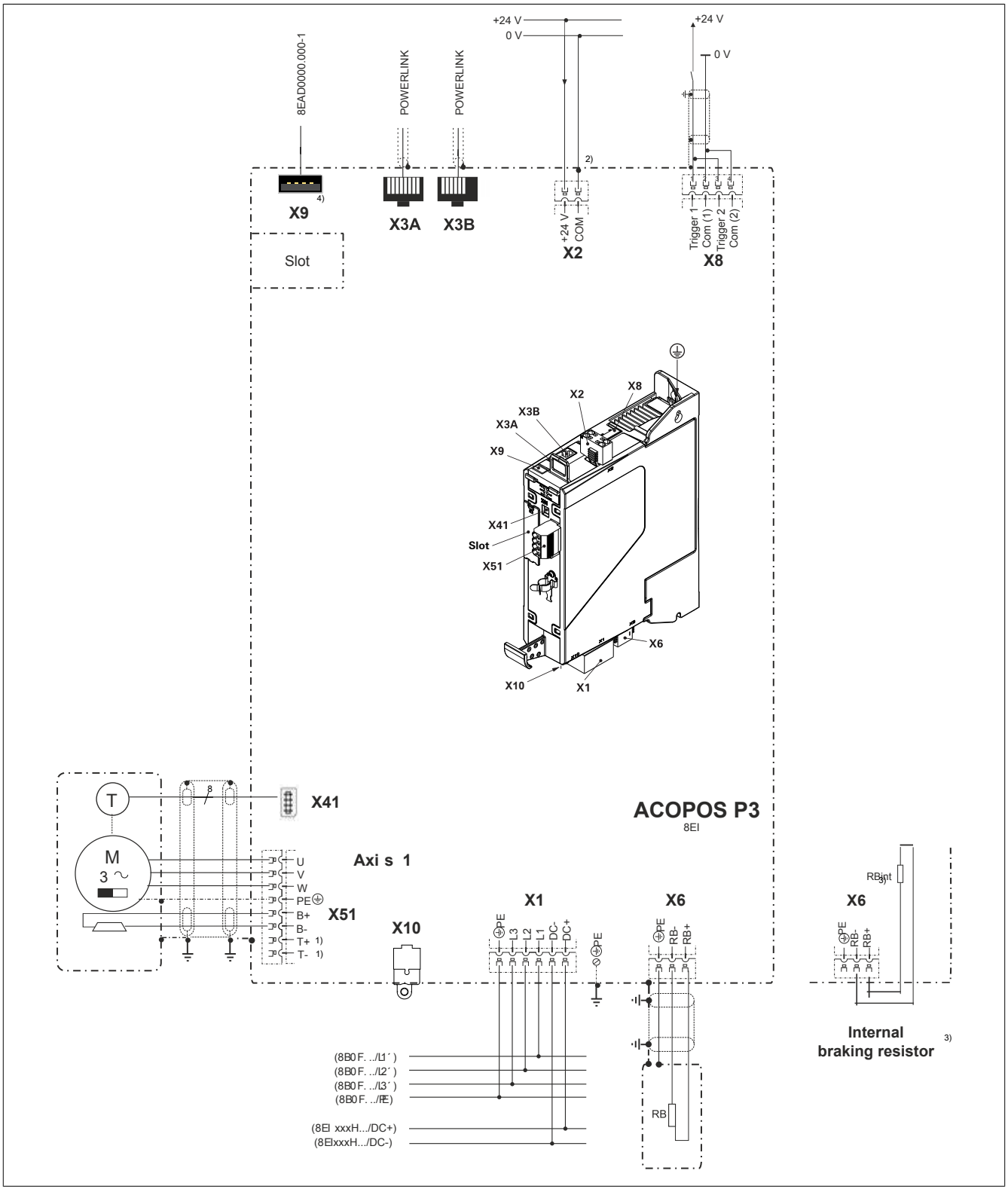



Figure 4: Mains input voltage - 3x 200 to 480 VAC

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 braking resistor!
4) Only 8EAD0000.000-1 display modules are permitted to be connected to connector X9!

## 5.2 Connector X1 - Pinout

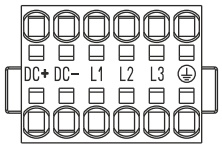
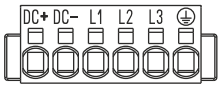
| X1 | | Description | Function |
|---|---|---|---|
|  |  | DC+ | DC bus connection DC+ |
| | | DC- | DC bus connection DC- |
| | | L1 | Mains connection L1 |
| | | L2 | Mains connection L2 |
| | | L3 | Mains connection L3 |
| | | PE | Protective ground conductor |

Table 7: 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

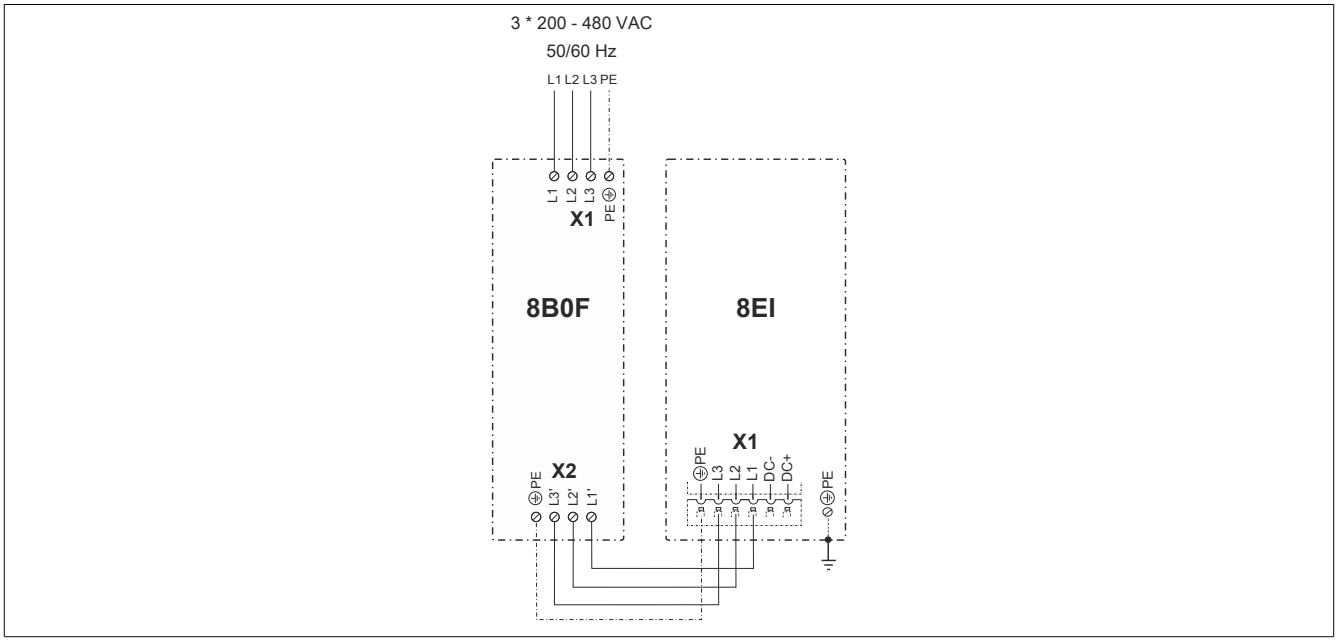



Figure 5: Mains connection 3x 200 - 480 VAC

## 5.3 Connector X2 - Pinout

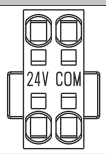
| X2 | | Name | Function |
|---|---|---|---|
|  |  | COM | 0 V power supply |
| | | 24 V | +24 V power supply |

Table 8: Connector X2 - Pinout

## 5.4 Connectors X3A, X3B - Pinout

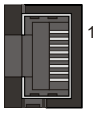
| X3A, X3B | Pin | Name | Function |
|---|---|---|---|
|  | 1 | RXD | Receive signal |
| | 2 | RXD\ | Receive signal inverted |
| | 3 | TXD | Transmit signal |
| | 4 | Shield | Shield |
| | 5 | Shield | Shield |
| | 6 | TXD\ | Transmit signal inverted |
| | 7 | Shield | Shield |
| | 8 | Shield | Shield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

Table 9: X3A, X3B connectors - Pinout

## 5.5 SafeMOTION connector X4x - Pinout

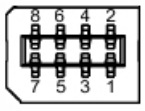
| X4x | Pin | Description | Function depending on configured encoder type | | | |
|---|---|---|---|---|---|---|
| | | | EnDat SafeMOTION | EnDat 2.2 | SSI | BiSS |
|  | 1 | U+ | Encoder power supply + | | | |
| | 2 | T | Clock output | | | |
| | 3 | --- | --- | | Sense input +5 V [1] | |
| | 4 | T\ |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

Table 10: Connector X4x - Pinout

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

## 5.6 Connector X5x - Pinout

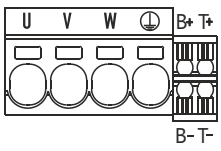
| X5x | Name | Function |
|---|---|---|
|  | B+ | Brake + |
| | B- | Brake - |
| | T+ | Temperature sensor + [1] |
| | T- | Temperature sensor - [1] |
| | PE | Protective ground conductor |
| | U | Motor connection U |
| | V | Motor connection V |
| | W | Motor connection W |

Table 11: 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**
3. **X53**

## 5.7 Connector X6 - Pinout

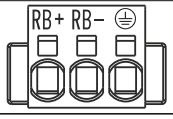
| X6 | Name | Function |
|---|---|---|
|  | PE | Protective ground conductor |
| | RB- | Braking resistor - |
| | RB+ | Braking resistor + |

Table 12: 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

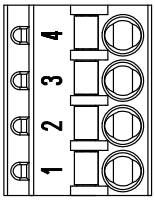
| X8 | Pin | Name | Function |
|---|---|---|---|
|  | 1 | Trigger 1 | Trigger 1 |
| | 2 | COM (1) | Trigger 1 0 V |
| | 3 | Trigger 2 | Trigger 2 |
| | 4 | COM (2) | Trigger 2 0 V |

Table 13: Connector X8 - Pinout

### 5.9 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.