# 8BVI0110HCD0.000-3

## 1 General information

- Integrated uncontrolled standstill and safe stop
- Integrated connection for motor holding brake and temperature sensor
- 2 slots for ACOPOSmulti plug-in modules
- Two fully independent power inverters in one inverter module contained in 2-axis modules
- Optimized for applications with decentralized, computationally intensive open-loop and closed-loop control requirements

## 2 Order data

| Model number | Short description | Figure |
|---|---|---|
| | **Cold plate or feed-through mounting** |  |
| 8BVI0110HCD0.000-3 | ACOPOSmulti3 inverter module, 15.1 A, HV, cold plate or feed-through mounting, 2 axes, optimized for applications with decentralized, computationally intensive open-loop and closed-loop control requirements | |
| | **Required accessories** | |
| | **Terminal block sets** | |
| 8BZVI0110D0.000-1A | Screw clamp set for ACOPOSmulti 8BVI0110HxD0 modules: 1x 8TB2112.2010-00, 1x 8TB2108.2010-00, 1x 8TB2104.203L-00, 1x 8TB2104.203F-00, 1x 8TB3104.204G-11, 1x 8TB3104.204K-11 | |
| | **Optional accessories** | |
| | **Accessory sets** | |
| 8BXB000.0000-00 | ACOPOSmulti accessory set for encoder buffering consists of the following: 1 lithium battery AA 3.6 V, 1 cover for battery compartment | |
| | **Fan modules** | |
| 8BXF001.0000-00 | ACOPOSmulti fan module, replacement fan for ACOPOSmulti modules (8BxP/8B0C/8BVI/8BVE/8B0K) | |
| | **Plug-in modules** | |
| 8BAC0120.000-1 | ACOPOSmulti plug-in module, EnDat 2.1 interface | |
| 8BAC0120.001-2 | ACOPOSmulti plug-in module, EnDat 2.2 interface | |
| 8BAC0121.000-1 | ACOPOSmulti plug-in module, HIPERFACE interface | |
| 8BAC0122.000-1 | ACOPOSmulti plug-in module, resolver interface 10 kHz | |
| 8BAC0123.000-1 | ACOPOSmulti plug-in module, incremental encoder and SSI absolute encoder interface for RS422 signals | |
| 8BAC0123.001-1 | ACOPOSmulti plug-in module, incremental encoder interface for 5 V single-ended and 5 V differential signals | |
| 8BAC0123.002-1 | ACOPOSmulti plug-in module, incremental encoder interface for 24 V single-ended and 24 V differential signals | |
| 8BAC0124.000-1 | ACOPOSmulti plug-in module, SinCos interface | |
| 8BAC0125.000-1 | ACOPOSmulti plug-in module, SinCos EnDat 2.1/SSI/BiSS interface | |
| 8BAC0130.000-1 | ACOPOSmulti plug-in module, 2 digital outputs, 50 mA, max. 62.5 kHz, 2 digital outputs, 500 mA, max. 1.25 kHz, 2 digital inputs 24 VDC | |
| 8BAC0130.001-1 | ACOPOSmulti plug-in module, 2 digital outputs, 50 mA, max. 62.5 kHz, 4 digital outputs, 500 mA, max. 1.25 kHz | |
| 8BAC0132.000-1 | ACOPOSmulti plug-in module, 4 analog inputs ±10 V | |
| 8BAC0133.000-1 | ACOPOSmulti plug-in module, 3 RS422 outputs for ABR encoder emulation, 1 MHz | |
| | **POWERLINK/Ethernet cables** | |
| X20CA0E61.00020 | POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.2 m | |
| X20CA0E61.00025 | POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.25 m | |
| X20CA0E61.00030 | POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.3 m | |
| X20CA0E61.00035 | POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.35 m | |
| X20CA0E61.00050 | POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.5 m | |
| X20CA0E61.00100 | POWERLINK/Ethernet connection cable, RJ45 to RJ45, 1 m | |
| | **Shield component sets** | |
| 8SCS000.0000-00 | ACOPOSmulti shield component set: 1 shield plate 1x type 0, 1 hose clamp, B 9 mm, D 12-22 mm | |
| 8SCS002.0000-00 | ACOPOSmulti shield component set: 1x clamping plate; 2x clamps D 4-13.5 mm; 4x screws | |

Table 1: 8BVI0110HCD0.000-3 - Order data

| Model number | Short description | Figure |
|---|---|---|
| 8SCS005.0000-00 | ACOPOSmulti shield component set: 1x slot cover/shield plate | |
| 8SCS009.0000-00 | ACOPOSmulti shield component set: 1x ACOPOSmulti holding plate SK8-14, 1x shield connection clamp SK14 | |
| | **Terminal blocks** | |
| 8TB2104.203F-00 | 4-pin screw clamp, single row, spacing: 5.08 mm, label 3: T- T + B- B+, F keying: 0101 | |
| 8TB2104.203L-00 | 4-pin screw clamp, single row, spacing: 5.08 mm, label 3: T- T + B- B+, L keying: 1010 | |
| 8TB2108.2010-00 | 8-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially | |
| 8TB2112.2010-00 | 12-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially | |
| 8TB3104.204G-11 | 4-pin screw clamp, single row, spacing: 7.62 mm, label 4: PE W V U, G keying: 0110 | |
| 8TB3104.204K-11 | 4-pin screw clamp, single row, spacing: 7.62 mm, label 4: PE W V U, K keying: 1001 | |

Table 1: 8BVI0110HCD0.000-3 - Order data

# 3 Technical data

| Model number | 8BVI0110HCD0.000-3 |
|---|---|
| **General information** | |
| Note | Optimized for applications with decentralized, computationally intensive open-loop and closed-loop control requirements |
| B&R ID code | 0xA8E3 |
| Cooling and mounting method | Cold plate or feed-through mounting |
| Slots for plug-in modules | 2 |
| Certifications | |
| CE | Yes |
| UL | cULus E225616<br>Power conversion equipment |
| Functional safety[1)] | Yes |
| **DC bus connection** | |
| Voltage | |
| Nominal | 750 VDC |
| Continuous power consumption [2)] | 22.3 kW |
| Power dissipation depending on switching frequency [3)] | |
| Switching frequency 5 kHz | $[0.33 * I_M^2 + 11 * I_M + 90]$ W |
| Switching frequency 10 kHz | $[0.97 * I_M^2 + 9.5 * I_M + 170]$ W |
| Switching frequency 20 kHz | $[1.66 * I_M^2 + 21 * I_M + 380]$ W |
| DC bus capacitance | 660 µF |
| Variant | ACOPOSmulti backplane |
| **24 VDC power supply** | |
| Input voltage | 25 VDC ±1.6% |
| Input capacitance | 23.5 µF |
| Max. power consumption | 20 W + $P_{SLOT1}$ + $P_{SLOT2}$ + $P_{24\ V\ Out}$ + $P_{HoldingBrake(s)}$ [4)] |
| Variant | ACOPOSmulti backplane |
| **24 VDC output** | |
| Quantity | 2 |
| Output voltage | |
| DC bus voltage ($U_{DC}$): 260 to 315 VDC | 25 VDC * ($U_{DC}$/315) |
| DC bus voltage ($U_{DC}$): 315 to 800 VDC | 24 VDC ±6% |
| Fuse protection | 250 mA (slow-blow) electronic, automatic reset |
| **Motor connection** | |
| Quantity | 2 |
| Continuous power per motor connection [2)] | 11 kW |
| Continuous current per motor connection [2)] | 15.1 $A_{eff}$ |
| Reduction of continuous current depending on switching frequency and mounting method [5)] | |
| Switching frequency 5 kHz | |
| Cold plate mounting [6)] | 0.38 A/K (starting at 51°C) [7)] |
| Feed-through mounting | 0.27 A/K (starting at 46°C) [7)] |
| Switching frequency 10 kHz | |
| Cold plate mounting [6)] | 0.25 A/K (starting at 24°C) [8)] |
| Feed-through mounting | 0.16 A/K (starting at 2°C) [9)] |
| Switching frequency 20 kHz | |
| Cold plate mounting [6)] | 0.19 A/K (starting at -14°C) [8)] |
| Feed-through mounting | 0.14 A/K (starting at -74°C) [9)] |
| Reduction of continuous current depending on installation elevation | |
| Starting at 500 m above sea level | 1.51 $A_{eff}$ per 1000 m |

Table 2: 8BVI0110HCD0.000-3 - Technical data

| Model number | 8BVI0110HCD0.000-3 |
|---|---|
| Peak current per motor connection | 37.7 $A_{eff}$ |
| Nominal switching frequency | 5 kHz |
| Possible switching frequencies [10] | 5 / 10 / 20 kHz |
| Electrical stress of connected motor per IEC TS 60034-25 [11] | Limit value curve A |
| Protective measures | |
| Overload protection | Yes |
| Short circuit and ground fault protection | Yes |
| Max. output frequency | 598 Hz [12] |
| Variant | |
| U, V, W, PE | Male connector |
| Shield connection | Yes |
| Terminal connection cross section | |
| Flexible and fine-stranded wires | |
| With wire end sleeves | 0.25 to 6 mm² |
| Approbation data | |
| UL/C-UL-US | 30 to 10 AWG |
| CSA | 28 to 10 AWG |
| Terminal cable cross section dimension of shield connection | 12 to 22 mm |
| Max. motor line length depending on switching frequency | |
| Switching frequency 5 kHz | 25 m |
| Switching frequency 10 kHz | 25 m |
| Switching frequency 20 kHz | 10 m |
| **Motor holding brake connection** | |
| Quantity | 2 |
| Output voltage [13] | 24 VDC +5.8% / -0% [14] |
| Continuous current | 2.1 A |
| Max. internal resistance | 0.3 Ω |
| Extinction potential | Approx. 30 V |
| Max. extinction energy per switching operation | 3 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. 0.5 A |
| Response threshold for undervoltage monitoring | 24 VDC +0% / -4% |
| **Enable inputs** | |
| Quantity | 4 (2 per axis) |
| Wiring | Sink |
| Electrical isolation | |
| Input - Inverter module | Yes |
| Input - Input | Yes |
| Input voltage | |
| Nominal | 24 VDC |
| Maximum | 30 VDC |
| Input current at nominal voltage | Approx. 30 mA |
| Switching threshold | |
| Low | <5 V |
| High | >15 V |
| Switching delay at nominal input voltage | |
| Enable 1 → 0, PWM off | Max. 20.5 ms |
| Enable 0 → 1, ready for PWM | Max. 100 µs |
| Modulation compared to ground potential | Max. ±38 V |
| OSSD signal connections [15] | Permitted<br>Max. test pulse length: 500 µs |
| **Trigger inputs** | |
| Quantity | 2 |
| Wiring | Sink |
| Electrical isolation | |
| Input - Inverter module | 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 | Approx. 10 mA |

Table 2: 8BVI0110HCD0.000-3 - Technical data

| Model number | 8BVI0110HCD0.000-3 |
|---|---|
| Switching delay | |
| Rising edge | 52 µs ±0.5 µs (digitally filtered) |
| Falling edge | 53 µs ±0.5 µs (digitally filtered) |
| Modulation compared to ground potential | Max. ±38 V |
| **Electrical characteristics** | |
| Discharge capacitance | 0.44 µF |
| **Operating conditions** | |
| Permissible mounting orientations | |
| Hanging vertically | Yes |
| Lying horizontally | Yes |
| Standing horizontally | No |
| Installation elevation above sea level | |
| Nominal | 0 to 500 m |
| Maximum [16)] | 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 |
| **Environmental conditions** | |
| Temperature | |
| Operation | |
| Nominal | 5 to 40°C |
| Maximum [17)] | 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 [18)] | |
| Width | 106.5 mm |
| Height | 317 mm |
| Depth | |
| Cold plate | 212 mm |
| Feed-through mounting | 209 mm |
| Weight | Approx. 4.1 kg |
| Module width | 2 |

Table 2: 8BVI0110HCD0.000-3 - Technical data

1) Achievable safety classifications (safety integrity level, safety category, performance level) are documented in the user's manual (section "Safety technology").
2) Valid in the following conditions: 750 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.
3) $I_M = 0.5 * (I_{X5A} + I_{X5B})$
   $I_{X5A}$ ... Current on motor connection X5A [$A_{eff}$]
   $I_{X5B}$ ... Current on motor connection X5B [$A_{eff}$]
4) $P_{SLOT1}$ ... Max. power consumption $P_{8BAC}$ [W] of the plug-in module in SLOT1 (see the technical data for the respective plug-in module)
   $P_{SLOT2}$ ... Max. power consumption $P_{8BAC}$ [W] of the plug-in module in SLOT2 (see the technical data for the respective plug-in module).
   $P_{24\ V\ Out}$ ... Power [W] that is output to connections X2/+24 V Out 1 and X2/+24 V Out 2 on the module (max. 10 W).
5) Valid under the following conditions: 750 VDC DC bus voltage, minimum permissible coolant flow volume (3 l/min). The temperature specifications refer to the return temperature of the cold plate mounting plate.
6) The temperature specifications refer to the return temperature of the cold plate mounting plate.
7) Value for the nominal switching frequency.
8) The module cannot supply the full continuous current at this switching frequency. This unusual value for the return 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.
   Caution! Condensation can occur at low flow temperatures and return temperatures.
9) 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.
10) 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 the CPU load.
11) If necessary, the stress of the motor isolation system can be reduced by an additional externally wired dv/dt choke. For example, the RWK 305 three-phase du/dt choke from Schaffner (www.schaffner.com) can be used. Important: Even when using a dv/dt choke, it is necessary to ensure that an EMC-compatible, low inductance shield connection is used!
12) 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").
13) During the project development phase, it is necessary to check if the minimum voltage can be maintained on the holding brake with the specified wiring. For the operating voltage range of the holding brake, see the user documentation for the motor being used.
14) The specified value is only valid under the following conditions:
   - The 24 VDC power supply for the module is provided by an auxiliary supply module 8B0C located on the same mounting plate.
   - Connection between S1 and S2 (activation of the external holding brake) using a jumper with a max. length of 10 cm.
   If the 24 VDC power supply for the module is applied to the mounting plate using an 8BVE expansion module, then the output voltage is reduced because of voltage drops on the expansion cable. In this case, undervoltage monitoring must be disabled.
   If jumpers longer than 10 cm are used to connect connectors S1 and S2, then the output voltage is reduced due to voltage drops on the jumpers.
15) OSSD (output signal switching device) signals are used to monitor signal lines for short circuits and cross faults.

16) 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.
17) 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.
18) These dimensions refer to the actual device dimensions including the respective mounting plate. Make sure to leave additional space above and below the devices for mounting, connections and air circulation.

# 4 Status indicators

Status indicators are located on the black cover of each module.

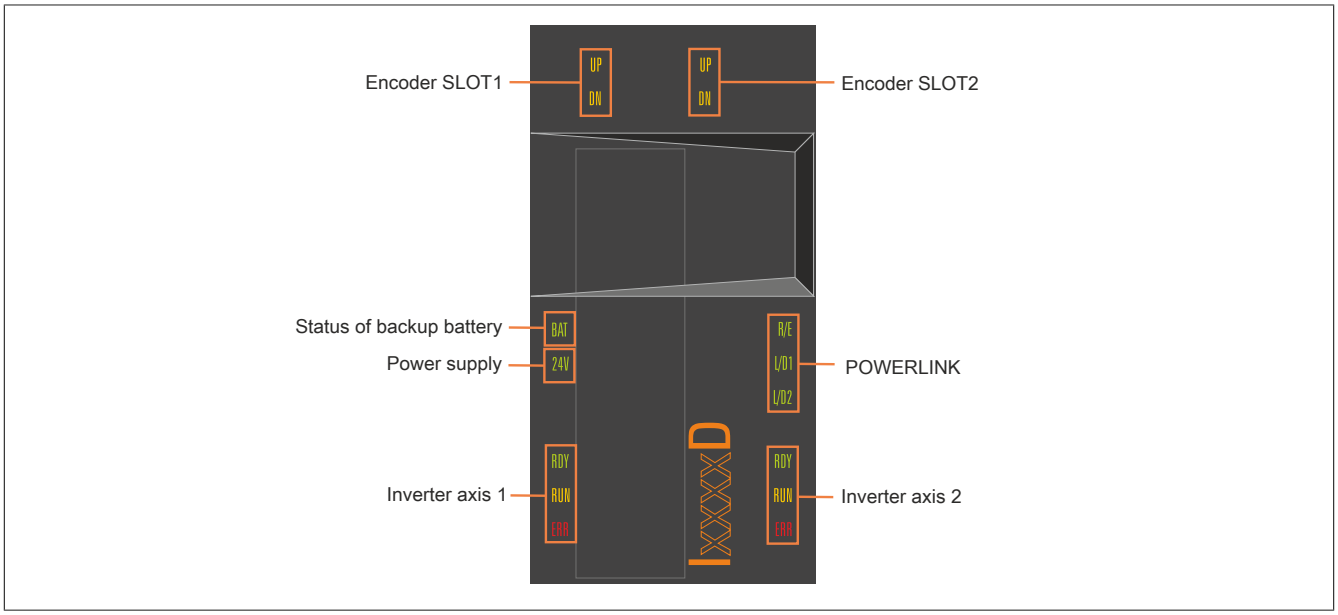



Figure 1: Indicator groups for 8BVI inverter modules (2-axis modules)

## LED status indicators

| Status indicator group | Label | Color | Function | Description |
|---|---|---|---|---|
| POWERLINK | R/E | Green/Red | Ready/Error | see "POWERLINK - LED status indicators" on page 6 |
| | L/D1 | Green | Link/Data activity on port 1 | |
| | L/D2 | Green | Link/Data activity on port 2 | |
| Inverter axis 1 | RDY | Green | Ready | see "RDY, RUN, ERR (8BVI, 8BVP, 8B0P) - LED status indicators" on page 6 |
| | RUN | Orange | Run | |
| | ERR | Red | Error | |
| Inverter axis 2 | RDY | Green | Ready | See inverter axis 1 |
| | RUN | Orange | Run | |
| | ERR | Red | Error | |
| Status of backup battery | BAT | Green/Red | Ready/Error | see "Backup battery - LED status indicators" on page 6 |
| Power supply | 24 V | Green | 24 V OK | The 24 V module power supply voltage is within the tolerance range. |
| Encoder SLOT1 | UP | Orange | Encoder direction of rotation + | The encoder position of the connected encoder is changing in the positive direction. The faster the encoder position changes, the brighter the LED is lit. |
| | DN | Orange | Encoder direction of rotation - | The encoder position of the connected encoder is changing in the negative direction. The faster the encoder position changes, the brighter the LED is lit. |
| Encoder SLOT2 | UP | Orange | Encoder direction of rotation + | See encoder SLOT1. |
| | DN | Orange | Encoder direction of rotation - | |

Table 3: LED status indicators - 8BVI inverter modules (2-axis modules)

## 4.1 RDY, RUN, ERR (8BVI, 8BVP, 8B0P) - LED status indicators

| Label | Color | Function | Description | |
|---|---|---|---|---|
| RDY | Green | Ready | Solid green | The module is operational and the power stage can be enabled (operating system present and booted, no permanent or temporary errors). |
| | | | Blinking green [1] | 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 |
| RUN | Orange | Run | Solid orange | The module's power stage is enabled. |
| ERR | Red | Error | Solid red [1] | There is a permanent error on the module.<br>**Examples:**<br>• Permanent overcurrent<br>• Invalid data in EPROM |
| | | | Blinking red | • LED status "Status changes when starting up the operating system loader" on page 7 |

Table 4: RDY, RUN, ERR (8BVI, 8BVP, 8B0P) - LED status indicators

1) Firmware V2.130 and later.

# Information:

**The ACOPOSmulti drive system has no way of detecting whether the fans in the fan modules of the mounting plate or the module-internal fans are actually rotating.**

## 4.2 POWERLINK - LED status indicators

| Label | Color | Function | Description | |
|---|---|---|---|---|
| R/E | Green/Red | Ready/Error | LED off | The module is not supplied with power or network interface initialization has failed. |
| | | | 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). |
| | | | Blinking green (1x) | The client detects a valid POWERLINK frame on the network. |
| | | | Blinking green (2x) | Cyclic operation on the network is taking place, but the client itself is not yet a participant. |
| | | | Blinking green (3x) | Cyclic operation of the client is in preparation. |
| | | | Solid green | The client is participating in cyclic operation. |
| | | | Flickering green | The client is not participating in cyclic operation and also does not detect any other stations on the network participating in cyclic operation. |
| L/D1 | Green | Link/Data activity Port 1 | Solid green | A physical connection has been established to another station on the network. |
| | | | Blinking green | Activity on port 1 |
| L/D2 | Green | Link/Data activity Port 2 | Solid green | A physical connection has been established to another station on the network. |
| | | | Blinking green | Activity on port 2 |

Table 5: POWERLINK - LED status indicators

## 4.3 Backup battery - LED status indicators

| Label | Color | Function | Description | |
|---|---|---|---|---|
| BAT | Green/Red | Ready/Error | LED off | **Possible causes:**<br>• The voltage of the installed backup battery is within the tolerance range, but an EnDat encoder with backup battery is not connected.<br>• An EnDat encoder with backup battery is connected and registering "Battery OK", but the module's firmware version does not support EnDat encoders with battery backup. |
| | | | Solid green | An EnDat encoder with battery backup is connected and registering "Battery OK" (voltage of the installed backup battery is within the tolerance range). |
| | | | Solid red | An EnDat encoder with battery backup is connected and registering "Battery not OK".<br>**Possible causes:**<br>• Voltage of the installed backup battery outside of tolerance range<br>• No backup battery installed in module |

Table 6: Backup battery - LED status indicators

## 4.4 Status changes when starting up the operating system loader

The following intervals are used for the LED status indicators:

Block size: 50 ms
Repeats after: 3,000 ms

| Status | LED | Display |
|---|---|---|
| 1. Boot procedure for base hardware active | RDY | |
| | RUN | |
| | ERR | |
| 2. Network configuration active | RDY | |
| | RUN | |
| | ERR | |
| 3. Waiting for network telegram | RDY | |
| | RUN | |
| | ERR | |
| 4. Network communication active | RDY | |
| | RUN | |
| | ERR | |
| 5. ACOPOS operating system being transferred/burned [1)] | RDY | |
| | RUN | |
| | ERR | |

Table 7: Status changes when starting up the operating system loader

1) Firmware V2.140 and later.

## 4.5 POWERLINK node number setting Inverter modules

The POWERLINK node number can be set using the two hexadecimal coded rotary switches located behind the module's black cover.

| Figure | | Coded rotary switches | POWERLINK node number |
|---|---|---|---|
|  |  | 1 | 16s position (high) |
| | | 2 | 1s position (low) |
| | | A change to the POWERLINK node number only takes effect the next time the ACOPOSmulti drive system is switched on. | |
| | | **Information:**<br>**In principle, node numbers between $01 and $FD are permitted.**<br>**However, node numbers between $F0 and $FD are intended for future system expansions. To ensure compatibility, these node numbers should be avoided.**<br>**Node numbers $00, $FE and $FF are reserved and are therefore not permitted to be set.** | |
| Cover closed | Cover open | | |

Table 8: Setting the POWERLINK node number

# 5 Dimension diagram and installation dimensions

## 5.1 Cold plate

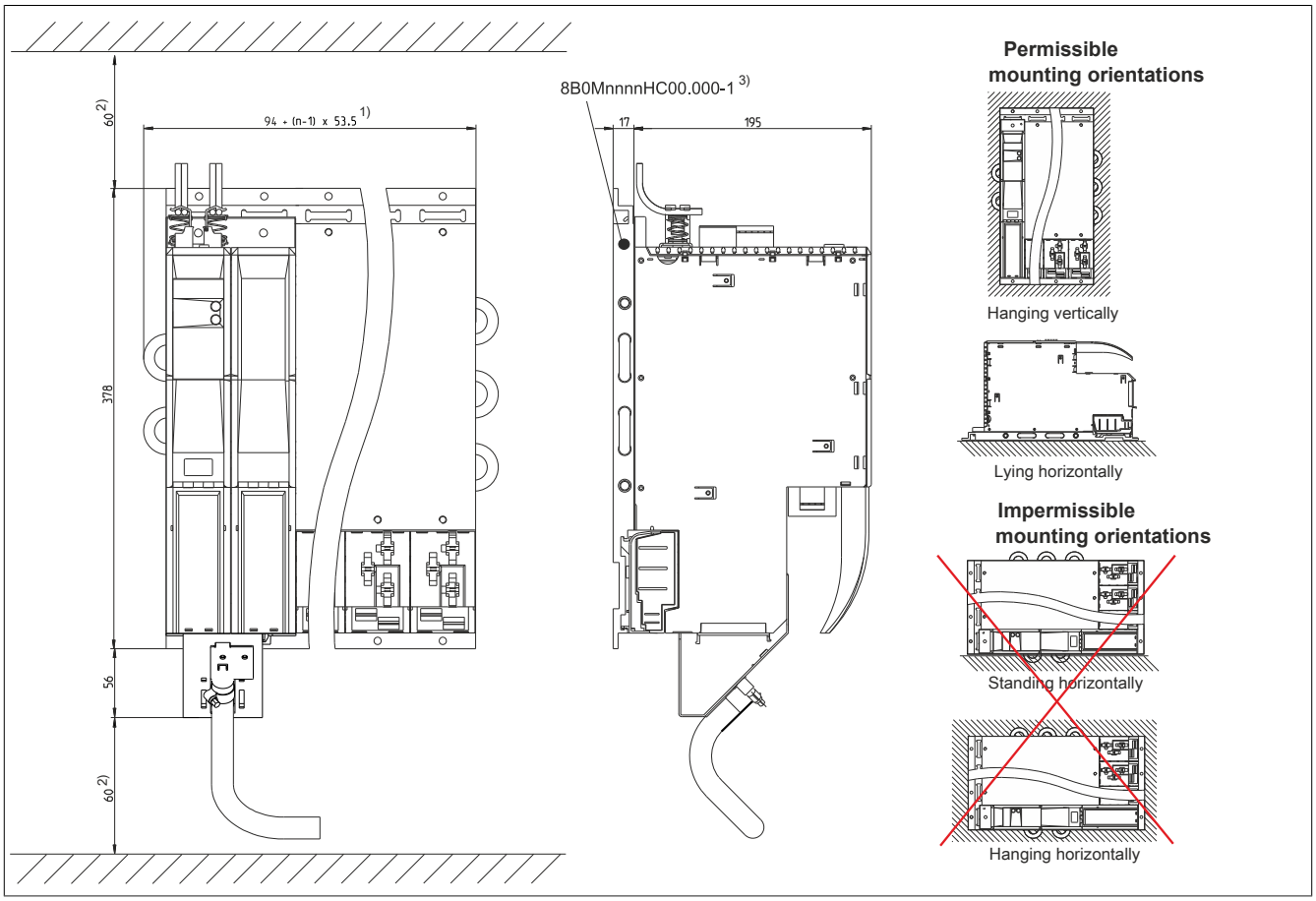



Figure 2: Cold plate - Dimension diagram and installation dimensions

1) n... Number of width units on the mounting plate
2) For sufficient air circulation, a clearance of at least 60 mm must be provided above the mounting plate and below the module.
3) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).

## Information:

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

**Do not set down ACOPOSmulti modules for cold-plate or feed-through mounting on their bottom side. Doing so could break the clips that hold the unit is fan. Broken clips make it more difficult to replace the fans later on.**

## 5.2 Feed-through mounting

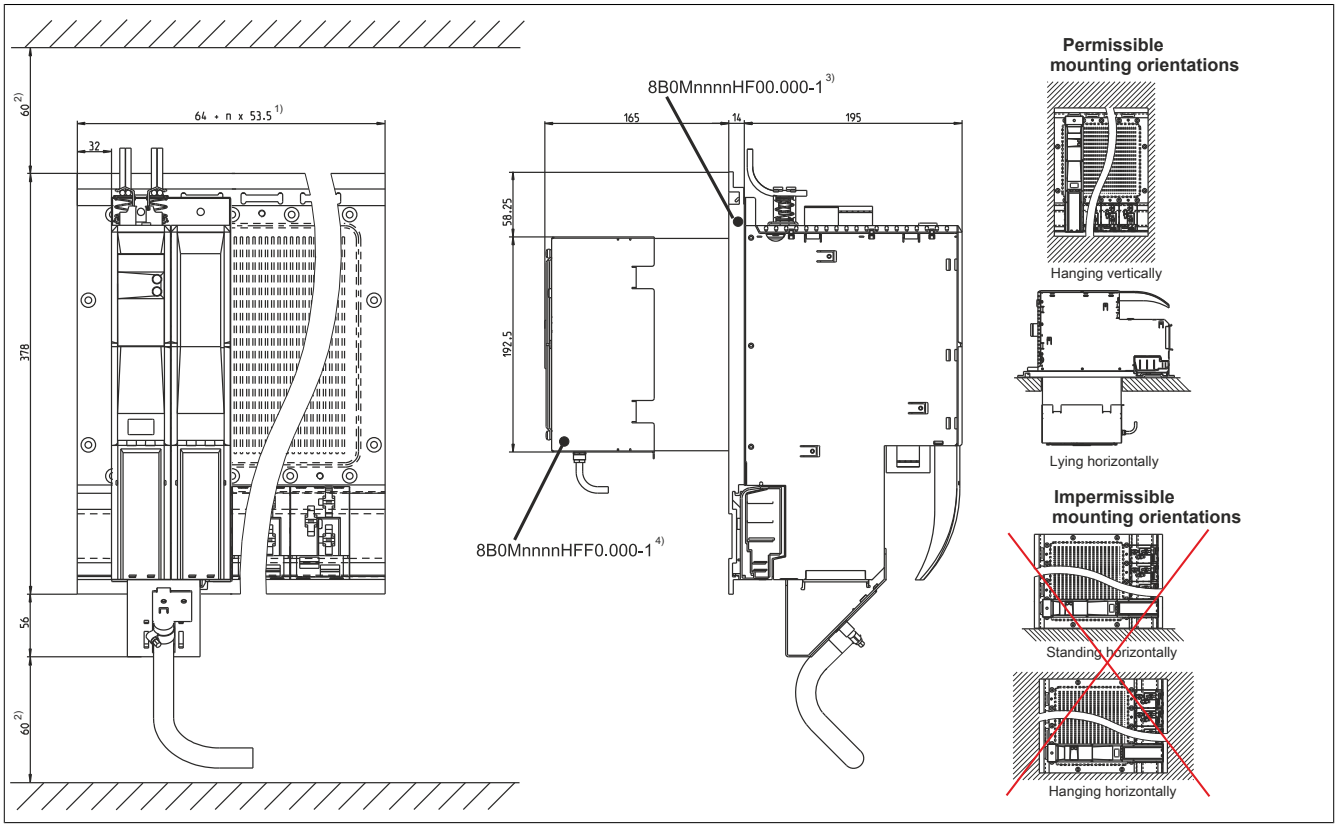



Figure 3: Feed-through mounting - Dimension diagram and installation dimensions

1) n... Number of width units on the mounting plate
2) For sufficient air circulation, a clearance of at least 60 mm must be provided above the mounting plate and below the module.
3) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).
4) For sufficient air circulation, a clearance of at least 100 mm must be provided around the fan module.

## Information:

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

**Do not set down ACOPOSmulti modules for cold-plate or feed-through mounting on their bottom side. Doing so could break the clips that hold the unit is fan. Broken clips make it more difficult to replace the fans later on.**

# 6 Wiring

## 6.1 2-axis modules (double-width) - Pinout overview

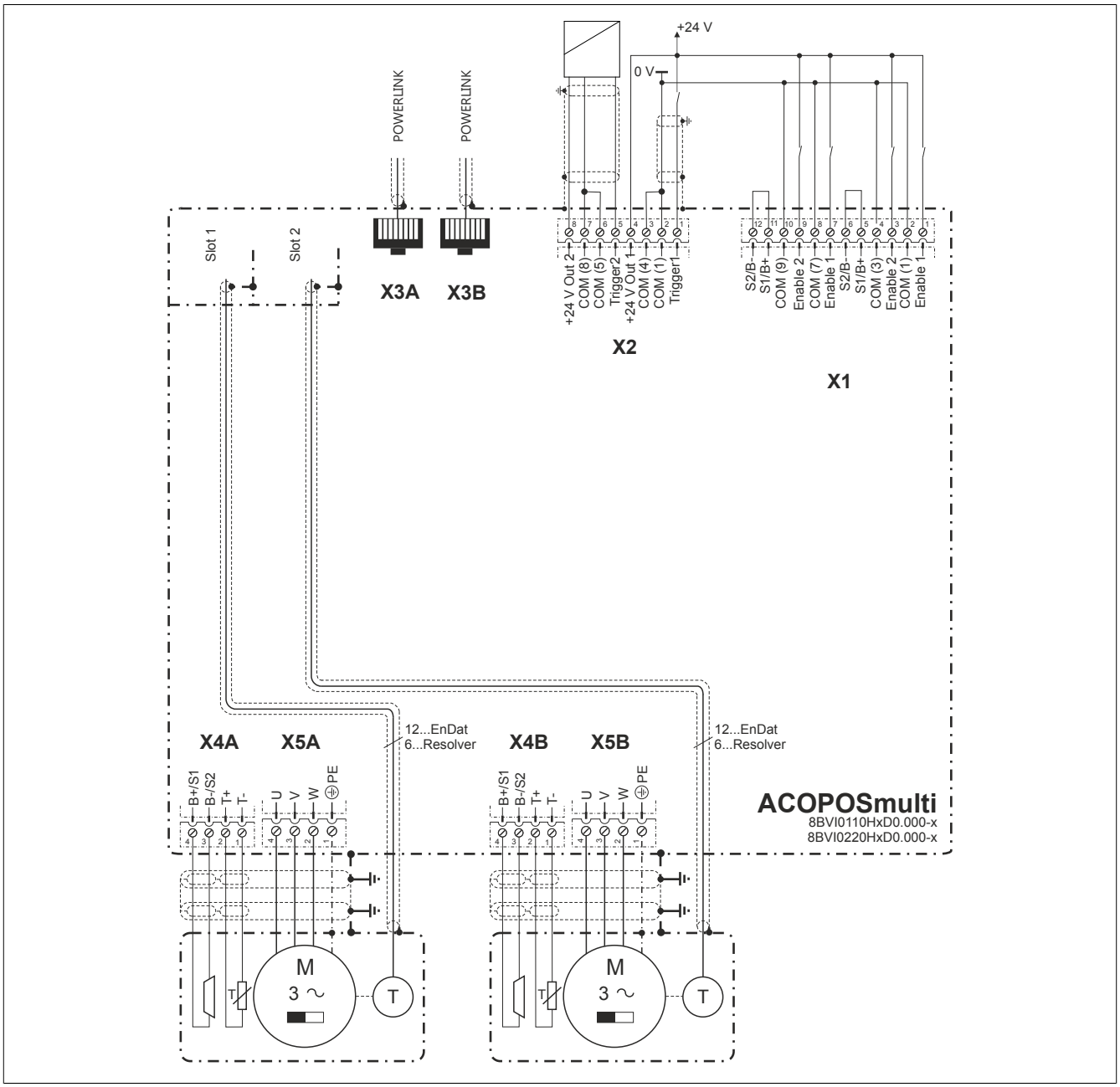



Figure 4: 8BVI0110HxD0.000-x, 8BVI0220HxD0.000-x - Pinout overview

### 6.1.1 Connector X1 - Pinout

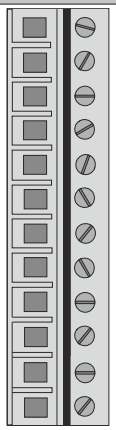
| X1 | Pin | Description | Function |
|---|---|---|---|
|  | 1 | Enable 1 1) | Axis 2: Enable 1 |
| | 2 | COM (1) | Axis 2: Enable 1 0 V |
| | 3 | Enable 2 1) | Axis 2: Enable 2 |
| | 4 | COM (3) | Axis 2: Enable 2 0 V |
| | 5 | S1/B+ 2) | Axis 2: Brake + / Activation of the external holding brake |
| | 6 | S2/B- 2) | Axis 2: Brake - / Activation of the external holding brake |
| | 7 | Enable 1 1) | Axis 1: Enable 1 |
| | 8 | COM (7) | Axis 1: Enable 1 0 V |
| | 9 | Enable 2 1) | Axis 1: Enable 2 |
| | 10 | COM (9) | Axis 1: Enable 2 0 V |
| | 11 | S1/B+ 2) | Axis 1: Brake + / Activation of the external holding brake |
| | 12 | S2/B- 2) | Axis 1: Brake - / Activation of the external holding brake |

Table 9: Connector X1 - Pinout

1) Wiring is not permitted to exceed a total length of 30 m.
2) If the connection is used to activate the external holding brake (S1/S2), then the wiring is not permitted to exceed a total length of 3 m.
If the holding brake is connected via an additional external relay contact (ground-in e.g. via connections S1/S2) instead of only via the internal transistor, then the internal quenching circuit has no effect! In this case, the customer must make sure that neither the relay contact nor the braking coil are damaged when switching off the brake. This can be done by interconnecting the coil or - better still - interconnecting the contact with a quenching circuit.

## Danger!

**The connections for the motor holding brake 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.**

## Caution!

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

### 6.1.1.1 Wiring the connections for the motor holding brake

**Activation of the motor holding brake internally by the ACOPOSmulti inverter module**

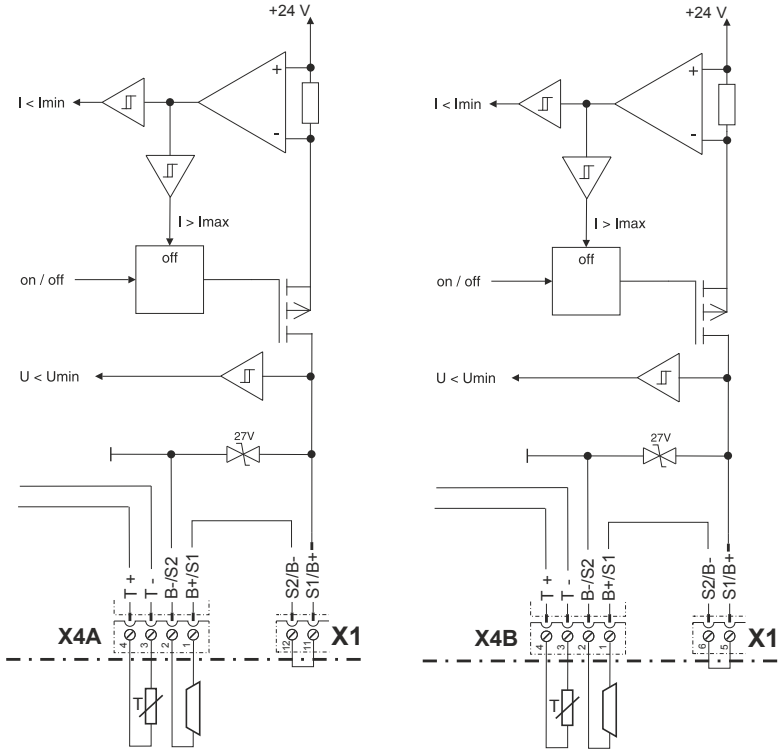
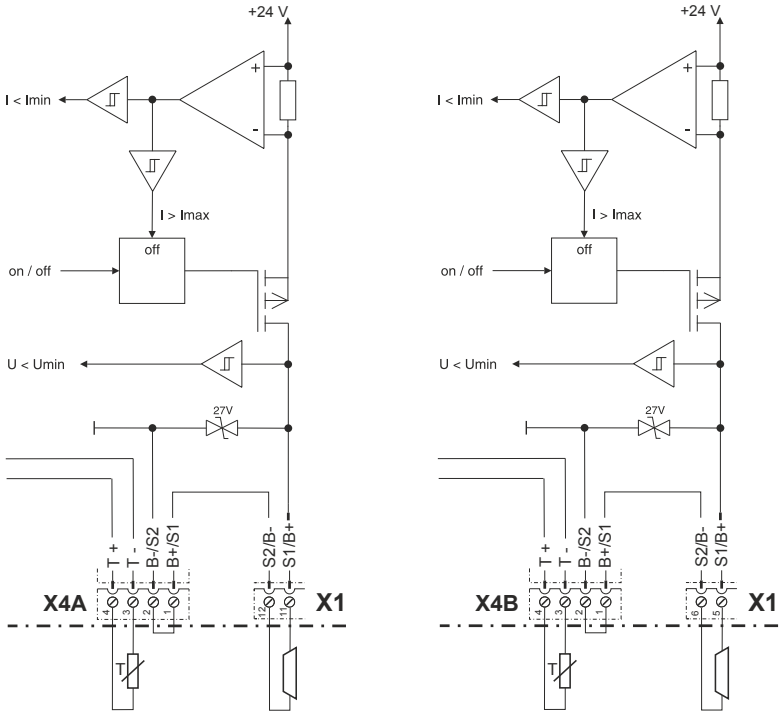
| Holding brake connected to connectors X4A and X4B | Description |
|---|---|
| <br>**Information:**<br>**Jumpers must be placed between connections S1/B+ and S2/B- on connector X1.** | • **Power supply:**<br>Internally by ACOPOSmulti inverter module<br>• **Activation:**<br>Internally by ACOPOSmulti inverter module<br>• **Monitoring:**<br>Internally by ACOPOSmulti inverter module |
| **Holding brake connected to connector X1** | **Description** |
| <br>**Information:**<br>**Jumpers must be placed between connections B+/S1 and B-/S2 on connectors X4A and X4B.** | • **Power supply:**<br>Internally by ACOPOSmulti inverter module<br>• **Activation:**<br>Internally by ACOPOSmulti inverter module<br>• **Monitoring:**<br>Internally by ACOPOSmulti inverter module |

Table 10: Activation of the motor holding brake internally

## Activation of the motor holding brake internally by the ACOPOSmulti inverter module and/or externally by dry contacts

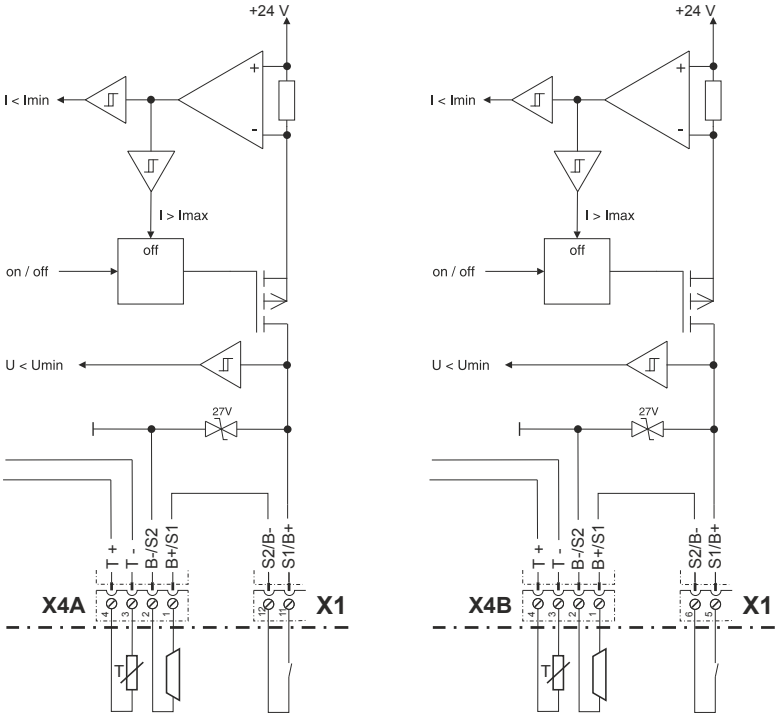
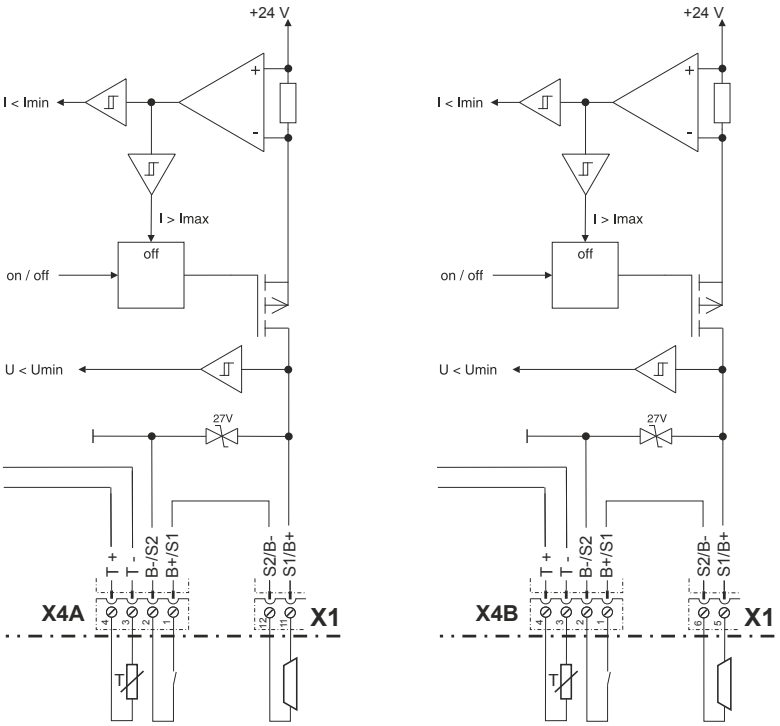
| Holding brake connected to connectors X4A and X4B | Description |
|---|---|
|  | • **Power supply:** Internally by ACOPOSmulti inverter module<br>• **Activation:** Possible internally by the ACOPOSmulti inverter module and externally by dry contacts [1)]<br>• **Monitoring:** Internally by ACOPOSmulti inverter module<br>**Information:**<br>**Internal monitoring by the ACOPOSmulti inverter module must be configured according to the requirements of the application.** [2)] |
| **Holding brake connected to connector X1** | **Description** |
|  | • **Power supply:** Internally by ACOPOSmulti inverter module<br>• **Activation:** Possible internally by the ACOPOSmulti inverter module and externally by dry contacts [1)]<br>• **Monitoring:** Internally by ACOPOSmulti inverter module<br>**Information:**<br>**Internal monitoring by the ACOPOSmulti inverter module must be configured according to the requirements of the application.** [2)] |

Table 11: Activation of the motor holding brake internally and/or externally

1) Activation of the holding brake via external safety circuits is thus possible independently of the control integrated in the ACOPOSmulti inverter.
2) Configuration takes place using ParID 90 (1 ... Internal monitoring active, 5 ... Internal monitoring not active).

### 6.1.2 Connector X2 - Pinout

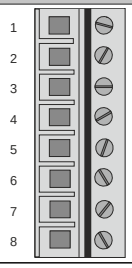
| X2 | Pin | Description | Function |
|---|---|---|---|
|  | 1 | Trigger1 | Trigger 1 |
| | 2 | COM (1) | Trigger 1 0 V |
| | 3 | COM (4) | +24 V output 1 0 V |
| | 4 | +24 V Out 1 | +24 V output 1 |
| | 5 | Trigger2 | Trigger 2 |
| | 6 | COM (5) | Trigger 2 0 V |
| | 7 | COM (8) | +24 V output 2 0 V |
| | 8 | +24 V Out 2 | +24 V output 2 |

Table 12: Connector X2 - Pinout

### 6.1.3 Connectors X3A, X3B - Pinout

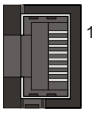
| X3A, X3B | Pin | Description | Function |
|---|---|---|---|
|  | 1 | RXD | Receive signal |
| | 2 | RXD\ | Receive signal inverted |
| | 3 | TXD | Transmit signal |
| | 4 | Shield | Shield |
| | 5 | Shield | Shield |
| | 6 | TXD\ | Transmit signal inverted |
| | 7 | Shield | Shield |
| | 8 | Shield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

Table 13: X3A, X3B connectors - Pinout

### 6.1.4 Connector X4A - Pinout

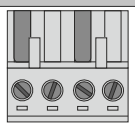
| X4A | Description | Function |
|---|---|---|
|  | T- | Axis 1: Temperature sensor - |
| | T+ | Axis 1: Temperature sensor + |
| | B-/S2 [1)] | Axis 1: Brake - / Activation of the external holding brake |
| | B+/S1 [1)] | Axis 1: Brake + / Activation of the external holding brake |

Table 14: Connector X4A - Pinout

1) If the connection is used to activate the external holding brake (S1/S2), then the wiring is not permitted to exceed a total length of 3 m.
If the holding brake is connected via an additional external relay contact (ground-in e.g. via connections S1/S2) instead of only via the internal transistor, then the internal quenching circuit has no effect! In this case, the customer must make sure that neither the relay contact nor the braking coil are damaged when switching off the brake. This can be done by interconnecting the coil or - better still - interconnecting the contact with a quenching circuit.

## Danger!

**The connections for the motor temperature sensors and the motor holding brake 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.**

## Caution!

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

## Warning!

**Temperature sensors are only permitted to be connected to the X4A/T+ and X4A/T- connectors on an ACOPOSmulti module under the following conditions:**

- **SLOT1 of the ACOPOSmulti module does not contain an ACOPOSmulti plug-in module to which a temperature sensor is connected on the T+ and T- connections.**

**Otherwise, the temperature monitoring functions on the ACOPOSmulti module may become ineffective, which in extreme cases can cause the hardware (e.g. motors) connected to the ACOPOSmulti module to be destroyed!**

### 6.1.5 Connector X4B - Pinout

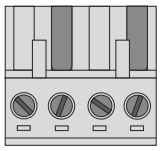
| X4B | Description | Function |
|---|---|---|
|  | T- | Axis 2: Temperature sensor - |
| | T+ | Axis 2: Temperature sensor + |
| | B-/S2 [1) 2)] | Axis 2: Brake - / Activation of the external holding brake |
| | B+/S1 [1) 2)] | Axis 2: Brake + / Activation of the external holding brake |

Table 15: Connector X4B - Pinout

1) Due to EMC reasons, wiring of the S1 and S2 connectors (activation of the external holding brake) is not permitted to exceed a total length of 3 m.
2) If the holding brake is connected via an additional external relay contact (ground-in e.g. via connections S1/S2) instead of only via the internal transistor, then the internal quenching circuit has no effect! In this case, the customer must make sure that neither the relay contact nor the braking coil are damaged when switching off the brake. This can be done by interconnecting the coil or - better still - interconnecting the contact with a quenching circuit.

## Danger!

**The connections for the motor temperature sensors and the motor holding brake 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.**

## Caution!

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

## Warning!

**Temperature sensors are only permitted to be connected to the X4B/T+ and X4B/T- connectors on an ACOPOSmulti module under the following conditions:**

- **SLOT2 of the ACOPOSmulti module does not contain an ACOPOSmulti plug-in module to which a temperature sensor is connected on the T+ and T- connections.**

**Otherwise, the temperature monitoring functions on the ACOPOSmulti module may become ineffective, which in extreme cases can cause the hardware (e.g. motors) connected to the ACOPOSmulti module to be destroyed!**

### 6.1.6 Wiring the connections for the motor holding brake

**Activation of the motor holding brake internally by the ACOPOSmulti inverter module**

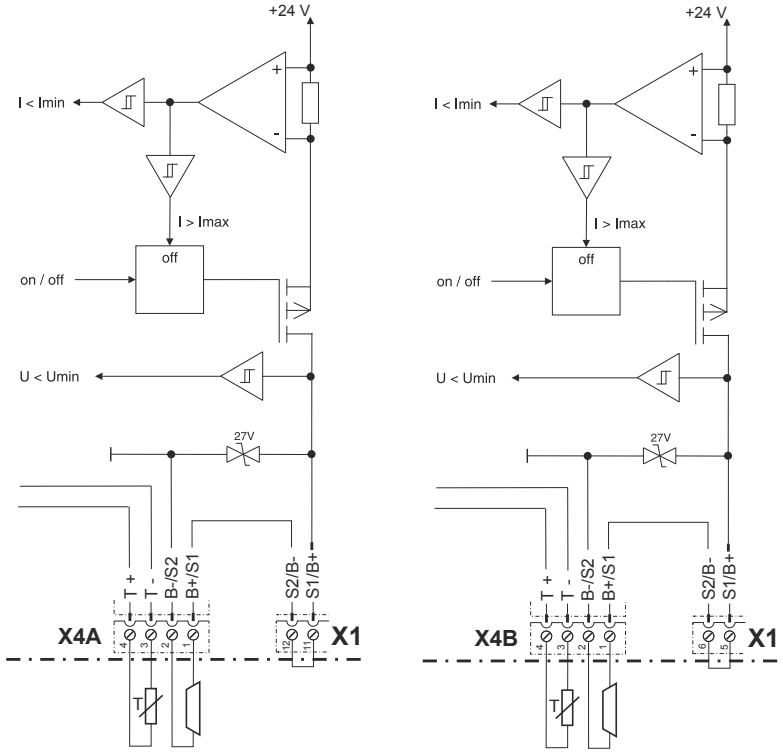
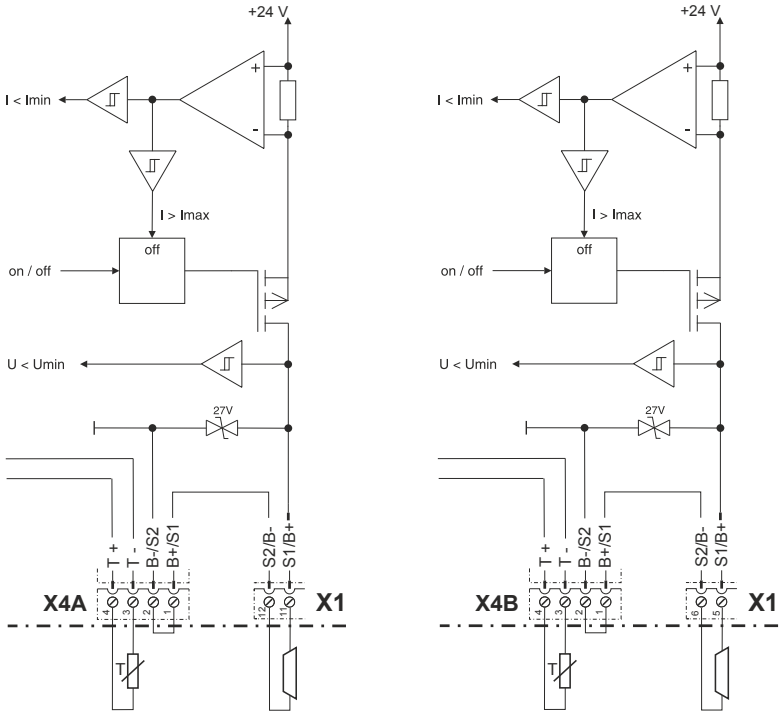
| Holding brake connected to connectors X4A and X4B | Description |
|---|---|
| <br>**Information:**<br>**Jumpers must be placed between connections S1/B+ and S2/B- on connector X1.** | • **Power supply:**<br>Internally by ACOPOSmulti inverter module<br>• **Activation:**<br>Internally by ACOPOSmulti inverter module<br>• **Monitoring:**<br>Internally by ACOPOSmulti inverter module |
| **Holding brake connected to connector X1** | **Description** |
| <br>**Information:**<br>**Jumpers must be placed between connections B+/S1 and B-/S2 on connectors X4A and X4B.** | • **Power supply:**<br>Internally by ACOPOSmulti inverter module<br>• **Activation:**<br>Internally by ACOPOSmulti inverter module<br>• **Monitoring:**<br>Internally by ACOPOSmulti inverter module |

Table 16: Activation of the motor holding brake internally

## Activation of the motor holding brake internally by the ACOPOSmulti inverter module and/or externally by dry contacts

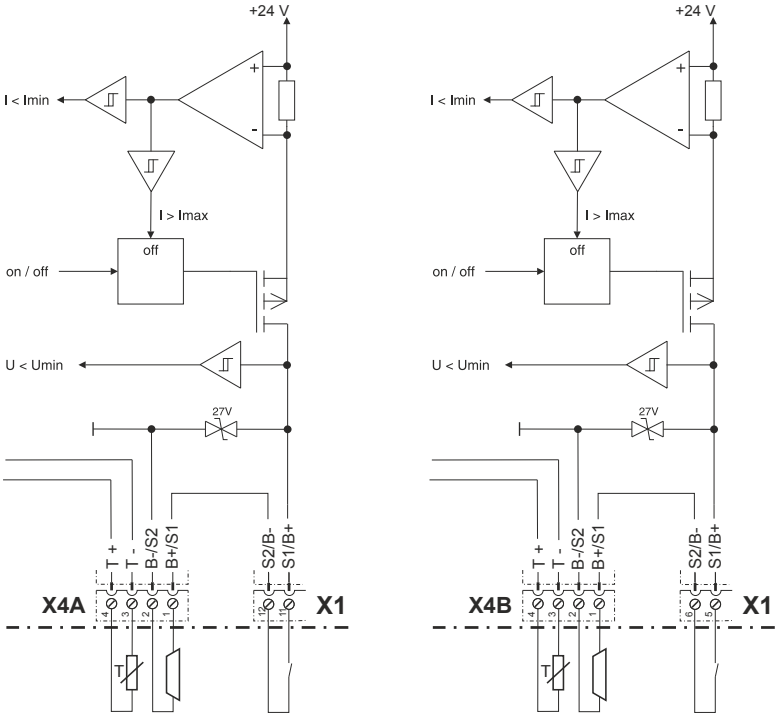
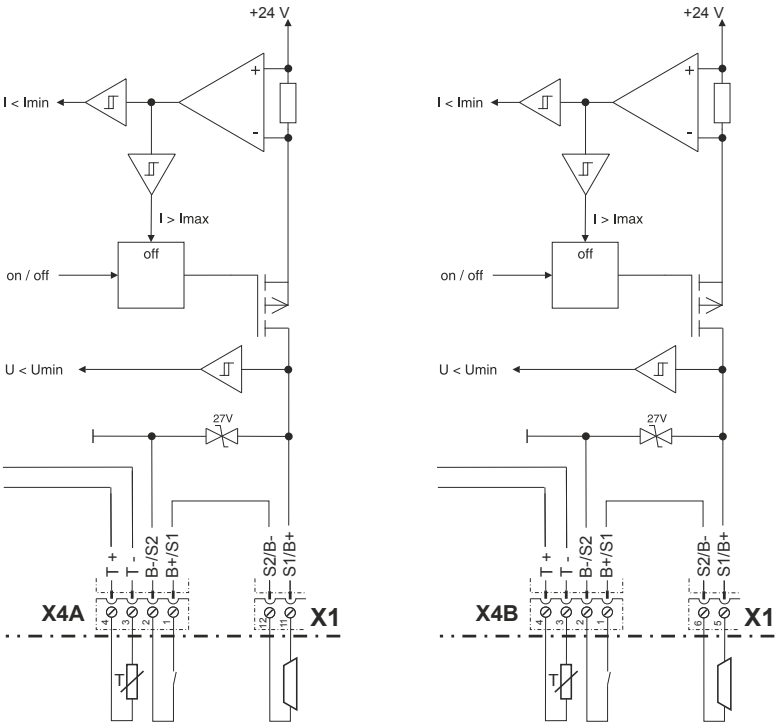
| Holding brake connected to connectors X4A and X4B | Description |
|---|---|
|  | • **Power supply:** Internally by ACOPOSmulti inverter module<br>• **Activation:** Possible internally by the ACOPOSmulti inverter module and externally by dry contacts [1)]<br>• **Monitoring:** Internally by ACOPOSmulti inverter module<br>**Information:**<br>**Internal monitoring by the ACOPOSmulti inverter module must be configured according to the requirements of the application.** [2)] |
| **Holding brake connected to connector X1** | **Description** |
|  | • **Power supply:** Internally by ACOPOSmulti inverter module<br>• **Activation:** Possible internally by the ACOPOSmulti inverter module and externally by dry contacts [1)]<br>• **Monitoring:** Internally by ACOPOSmulti inverter module<br>**Information:**<br>**Internal monitoring by the ACOPOSmulti inverter module must be configured according to the requirements of the application.** [2)] |

Table 17: Activation of the motor holding brake internally and/or externally

1) Activation of the holding brake via external safety circuits is thus possible independently of the control integrated in the ACOPOSmulti inverter.
2) Configuration takes place using ParID 90 (1 ... Internal monitoring active, 5 ... Internal monitoring not active).

### 6.1.7 Connector X5A - Pinout

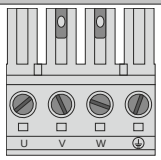
| X5A | Description | Function |
|---|---|---|
|  | ⏚ | Axis 1: Protective ground conductor |
| | W | Axis 1: Motor connection W |
| | V | Axis 1: Motor connection V |
| | U | Axis 1: Motor connection U |

Table 18: Connector X5A - Pinout

## Information:

**An additional PE wire does not have to be connected to the threaded bolt beside the X5A connector. The PE connection on the male X5A connector is required and sufficient.**

### 6.1.8 Connector X5B - Pinout

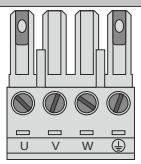
| X5B | Description | Function |
|---|---|---|
|  | ⏚ | Axis 2: Protective ground conductor |
| | W | Axis 2: Motor connection W |
| | V | Axis 2: Motor connection V |
| | U | Axis 2: Motor connection U |

Table 19: Connector X5B - Pinout

### 6.1.9 Input/Output circuit diagram

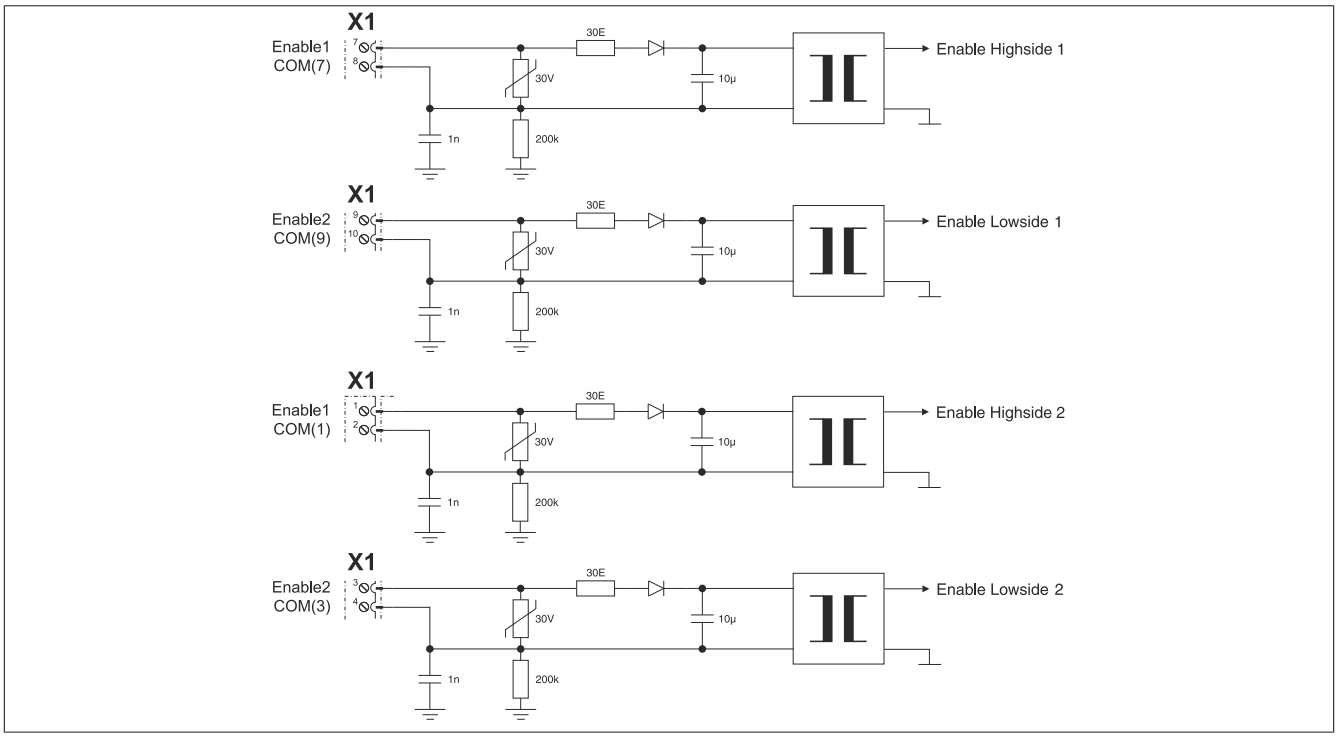



Figure 5: Enable

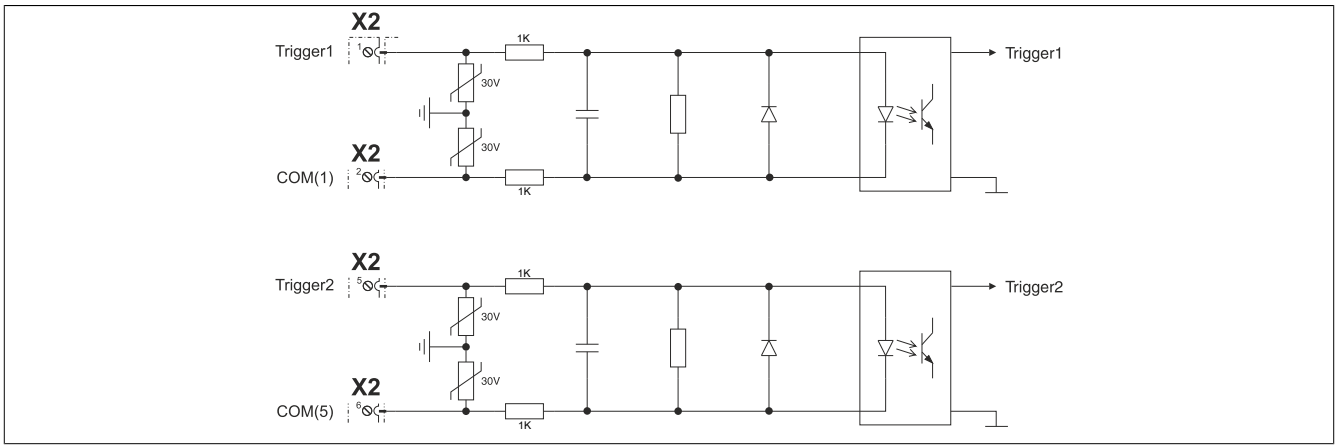



Figure 6: Trigger inputs

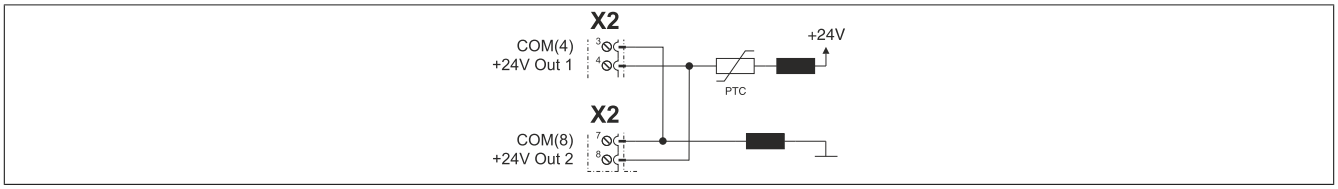



Figure 7: 24 VDC out

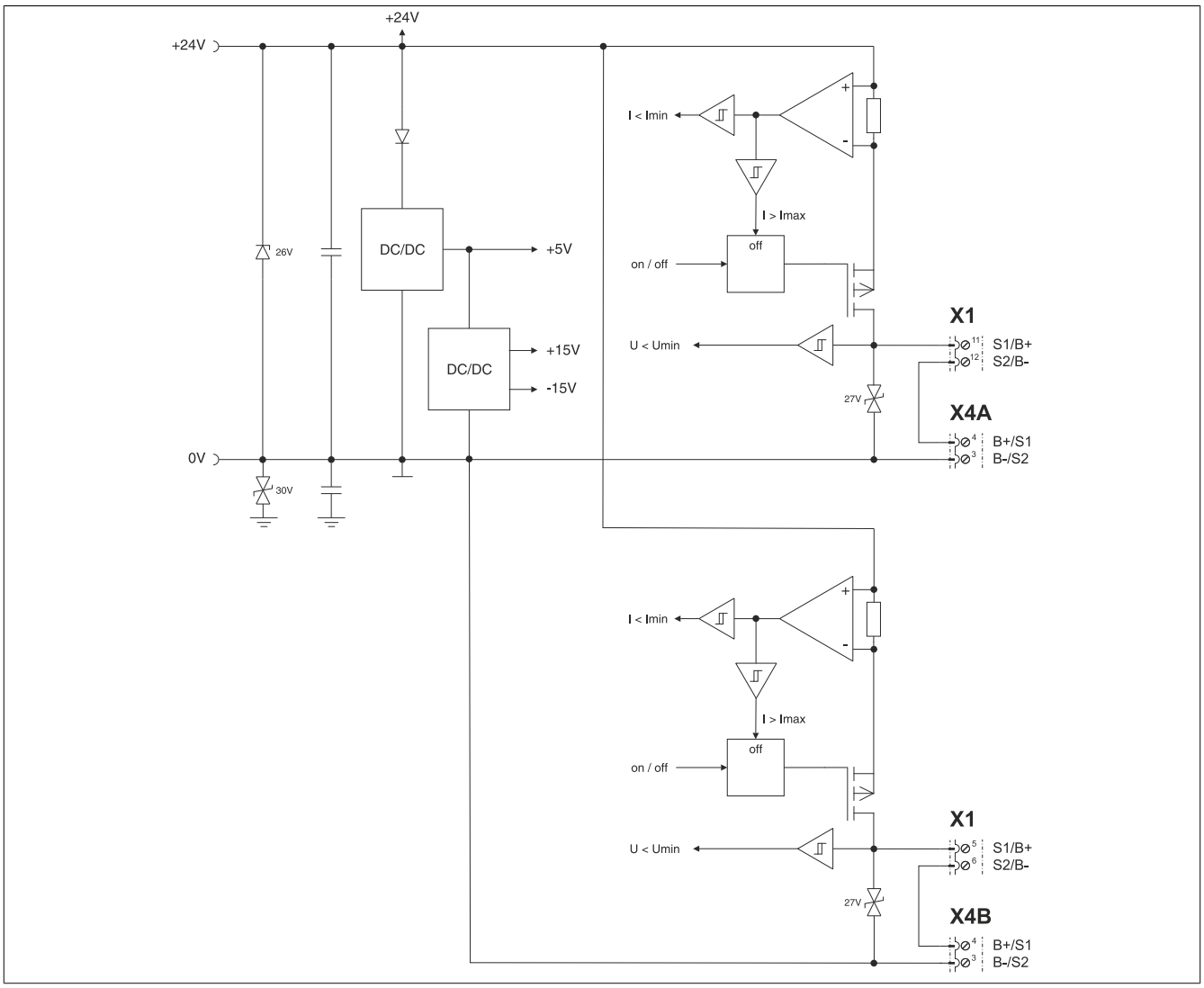



Figure 8: Holding brake

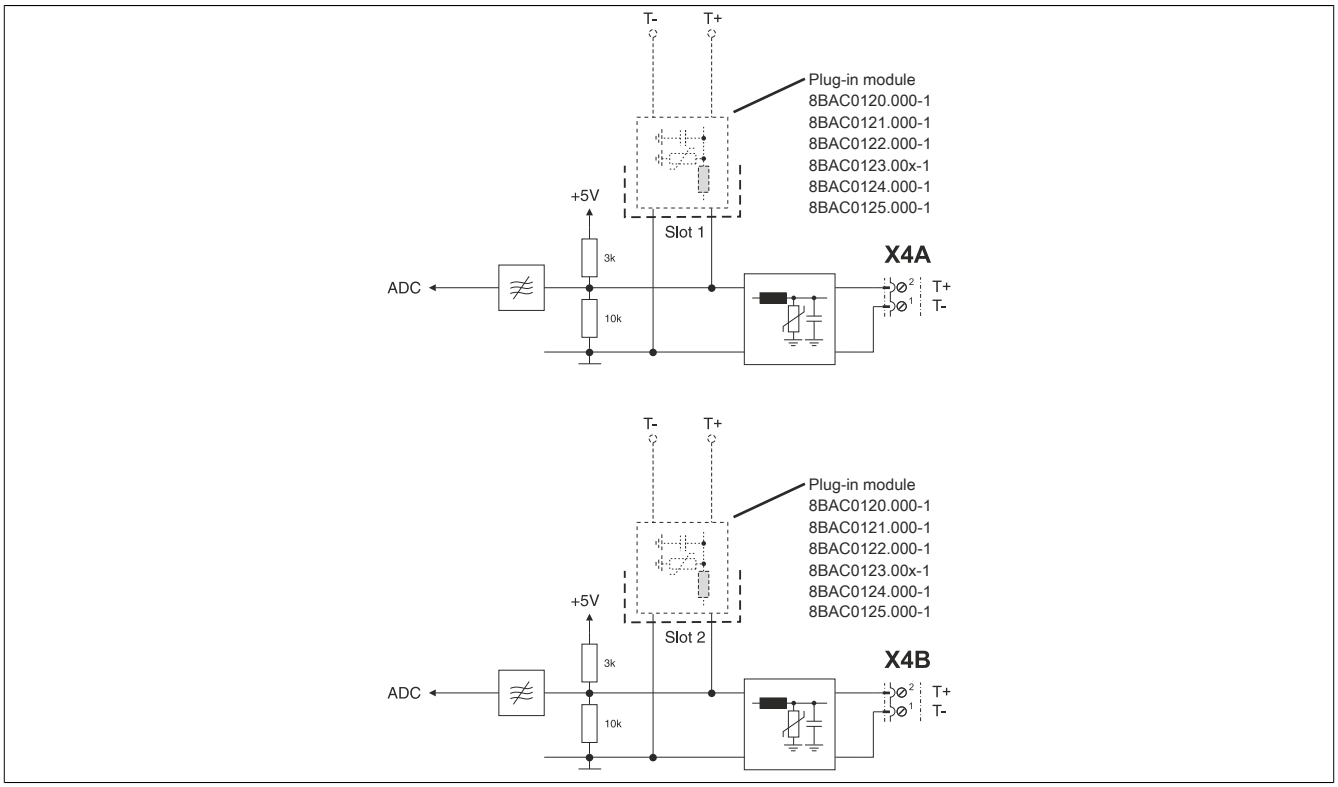



Figure 9: Temperature sensor

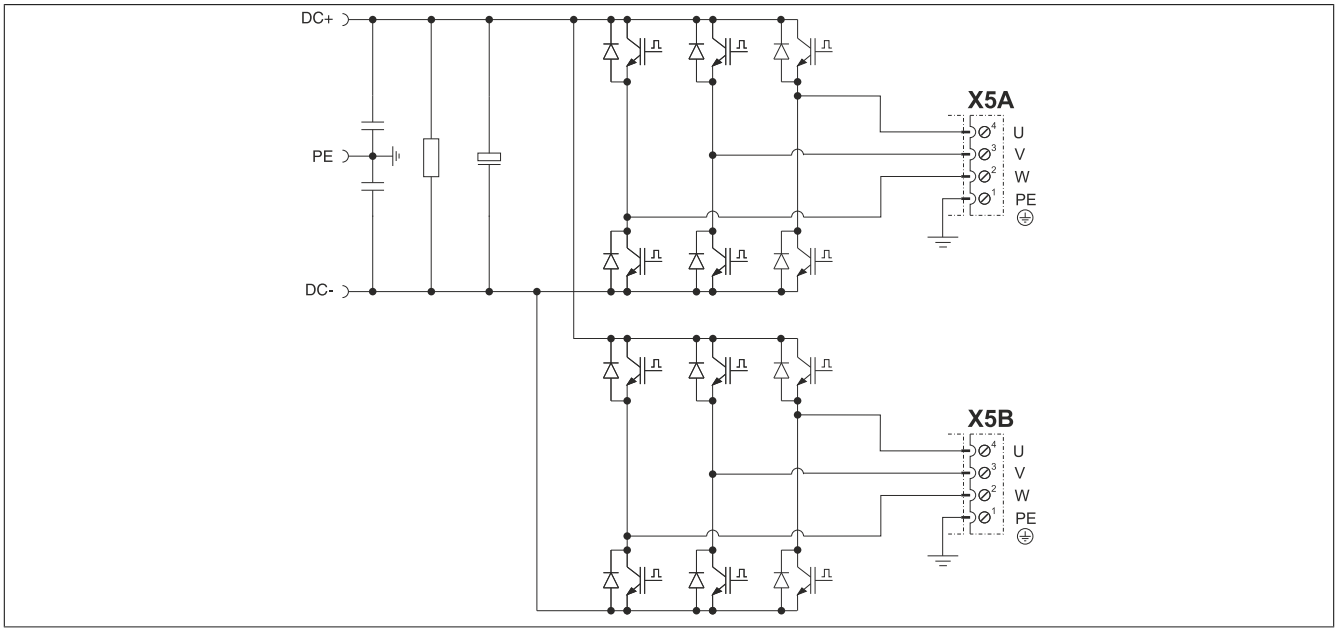



Figure 10: Motor