8BVP0440HC00.000-1

1 General information

- Wide input voltage range
- · Capable of power regeneration
- Integrated connection for temperature sensor
- 2 slots for ACOPOSmulti plug-in modules

2 Order data

Model number	Short description	Figure
	Cold plate or feed-through mounting	
8BVP0440HC00.000-1	ACOPOSmulti power supply module, 44 A, HV, cold plate or	
	feed-through mounting	The state of the s
	Required accessories	
	Terminal block sets	
8BZVP044000.000-1A	Screw clamp set for ACOPOSmulti modules 8BVP0220Hx00 and 8BVP0440Hx00: 1x 8TB2106.2010-00, 1x 8TB2108.2010-00, 1x 8TB2104.204A-00, 1x 8TB4104.202L-10	0100
	Optional accessories	SDE STATE OF THE S
	Accessory sets	VCO VCO
8BXB000.0000-00	ACOPOSmulti accessory set for encoder buffering consists of the following: 1 lithium battery AA 3.6 V, 1 cover for battery com- partment	
	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	
8SCS002.0000-00	ACOPOSmulti shield component set: 1x clamping plate; 2x clamps D 4-13.5 mm; 4x screws	
8SCS005.0000-00	ACOPOSmulti shield component set: 1x slot cover/shield plate	
8SCS007.0000-00	ACOPOSmulti shield component set: 1x shield mounting plate 2x 45°, 4x screws	
8SCS008.0000-00	ACOPOSmulti shield component set: 1x shield plate 2x type 0, 1x hose clamp, B 9 mm, D 23-35 mm	
8SCS010.0000-00	ACOPOSmulti shield component set: 1x ACOPOSmulti holding plate SK14-20, 1x shield connection clamp SK20	

Table 1: 8BVP0440HC00.000-1 - Order data

8BVP0440HC00.000-1

Model number	Short description	
	Terminal blocks	
8TB2104.204A-00	4-pin screw clamp, single row, spacing: 5.08 mm, label 4: T- T + F- F+, A keying: 0000	
8TB2106.2010-00	6-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB2106.2210-00	Push-in terminal block 6-pin, 1-row, spacing: 5.08 mm, label 1: numbered consecutively	
8TB2108.2010-00	8-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB4104.202L-10	4-pin screw clamp terminal block, 1-row, spacing: 10.16 mm, label 2: PE L3 L2 L1, coding L: 1010	

Table 1: 8BVP0440HC00.000-1 - Order data

3 Technical data

Model number	8BVP0440HC00.000-1
General information	
B&R ID code	0xA073
Cooling and mounting method	Cold plate or feed-through mounting
Slots for plug-in modules	2
Certifications	-
CE	Yes
KC	Yes
UL	cULus E225616
	Power conversion equipment
Mains connection	
Network configurations	TT, TN-S, TN-C-S 1)
Mains input voltage	3x 220 to 3x 480 VAC ±10%
Frequency	50 / 60 Hz ±4%
Installed load 2)	Max. 31.1 kW
Inrush current at 400 VAC	Max. 67 A
Switch-on interval 3)	>300 s
Max. DC bus capacitance depending on mains volt-	
age	
230 VAC	17.4 mF
400 VAC	5.8 mF
480 VAC	4 mF
Nominal switching frequency	5 kHz
Possible switching frequencies 4)	5 / 10 kHz
Integrated line filter per EN 61800-3, category C3 5)	No
Integrated regeneration choke	No
Capable of power regeneration	Yes
Power factor correction (PFC)	Yes
Variant	
L1, L2, L3, PE	Male connector
PE	M5 threaded bolt
Shield connection 6)	Yes
Terminal connection cross section	
Flexible and fine-stranded wires	
With wire end sleeves	0.5 to 16 mm ²
Approbation data	
UL/C-UL-US	20 to 6 AWG
CSA	20 to 6 AWG
Terminal cable cross section dimension of shield connection	23 to 35 mm
DC bus connection	
Voltage	
Nominal	750 VDC
Continuous power (supply and regeneration) 7)	30 kW
Reduction of continuous power depending on mains input voltage	
Mains input voltage <3x 400 VAC	75 W/V * (400 V - Mains input voltage)
Reduction of continuous power depending on DC bus voltage (U _{DC})	
U _{DC} <750 VDC	P * (1 - U _{nc} /750) ⁸⁾

Table 2: 8BVP0440HC00.000-1 - Technical data

Model number	8BVP0440HC00.000-1
Reduction of continuous power depending on	0DYFV44VNGUU.UUU-1
switching frequency and mounting method 9)	
Switching frequency 5 kHz	
Cold plate mounting 10)	0.56 kW/K (starting at 45°C) 11)
Feed-through mounting	In preparation
Switching frequency 10 kHz	III propulation
Cold plate mounting 10)	0.43 kW/K (starting at 6°C) 12)
Feed-through mounting	In preparation
Reduction of continuous power depending on in-	in proparation
stallation elevation	
Starting at 500 m above sea level	3 kW per 1000 m
Peak power (supply and regeneration)	60 kW
Power dissipation depending on switching frequen-	
cy ¹³⁾	
Switching frequency 5 kHz	[0.15*P²+10.5*P+40] W
Switching frequency 10 kHz	[0.42*P²+16*P+130] W
DC bus capacitance	825 μF
Protective measures	
Overload protection	Yes
Short circuit and ground fault protection	No
Variant	ACOPOSmulti backplane
24 VDC power supply	
Input voltage	25 VDC ±1.6%
Input capacitance	4.7 μF
Max. power consumption	25 W + P _{SLOT1} + P _{SLOT2} + P _{24 V Out} + P _{Fan8BVF} ¹⁴⁾
Variant	ACOPOSmulti backplane
24 VDC Out	
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
Filter fan connection	
Output voltage	24 V +5.8% / -0.1%
Continuous current	4.2 A
Max. overcurrent limitation	10 A
Protective measures	
Overload protection	No
Short-circuit proof	Yes
Open circuit monitoring	No
Undervoltage monitoring	No
Trigger inputs	
Quantity	2
Wiring	Sink
Electrical isolation	
Input - Power supply 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
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	0.9 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 ¹⁵⁾	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
	i ===

Table 2: 8BVP0440HC00.000-1 - Technical data

Model number	8BVP0440HC00.000-1
Environmental conditions	
Temperature	
Operation	
Nominal	5 to 40°C
Maximum 16)	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 17)	
Width	106.5 mm
Height	317 mm
Depth	
Cold plate	212 mm
Feed-through mounting	209 mm
Weight	Approx. 4.5 kg
Module width	2

Table 2: 8BVP0440HC00.000-1 - Technical data

- 1) TT and TN power systems are commonly referred to as "Delta/Wye with grounded wye neutral" in the USA.
- 2) The specified value already contains the power dissipation of the associated 8BVF line filter and associated 8BVR regeneration choke.
- 3) At max. loadable DC bus capacitance.
- 4) B&R recommends operating the module at its nominal switching frequency. Operating the module at a higher switching frequency for application-specific reasons results in a reduction in continuous power and higher CPU utilization.
- 5) Limit values from EN 61800-3 C3 (second environment).
- 6) Cables do not have to be shielded up to a total length of 3 m between the line filter, regeneration choke and power supply module. Please contact B&R when using cable lengths >3 m.
- 7) Valid under the following conditions: 3x 400 VAC mains input voltage, DC bus nominal voltage 750 VDC, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
- 8) P ... Actual continuous power available (value adjusted to the actual environmental conditions)
- 9) Valid for the following conditions: 750 VDC DC bus voltage, minimum permissible coolant flow volume (3 l/min).
- 10) The temperature specifications refer to the return temperature of the cold plate mounting plate.
- 11) Value for the nominal switching frequency.
- 12) 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.
- 13) Valid for a mains input voltage of 400 VAC and a DC bus voltage of 750 VDC. P ... Continuous power [kW].
- 14) P_{SLOT1} ... Max. power consumption P_{BBAC} [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).
 - P_{Fan8BVF...} ... Power [W] that is output to connections X4A/F- and X4A/F+ on the module (see the technical data for the respective 8BVF... line filter).
- 15) 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.
- 16) 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.
- 17) 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.

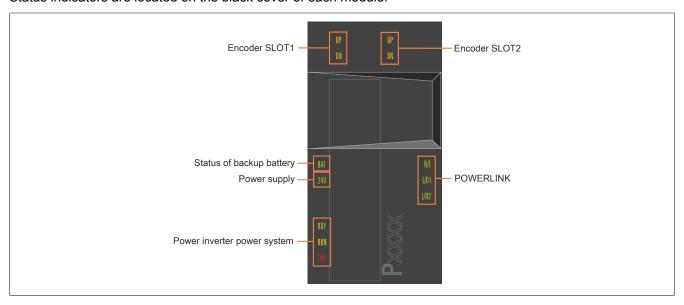


Figure 1: 8BVP power supply modules - Status indicator groups

4.1 LED status indicators

Status indicator group	Label	Color	Function	Description	
POWERLINK R/E Green/Red Ready/Error		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		
Power inverter power system	RDY	Green	Ready	see "RDY, RUN, ERR (8BVI, 8BVP, 8B0P) - LED status indica-	
	RUN	Orange	Run	tors" on page 6	
	ERR	Red	Error		
Status of backup battery	BAT	Green/Red	Ready/Error	see "Backup battery - LED status indicators" on page 7	
Power supply	Power supply 24 V Green 24 V OK		24 V OK	24 V internal system voltage supply 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: 8BVP power supply modules - LED status indicators

4.2 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 stem present and booted, no permanent or temporary errors).	
			Blinking green 1)	The module is not ready for operation.	
				Examples:	
				No signal on one or both enable inputs	
				DC bus voltage outside the tolerance range	
				Overtemperature on the motor (temperature sensor)	
				Motor feedback not connected or defective	
				Motor temperature sensor not connected or defective	
				Overtemperature on the module (IGBT junction, heat sink, etc.)	
				Disturbance on network	
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.	
				Examples:	
				Permanent overcurrent	
				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.

4.3 POWERLINK - LED status indicators

Label	Color	Function	Description	
R/E Green/		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	n 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

4.4 Backup battery - LED status indicators

Label	Color	Function	Description	
BAT	Green/Red	Ready/Error	LED off	Possible causes:
				 The voltage of the installed backup battery is within the tolerance range, but an EnDat encoder with backup battery is not connected. 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".
				Possible causes:
				Voltage of the installed backup battery outside of tolerance range No backup battery installed in module

Table 6: Backup battery - LED status indicators

4.5 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

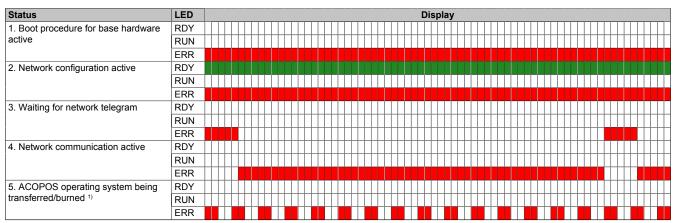


Table 7: Status changes when starting up the operating system loader

Firmware V2.140 and later.

5 Dimension diagram and installation dimensions

5.1 Cold plate

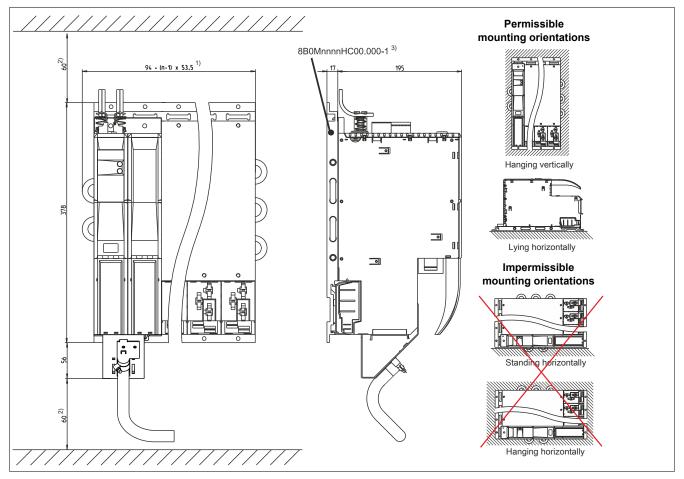


Figure 2: Cold plate - Dimension diagram and installation dimensions

- 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

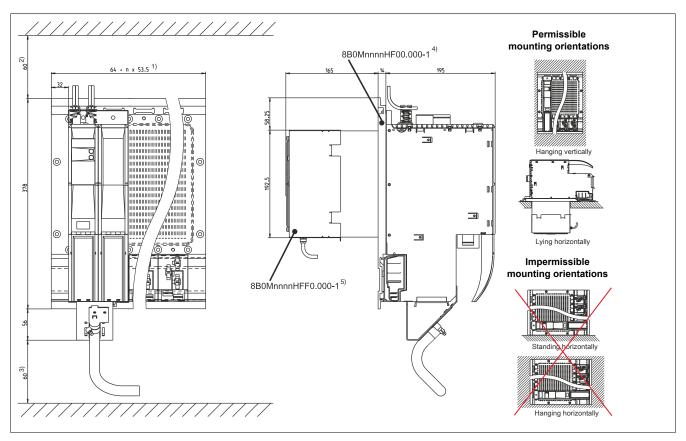


Figure 3: Feed-through mounting - Dimension diagram and installation dimensions

- 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) The required spacing to the wiring on the bottom of the module depends on the power cable being used.
- 4) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).
- 5) 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 8BVP0220Hx00.000-1, 8BVP0440Hx00.000-1 - Pinout overview

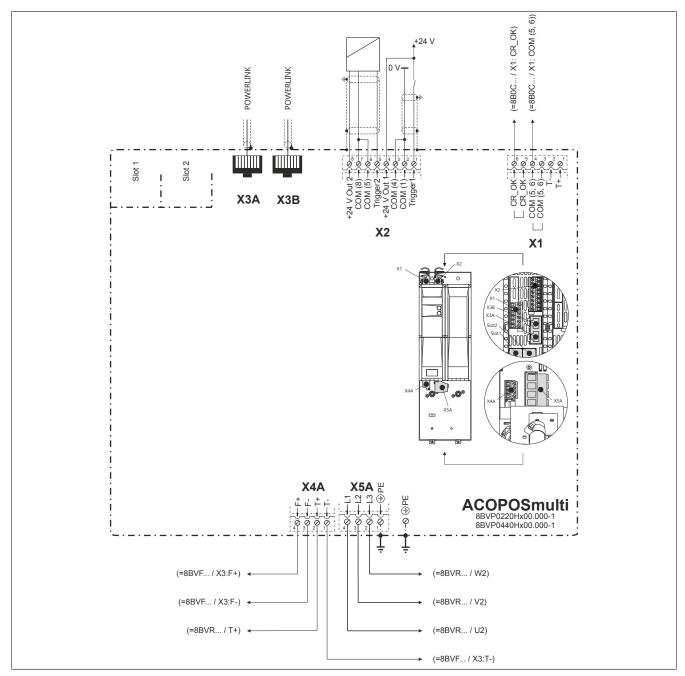


Figure 4: 8BVP0220Hx00.000-1, 8BVP0440Hx00.000-1 - Pinout overview

6.2 Connector X1 - Pinout

X1	Pin	Description	Function
	1	T+	Temperature sensor +
	2	T-	Temperature sensor -
	3	COM (5, 6)	DC bus ready 0 V
3	4	COM (5, 6)	DC bus ready 0 V
4	5	CR_OK	DC bus ready 1)
5	6	CR_OK	DC bus ready 1)
6			

Table 8: Connector X1 - Pinout

1) Output CR_OK is only set if the following condition is met: The charging relay is closed and the DC bus voltage U_{DC} >270 VDC.

Danger!

The connections for the temperature sensors 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.

6.3 Connector X2 - Pinout

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

Table 9: Connector X2 - Pinout

6.4 Connectors X3A, X3B - Pinout

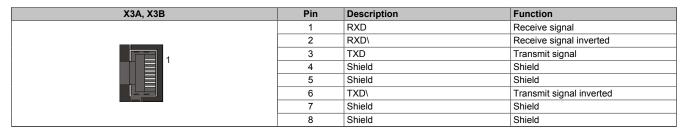


Table 10: X3A, X3B connectors - Pinout

6.5 Connector X4A - Pinout

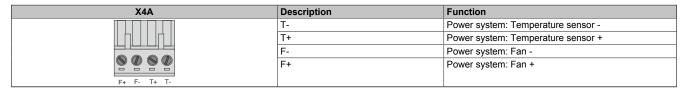


Table 11: Connector X4A - Pinout

Danger!

The connections for temperature sensor and fan 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.

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!

6.6 Connector X5A - Pinout

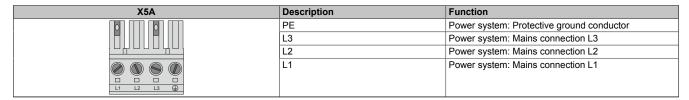


Table 12: Connector X5A - Pinout

Danger!

Before switching on the module, it is important to make sure that the housing is properly connected to ground (PE rail). Ground connections must also be established if the module is connected for test purposes or only being operated for a short period of time!

6.7 Additional protective ground connection (PE)

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

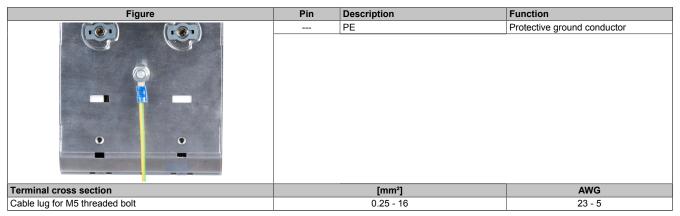


Table 13: Additional protective ground connection (PE)

Danger!

Before switching on the power supply, it must be ensured that the housing of the 8BVP power supply module is properly connected to ground potential (PE rail). Ground connections must also be established if the 8BVP power supply module is connected for test purposes or only being operated for a short period of time!

6.8 Input/Output circuit diagram

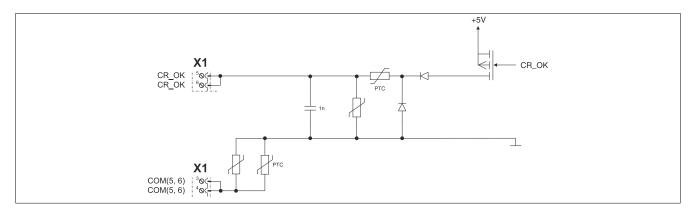


Figure 5: 8B0C - Enable

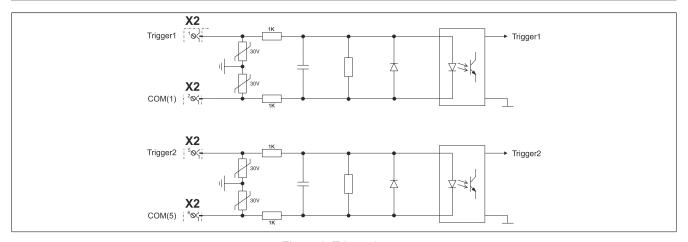


Figure 6: Trigger inputs

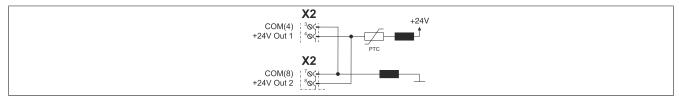


Figure 7: 24 VDC out

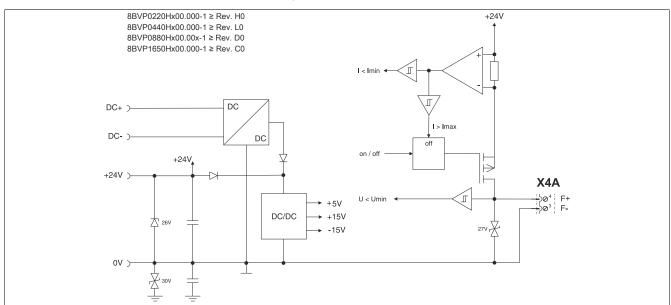


Figure 8: 8BVF fan - Control

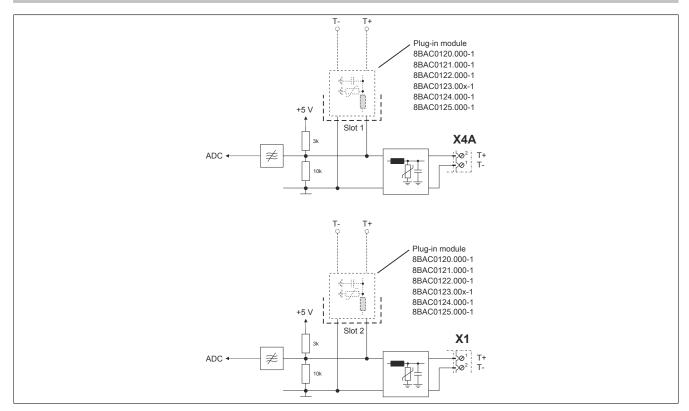


Figure 9: Temperature sensor

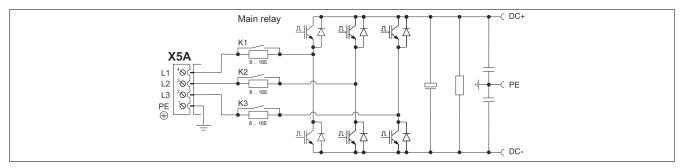


Figure 10: Power unit

6.9 POWERLINK node number setting

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

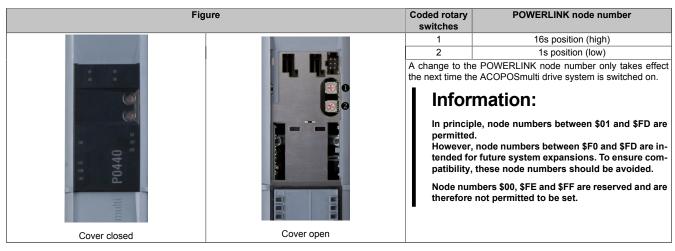


Table 14: Setting the POWERLINK node number