11. 8BVI inverter modules 16kW ... 32kW

11.1 Order data

Model number	Short description	Figure
	Wall mounting	8BVI0440HCS0.000-1
8BVI0220HWS0.000-1	ACOPOSmulti inverter module 22A, HV, wall-mounting	
8BVI0440HWS0.000-1	ACOPOSmulti inverter module 44A, HV, wall-mounting	
	Cold plate or feed-through mounting	
8BVI0220HCS0.000-1	ACOPOSmulti inverter module 22A, HV, cold plate or feed-through mounting	
8BVI0440HCS0.000-1	ACOPOSmulti inverter module 44A, HV, cold plate or feed-through mounting	

Table 40: Order data - 8BVI inverter modules, 16kW ... 32kW

Required accessories				
Model number	**Amount**	**Short description**	**Comment**	**Page**
8TB2106.2010-00	1	Screw terminal 6 pins, 1 row RM5.08 Label 1: numbered serially	Plug for X1 connection	---
8TB2108.2010-00	1	Screw terminal 8 pins, 1 row RM5.08 Label 1: numbered serially	Plug for X2 connection	---
8TB2104.203L-00	1	Screw terminal 4 pins, 1 row RM5.08 Label 3: T- T+ B- B+ Coding L: 1010	Plug for X4A connection	---
8TB4104.204G-00 [1)]	1	Screw terminal 4 pins, 1 row RM10.16 Label 4: PE W V U Coding G: 0110	Plug for X5A connection	---
8TB4104.204G-10 [2)]	1	Screw terminal 4 pins, 1 row RM10.16 Label 4: PE W V U Coding G: 0110	Plug for X5A connection	---

Table 41: Required accessory for 8BVI inverter modules, 16kW ... 32kW

1) Only for 8BVI0220HxS0.000-1.
2) Only for 8BVI0440HxS0.000-1.

Optional accessories				
Model number	**Amount**	**Short description**	**Comment**	**Page**
8BAC0120.000-1	max. 2	ACOPOSmulti plug-in module, EnDat 2.1 interface	---	99
8BAC0120.001-1	max. 2	ACOPOSmulti plug-in module, EnDat 2.2 interface	---	---
8BAC0122.000-1	max. 2	ACOPOSmulti plug-in module, Resolver interface	---	107
8BAC0124.000-1	max. 2	ACOPOSmulti plug-in module, SinCos interface	---	127
8SCS000.0000-00 1)	1	Shield component set consisting of: 1 shield plate 1x type 0 1 hose clamp, W 9mm, D 12-22mm	Shield component set for motor cables with a cable diameter of 12 - 22 mm	---
8SCS005.0000-00	Up to 2	Shield component set consisting of: 1 slot cover shield sheet	Shield sheet for covering free plug-in module slots	---
8SCS002.0000-00	1	Shield component set consisting of: 1 clamping plate 2 clamps D 4-13.5mm 2 screws	Shield component set for I/O cable with a cable diameter of 4 - 13.5 mm	---
8SCS007.0000-00 2)	1	Shield component set consisting of: 1 shield mounting plate, 2x, 45° 4 screws	Base plate for mounting shield component set 8SCS008.0000-00	---
8SCS008.0000-00 2)	1	Shield component set consisting of: 1 shield plate, 2x, type 0 1 hose clamp, W 9mm, D 23-35mm	Shield component set for motor cables with a cable diameter of 23 - 35 mm	---
8BXF001.0000-00	---	ACOPOSmulti fan module Replacement fan for ACOPOSmulti modules (8BVP/8B0C/8BVI/8BVE/8B0K)	Replacement fan for ACOPOSmulti modules (8BVP/8B0C/8BVI/8BVE/8B0K)	---

Table 42: Optional accessory for 8BVI inverter modules, 16kW ... 32kW

1) Only for 8BVI0220HxS0.000-1.
2) Only for 8BVI0440HxS0.000-1.

11.2 Technical data

Product ID **Wall mounting** **Cold plate or feed-through mounting**	**8BVI0220HWS0.000-1** **8BVI0220HCS0.000-1**	**8BVI0440HWS0.000-1** **8BVI0440HCS0.000-1**
General information		
C-UL-US listed	Yes	
Available cooling and mounting methods Wall mounting Cold plate or feed-through mounting	 Yes Yes	
Module width	2	

Table 43: Technical data for inverter modules 16kW ... 32kW

Product ID **Wall mounting** **Cold plate or feed-through mounting**	**8BVI0220HWS0.000-1** **8BVI0220HCS0.000-1**	**8BVI0440HWS0.000-1** **8BVI0440HCS0.000-1**
DC bus		
Voltage Max.	800 VDC 900 VDC	
Continuous power consumption	In preparation	
Power loss at max. device power	In preparation	
DC bus capacitance	495 µF	990 µF
Design	ACOPOSmulti backplane	
24 VDC supply		
Input voltage	25 VDC ±1.6%	
Input capacitance	32.9 µF	
Max. power consumption	20 W + $P_{24\ V\ Out}$ {0 ... 10 W} [1] + $P_{HoldingBrake}$ + 2 * $P_{Fan8B0M...}$ [2]	
Design	ACOPOSmulti backplane	
Motor connector		
Continuous power [3]	16 kW	32 kW
Continuous current [3]	22 A_{eff}	44 A_{eff}
Reduction of continuous current depending on switching frequency and cooling method [4] Switching frequency 20 kHz Wall mounting[5] Installing the cold plate[6] Feed-through mounting Switching frequency 10 kHz Wall mounting[5] Installing the cold plate[6] Feed-through mounting Switching frequency 5 kHz Wall mounting[5] Installing the cold plate[6] Feed-through mounting	 0.31 A/K (from -16°C) [7] 0.36 A/K (from 5°C) [8] In preparation 0.4 A/K (from 31°C) 0.5 A/K (from 49°C) In preparation **No reduction** **No reduction** In preparation	 0.36 A/K (from -77°C) [7] 0.32 A/K (from -82°C) [8] In preparation 0.5 A/K (from -10°C) [7] 0.62 A/K (from 6°C) [8] In preparation **1.57 A/K (from 40°C)** **0.8 A/K (from 45°C)** In preparation
Reduction of continuous power depending on altitude Starting at 500 m above sea level	 2.2 A_{eff} per 1000 m	 4.4 A_{eff} per 1000 m
Peak current	55 A_{eff}	88 A_{eff}
Rated switching frequency	5 kHz	
Possible switching frequencies[9]	5/10/20 kHz	
Max. rate of rise in voltage according to IEC EN 60034-17 [10]	10 kV/µs	
Protective measures Overload protection Short circuit and ground fault	 Yes Yes	
Maximum motor line length depending on the switching frequency [11] Switching frequency 5 kHz Switching frequency 10 kHz Switching frequency 20 kHz	 25 m 25 m 25 m	

Table 43: Technical data for inverter modules 16kW ... 32kW (Forts.)

Product ID **Wall mounting** **Cold plate or feed-through mounting**	**8BVI0220HWS0.000-1** **8BVI0220HCS0.000-1**	**8BVI0440HWS0.000-1** **8BVI0440HCS0.000-1**
Design U, V, W, PE Shield connection	Connectors Yes	
Terminal connection cross sections Flexible and fine wire lines with wire tip sleeves Approbation data UL/C-UL-US CSA	 0.5 - 6 mm² 20 - 8 20 - 8	 0.5 - 16 mm² 20 - 6 20 - 6
Terminal cable outer-cross-section dimension of the shield connection	12 - 22 mm	23 - 35 mm
Motor holding brake connection		
Output voltage	24 VDC +5.8% / -0.1%	
Continuous current	4.2 A	
Max. internal resistance	0.15 Ω	
Extinction potential	Approx. 30 V	
Max. extinction energy per connection	3 Ws	
Max. switching frequency	0.5 Hz	
Protective measures Overload and short-circuit protection Cable breakage monitoring Undervoltage monitoring	 Yes Yes Yes	
Max. over-current limitation	10 A	
Response threshold for cable breakage monitoring	Approx. 0.5 A	
Response threshold for undervoltage monitoring	24 VDC +0% / -5%	
Trigger inputs		
Number of inputs	2	
Wiring	Sink	
Electrical isolation Input - inverter module Input - Input	 Yes No	
Input voltage Rated Maximum	 24 VDC 30 VDC	
Switching threshold LOW HIGH	 <5 V >15 V	
Input current at rated voltage	Approx. 10 mA	
Switching delay Positive edge Negative edge	 52 µs ± 0.5 µs (digitally filtered) 53 µs ± 0.5 µs (digitally filtered)	
Modulation compared to ground potential	Max. ±38 V	

Table 43: Technical data for inverter modules 16kW ... 32kW (Forts.)

Product ID Wall mounting Cold plate or feed-through mounting	8BVI0220HWS0.000-1 8BVI0220HCS0.000-1	8BVI0440HWS0.000-1 8BVI0440HCS0.000-1
24 V Out		
Amount	2	
Output voltage DC bus voltage 260 ... 315 VDC DC bus voltage 315 ... 900 VDC	25 VDC * (DC bus voltage / 315) 24 VDC ±6%	
Fuse protection	500 mA (slow-blow) electronic, automatic reset	
Enable inputs		
Number of inputs	2	
Wiring	Sink	
Electrical isolation Input - inverter module	Yes	
Input voltage Rated Maximum	24 VDC 30 VDC	
Switching threshold LOW HIGH	<5 V >15 V	
Input current at rated voltage	Approx. 30 mA	
Switching delay @ 24 VDC Enable 1 -> 0, PWM off Enable 0 -> 1, Ready for PWM	Max. 20,5 ms Max. 100 µs	
Modulation compared to ground potential	Max. ±38 V	
Operational conditions		
Ambient temperature during operation Max. ambient temperature [12)]	5 to 40°C +55°C	
Relative humidity during operation	5 to 85%, non-condensing	
Installation at altitudes above sea level Maximum installation altitude [13)]	0 to 500 m 4000 m	
Degree of pollution according to EN 60664-1	2 (non-conductive material)	
Overvoltage cat. according to IEC 60364-4-443:1999	III	
EN 60529 protection	IP20	
Storage and transport conditions		
Storage temperature	-25 to +55°C	
Relative humidity during storage	5 to 95%, non-condensing	
Transport temperature	-25 to +70°C	
Relative humidity during transport	95% at +40°C	

Table 43: Technical data for inverter modules 16kW ... 32kW (Forts.)

Product ID Wall mounting Cold plate or feed-through mounting	8BVI0220HWS0.000-1 8BVI0220HCS0.000-1	8BVI0440HWS0.000-1 8BVI0440HCS0.000-1
Mechanical characteristics		
Dimensions[14)]		
Width	106.5 mm	
Height	317 mm	
Depth		
Wall mounting	263 mm	
Cold-plate	212 mm	
Feed-through mounting	209 mm	
Weight		
Wall mounting	Approx. 5.2 kg	
Cold-plate	Approx. 4.2 kg	
Feed-through mounting	Approx. 4.2 kg	

Table 43: Technical data for inverter modules 16kW ... 32kW (Forts.)

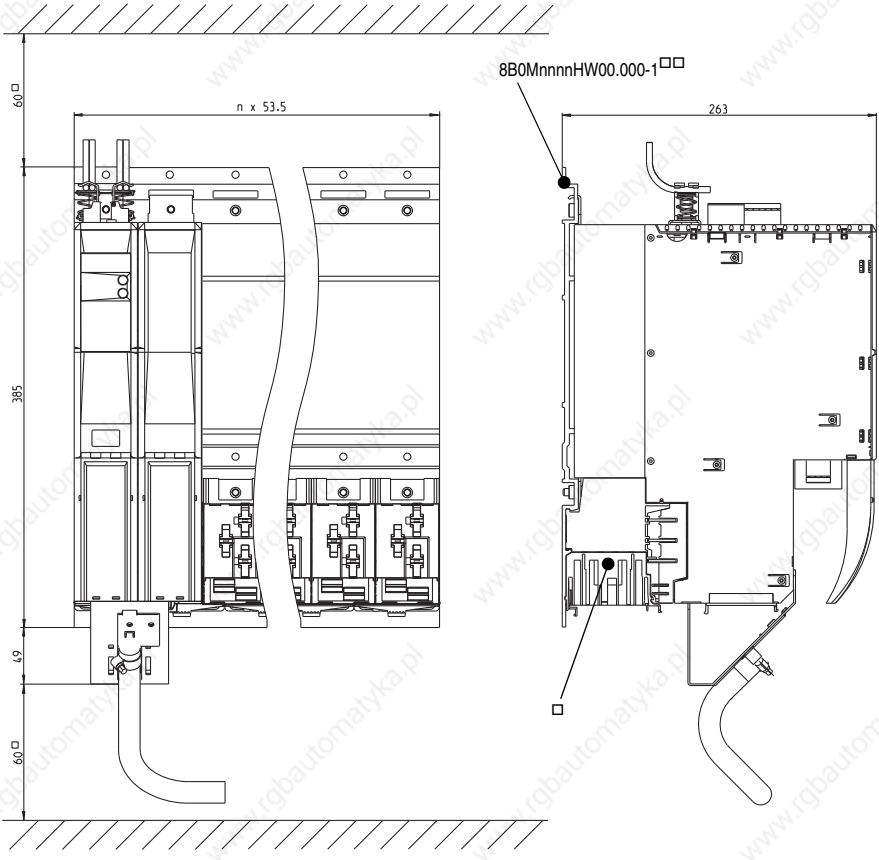
1) The power consumption $P_{24\ V\ Out}$ corresponds to the power that is output on the module's X2 / +24 V Out 1 and X2 / +24 V Out 2 connections (max. 10 W).
2) The power consumption $P_{Fan8B0M...}$ corresponds to the portion of the power that is used by the fan modules in the mounting plate / by the 8B0M0040HFF0.000-1 fan module and can be found in the technical data for the respective 8B0M... mounting plate.
3) The continuous power and continuous current are valid for the following boundary conditions: Nominal DC bus voltage 800 VDC, nominal switching frequency 5 kHz, 40°C ambient temperature, installation altitudes < 500 m above sea level.
4) Valid in the following conditions: Nominal DC bus voltage 800 VDC, minimum permissible coolant flow volume (3 l/min). The nominal switching frequency values for the respective ACOPOSmulti inverter module are marked in bold.
5) The temperature specifications are based on the ambient temperature.
6) The temperature specifications are based on the return temperature of the cold plate mounting plate.
7) The module cannot supply the full continuous current at this switching frequency. This unusual value for the ambient temperature, at which a derating of the continuous current must be accounted for, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
8) The module cannot supply the full continuous current at this switching frequency. This unusual value for the return temperature, at which a derating of the continuous current must be accounted for, 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 low return-temperatures. The designs in the section "Condensation", auf Seite 203 must be taken into consideration!
9) B&R recommends operating the module at nominal switching frequency. Operating the module at a higher switching frequency for application-specific reasons reduces the continuous current and increases the CPU load.
   When using double-axis modules, the increased CPU load causes a reduction of the functional range in the drive; if this is not taken into consideration then it can cause the computing time to be exceeded in extreme cases.
10) The value listed is only valid for motor cables with a length > 3 m and also depends (to a small extend) on the motor used.
11) **Information:**

    When using two motor cables that are connected in parallel, the maximum permissible motor cable lengths are reduced by half.

    The total length of all motor cables per backplane module is limited (see section 3 "Line filter 8BVF" on page 41).
12) Continuous operation of ACOPOSmulti inverter modules at ambient temperatures ranging from 40°C to max. 55°C is possible (taking the continuous current reductions listed into consideration), but results in a shorter lifespan.
13) Continuous operation of ACOPOSmulti inverter modules at altitudes ranging from 500 m to 4000 m above sea level is possible (taking the continuous current reductions listed into consideration). Additional requirements are to be arranged with B&R.
14) The dimensions define the true device dimensions including the respective mounting plate. Make sure to leave additional space above and below the device for mounting, connections and air circulation (see section 2 "Dimension diagrams and installation dimensions" on page 143).

2.4.7 Inverter modules 8BVI0220HWS0.000-1, 8BVI0440HWS0.000-1



n ... Number of width units of the mounting plate

□ ... For proper air circulation, at least 60 mm has to be left free above and below the module.
To ensure that the fan modules in the mounting plate can be exchanged easily, at least 250 mm has to be left free below the module.

□□ ... nnnn indicates the number of slots (0160 equals 16 slots)

Figure 29: Dimensional diagram and installation dimensions for 8BVI0220HCW0.000-1, 8BVI0440HWS0.000-1

6.3 8BVI0220HxS0.000-1, 8BVI0440HxS0.000-1

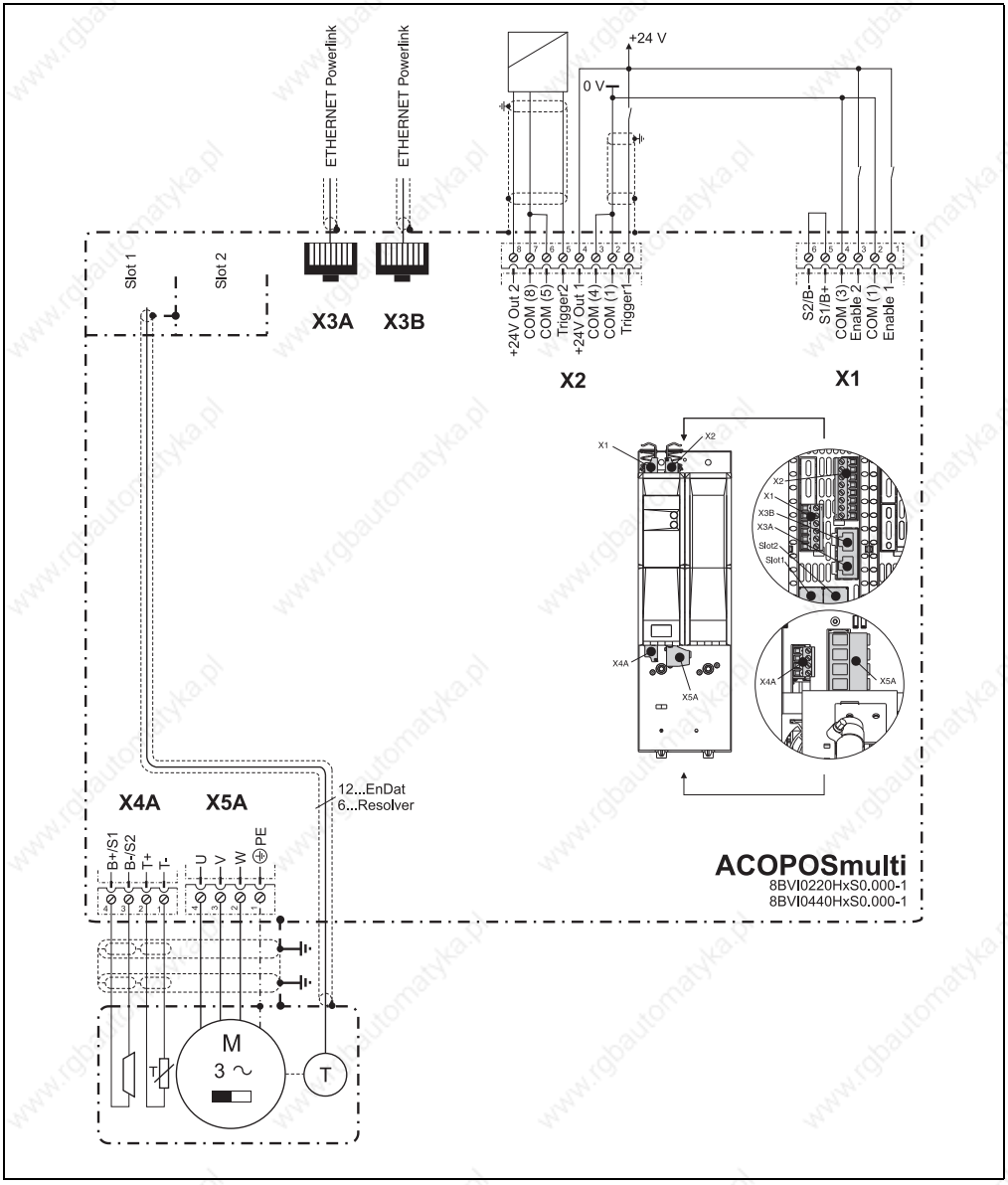


Figure 110: Overview of pin assignments - 8BVI0220HxS0.000-1, 8BVI0440HxS0.000-1

6.3.1 Pin assignments - X1 plug

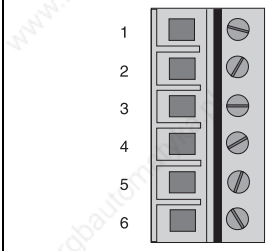
X1	Pin	Name	Function
	1	Enable 1	Axis 1: Enable 1
	2	COM (1)	Axis 1: Enable 1 0 V
	3	Enable 2	Axis 1: Enable 2
	4	COM (3)	Axis 1: Enable 2 0 V
	5	S1/B+ [1)]	Axis 1: Brake + / Activation for the external holding brake
	6	S2/B- [1)]	Axis 1: Brake - / Activation for the external holding brake

Table 144: Pin assignments for X1 plug - 8BVI0220HxS0.000-1, 8BVI0440HxS0.000-1

1) If the holding brake is connected via an additional external relay contact (ground-in e.g. via the conections S1/S2) instead of 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.

6.3.2 Pin assignments - X2 plug

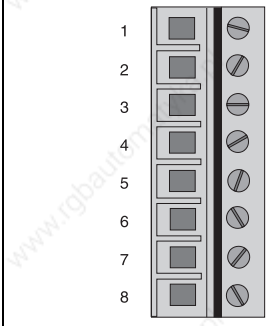
X2	Pin	Name	Function
	1	Trigger1	Trigger 1
	2	COM (1)	Trigger 1 0 V
	3	COM (4)	+24 V output 1 0 V
	4	+24 V Out 1	+24 V output 1
	5	Trigger2	Trigger 2
	6	COM (5)	Trigger 2 0 V
	7	COM (8)	+24 V output 2 0 V
	8	+24 V Out 2	+24 V output 2

Table 145: Pin assignments for X2 plug - 8BVI0220HxS0.000-1, 8BVI0440HxS0.000-1

6.3.3 Pin assignments - X3A, X3B plugs

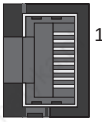
X3A, X3B	Pin	Name	Function
	1	RXD	Receive signal
	2	RXD\	Receive signal inverted
	3	TXD	Transmit signal
	4	Shield	Shield
	5	Shield	Shield
	6	TXD\	Transmit signal inverted
	7	Shield	Shield
	8	Shield	Shield

Table 146: Pin assignments for X3A, X3B plugs - 8BVI0220HxS0.000-1, 8BVI0440HxS0.000-1

Usage guidelines for B&R Powerlink cables

Special usage guidelines

Special usage guidelines must be adhered to for the following B&R Powerlink cables:

Model number	Short description
X20CA0E61.0002	Ethernet POWERLINK connection cables, RJ45 to RJ45, 0.2 m
X20CA0E61.0005	Ethernet POWERLINK connection cables, RJ45 to RJ45, 0.5 m
X20CA0E61.0010	Ethernet POWERLINK connection cables, RJ45 to RJ45, 1.0 m
X20CA0E61.0020	Ethernet POWERLINK connection cables, RJ45 to RJ45, 2.0 m
X20CA0E61.0030	Ethernet POWERLINK connection cables, RJ45 to RJ45, 3.0 m
X20CA0E61.0040	Ethernet POWERLINK connection cables, RJ45 to RJ45, 4.0 m
X20CA0E61.0050	Ethernet POWERLINK connection cables, RJ45 to RJ45, 5.0 m
X20CA0E61.0080	Ethernet POWERLINK connection cables, RJ45 to RJ45, 8.0 m
X20CA0E61.0100	Ethernet POWERLINK connection cables, RJ45 to RJ45, 10.0 m
X20CA0E61.0150	Ethernet POWERLINK connection cables, RJ45 to RJ45, 15.0 m
X20CA0E61.0300	Ethernet POWERLINK connection cables, RJ45 to RJ45, 30.0 m
X20CA0E61.0500	Ethernet POWERLINK connection cables, RJ45 to RJ45, 50.0 m
X20CA3E61.0100	Ethernet POWERLINK connection cables, RJ45 to RJ45, can be used in cable drag chains, 10.0 m
X20CA3E61.0150	Ethernet POWERLINK connection cables, RJ45 to RJ45, can be used in cable drag chains, 15.0 m
X67CA0E41.0010	Ethernet POWERLINK attachment cables, RJ45 to M12, 1.0 m
X67CA0E41.0050	Ethernet POWERLINK attachment cables, RJ45 to M12, 5.0 m
X67CA0E41.0150	Ethernet POWERLINK attachment cables, RJ45 to M12, 15.0 m
X67CA0E41.0500	Ethernet POWERLINK attachment cables, RJ45 to M12, 50.0 m
X67CA3E41.0150	Ethernet POWERLINK attachment cables, RJ45 to M12, can be used in cable drag chains, 15.0 m

Table 147: Overview of B&R Powerlink cables

The unlocking mechanism for this B&R Powerlink cable is protected by a soft plastic clip (see figure 111 "B&R Powerlink cable").

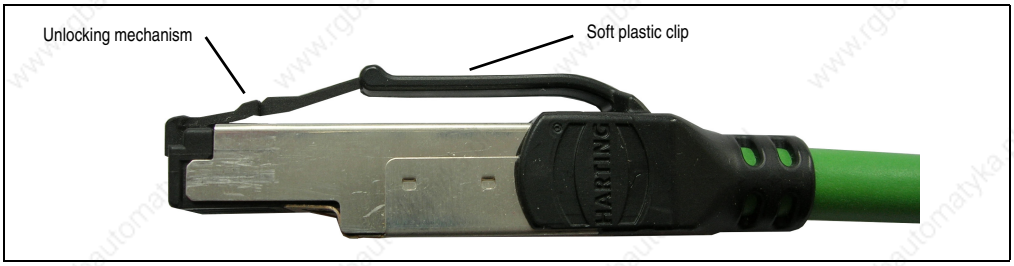


Figure 111: B&R Powerlink cable

This soft plastic clip connects the unlocking mechanism to the connector housing when extended and is designed to prevent the unlocking mechanism from breaking off when disconnecting the cable.

Disconnecting the B&R Powerlink cable from ACOPOSmulti modules

The RJ45 plug must be unlocked by pressing on the front part of the soft plastic clip and the B&R Powerlink cable must then be disconnected from the ACOPOSmulti module (see figure 112 "Correct unlocking of B&R Powerlink cables") .

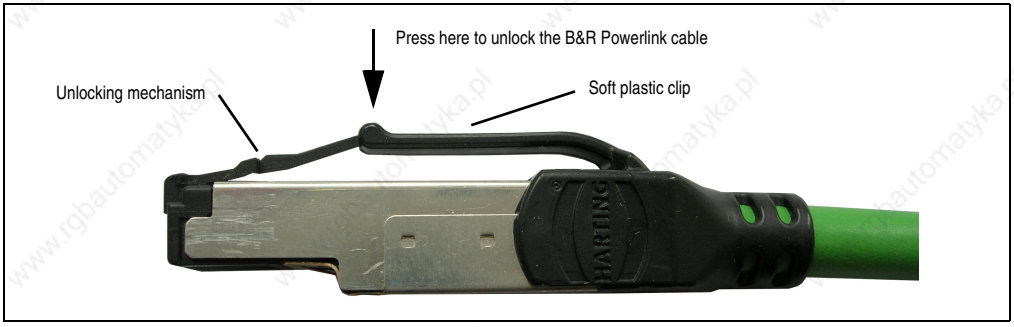


Figure 112: Correct unlocking of B&R Powerlink cables

Caution!

Before disconnecting the B&R Powerlink cable from ACOPOSmulti modules, make sure that the RJ45 plug is completely unlocked.

6.3.4 Pin assignments - X4A plug

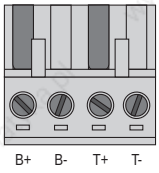
X4A	Name	Function
	T-	Axis 1: Temperature sensor -
	T+	Axis 1: Temperature sensor +
	B-/S2 1)	Axis 1: Brake - / Activation for the external holding brake
	B+/S1 1)	Axis 1: Brake + / Activation for the external holding brake

Table 148: Pin assignments for X4A plug - 8BVI0220HxS0.000-1, 8BVI0440HxS0.000-1

1) If the holding brake is connected via an additional external relay contact (ground-in e.g. via the conections S1/S2) instead of 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.

6.3.5 Pin assignments - X5A plug

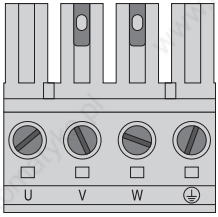
X5A	Name	Function
	PU	Axis 1: Protective ground conductor
	W	Axis 1: Motor connection W
	V	Axis 1: Motor connection V
	U	Axis 1: Motor connection U

Table 149: Pin assignments for X5A plug - 8BVI0220HxS0.000-1, 8BVI0440HxS0.000-1

6.3.6 Input/output circuit diagram

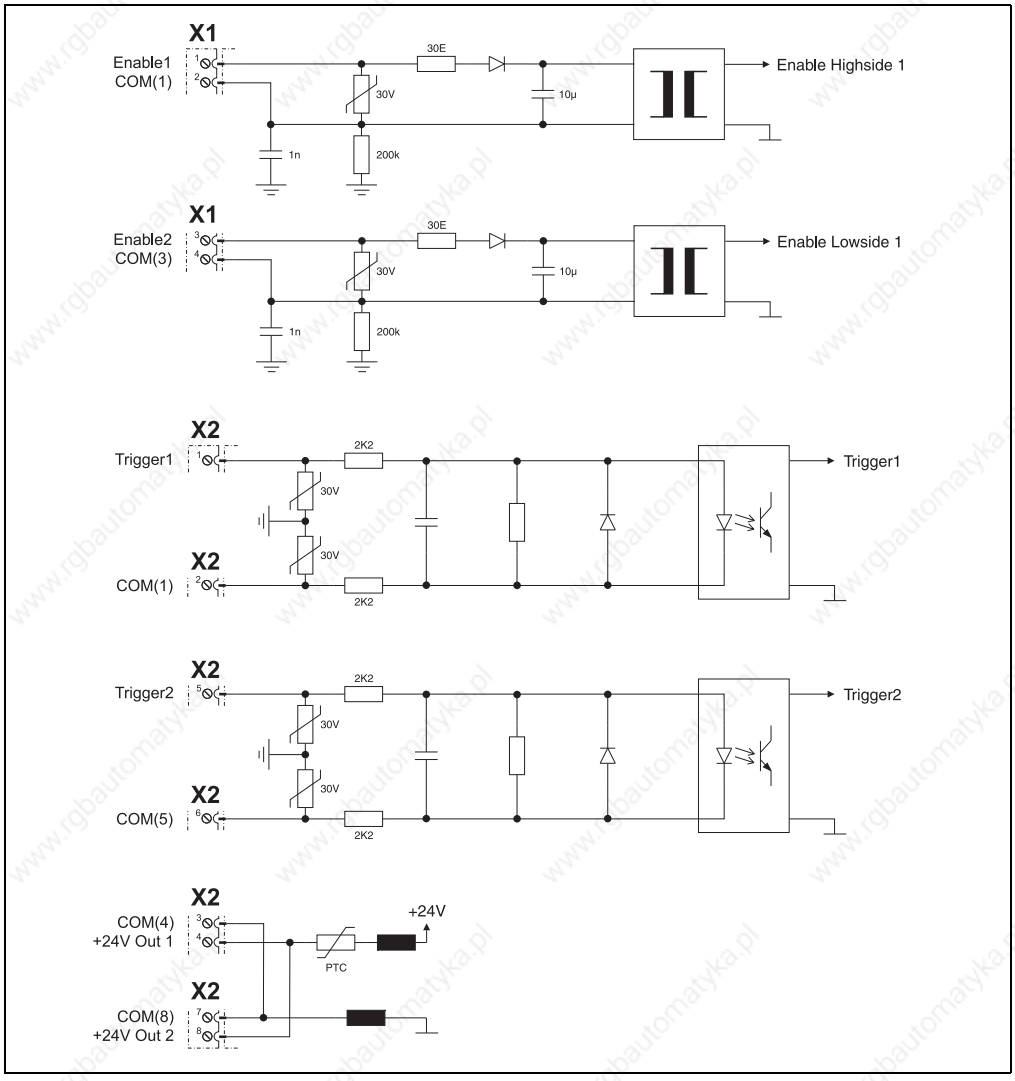


Figure 113: Input/output circuit diagram
8BVI0014HxS0.000-1, 8BVI0028HxS0.000-1, 8BVI0055HxS0.000-1, 8BVI0110HxS0.000-1

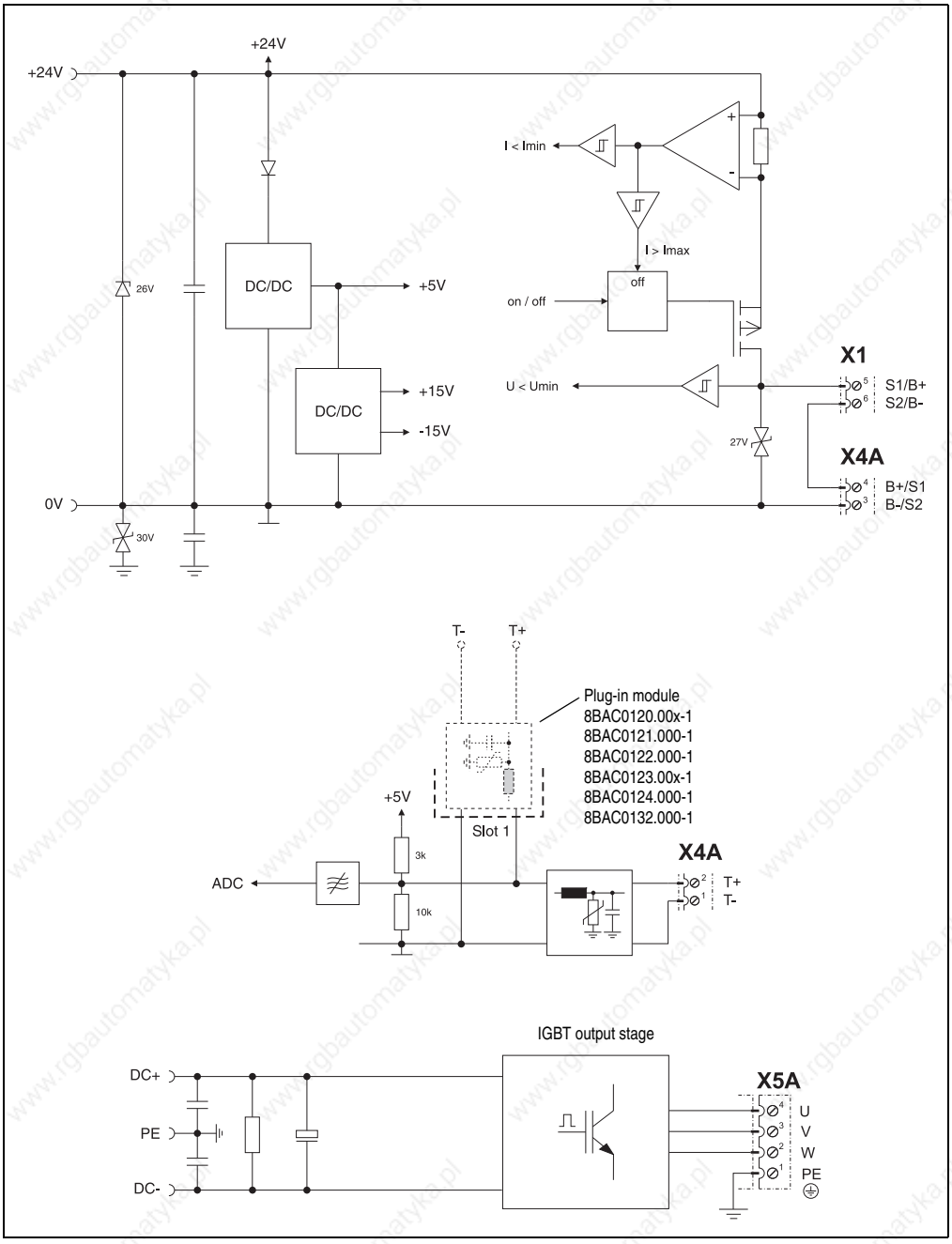


Figure 113: Input/output circuit diagram
8BVI0014HxS0.000-1, 8BVI0028HxS0.000-1, 8BVI0055HxS0.000-1, 8BVI0110HxS0.000-1 (Forts.)