

X20(c)BC0083

1 General information

The bus controller makes it possible to connect X2X Link I/O nodes to POWERLINK. It is also possible to operate the X2X Link cycle synchronously 1:1 or synchronous to POWERLINK using a prescaler.

POWERLINK is a standard protocol for Fast Ethernet with hard real-time properties. The Ethernet POWERLINK Standardization Group (EPSG) ensures that the standard remains open and is continually developed: www.ethernet-powerlink.org

- POWERLINK
- I/O configuration and Firmware update via the fieldbus
- Integrated hub for efficient cabling

2 Coated modules

Coated modules are X20 modules with a protective coating for the electronics component. This coating protects X20c modules from condensation and corrosive gases.

The modules' electronics are fully compatible with the corresponding X20 modules.

For simplification purposes, only images and module IDs of uncoated modules are used in this data sheet.

The coating has been certified according to the following standards:

- Condensation: BMW GS 95011-4, 2x 1 cycle
- Corrosive gas: EN 60068-2-60, Method 4, Exposure 21 days



3 Order data

Model number	Short description	Figure
	Bus controllers	
X20BC0083	X20 bus controller, 1 POWERLINK interface, integrated 2-port hub, 2x RJ45, order bus base, power supply module and terminal block separately.	
X20cBC0083	X20 bus controller, coated, 1 POWERLINK interface, integrated 2-port hub, 2x RJ45, order bus base, power supply module and terminal block separately.	
	Required accessories	
	System modules for bus controllers	
X20BB80	X20 bus base, for X20 base module (BC, HB, etc.) and X20 power supply module, X20 end plates X20AC0SL1/X20AC0SR1 (left and right) included	
X20PS9400	X20 supply module, for bus controller and internal I/O supply, X2X Link supply	
X20PS9402	X20 power supply module, for bus controller and internal I/O supply, X2X Link supply, supply not electrically isolated	
X20cBB80	X20 bus base, coated, for X20 base module (BC, HB, etc.) and X20 power supply module, X20 end plates X20AC0SL1/X20AC0SR1 (left and right) included	
X20cPS9400	X20 supply module, coated, for bus controller and internal I/O supply, X2X Link supply	
	Terminal blocks	
X20TB12	X20 terminal block, 12-pin, 24 VDC keyed	

Table 1: X20BC0083, X20cBC0083 - Order data

4 Technical data

Product ID	X20BC0083	X20cBC0083
Short description		
Bus controller	POWERLINK (V1/V2) controlled node	
General information		
B&R ID code	0x1F1E	0xE216
Status indicators	Module status, bus function	
Diagnostics		
Module status	Yes, using status LED and software	
Bus function	Yes, using status LED and software	
Power consumption		
Bus	2 W	
Additional power dissipation caused by the actuators (resistive) [W]	-	
Electrical isolation		
Fieldbus - X2X Link	Yes	
Fieldbus - I/O	Yes	
Certification		
CE	Yes	
cULus	Yes	
cCSAus HazLoc Class 1 Division 2	Yes	-
ATEX Zone 2 ¹⁾	Yes	
KC	Yes	-
GL	Yes	
GOST-R	Yes	
Interfaces		
Fieldbus	POWERLINK (V1/V2) controlled node	
Design	2x shielded RJ45 port (hub)	
Cable length	Max. 100 m between two stations (segment length)	
Transfer rate	100 Mbit/s	
Transmission		
Physical layer	100 BASE-TX	
Half-duplex	Yes	
Full-duplex	No	
Autonegotiation	Yes	
Auto-MDI / MDIX	Yes	
Hub runtime	0.96 to 1 µs	
Min. cycle time ²⁾		
Fieldbus	200 µs	
X2X Link	200 µs	
Synchronization between bus systems possible	Yes	
Operating conditions		
Mounting orientation		
Horizontal	Yes	
Vertical	Yes	
Installation at elevations above sea level		
0 to 2000 m	No limitations	
>2000 m	Reduction of ambient temperature by 0.5°C per 100 m	
EN 60529 protection	IP20	
Environmental conditions		
Temperature		
Operation		
Horizontal installation	-25 to 60°C	
Vertical installation	-25 to 50°C	
Derating	-	
Storage	-40 to 85°C	
Transport	-40 to 85°C	
Relative humidity		
Operation	5 to 95%, non-condensing	Up to 100%, condensing
Storage	5 to 95%, non-condensing	
Transport	5 to 95%, non-condensing	
Mechanical characteristics		
Note	Order 1x X20TB12 terminal block separately Order 1x X20PS9400 or X20PS9402 power supply module separately Order 1x X20BB80 bus base separately	Order 1x X20TB12 terminal block separately Order 1x X20cPS9400 power supply module separately Order 1x X20cBB80 bus base separately
Spacing ³⁾	37.5 ^{+0.2} mm	

Table 2: X20BC0083, X20cBC0083 - Technical data

- 1) Ta min.: 0°C
Ta max.: See environmental conditions
- 2) The minimum cycle time defines how far the bus cycle can be reduced without communication errors occurring.
- 3) Spacing is based on the width of the X20BB80 bus base. In addition, an X20PS9400 or X20PS9402 supply module is always required for the bus controller.

5 LED status indicators

Figure	LED	Color	Status	Description	
	S/E ¹⁾	Green	Off	No power supply or mode is NOT_ACTIVE. In this mode, the bus controller waits for about 5 seconds after restarting. No communication with the bus controller is possible. If no POWERLINK communication is detected during these 5 seconds, the bus controller goes into the BASIC_ETHERNET mode. If POWERLINK communication is detected before this time passes, however, the bus controller goes into the PRE_OPERATIONAL_1 mode.	
			Flickering	BASIC_ETHERNET mode. The bus controller did not detect any POWERLINK communication. In this mode, direct communication with the bus controller is possible using UDP. If POWERLINK communication is detected while in this mode, the bus controller goes into the PRE_OPERATIONAL_1 mode.	
			Single flash	PRE_OPERATIONAL_1 mode. With operation on a POWERLINK V1 master, the bus controller goes directly into PRE_OPERATIONAL_2 mode. With operation on an POWERLINK V2 manager, the CN (Controlled Node) waits for the reception of a SoC frame and then switches over to PRE_OPERATIONAL_2 mode.	
			Double flash	PRE_OPERATIONAL_2 mode. In this mode the bus controller is normally configured by the manager. A command (POWERLINK V2) or setting the data valid flag in the output data (POWERLINK V1) then switches the mode to READY_TO_OPERATE.	
			Triple flash	READY_TO_OPERATE mode. In a POWERLINK V2 network, the manager then switches via command to OPERATIONAL mode. In a POWERLINK V1 network, the bus controller then switches automatically to OPERATIONAL mode as soon as input data are present.	
			On	OPERATIONAL mode	
			Blinking	STOPPED mode. No output data sent nor input data received. Only the appropriate command from the manager can enter or leave this mode.	
		Red	On	The bus controller has encountered an error (failed Ethernet frames, increased number of collisions on the network, etc.). Note: The LED blinks red several times immediately after startup. This is not an error.	
		L/A IFx	Green	On	Link established to the remote station
		Blinking		A link to the remote station has been established and there is activity on bus.	

1) The Status/Error LED "S/E" is a green/red dual LED.

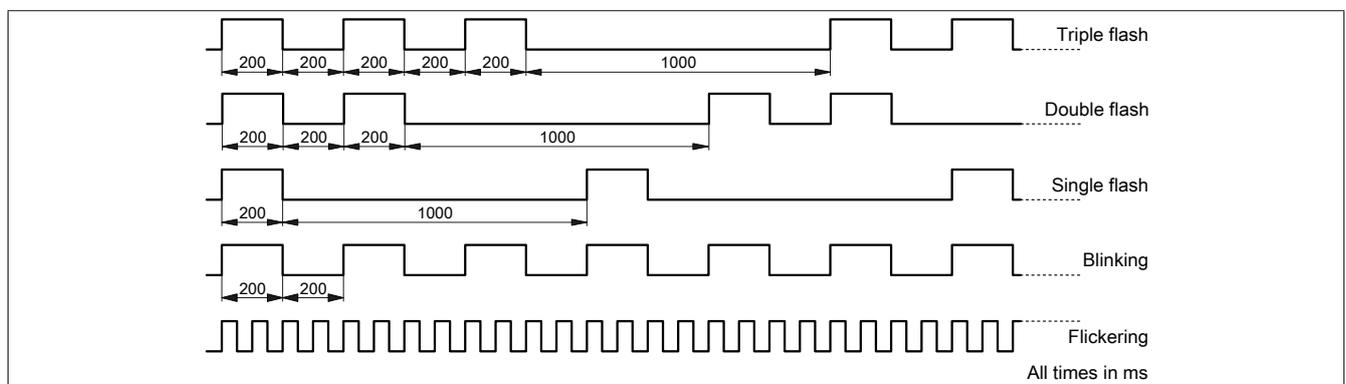
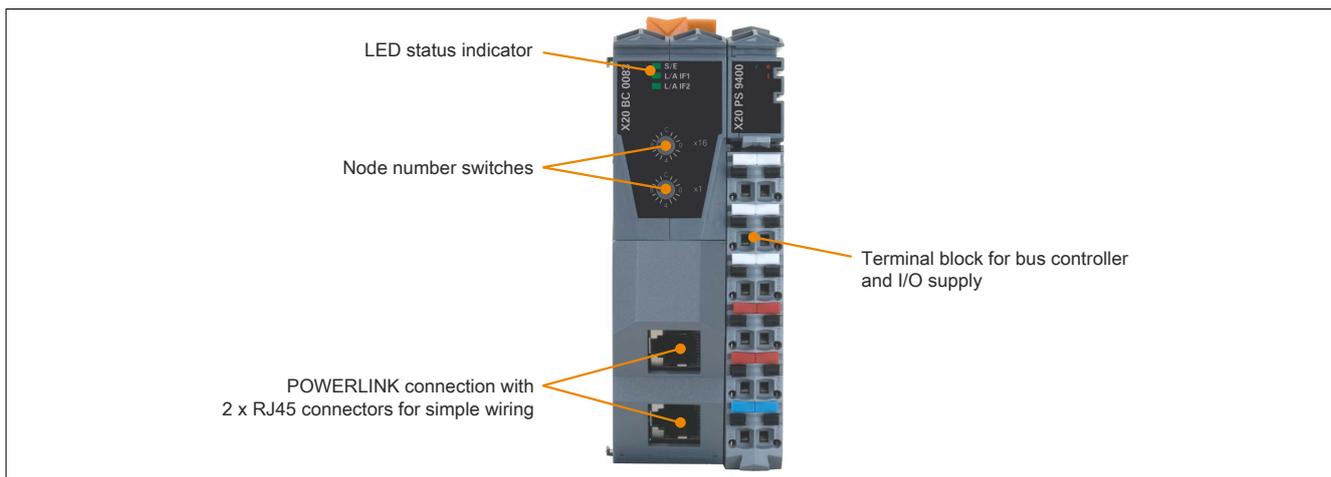
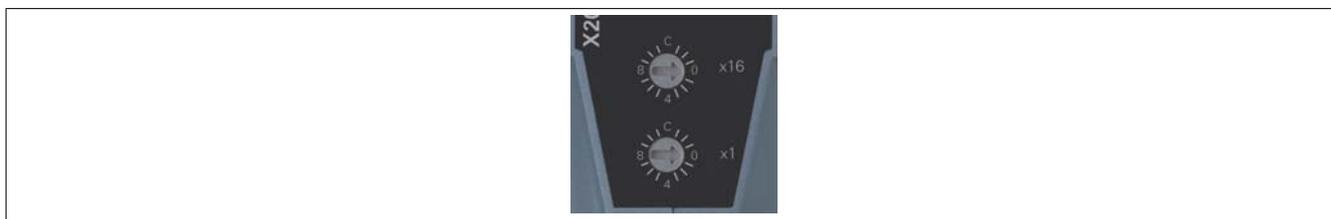


Figure 1: Status LEDs - Blinking patterns

6 Operating and connection elements



7 POWERLINK node number



The node number for the POWERLINK node is set using the two number switches. Node numbers between 0x01 and 0xEF are permitted.

Switch position	Description
0x00	Reserved, switch position not permitted
0x01 - 0xEF	Node number of the POWERLINK node Operation as a controlled node.
0xF0 - 0xFF	Reserved, switch position not permitted

8 Dynamic Node Allocation (DNA)

The node numbers of all POWERLINK bus controllers can be assigned dynamically. This has the following advantages:

- No need to set the node number switch
- Easier installation
- Reduced error sources

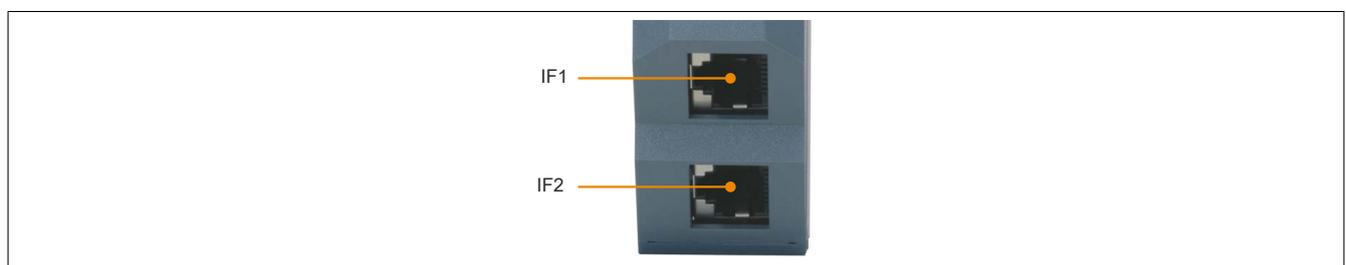
For information about configuration as well as an example, see the AS help system (Communication → POWERLINK → General information → Dynamic Node Allocation (DNA)).

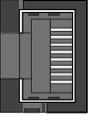
Information:

The IF1 interface must always be used as the input from the preceding node.

9 Ethernet interface

Information about cabling X20 modules with an Ethernet interface can be found in the module's download section on the B&R website (www.br-automation.com).



Interface	Pinout		
	Pin	Ethernet	
 Shielded RJ45	1	RXD	Receive data
	2	RXD\	Receive data\
	3	TXD	Transmit data
	4	Termination	
	5	Termination	
	6	TXD\	Transmit data\
	7	Termination	
	8	Termination	

10 SG3

This module is not supported on SG3 targets.

11 SG4

This module comes with preinstalled firmware. The firmware is also part of the Automation Runtime operating system for the PLC. If the two versions are different, the Automation Runtime firmware is loaded to the module.

The latest firmware is made available automatically when updating Automation Runtime.