

# X20(c)BC0083

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## 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](http://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
	<b>Bus controllers</b>	
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	
	<b>Required accessories</b>	
	<b>System modules for bus controllers</b>	
X20BB80	X20 bus base, for X20 base module (BC, HB, etc.) and X20 power supply module, X20 end plates (left and right) X20AC0SL1/X20AC0SR1 included	
X20PS9400	X20 power supply module, for bus controller and internal I/O supply, X2X Link supply	
X20PS9402	X20 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 (left and right) X20AC0SL1/X20AC0SR1 included	
X20cPS9400	X20 power supply module, coated, for bus controller and internal I/O supply, X2X Link supply	
	<b>Terminal blocks</b>	
X20TB12	X20 terminal block, 12-pin, 24 VDC keyed	

Table 1: X20BC0083, X20cBC0083 - Order data

### 4 Technical data

Model number	X20BC0083	X20cBC0083
<b>Short description</b>		
Bus controller	POWERLINK (V1/V2) controlled node	
<b>General information</b>		
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	
KC	Yes	-
UL	cULus E115267 Industrial Control Equipment	
HazLoc	cCSAus 244665 Process Control Equipment for Hazardous Locations Class I, Division 2, Groups ABCD, T5	-
ATEX	Zone 2, II 3G Ex nA nC IIA T5 Gc IP20, Ta = 0 - max. 60°C FTZÚ 09 ATEX 0083X	
DNV GL	Temperature: <b>B</b> (0 - 55°C) Humidity: <b>B</b> (up to 100%) Vibration: <b>B</b> (4g) EMC: <b>B</b> (Bridge and open deck)	
LR	ENV1	
GOST-R	Yes	
<b>Interfaces</b>		
Fieldbus	POWERLINK (V1/V2) controlled node	
Design	2x shielded RJ45 (hub)	
Cable length	Max. 100 m between 2 stations (segment length)	
Transfer rate	100 Mbit/s	

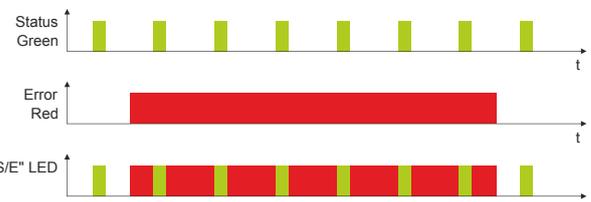
Table 2: X20BC0083, X20cBC0083 - Technical data

Model number	X20BC0083	X20cBC0083
Transmission		
Physical layer		100BASE-TX
Half-duplex		Yes
Full-duplex		No
Autonegotiation		Yes
Auto-MDI / MDIX		Yes
Hub runtime		0.96 to 1 $\mu$ s
Min. cycle time <sup>1)</sup>		
Fieldbus		200 $\mu$ s
X2X Link		200 $\mu$ s
Synchronization between bus systems possible		Yes
<b>Operating conditions</b>		
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
<b>Environmental conditions</b>		
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
<b>Mechanical characteristics</b>		
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 <sup>2)</sup>		37.5 <sup>+0.2</sup> mm

Table 2: X20BC0083, X20cBC0083 - Technical data

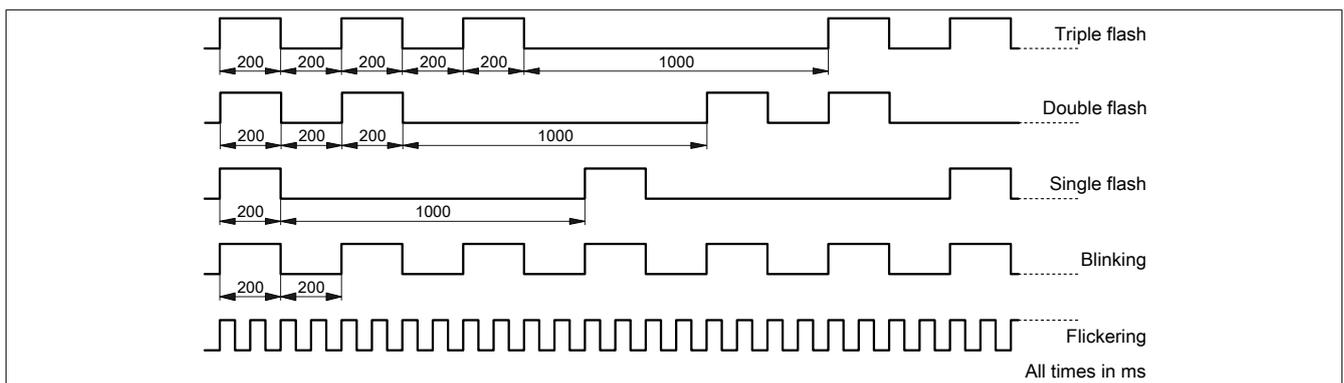
- 1) The minimum cycle time defines how far the bus cycle can be reduced without communication errors occurring.
- 2) Spacing is based on the width of the X20BB80 bus base. In addition, an X20PS9400 or X20PS9402 supply module is always required for the bus controller.

## 5 LED status indicators

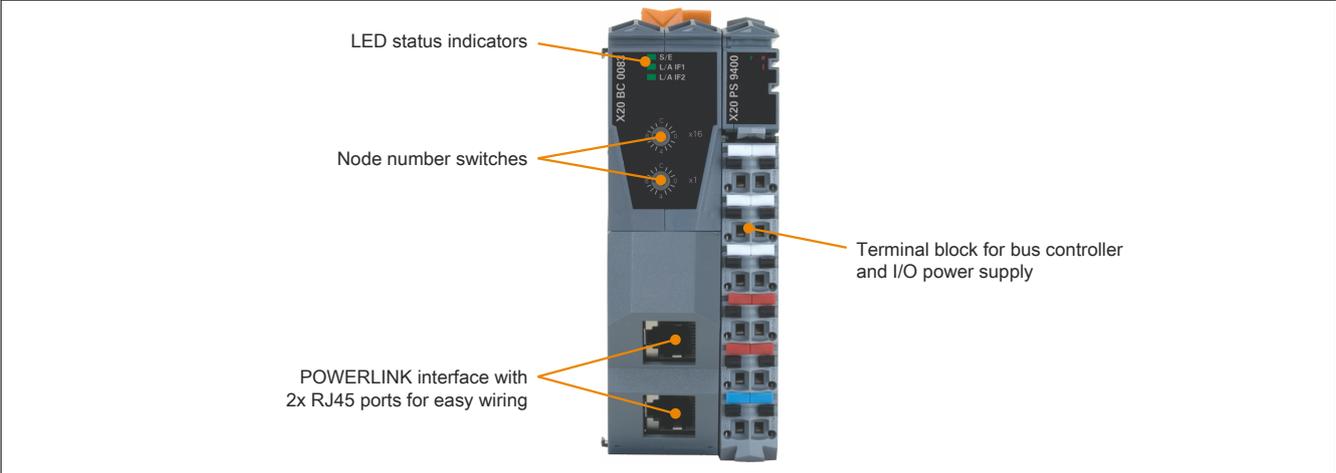
Figure	LED	Color	Status	Description	
	S/E <sup>1)</sup>	Green	Off	No power supply or mode NOT_ACTIVE. The controlled node (CN) is either not getting power, or it is in the NOT_ACTIVE state. The CN waits in this state for about 5 seconds after a restart. Communication is not possible with the CN. If no POWERLINK communication is detected during these 5 seconds, the CN switches to the BASIC_ETHERNET state (flickering). If POWERLINK communication is detected before this time expires, however, the CN switches immediately to the PRE_OPERATIONAL_1 state.	
			Flickering	BASIC_ETHERNET mode. The CN has not detected any POWERLINK communication. It is possible to communicate directly with the CN in this state (e.g. with UDP, IP, etc.). If POWERLINK communication is detected while in this state, the CN switches to the PRE_OPERATIONAL_1 state.	
			Single flash	PRE_OPERATIONAL_1 mode. When operated on a POWERLINK V1 manager, the CN immediately switches to the PRE_OPERATIONAL_2 state. When operated on a POWERLINK V2 manager, the CN waits until an SoC frame is received and then switches to the PRE_OPERATIONAL_2 state.	
			Double flash	PRE_OPERATIONAL_2 mode. The CN is normally configured by the manager in this state. Issuing a command (POWERLINK V2) or setting the data valid flag in the output data (POWERLINK V1) then switches to the READY_TO_OPERATE state.	
			Triple flash	READY_TO_OPERATE mode. In a POWERLINK V1 network, the CN automatically switches to the OPERATIONAL state as soon as input data is present. In a POWERLINK V2 network, the manager switches to the OPERATIONAL state by issuing a command.	
			On	OPERATIONAL mode. PDO mapping is active and cyclic data is being evaluated.	
			Blinking	STOPPED mode. No output data is produced or input data supplied. It is only possible to switch to or leave this state after the manager has given the appropriate command.	
			Red	On	The controlled node (CN) is in an error state (failed Ethernet frames, increased number of collisions on the network, etc.). If an error occurs in the following states, then the green LED blinks over the red LED:
					<ul style="list-style-type: none"> <li>PRE_OPERATIONAL_1</li> <li>PRE_OPERATIONAL_2</li> <li>READY_TO_OPERATE</li> </ul>  <p>Note:</p> <ul style="list-style-type: none"> <li>The LED blinks red several times immediately after startup. This is not an error, however.</li> <li>The LED is lit red for CNs with configured physical node number 0 but that have not yet been assigned a node number via dynamic node allocation (DNA).</li> </ul>
	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.

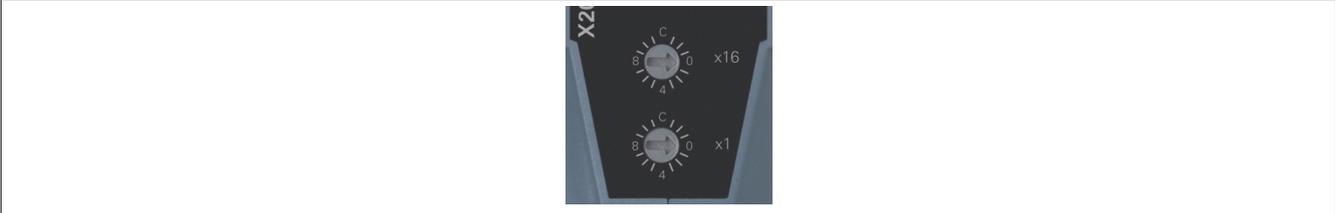
### Status LEDs - Blinking patterns



### 6 Operating and connection elements



### 7 POWERLINK node number



The node number for the POWERLINK node is set using the two number switches.

Switch position	Description
0x00	Only permitted when operating the POWERLINK node in DNA mode.
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

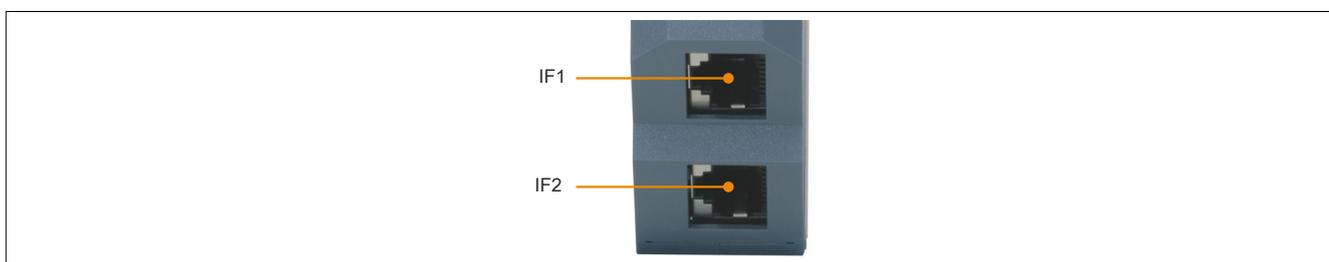
For information about configuration as well as an example, see the AS help system (Communication → POWERLINK → General information → Dynamic node allocation (DNA)).

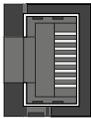
### Information:

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](http://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.