X20(c)BC00E3

Data sheet
1.30 (August 2025)

1 General information

1.1 Other applicable documents

For additional and supplementary information, see the following documents.

Other applicable documents

Document name	Title
MAX20	X20 System user's manual

1.2 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.

> ℹ️ 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

1.3 Order data

Order number	Short description	Figure
	Bus controllers	
X20BC00E3	X20 bus controller, 1 PROFINET IO interface, integrated 2-port switch, 2x RJ45, order bus base, power supply module and terminal block separately!	
X20cBC00E3	X20 bus controller, coated, 1 PROFINET IO interface, integrated 2-port switch, 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 cover plates (left and right) X20AC0SL1/X20AC0SR1 included	
X20PS9400	X20 power supply module, for bus controller and internal I/O power supply X2X Link power supply	
X20PS9402	X20 power supply module, for bus controller and internal I/O power supply, X2X Link supply, supply not galvanically isolated	
X20cBB80	X20 bus base, coated, for X20 base module (BC, HB, etc.) and X20 power supply module, X20 end cover plates (left and right) X20AC0SL1/X20AC0SR1 included	
X20cPS9400	X20 power supply module, coated, for bus controller and internal I/O power supply X2X Link power supply	
	Terminal blocks	
X20TB12	X20 terminal block, 12-pin, 24 VDC keyed	

Table 1: X20BC00E3, X20cBC00E3 - Order data

1.4 Module description

X20 modules or other modules that are based on X2X Link can be connected to the bus controller. Modular system configurations are optimally supported by PROFINET IO. Using the device description file (GSDML format), it is very easy to handle project configuration in the respective engineering tool from the manufacturer of the master device.

- Conformance Class B (RT)
- Minimum cycle time 1 ms
- Integrated switch for wiring multiple slaves
- Up to 1440 bytes of input data and up to 1440 bytes of output data possible
- PROFINET diagnostics and module diagnostics at runtime via master environment

Functions:

- PROFINET IO

PROFINET IO

PROFINET IO (Process Field Network) is a real-time TCP/IP industrial Ethernet protocol.

2 Technical description

2.1 Technical data

Order number	X20BC00E3	X20cBC00E3
Short description		
Bus controller	PROFINET IO slave	
General information		
B&R ID code	0xBB7D	0xE4E0
Status indicators	Module status, bus function	
Diagnostics		
Module status	Yes, using LED status indicator and software	
Bus function	Yes, using LED status indicator and software	
Power consumption		
Bus	2.5 W	
Additional power dissipation caused by actuators (resistive) [W]	-	
Certifications		
CE	Yes	
UKCA	Yes	
ATEX	Zone 2, II 3G Ex nA nC IIA T5 Gc IP20, Ta (see X20 user's manual) FTZÚ 09 ATEX 0083X	
UL	cULus E115267 Industrial control equipment	
HazLoc	cCSAus 244665 Process control equipment for hazardous locations Class I, Division 2, Groups ABCD, T5	
Interfaces		
Fieldbus	PROFINET IO slave	
PROFINET attributes		
Conformance class	B	
Performance class	RT	
Variant	2x shielded RJ45 (switch)	
Line length	Max. 100 m between 2 stations (segment length)	
Transfer rate	100 Mbit/s	
Transfer		
Physical layer	100BASE-TX	
Half-duplex	Yes	
Full-duplex	Yes	
Autonegotiation	Yes	
Auto-MDI/MDIX	Yes	
Min. cycle time [1]		
Fieldbus	1 ms	
X2X Link	250 µs	
Synchronization between bus systems possible	Yes	
Electrical properties		
Electrical isolation	PROFINET isolated from bus and I/O	
Operating conditions		
Mounting orientation		
Horizontal	Yes	
Vertical	Yes	
Installation elevation above sea level		
0 to 2000 m	No limitation	
>2000 m	Reduction of ambient temperature by 0.5°C per 100 m	
Degree of protection per EN 60529	IP20	
Ambient conditions		
Temperature		
Operation		
Horizontal mounting orientation	-25 to 60°C	
Vertical mounting orientation	-25 to 50°C	
Derating	-	
Storage	-40 to 85°C	
Transport	-40 to 85°C	

Table 2: X20BC00E3, X20cBC00E3 - Technical data
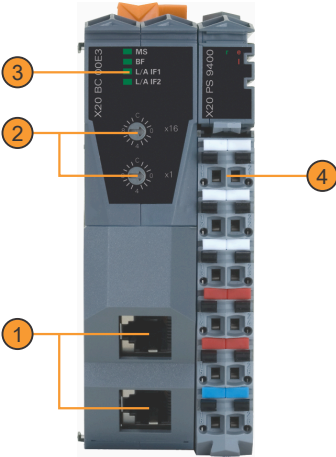
Technical description

Order number	X20BC00E3	X20cBC00E3
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 properties		
Note	Order 1x terminal block X20TB12 separately. Order 1x power supply module X20PS9400 or X20PS9402 separately. Order 1x bus base X20BB80 separately.	Order 1x terminal block X20TB12 separately. Order 1x power supply module X20cPS9400 separately. Order 1x bus base X20cBB80 separately.
Pitch [2]	$37.5^{+0.2}$ mm	

Table 2: X20BC00E3, X20cBC00E3 - Technical data

1) The minimum cycle time specifies how far the bus cycle can be reduced without communication errors occurring.
2) Pitch is based on the width of bus base X20BB80. In addition, power supply module X20PS9400 or X20PS9402 is always required for the bus controller.
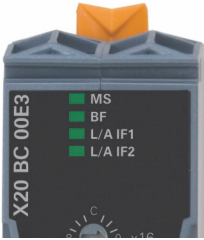
2.2 Operating and connection elements

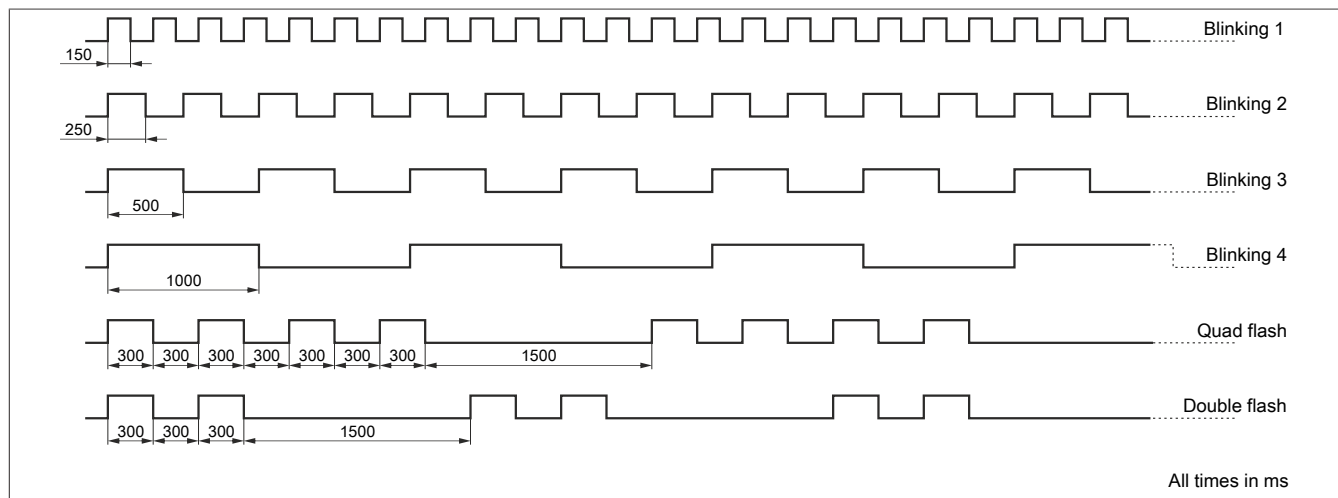| 1	PROFINIET RT connection with 2x RJ45 for simple wiring	2	Node number switches
3	LED status indicators	4	Terminal block for bus controller and I/O supply

2.2.1 LED status indicators

The following table lists the LED status indicators available on the bus controller. Exact blink times are specified in the timing diagram in the next section.
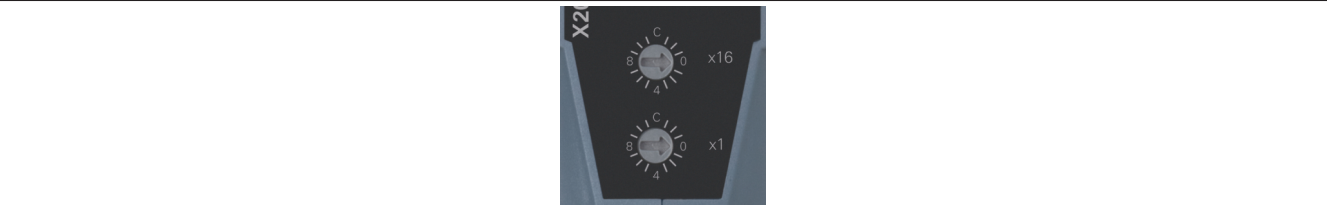
Figure	LED	Color	Status	Description
	MS[1]	Green	Off	The PROFINET master is in "Stop" mode.
			Quad flash	The bus controller does not have a valid IP address (0.0.0.0). It will wait in this state until it is assigned an IP address from the PROFINET master or from an external source. This state can also occur if the bus controller is being operated in DHCP mode.
			Double flash	An unacknowledged alarm is pending on the bus controller.
			Blinking 1	The bus controller is in the initialization phase. This boot phase is where all connected I/O modules are initialized.
			Blinking 3	The bus controller is configuring the connected I/O modules. The configuration is transferred to the bus controller via the PROFINET master.
			On	A connection to a PROFINET master has been established. The master and slave are both in OPERATIONAL mode and data is being exchanged between them. This mode also indicates that the master itself is in RUN mode.
		Red	Blinking 4	The bus controller has detected an error. However, it can still be corrected in the master environment during runtime.
			Blinking 1	The bus controller has detected an error. This error cannot be corrected during runtime; a restart is required.
	BF[1]	Green	Blinking 2	Device identification ("blink" function in step 7 when searching for existing Ethernet stations).
			On	A connection to a PROFINET master has been established.
		Red	On	Not connected to a PROFINET Master
	L/A IFx	Green	Off	Indicates that no physical Ethernet connection exists
			Blinking	Ethernet activity taking place on the RJ45 interface (IF1, IF2) indicated by the respective LED
			On	Indicates an established connection (link), but no communication is taking place

1)   The "MS" and "BF" LEDs are green/red dual LEDs.

LED status indicators - Blinking patterns

Blinking 1 — 150
Blinking 2 — 250
Blinking 3 — 500
Blinking 4 — 1000
Quad flash — 300 300 300 300 300 300 300 1500
Double flash — 300 300 300 1500

All times in ms

2.2.2 Node number switches

This bus controller is equipped with 2 node number switches. The bus controller can be set to various operating states with certain predefined switch positions. Various parameters (PROFINET device name, DHCP mode, etc.) can also be configured.

Switch position	Description
0x00	Initializes all parameters from flash memory: PROFINET-compliant initialization via the DCP protocol (factory setting)
0x01 - 0xEF	These switch positions generate a valid PROFINET device name. This name is composed as follows: "brp-nXXX". Number XXX corresponds to the decimal value of the node number switch position. The system automatically adds leading 0s.
0xF0	Erases flash memory (see "Erasing flash memory" on page 11)
0xF1 - 0xFD	Reserved, switch position not permitted
0xFE	IP address via DHCP server
0xFF	Sets all parameters to default

PROFINET-compliant factory setting - Node number switch position 0x00

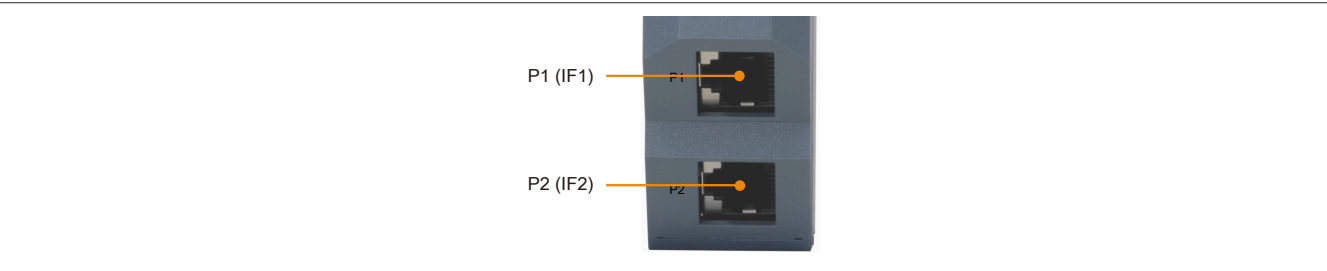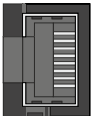| Parameter	Value
IP address	0.0.0.0
Subnet mask	0.0.0.0
Gateway	0.0.0.0
PROFINET device name	"" ... No name when delivered

Default parameters - Node number switch position 0xFF

Parameters cannot be changed by the master in node switch position 0xFF.

Parameter	Value
IP address	192.168.100.1
Subnet mask	255.255.255.0
Gateway	192.168.100.254
PROFINET device name	x20bc00e3

2.2.3 Ethernet interface

For information about wiring X20 modules with an Ethernet interface, see section "Mechanical and electrical configuration - Wiring guidelines for X20 modules with Ethernet cables" in the X20 user's manual.

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

3 Function description

3.1 PROFINET IO

PROFINET (Process Field Network) is an Industrial Ethernet protocol. It uses TCP/IP and is real-time capable.

PROFINET IO is specially designed for communication between a controller and decentralized field devices and describes the entire data exchange between controllers (masters) and devices (slaves) as well as configuration and diagnostics. It follows the producer-consumer model.
2 transfer variants are available:

- Real-time (RT) communication
- Isochronous real-time (IRT) communication.

Within PROFINET IO, process data and alarms are always transferred in real time (RT). RT communication is the basis for data exchange with PROFINET IO. Clock-synchronous data exchange with PROFINET is defined in the isochronous real-time (IRT) concept. The difference to real-time communication lies essentially in the determinism so that the start of a bus cycle is maintained with the highest precision.

For additional information, see the PROFINET IO bus controller user's manual.

3.2 Web interface

The integrated Web interface gives the user an overview of the bus controller's network parameters, the configured I/O modules and the switch configuration. The starting page includes information regarding specific bus controller settings such as IP address, host name and the PROFINET device name. In addition, the web page provides information about the current firmware version. Information concerning module diagnostics is incorporated into a tree structure. Expanding and collapsing the individual module nodes provides an overview of the configured I/O modules. In addition, various package counters are read from the integrated switch. This makes diagnosing errors on the network quick and easy.

Network parameters concerning the bus controller itself can be read, but they cannot be modified. The bus controller's IP configuration is handled during booting or by the PROFINET master when a connection is established.

Each page of the Web interface contains help information that describes the functions and parameters displayed on that page. The link to this information can be found in the upper right corner of the page in the form of a question mark.

A connection to the web interface is established by entering the **current IP address** or the unique **host name** in a Web browser. Some functions require authentication.

The host name is composed of a predefined text and a unique MAC address. For example, if the bus controller has the MAC address 00:60:65:11:22:33, this will result in the following host name: **br006065112233.**
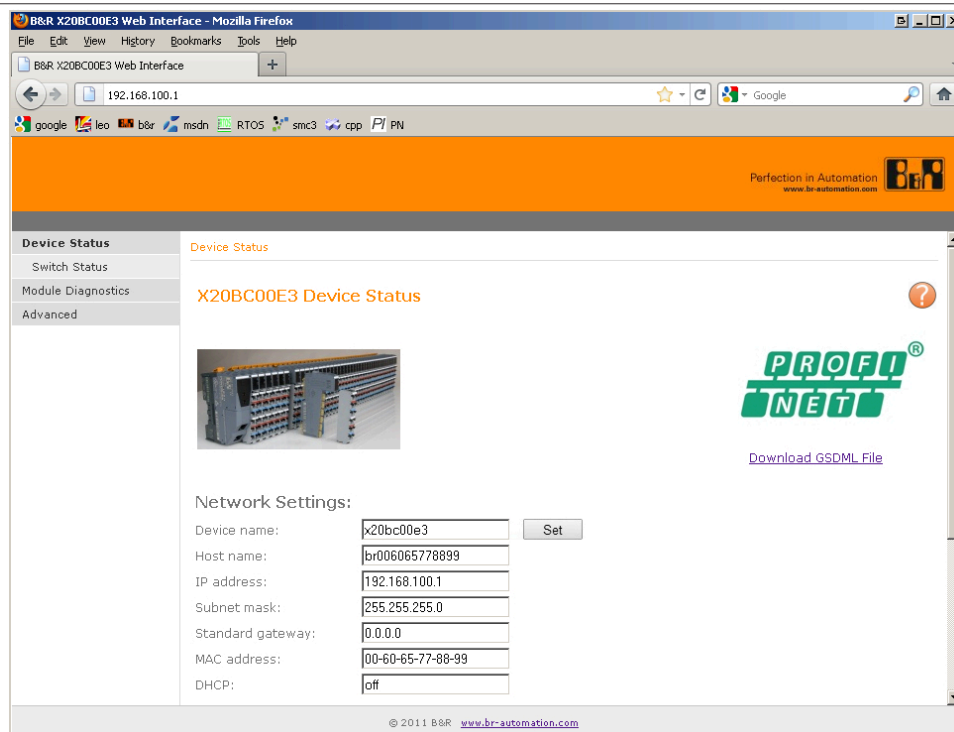
Default parameters for the web interface

IP address:	192.168.100.1
Username:	admin
Password:	B&R

> **Information:**
>
> **Take note of the node number switch position.**
>
> **Please note that authentication parameters are case-sensitive.**

3.3 Node numbers

This bus controller is equipped with 2 node number switches. The bus controller can be set to various operating states with certain predefined switch positions. Various parameters (PROFINET device name, DHCP mode, etc.) can also be configured.

3.3.1 Erasing flash memory

Erasing flash memory using switch position 0xF0 returns the bus controller to its factory state.

Procedure

1. Turn off the power supply to the bus controller.
2. Set the node number to 0xF0.
3. Turn the power supply to the bus controller back on.
4. Wait until the "MS" LED flashes green for 5 s. The node number switch must be set to 0x00 and then back to 0xF0 within this time window of 5 seconds (rotate the top switch).
5. Wait until the "MS" LED blinks with a red double-flash (flash has been cleared).
6. Turn off the power supply to the bus controller.
7. Set the desired node number (0x00 - 0xEF)
8. Turn the power supply to the bus controller back on.
9. The bus controller boots with the configured node number.