

# X20BC0073

Data sheet  
2.51 (August 2025)



**Publishing information**

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# 1 General information

## 1.1 Other applicable documents

For additional and supplementary information, see the following documents.

### Other applicable documents

Document name	Title
MAX20	<a href="#">X20 System user's manual</a>

## 1.2 Order data


Order number	Short description	<div>Figure</div> 
	<b>Bus controllers</b>	
X20BC0073	X20 bus controller, 1 CAN I/O interface, order 1x terminal block TB2105 separately! 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 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	
	<b>Terminal blocks</b>	
0TB2105.9010	Accessory terminal block, 5-pin, screw clamp terminal block 2.5 mm²	
0TB2105.9110	Accessory terminal block, 5-pin, push-in terminal block 2.5 mm²	
X20TB12	X20 terminal block, 12-pin, 24 VDC keyed	

Table 1: X20BC0073 - Order data

## 1.3 Module description

The bus controller makes it possible to connect X2X Link I/O nodes to CAN I/O. CAN I/O is a transfer protocol based on standard CAN bus that is fully integrated in the B&R system.

Up to 44 logical I/O modules can be connected to the bus controller. Up to 16 of these can be analog modules including power supply module.

Functions:

- [CAN I/O](#)

### CAN I/O

CAN I/O is a B&R-specific I/O system that functions via a special protocol on the CAN bus using fixed identifier assignment.

## 2 Technical description

### 2.1 Technical data

Order number	X20BC0073
Short description	
Bus controller	CAN I/O slave
General information	
B&R ID code	0x1F1D
Status indicators	Module status, bus function, data transfer, terminating resistor
Diagnostics	
Module status	Yes, using LED status indicator and software
Bus function	Yes, using LED status indicator
Data transfer	Yes, using LED status indicator
Terminating resistor	Yes, using LED status indicator
Power consumption	
Bus	1.5 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) FTZÜ 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
KC	Yes
Interfaces	
Fieldbus	CAN I/O slave
Variant	5-pin male multipoint connector
Max. distance	1000 m
Transfer rate	Max. 1 Mbit/s
Default transfer rate	Automatic transfer rate detection or fixed setting
X2X Link cycle time	Permanently set to 1 ms <sup>1)</sup>
Synchronization between bus systems possible	No
Terminating resistor	Integrated in module
Electrical properties	
Electrical isolation	CAN I/O isolated from I/O CAN I/O not isolated from bus
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

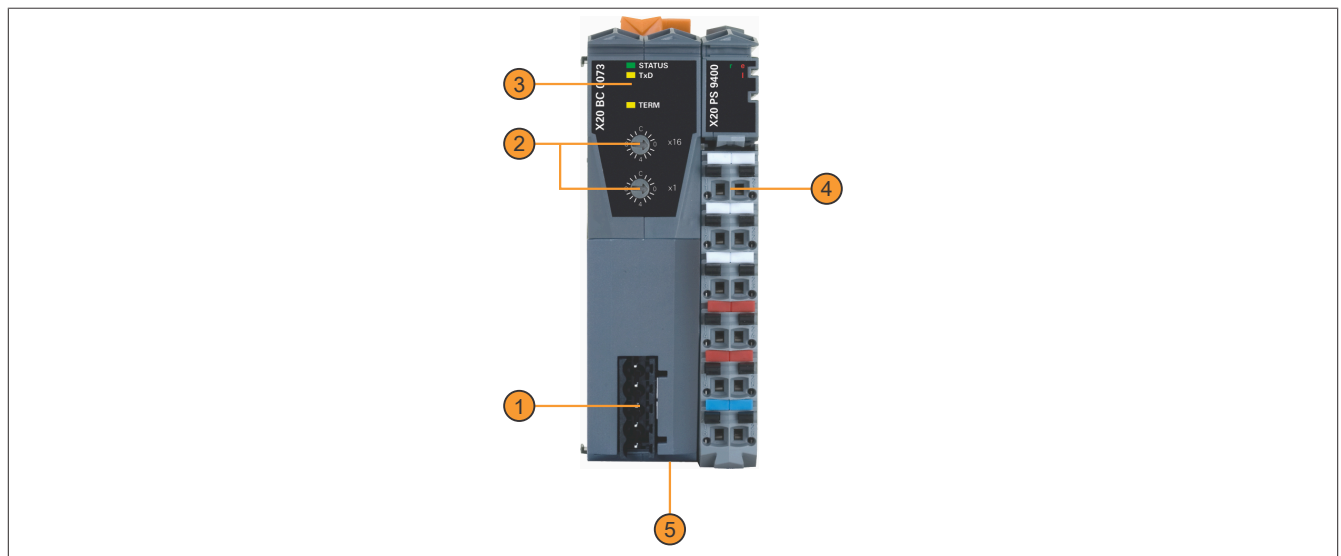
Table 2: X20BC0073 - Technical data

Order number	X20BC0073
Relative humidity	
Operation	5 to 95%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Mechanical properties	
Note	Order 1x terminal block TB2105 separately. Order 1x terminal block X20TB12 separately. Order 1x power supply module X20PS9400 or X20PS9402 separately. Order 1x bus base X20BB80 separately.
Pitch <sup>2)</sup>	37.5 <sup>+0.2</sup> mm

Table 2: X20BC0073 - Technical data

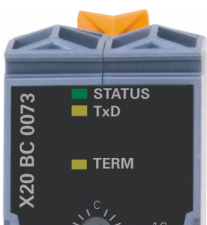
- 1) CAN I/O data points are processed in Automation Runtime in a separate cycle set to 10 ms (CAN I/O cycle).
- 2) Pitch is based on the width of bus base X20BB80. In addition, power supply module X20PS9400 or X20PS9402 is always required for the bus controller.

## 2.2 Operating and connection elements



1	CAN I/O connection	2	Node number switches
3	LED status indicators	4	Terminal block for bus controller and I/O supply
5	Switch for terminating resistor on the bottom of the module	6	-

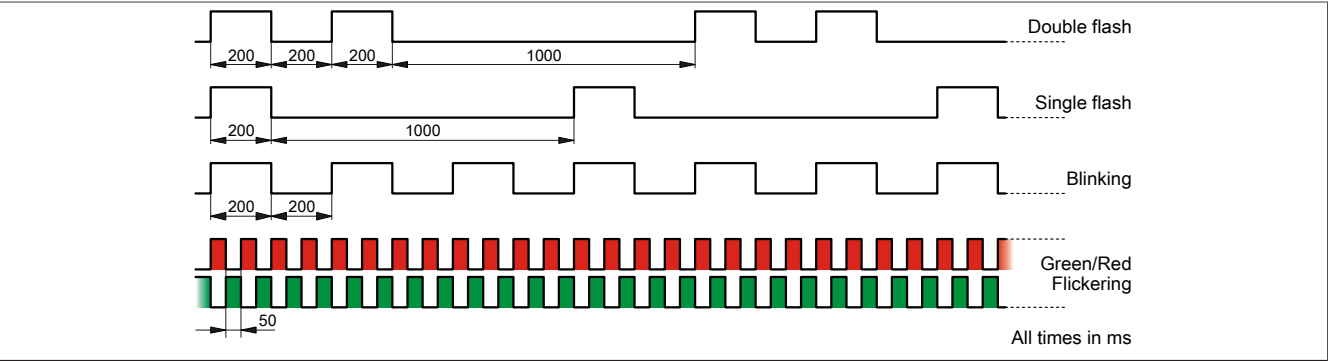
### 2.2.1 LED status indicators

Figure	LED	Color	Status	Description
	STATUS <sup>1)</sup>	Green	Off	No power supply
			Blinking	PREOPERATIONAL mode
			On	RUN mode
		Red	On	CAN connection reports BusOff status
		Green/red	Flickering	Transfer rate detection in progress
		Green blinking / red single flash		PREOPERATIONAL mode; CAN connection reports: Warning limit reached
		Steady green / single red flash		RUN mode; CAN connection reports: Warning limit reached
	TxD	Yellow	Off	The bus controller is not transmitting any data via the CAN I/O fieldbus
	On		The bus controller is transmitting data via the CAN I/O fieldbus	
	TERM	Yellow	Off	The terminating resistor integrated in the bus controller is turned off
			On	The terminating resistor integrated in the bus controller is turned on

- 1) The "STATUS" LED is a green/red dual LED.

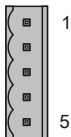
Technical description

LED status indicators - Blink times

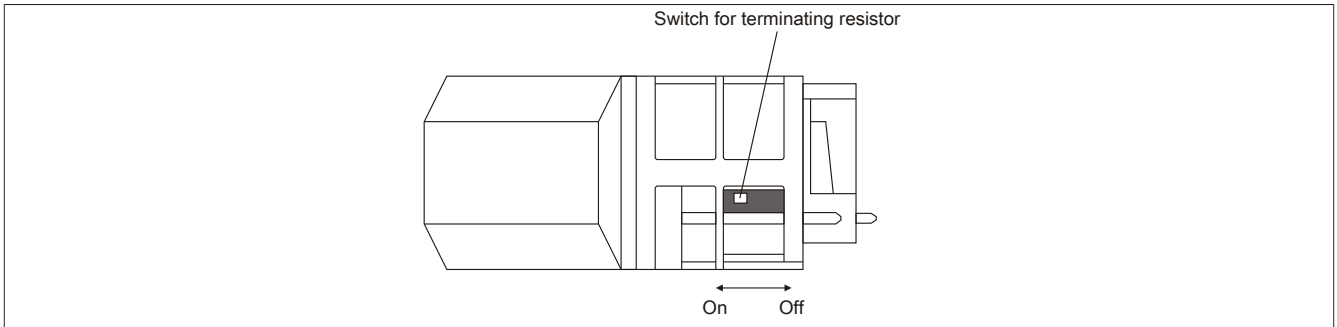


2.2.2 CAN bus interface

The interface is a 5-pin multipoint connector. Terminal block OTB2105 must be ordered separately.

Interface		Pinout	
 5-pin male multipoint connector	Terminal	Function	
	1	CAN_L	CAN ground
	2	CAN_L	CAN low
	3	SHLD	Shield
	4	CAN_H	CAN high
	5	NC	

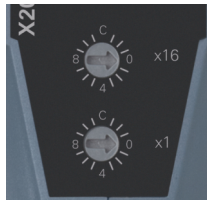
### 2.2.3 Terminating resistor



A terminating resistor is already integrated on the bus controller. It can be turned on and off with a switch on the bottom of the housing. An active terminating resistor is indicated by the "TERM" LED.

### 2.2.4 Node number and transfer rate

The node number and transfer rate are configured using the two number switches on the bus controller. Switch positions 0x01 to 0x3F and enable automatic transfer rate detection (see ["Automatic transfer rate detection" on page 11](#)). The rest of the switch positions have a fixed transfer rate (see table).



Switch position	Node number	Transfer rate
0x00	Reserved	-
0x01 - 0x3F	1 - 63	Automatic
0x40	Reserved	-
0x41 - 0x5F	1 - 31	1000 kbit/s
0x60	Reserved	-
0x61 - 0x7F	1 - 31	800 kbit/s
0x80	Reserved	-
0x81 - 0x9F	1 - 31	500 kbit/s
0xA0	Reserved	-
0xA1 - 0xBF	1 - 31	250 kbit/s
0xC0	Reserved	-
0xC1 - 0xDF	1 - 31	125 kbit/s
0xE0	Reserved	-
0xE1 - 0xFE	1 - 31	20 kbit/s
0xFF	Reserved	-

## 3 Function description

### 3.1 CAN I/O

CAN I/O is a B&R-specific I/O system that functions via a special protocol on the CAN bus using fixed identifier assignment.

CAN I/O makes it possible to connect B&R CAN slave nodes (CAN I/O slaves for short) to all central processing units that are equipped with a CAN interface or that can be expanded with an interface card. The connection is implemented using CAN I/O master software (CAN I/O master for short).

The CAN I/O slaves connected to and configured on the CAN bus are detected by the CAN I/O master and initialized accordingly to enable reading and writing of the I/O points. The CAN I/O master takes over node monitoring and error signaling. The response to changes is event-related with CAN I/O.

### 3.2 Logical I/O modules

Up to 44 I/O modules can be connected to the bus controller. A maximum of 28 digital and 16 analog modules including power supply module are possible. This value refers not to the physical but the logical I/O module slots.



#### Information:

**Physical I/O modules can take up more than one digital or analog slot.**

The following table lists all CAN I/O-capable X20 modules and how many logical digital or analog slots they occupy.

Module	Digital module slots	Analog module slots
X20AI1744(-xx)	0	1
X20AI2222	0	1
X20AI2237	0	1
X20AI2322	0	1
X20AI2437	0	1
X20AI2438	0	2
X20AI2622	0	1
X20AI2632	0	1
X20AI2636	0	1
X20AI4222	0	1
X20AI4322	0	1
X20AI4622	0	1
X20AI4632-1	0	1
X20AI4636	0	1
X20AI8221	0	2
X20AI8321	0	2
X20AIA744	0	2
X20AIB744	0	4
X20AO2437	0	1
X20AO2438	0	2
X20AO2622	0	1
X20AO2632	0	1
X20AO4622	0	1
X20AO4632(-1)	0	1
X20AO4635	0	1
X20AP31xx	0	3
X20AT2222	0	1
X20AT2311	0	1
X20AT2402	0	1
X20AT4222	0	1
X20AT4232	0	1
X20AT6402	0	2
X20ATA312	0	1
X20ATA492	0	1
X20ATB312	0	Firmware version ≤1.1.3.0: 1 Firmware version >1.1.3.0: 2



Module	Digital module slots	Analog module slots
X20ATC402	0	2
X20BR9300	0	1
X20BT9100	0	1
X20BT9400	0	1
X20CM0985	0	8
X20CM1941	0	1
X20CM4323	0	1
X20CM4810	0	2
X20CM8281	0	1
X20CM8323	0	1
X20CMR010	0	1
X20CMR011	0	4
X20CMR100	0	1
X20CMR111	0	4
X20CS1012	0	3
X20CS1013	0	1
X20CS1020	0	1
X20CS1030	0	1
X20CS1070	0	1
X20CS2770	0	2
X20DC1073	0	1
X20DC1176	0	1
X20DC1178	0	1
X20DC1196	0	1
X20DC1198	0	1
X20DC11A6	0	1
X20DC1376	0	1
X20DC137A	0	1
X20DC1396	0	1
X20DC1976	0	1
X20DC2190	0	4
X20DC2395	0	1
X20DC2396	0	1
X20DC2398	0	2
X20DC4395	0	2
X20DI0471	2	0
X20DI2371	1	0
X20DI2372	1	0
X20DI2377	0	1
X20DI4371	1	0
X20DI4372	1	0
X20DI4375	1	0
X20DI4653	1	0
X20DI4760	1	0
X20DI6371	1	0
X20DI6372	1	0
X20DI6373	1	0
X20DI6553	1	0
X20DI8371	1	0
X20DI9371	2	0
X20DI9372	2	0
X20DID371	1	0
X20DIF371	2	0
X20DIF372	2	0
X20DM9324	1	0
X20DMF320	0	2
X20DO2321	1	0
X20DO2322	1	0
X20DO2633	0	1
X20DO2649	1	0
X20DO4321	1	0
X20DO4322	1	0
X20DO4332	1	0
X20DO4332-1	0	1
X20DO4529	1	0
X20DO4613	0	1
X20DO4623	0	1
X20DO4633	0	1
X20DO4649	1	0
X20DO4F49	1	0
X20DO6321	1	0
X20DO6322	1	0
X20DO6325	1	0
X20DO6529	1	0

## Function description

Module	Digital module slots	Analog module slots
X2ODO6639	1	0
X2ODO8232	1	0
X2ODO8322	1	0
X2ODO8331	1	0
X2ODO8332(-1)	1	0
X2ODO9321	2	0
X2ODO9322	2	0
X2ODOD322	1	0
X2ODOF321	2	0
X2ODOF322	2	0
X2ODS1828	0	2
X2ODS1928	0	2
X2ODS438A	0	3
X20MM2436	0	1
X20MM3332	0	1
X20MM4331	0	2
X20MM4455	0	4
X20MM4456	0	4
X20PD0011	1	0
X20PD0012	1	0
X20PD0016	1	0
X20PD0053	0	1
X20PD2113	1	0
X20PS2100	0	1
X20PS2110	0	1
X20PS3300	0	1
X20PS3310	0	1
X20PS4951	1	0
X20PS9400	0	1
X20PS9402	0	1
X20SM1426	0	1
X20SM1436	0	1
X20SM1436-1	0	1
X20SM1444-1	0	2
X20SM1446-1	0	2

## 4 Commissioning

### 4.1 Module description



#### Information:

The bus controller is unable to detect modules after a gap in the X2X Link node numbers.  
Possible causes:

- Unconnected X20 modules
- Modules with integrated node number switch, e.g. X20BM05



#### Information:

With multifunction modules, the bus controller supports only the default function model in the event of automatic configuration by the bus controller (see the respective module description).

### 4.2 SG4

The module comes with preinstalled firmware. The firmware is also part of the Automation Runtime operating system for the PLC. With different versions, the Automation Runtime firmware is loaded onto the module.

Current firmware is made available automatically by updating Automation Runtime.

### 4.3 Automatic transfer rate detection

After startup, the bus controller goes into "Listen only" mode. This means the bus controller behaves passively on the bus and only listens.

The bus controller attempts to receive valid objects. If receive errors occur, the controller switches to the next transfer rate in the lookup table.

If no objects are received, all transfer rates are tested cyclically. This procedure is repeated until valid objects are received.

#### Starting transfer rate

The bus controller begins the search with this transfer rate. The starting transfer rate can be defined in the following way:

- The last detected transfer rate is used after a software reset (command code 20).

#### Lookup table

The bus controller tests the transfer rate according to this table. Beginning with the starting transfer rate, the controller switches to the next lower transfer rate. At the end of the table, the bus controller restarts the search from the beginning.

Transfer rate
1000 kbit/s
500 kbit/s
250 kbit/s
125 kbit/s
50 kbit/s
20 kbit/s
10 kbit/s