

X20(c)BT9100

Data sheet
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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	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.



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



1.2.1 Starting temperature

The starting temperature describes the minimum permissible ambient temperature in a voltage-free state at the time the coated module is switched on. This is permitted to be as low as -40°C. During operation, the conditions as specified in the technical data continue to apply.



Information:

It is important to absolutely ensure that there is no forced cooling by air currents in the closed control cabinet, e.g. due to the use of a fan or ventilation slots.

1.3 Order data

Order number	Short description	Figure
	Bus receivers and transmitters	
X20BT9100	X20 bus transmitter, X2X Link, supply for internal I/O power supply	
X20cBT9100	X20 bus transmitter, coated, X2X Link, supply for internal I/O power supply	
	Required accessories	
	Bus modules	
X20BM11	X20 bus module, 24 VDC keyed, internal I/O power supply connected through	
X20BM15	X20 bus module, with node number switch, 24 VDC keyed, internal I/O power supply connected through	
X20cBM11	X20 bus module, coated, 24 VDC keyed, internal I/O power supply connected through	
	Terminal blocks	
X20TB06	X20 terminal block, 6-pin, 24 VDC keyed	
X20TB12	X20 terminal block, 12-pin, 24 VDC keyed	
	Optional accessories	
	X2X Link Cable	
X67CA0X99.1000	Cable for custom assembly, 100 m	
X67CA0X99.5000	Cable for custom assembly, 500 m	

1.4 Module description

The bus transmitter is used for seamless expansion of the X20 system. Stations can be up to 100 m apart.

- X2X Link bus transmitter
- For seamless expansion of the system
- Up to 100 m segment length
- Supply for internal I/O power supply
- Operation only on the rightmost slot

Functions:

- [Monitoring the operating limits](#)

Monitoring operating limits

The voltage of the I/O power supply is monitored for voltage overshoot or undershoot.

2 Technical description

2.1 Technical data

Order number	X20BT9100	X20cBT9100
Short description		
Bus transmitter	X2X Link bus transmitter with supply for I/O	
General information		
B&R ID code	0x1BC2	0xE219
Status indicators	X2X bus function, operating state, module status	
Diagnostics		
Module run/error	Yes, using LED status indicator and software	
X2X bus function	Yes, using LED status indicator	
Power consumption ¹⁾		
Bus	0.5 W	
Internal I/O		
As bus transmitter	0.1 W	
Additionally as supply module	0.6 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	
KC	Yes	-
Input I/O power supply		
Input voltage	24 VDC -15% / +20%	
Fuse	Required line fuse: Max. 10 A, slow-blow	
Reverse polarity protection	No	
Output I/O power supply		
Nominal output voltage	24 VDC	
Behavior on short circuit	Required line fuse	
Permissible contact load	10 A	
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	-	
Starting temperature	-	Yes, -40°C
Storage	-40 to 85°C	
Transport	-40 to 85°C	

Table 2: X20BT9100, X20cBT9100 - Technical data

Technical description


Order number	X20BT9100	X20cBT9100
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 X20T-B06 or X20TB12 separately. Order 1x bus module X20B-M11 or X20BM15 separately.	Order 1x terminal block X20T-B06 or X20TB12 separately. Order 1x bus module X20cBM11 separately.
Pitch	12.5 ^{+0.2} mm	

Table 2: X20BT9100, X20cBT9100 - Technical data

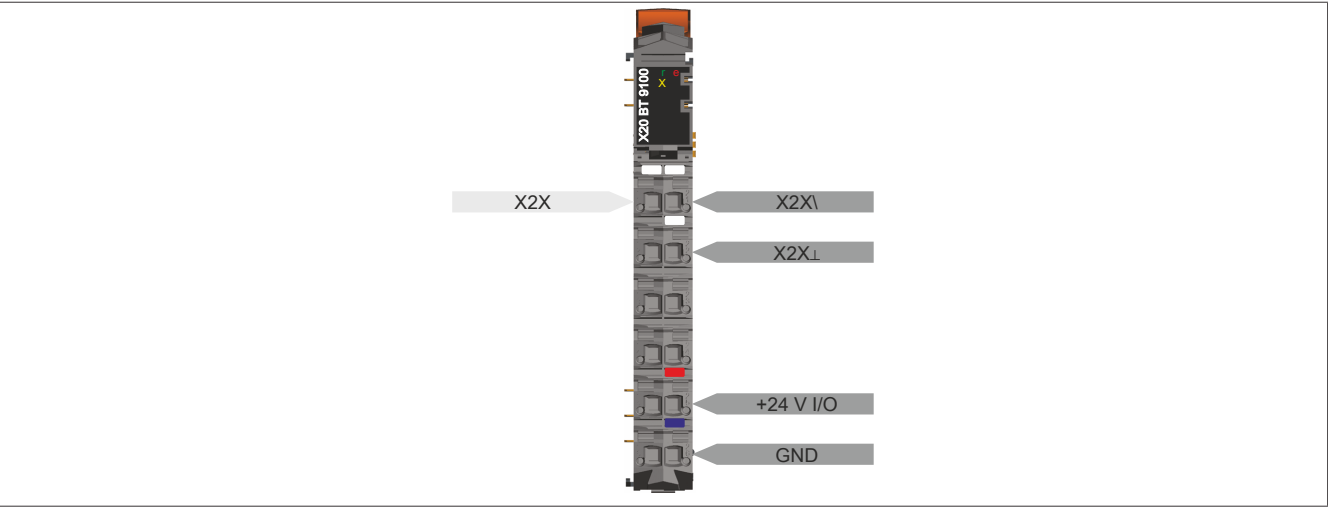
- 1) The specified values are maximum values. For examples of the exact calculation, see section "Mechanical and electrical configuration" in the X20 system user's manual.

2.2 LED status indicators

For a description of the various operating modes, see section "Additional information - Diagnostic LEDs" in the X20 system user's manual.

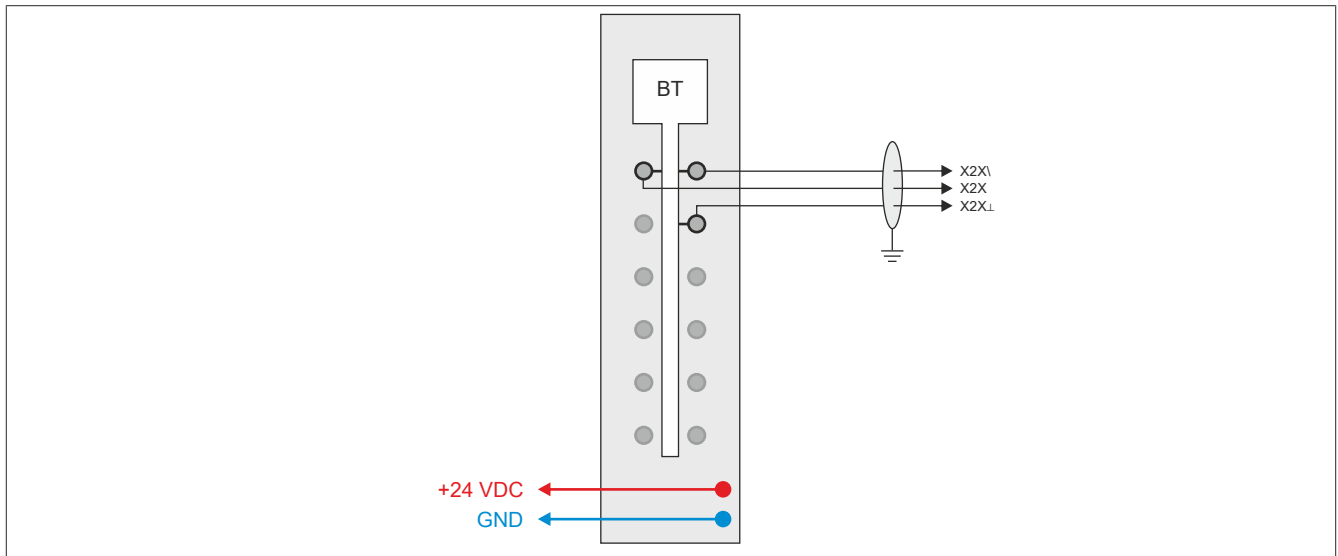
Figure	LED	Color	Status	Description
	r	Green	Off	No power to module
			Single flash	Mode RESET
			Blinking	Mode PREOPERATIONAL
			On	Mode RUN
	e	Red	Off	Module not supplied with power or everything OK
			Double flash	The LED indicates one of the following states: <ul style="list-style-type: none">I/O power supply too lowX2X bus voltage too low
	e + r	Solid red / Single green flash		Invalid firmware
	X	Orange	Off	No communication on X2X Link network
			On	Communication on X2X Link network running

2.3 Pinout



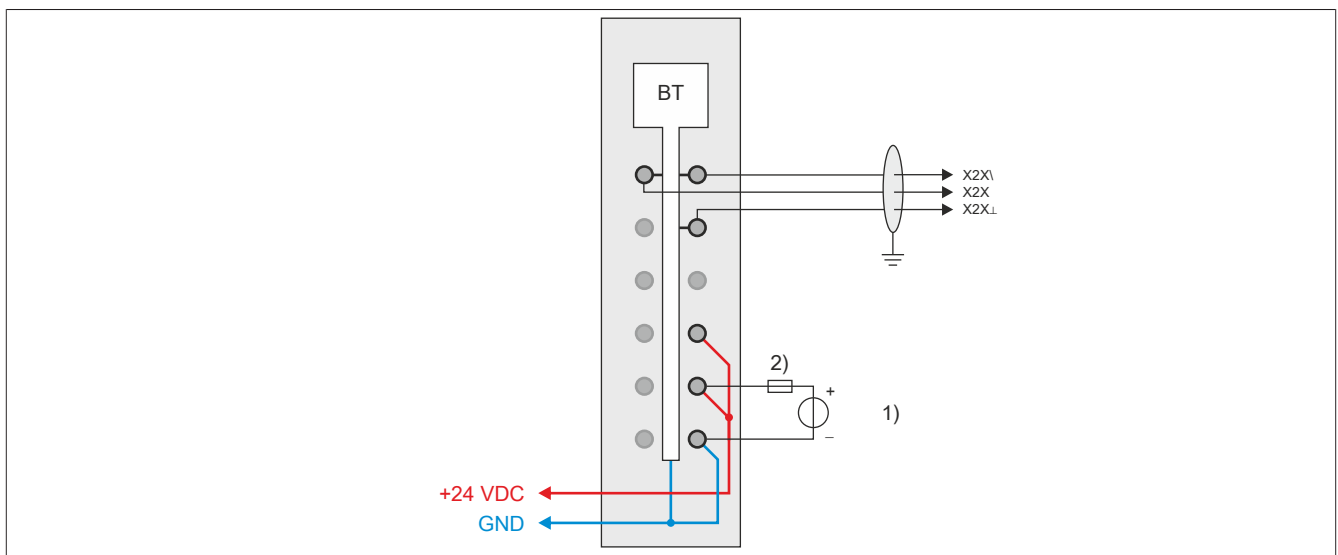
2.4 Connection examples

Without supply for internal I/O power supply



With supply for internal I/O power supply

See also "Supply via bus transmitter" on page 8.



- 1) Supply for the I/O power supply
- 2) Fuse, 10 A slow-blow

2.5 Supply via bus transmitter

The bus transmitter has an integrated internal I/O power supply feed. This saves a power supply module for the last potential group.

It is important to note that this potential group is isolated from the remaining potential groups by an I/O module with bus module X20(c)BM01.

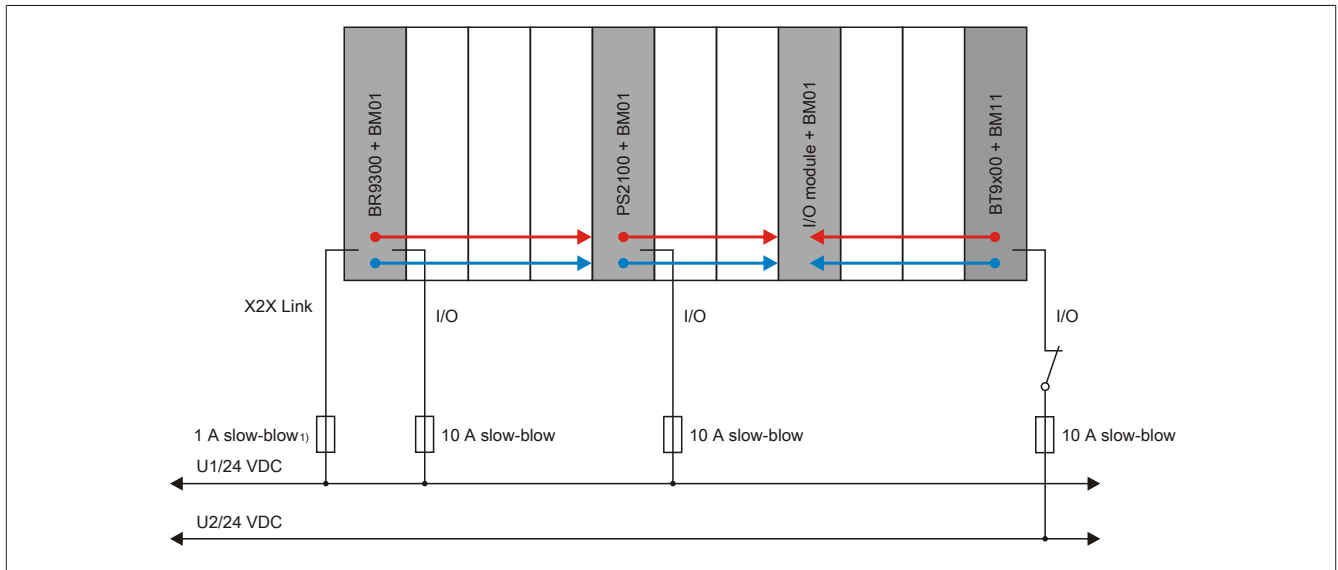


Figure 1: Fuse protection when supplied via bus transmitter

1) Recommended for line protection.

2.6 Connection to the next X2X Link I/O node

The bus transmitter establishes the connection to the next X2X Link-based I/O node. It is important to note that only the data lines are relayed. The power supply of the X2X Link network is system-dependent.

System	X2X Link power supply
X67 system	System power supply X67PS1300
Remote I/O with X2X Link (XX modules)	External 24 VDC power supply
Remote valve terminal connection (XV modules)	External 24 VDC power supply

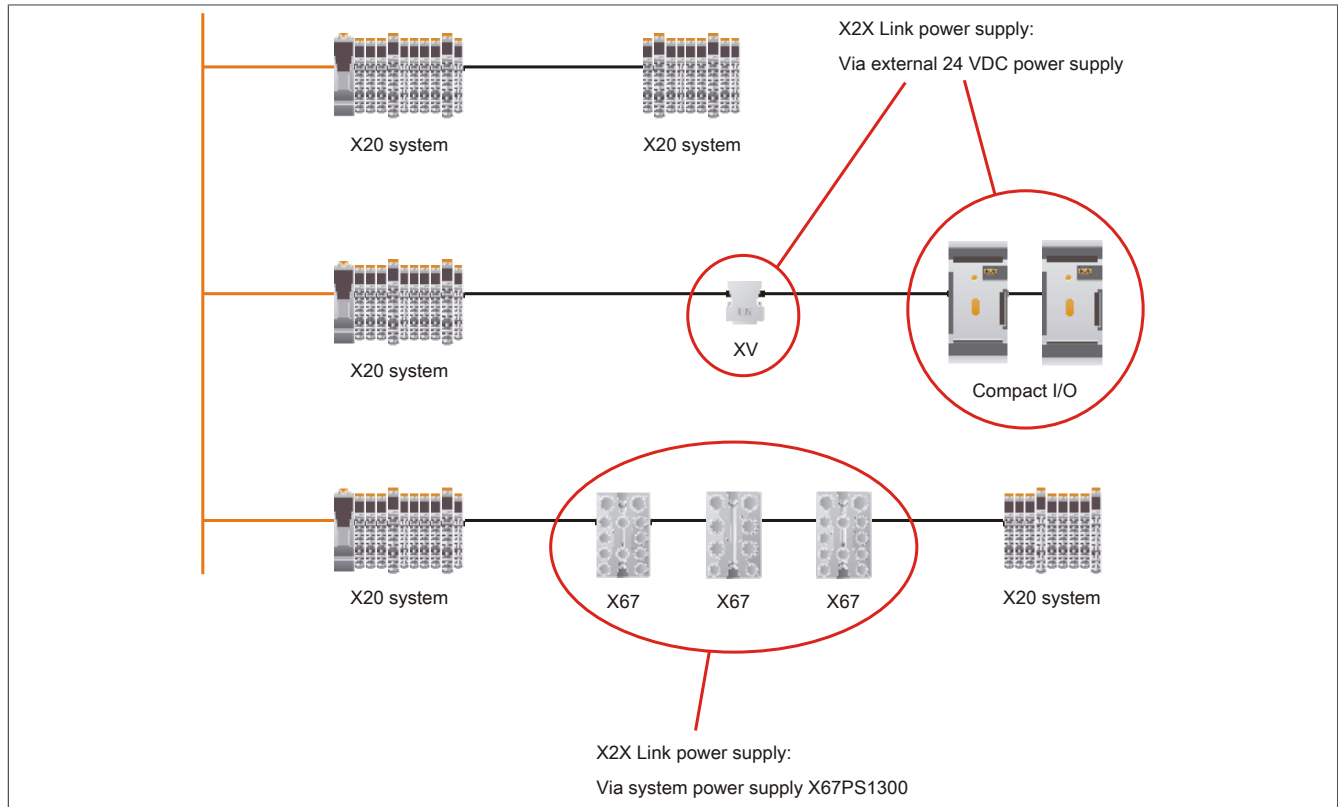


Figure 2: X2X Link power supply depending on the system

3 Function description

3.1 Monitoring the operating limits

The status of the bus supply voltage can be read out.

Bit	Description
0	No error
1	Undervoltage warning

The status of the I/O supply voltage can be read out.

Bit	Description
0	Supply voltage OK
1	Supply voltage outside the valid range

**Information:**

The register is described in ["Status of the module" on page 12](#).

4 Commissioning



Information:

The bus transmitter module is only permitted to be operated with a bus module where the internal I/O power supply is connected through (e.g. X20BM11).

If the supply is used for the internal I/O power supply, this potential group is not permitted to be supplied by any other module. An I/O module with bus module X20BM01 must be used to isolate the potential group.

4.1 Using the module on the bus controller

Function model 254 "Bus controller" is used by default only by non-configurable bus controllers. All other bus controllers can use other registers and functions depending on the fieldbus used.

For detailed information, see section "Additional information - Using I/O modules on the bus controller" in the X20 user's manual (version 3.50 or later).

4.1.1 CAN I/O bus controller

The module occupies 1 analog logical slot on CAN I/O.

5 Register description

5.1 General data points

In addition to the registers described in the register description, the module has additional general data points. These are not module-specific but contain general information such as serial number and hardware variant.

General data points are described in section "Additional information - General data points" in the X20 System user's manual.

5.2 Function model 0 - Standard

Register	Fixed offset	Name	Data type	Read		Write	
				Cyclic	Acyclic	Cyclic	Acyclic
0	1	Status of the module	USINT	•			
		StatusInput01	Bit 0				
		StatusInput02	Bit 2				
4	3	SupplyVoltage	USINT	•			

Fixed modules require their data points to be in a specific order in the X2X frame. Cyclic access occurs according to a predefined offset, not based on the register address.

Acyclic access continues to be based on the register numbers.

5.3 Function model 254 - Bus controller

Register	Offset ¹⁾	Name	Data type	Read		Write	
				Cyclic	Acyclic	Cyclic	Acyclic
0	0	Status of the module	UINT	•			
		StatusInput01	Bit 0				
		StatusInput02	Bit 2				
4	4	SupplyVoltage	UINT	•			

1) The offset specifies the position of the register within the CAN object.

5.4 Status of the module

Name:

Module status

The following module power supply voltages are monitored in this register:

Function model	Data type	Values
0 - Standard	USINT	See the bit structure.
254 - Bus controller	UINT	See the bit structure.

Bit structure:

Bit	Name	Value	Information
0	StatusInput01	0	No error
		1	Bus supply warning for undervoltage
1	Reserved	0	
2	StatusInput02	0	Supply voltage OK
		1	Supply voltage outside the valid range
3 - x	Reserved	0	

5.5 Bus supply voltage

Name:

SupplyVoltage

This register indicates the measured bus supply voltage with a resolution of 0.1 V.



Information:

The nominal bus supply voltage is 5 V and should not fall below 4.7 V.

Function model	Data type
0 - Standard	USINT
254 - Bus controller	UINT

5.6 Minimum cycle time

The minimum cycle time specifies how far the bus cycle can be reduced without communication errors occurring. It is important to note that very fast cycles reduce the idle time available for handling monitoring, diagnostics and acyclic commands.

Minimum cycle time
100 μ s

5.7 Minimum I/O update time

The minimum I/O update time specifies how far the bus cycle can be reduced so that an I/O update is performed in each cycle.

Minimum I/O update time
2 ms