X20(c)BT9100

1 General information

The bus transmitter provides for the seamless expansion of the X20 System. The stations can be up to 100 m away from each other.

- X2X Link bus transmitter
- For seamless expansion of the system
- Up to 100 m segment lengths
- Feed for internal I/O supply
- Operation only on the slot to the far right

Information:

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

If the incoming voltage is used for internal I/O supply, then this potential group must not be supplied by any other module. An I/O module with bus module X20BM01 should be used to separate the potential group.

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 receivers and transmitters	
X20BT9100	X20 bus transmitter, X2X Link, supply for internal I/O supply	
X20cBT9100	X20 bus transmitter, coated, X2X Link, supply for internal I/O supply	
	Required accessories	
	Bus modules	
X20BM11	X20 bus module, 24 VDC keyed, internal I/O supply continuous	
X20BM15	X20 bus module, with node number switch, 24 VDC keyed, internal I/O supply continuous	
X20cBM11	X20 bus module, coated, 24 VDC keyed, internal I/O supply continuous	
	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	

Table 1: X20BT9100, X20cBT9100 - Order data

4 Technical data

Model 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 status, module status	
Diagnostics		
Module run/error	Yes, using status LED and software	
X2X bus function	Yes, using status LED	
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 the actuators (resistive) [W]	-	
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	
GOST-R	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		
Rated output voltage	24 VDC	
Behavior if a short circuit occurs	Required line fuse	
Permitted contact load	10 A	
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 X20TB06 or X20T-B12 terminal block separately Order 1x X20BM11 or X20B-M15 bus module separately	Order 1x X20TB06 or X20T-B12 terminal block separately Order 1x X20cBM11 bus module separately
Spacing	$12.5^{+0.2}$ mm	

Table 2: X20BT9100, X20cBT9100 - Technical data

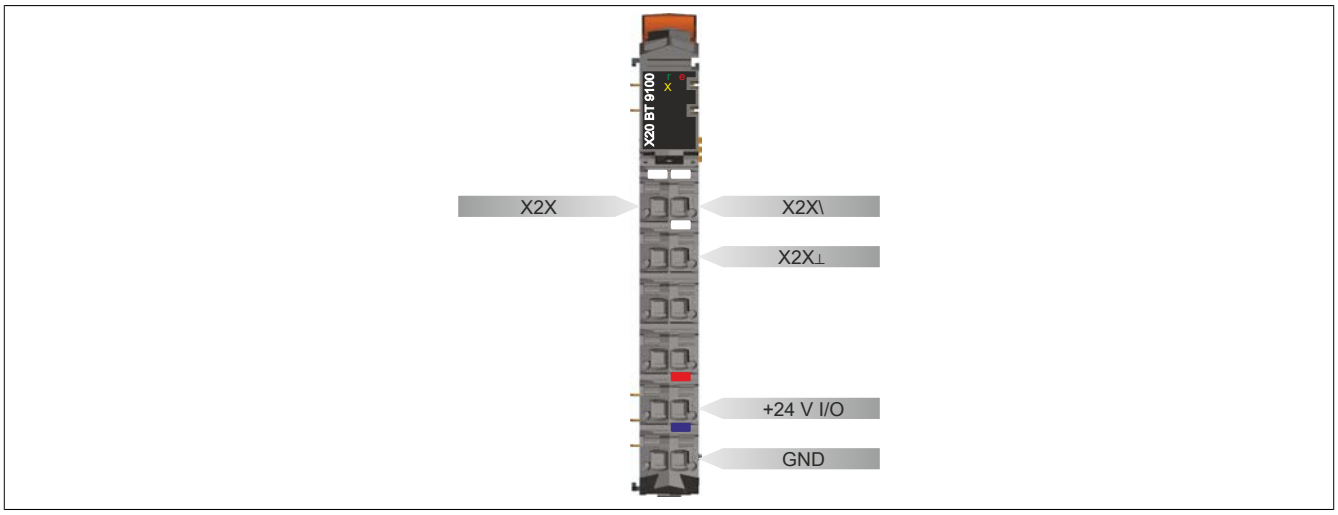
1) The specified values are maximum values. The exact calculation is also available for download as a data sheet with the other module documentation on the B&R website.

5 LED status indicators

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

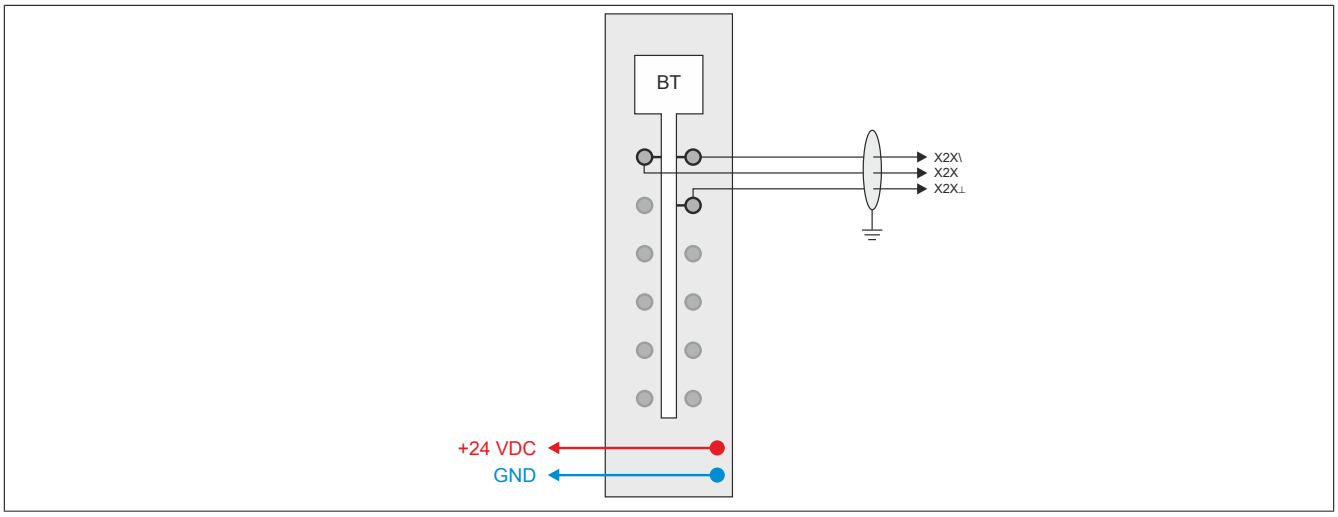
Figure	LED	Color	Status	Description
	r	Green	Off	No power to module
			Single flash	RESET mode
			Blinking	PREOPERATIONAL mode
			On	RUN mode
	e	Red	Off	No power to module or everything OK
			Double flash	LED indicates one of the following states: • I/O supply too low • X2X bus supply too low
	e + r	Red on / Green single flash		Invalid firmware
	X	Orange	Off	No communication at the X2X Link
			On	X2X Link communication in progress

6 Pinout



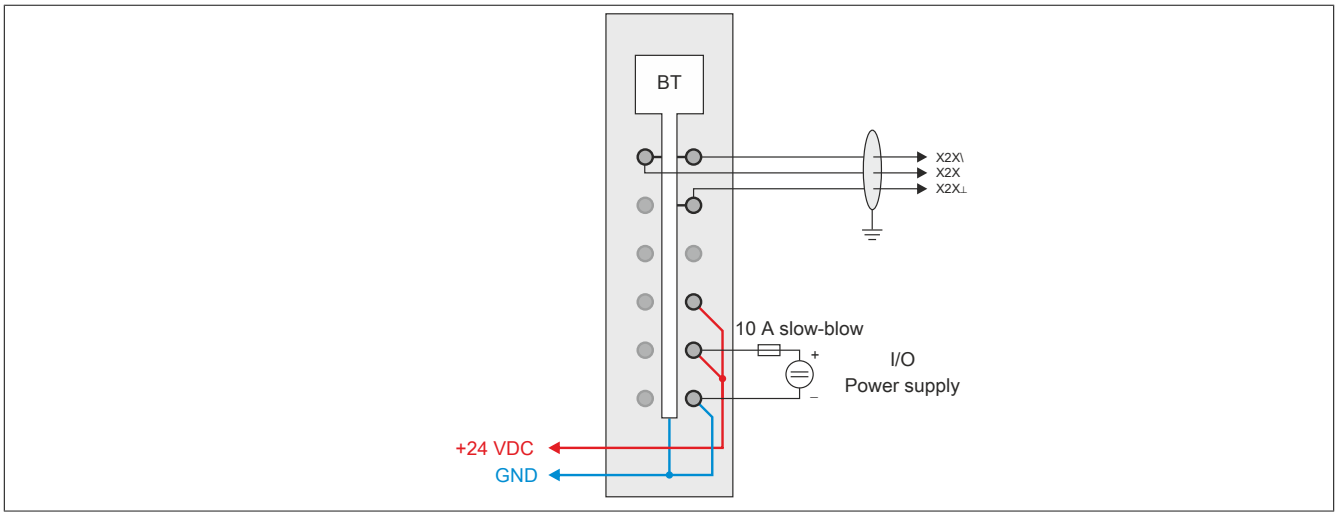
7 Connection examples

No feed for internal I/O supply



With feed for internal I/O supply

See also "Supply via bus transmitter" on page 4.



8 Supply via bus transmitter

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

Keep in mind: this potential group is separated from the rest of the potential groups by an I/O module with the x20(c)BM01 bus module.

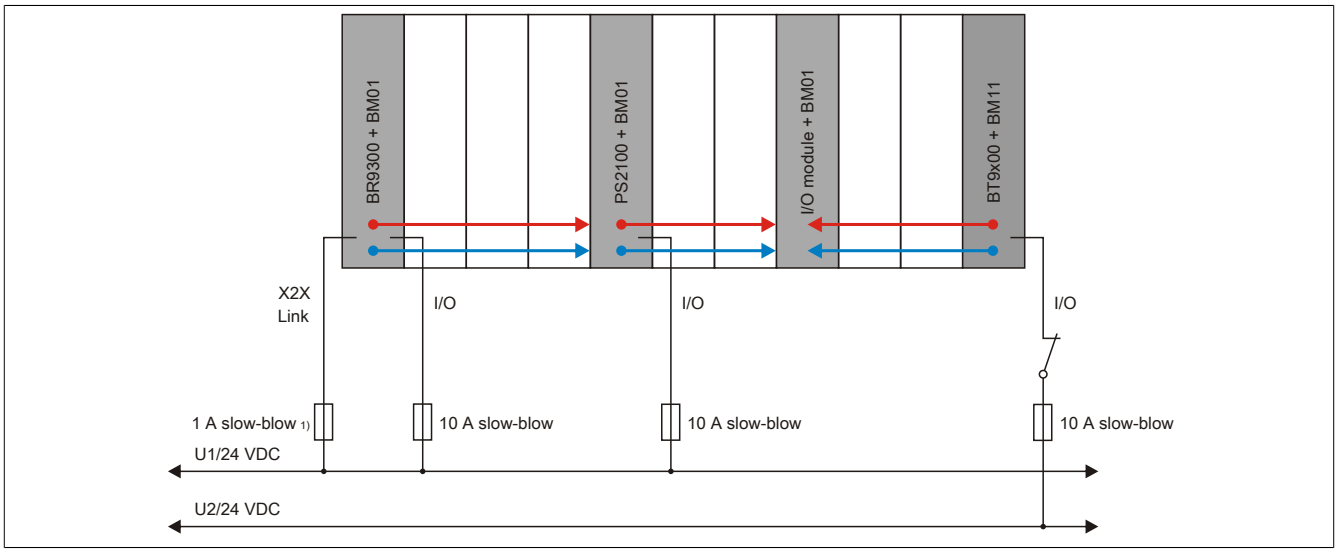


Figure 1: Protection when supplied via bus transmitter

1) Recommended for line protection.

9 Connection to 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 be sure that only the data lines are connected on. X2X Link supply is system dependant.

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

Table 3: X20BT9100 - System-dependent X2X Link supply

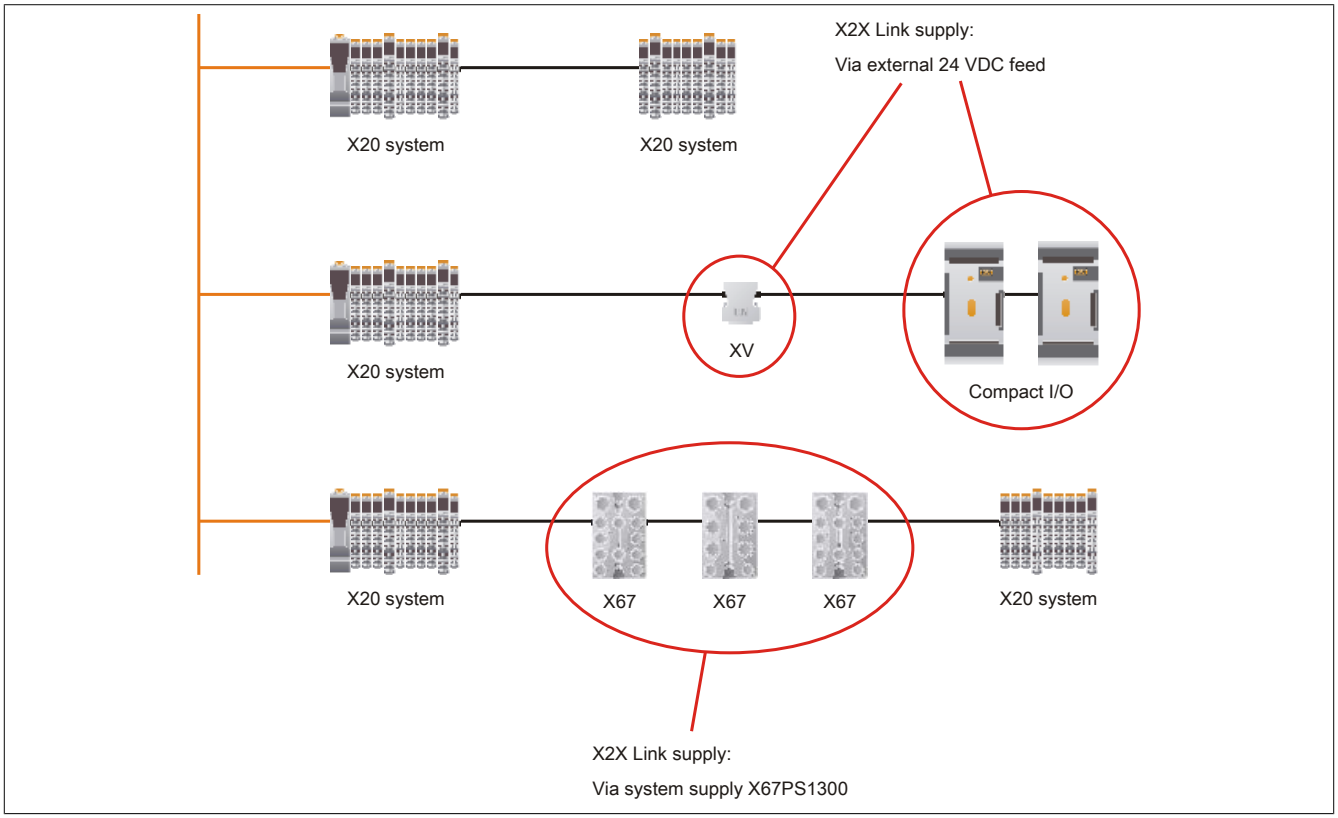


Figure 2: X2X Link supply depending on the system

10 Register description

10.1 General data points

In addition to the registers listed in the register description, the module also has other more general data points. These registers are not specific to the module but contain general information such as serial number and hardware version.

These general data points are listed in section "Additional information - General data points" of the X20 system user's manual.

10.2 Function model 0 - Standard

Register	Name	Data type	Read		Write	
			Cyclic	Non-cyclic	Cyclic	Non-cyclic
0	Module status	USINT	•			
	StatusInput01	Bit 0				
	StatusInput02	Bit 2				
4	SupplyVoltage	USINT	•			

10.3 Function model 254 - Bus controller

Register	Offset[1)]	Name	Data type	Read		Write	
				Cyclic	Non-cyclic	Cyclic	Non-cyclic
0	0	Module status	UINT	•			
		StatusInput01	Bit 0				
		StatusInput02	Bit 2				
4	4	SupplyVoltage	UINT	•			

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

10.3.1 CAN I/O bus controller

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

10.4 Module status

Name:
Module status

The following module supply voltages are monitored in this register:

Bus supply voltage:	A bus supply voltage of <4.7 V is displayed as a warning.
24 VDC I/O supply voltage:	An I/O supply voltage of <20.4 V is displayed as a warning.

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

Bit structure:

Bit	Name	Value	Information
0	StatusInput01	0	No error
		1	Bus supply warning - Undervoltage (<4.7 V)
1	Reserved	0	
2	StatusInput02	0	I/O power supply above the warning threshold of 20.4 V
		1	I/O power supply below the warning threshold of 20.4 V
3 - x	Reserved	0	

10.5 Bus supply voltage

Name:
SupplyVoltage

This register displays the bus supply voltage measured at a resolution of 0.1 V.

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

10.6 Minimum cycle time

The minimum cycle time defines how far the bus cycle can be reduced without communication errors occurring. Note that very fast cycles decrease the idle time available for handling monitoring, diagnostics and acyclic commands.

Minimum cycle time
100 µs

10.7 Minimum I/O update time

The minimum I/O update time defines how far the bus cycle can be reduced while still allowing an I/O update to take place in each cycle.

Minimum I/O update time
2 ms