X20BT9400

1 General information

To connect an X20 system to an X67 system, a bus transmitter is simple added to the end of the X20 block, so that the X2X Link cable can be connected. The bus transmitter also provides the X2X supply voltage for the X67 system. There is no longer a need for an X67 system supply module.

- X2X Link bus transmitter
- For seamless expansion of the system
- Up to 100 m segment lengths
- Feed for internal I/O supply
- Integrated X2X Link supply for the X67 system
- 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 Order data

Model number	Short description	Figure
	Bus receivers and transmitters	
X20BT9400	X20 bus transmitter X2X Link, feed for internal I/O supply, X2X Link supply for X67 modules, reverse polarity protection, short circuit protection, overload protection, parallel connection possible, redundancy operation possible	
	Required accessories	
	Bus modules	
X20BM11	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	
	Terminal blocks	
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: X20BT9400 - Order data

3 Technical data

| Product ID	X20BT9400
Short description	
Bus transmitter	X2X Link bus transmitter with supply for I/O and integrated supply for the X67 system
General information	
B&R ID code	0xA238
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 X67 X2X Link	1.38 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
cULus	Yes
cCSAus HazLoc Class 1 Division 2	Yes
ATEX Zone 2	Yes
KC	Yes
GOST-R	Yes
X67 X2X Link supply input	
Input voltage	24 VDC -15% / +20%
Input current	Max. 0.5 A
Fuse	Integrated, cannot be replaced
Reverse polarity protection	Yes
X67 X2X Link supply output	
Parallel connection with X67PS1300	Yes [2]
Overload behavior	Temporarily protected against short circuit, overload Be aware of corresponding status message (LED "I") or evaluate software status
X67 modules supplied by BT9400	
Horizontal installation	Max. 8 (Nominal output power: 6 W)
Vertical installation	Max. 6 (Nominal output power: 4.5 W)
Input I/O supply	
Input voltage	24 VDC -15% / +20%
Fuse	Required line fuse: Max. 10 A, slow-blow
Reverse polarity protection	No
Output I/O 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
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Mechanical characteristics	
Note	Order 1x X20TB12 terminal block separately Order 1x X20BM11 or 1x X20BM15 bus module separately
Spacing	12.5 $^{+0.2}$ mm

Table 2: X20BT9400 - 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.
2) Only the PS1300 can be used for calculating the total number of X67 modules.

4 LED status indicators

For a description of the various operating modes, see the X20 user's manual, chapter 2 "System characteristics", section "re LEDs".

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 Link voltage too low
	e + r	Red on / Green single flash		Invalid firmware
	X	Orange	Off	No X2X Link communication
			On	X2X Link communication active
	I	Red	Off	The X67 / X2X Link supply is within the valid limits
			On	The X67 / X2X Link supply for the power supply is overloaded **Remedy:** Use additional X67PS1300 supply modules

5 Pinout
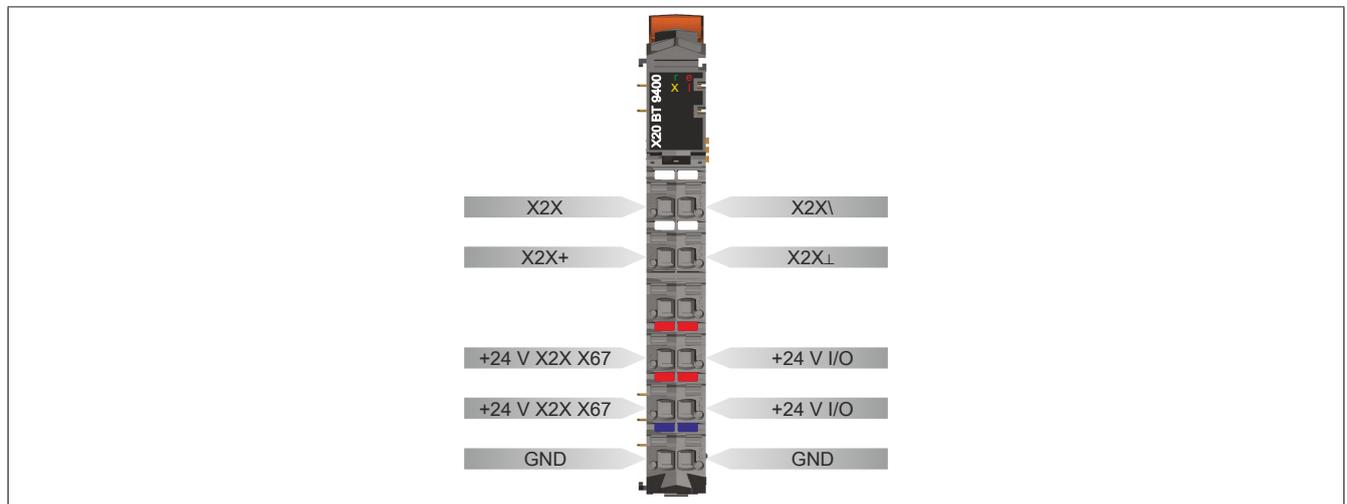
6 Connection examples
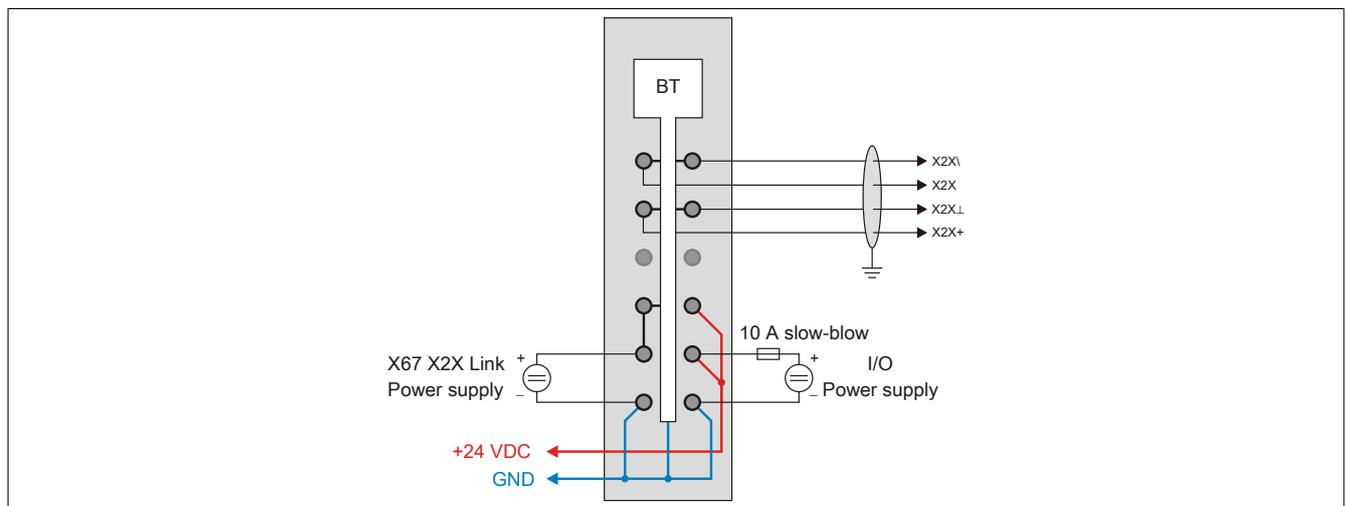
With 2 separate supplies

Figure 1: Connection example with 2 separate supplies

With a supply and jumper

Figure 2: Connection example with a supply and jumper

No feed for internal I/O supply

Figure 3: Connection example - No feed for internal I/O supply

7 Supply feed via bus transmitter

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

It is important to note that this potential group is separated from the other potential groups by an I/O module with the bus module.
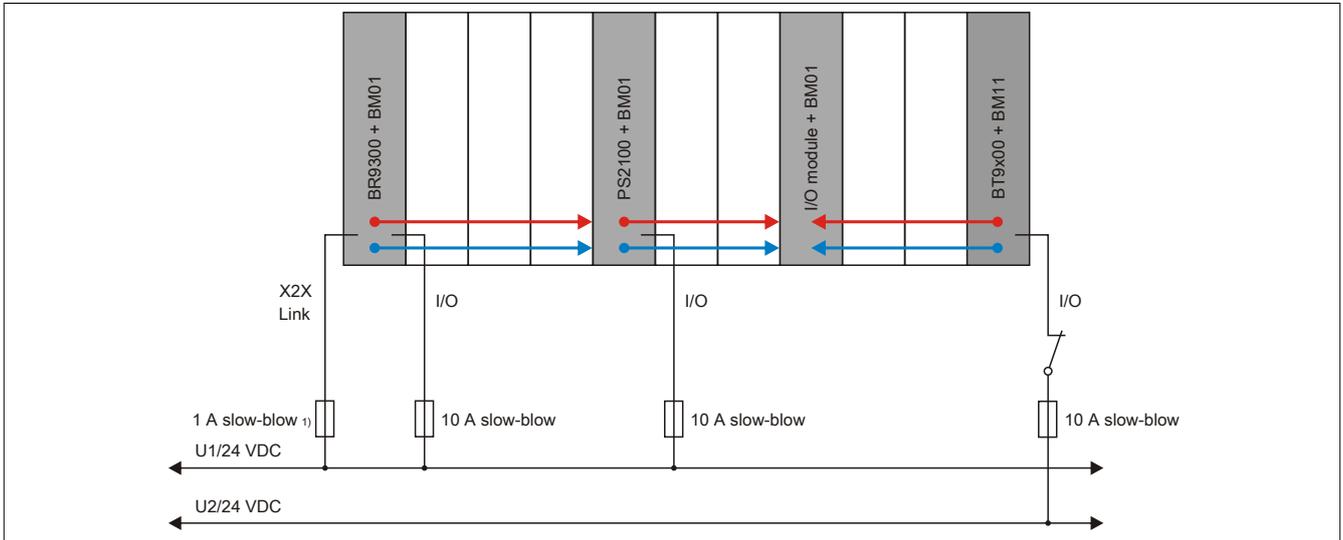
Figure 4: Fuse when fed via bus transmitter

1) Recommended for line protection.

8 Connection between X20 and X67 system

The bus transmitter establishes the link between the X20 system and the X67 system. In addition to the data lines, the X2X Link supply is also fed through. The module can supply up to 8 X67 modules. An additional X67 supply module is only needed if operating more than 8 X67 modules.

Information:

Only the X67PS1300 system supply module can be used for calculating the total number of X67 modules.

9 Register description

9.1 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				
2	SupplyCurrent	USINT	●			
4	SupplyVoltage	USINT	●			

9.2 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				
2	2	SupplyCurrent	UINT	●			
4	4	SupplyVoltage	UINT	●			

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

9.3 Module status

Name:
Module status

The following module supply voltages are monitored in this register:

X67 bus supply current:	An X67 bus supply current of >0.4 A is displayed as a warning.
X67 bus supply voltage:	A bus supply voltage of <18 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	X67 bus supply warning for undervoltage (18 V) or when over-current (0.4 A)
1	Reserved	0	
2	StatusInput02	0	I/O supply above the warning level of 20.4 V
		1	I/O supply below the warning level of 20.4 V
3 - x	Reserved	0	

9.4 X67 bus supply current

Name:
SupplyCurrent

This register shows the X67 bus supply current with a resolution of 0.01 A.

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

9.5 X67 bus supply voltage

Name:
SupplyVoltage

This register shows the X67 bus supply voltage with a resolution of 0.1 V.

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

9.6 Minimum cycle time

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

Minimum cycle time
100 µs

9.7 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