

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 | |
| 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


| Product ID | 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 | Yes, using status LED and software | |
| Module run/error | Yes, using status LED | |
| X2X bus function | | |
| 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 | |
| cULus | Yes | |
| cCSAus HazLoc Class 1 Division 2 | Yes | - |
| ATEX Zone 2 ²⁾ | Yes | |
| KC | Yes | - |
| GOST-R | Yes | |
| 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 | Up to 100%, condensing |
| Storage | 5 to 95%, non-condensing | |
| Transport | 5 to 95%, non-condensing | |
| Mechanical characteristics | | |
| Note | Order 1x X20TB06 or X20TB12 terminal block separately Order 1x X20BM11 or X20BM15 bus module separately | Order 1x X20TB06 or X20TB12 terminal block separately Order 1x X20cBM11 bus module separately |
| Spacing | 12.5 ^{+0.2} mm | |

Table 2: X20BT9100, X20cBT9100 - Technical data

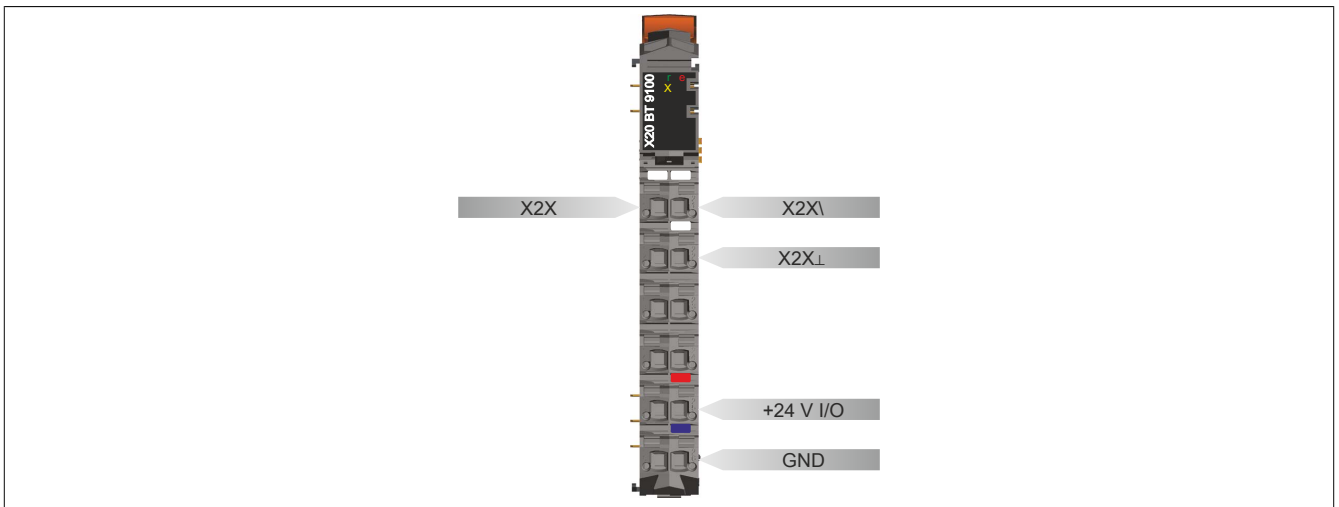
- 1) The specified values are maximum values. The exact calculation is also available for download as a data sheet with the other module documentation on the B&R website.
- 2) Ta min.: 0°C
Ta max.: See environmental conditions

5 LED status indicators

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

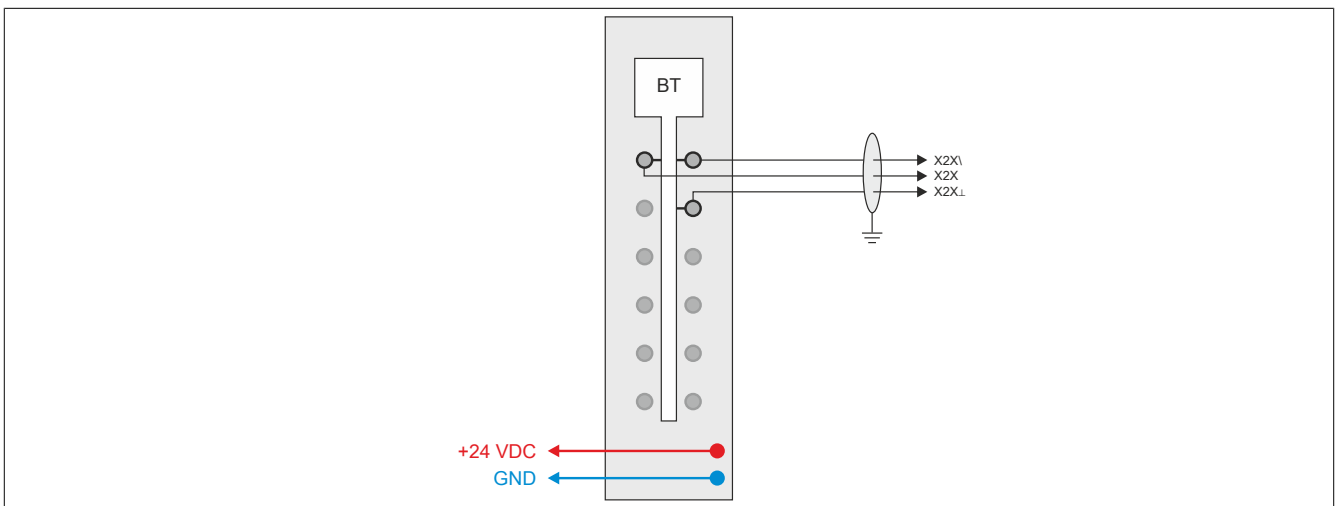
| Figure | LED | Color | Status | Description |
|---|-------|-----------------------------|------------------------------------|---|
|  | r | Green | Off | No power to module |
| | | | Single flash | RESET mode |
| | | | Blinking | PREOPERATIONAL mode |
| | | | On | RUN mode |
| | e | Red | Off | No power to module or everything OK |
| | | | Double flash | LED indicates one of the following states: <ul style="list-style-type: none"> • 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



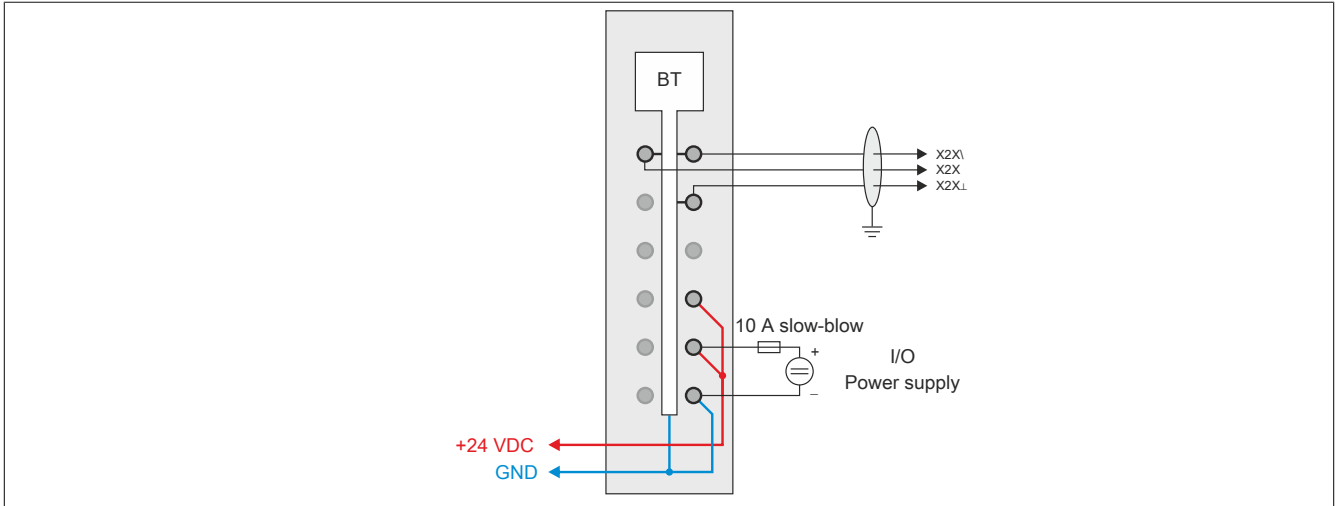
7 Connection examples

No feed for internal I/O supply



With feed for internal I/O supply

See also 8 "Supply via bus transmitter".



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 bus module.

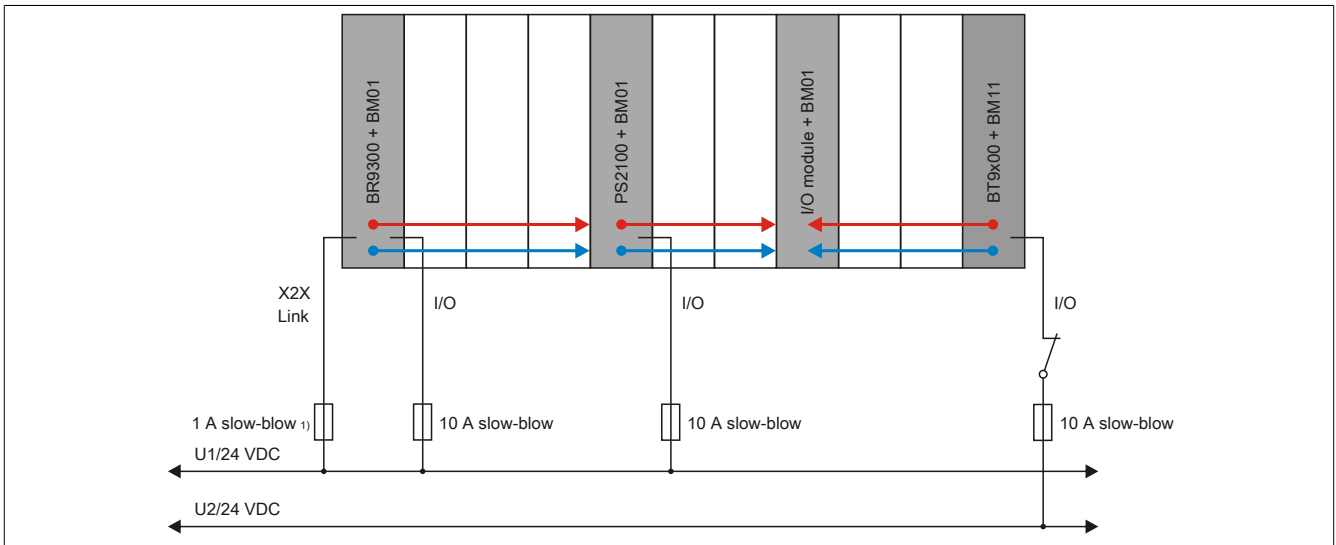


Figure 1: Protection when supplied via bus transmitter

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

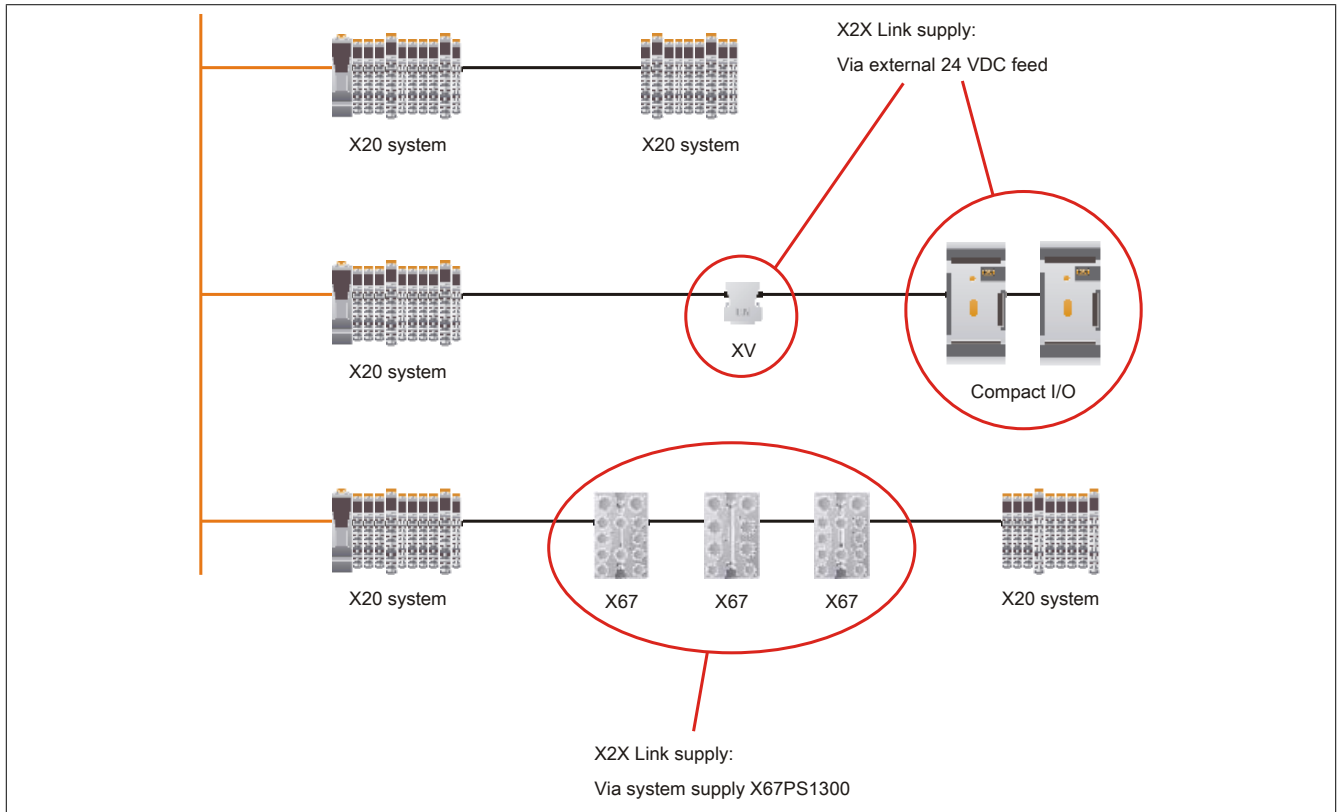


Figure 2: X2X Link supply depending on the system

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 the "General data points" section of chapter 4 "X20 system modules" in 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.

10.4 Module status

Name:

Module status

The following module supply voltages are monitored in this register:

Bus supply voltage: A bus supply voltage of <4.7V 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 (<4.7V) |
| 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 | |

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. It should be noted that very fast cycles decrease the idle time available for handling monitoring, diagnostics and acyclic commands.

| Minimum cycle time |
|--------------------|
| 100 μ s |

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 |