# 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 actuators (resistive) [W] | - | |
| Certifications | | |
| CE | Yes | |
| KC | Yes | - |
| UL | cULus E115267<br>Industrial control equipment | |
| HazLoc | cCSAus 244665<br>Process control equipment<br>for hazardous locations<br>Class I, Division 2, Groups ABCD, T5 | |
| ATEX | Zone 2, II 3G Ex nA nC IIA T5 Gc<br>IP20, Ta (see X20 user's manual)<br>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** | | |
| 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 limitations | |
| >2000 m | Reduction of ambient temperature by 0.5°C per 100 m | |
| Degree of protection per EN 60529 | IP20 | |
| **Environmental 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 | |
| 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 X20TB06 or X20T-B12 terminal block separately<br>Order 1x X20BM11 or X20B-M15 bus module separately | Order 1x X20TB06 or X20T-B12 terminal block separately<br>Order 1x X20cBM11 bus module separately |
| Spacing | $12.5^{+0.2}$ mm | |

Table 2: X20BT9100, X20cBT9100 - Technical data

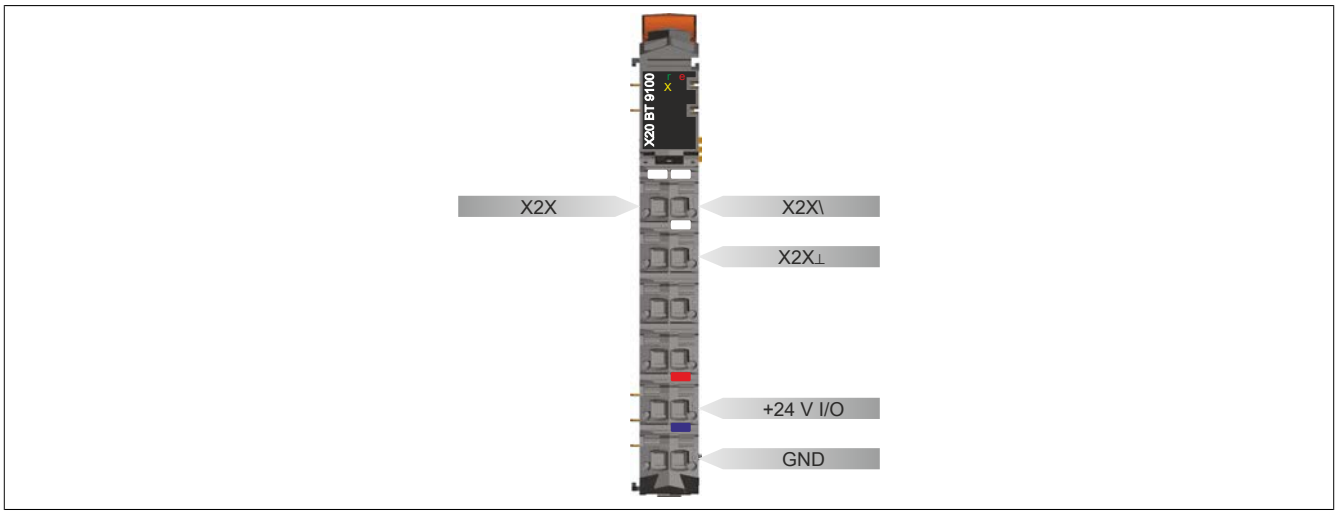
1) The specified values are maximum values. For examples of the exact calculation, see section "Mechanical and electrical configuration" of the X20 system user's manual.

# 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.

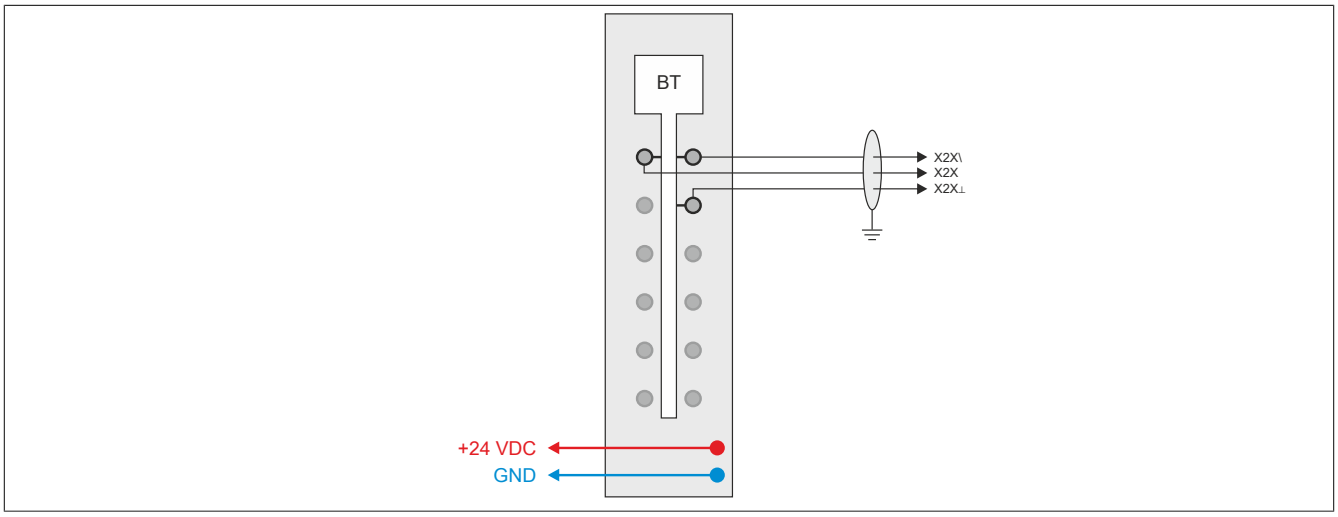
| Figure | LED | Color | Status | Description |
|---|---|---|---|---|
|   | r | Green | Off | No power to module |
| | | | Single flash | RESET mode |
| | | | Blinking | PREOPERATIONAL mode |
| | | | On | RUN mode |
| | e | Red | Off | No power to module or everything OK |
| | | | Double flash | LED indicates one of the following states:<br>• I/O supply too low<br>• 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



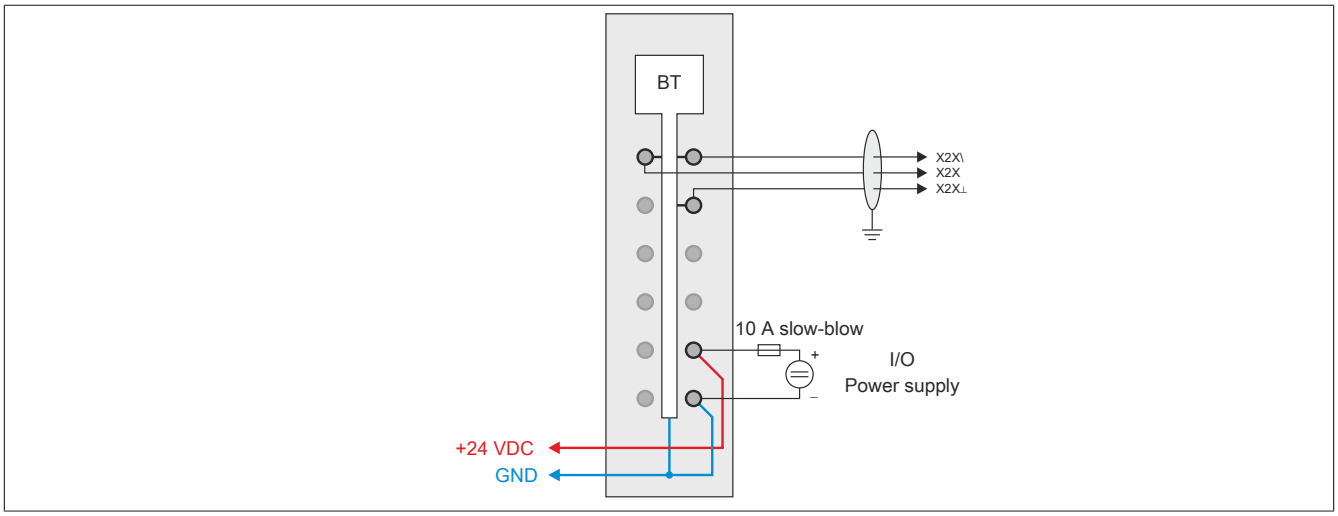

# 7 Connection examples

### 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.

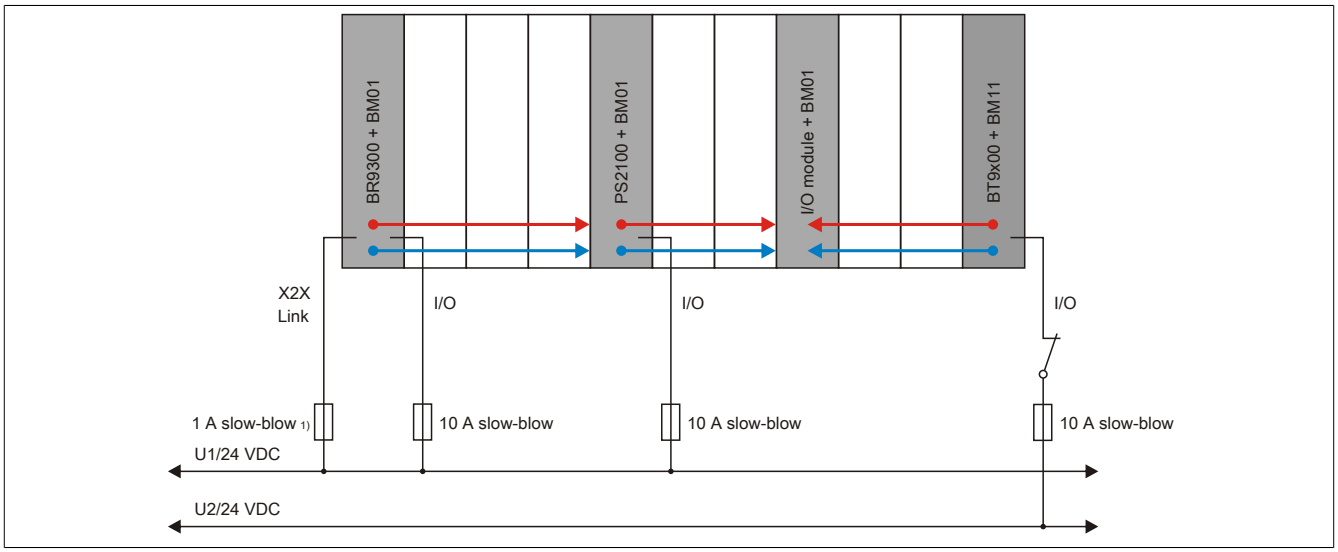



Figure 1: Protection when supplied via bus transmitter

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

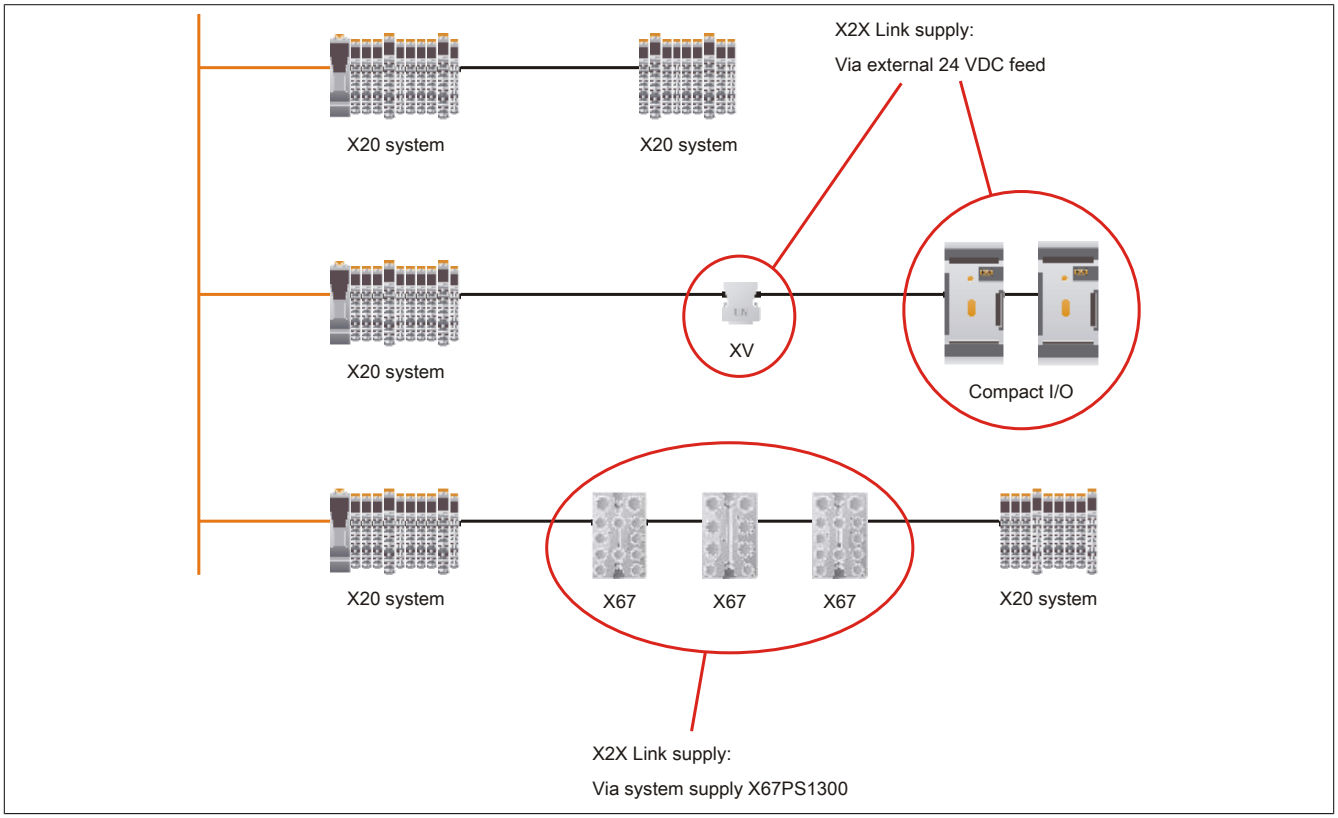



Figure 2: X2X Link supply depending on the system

# 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.

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

## 10.2 Function model 0 - Standard

| Register | Fixed offset | Name | Data type | Read | | Write | |
|---|---|---|---|---|---|---|---|
| | | | | Cyclic | Non-cyclic | Cyclic | Non-cyclic |
| 0 | 1 | Module status | 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.

## 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 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" of the X20 user's manual (version 3.50 or later).

### 10.3.2 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: | Bus supply voltage <4.7 V is displayed as a warning. |
| 24 VDC I/O supply voltage: | I/O supply voltage <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 limit of 20.4 V |
| | | 1 | I/O power supply below the warning limit 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 is important to note that very fast cycles reduce 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 |