X20(c)PS9400

1 General information

The supply module is used together with an X20 bus controller. It is equipped with a feed for the bus controller, the X2X Link and the internal I/O supply.

- Supply for the bus controller, X2X Link and internal I/O supply
- Feed and bus controller / X2X Link supply electrically isolated
- Redundancy of bus controller / X2X Link supply possible by operating multiple supply modules simultaneously
- Service interface (RS232)

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

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.

3 Order data

Order number	Short description	Figure
	System modules for bus controllers	
X20PS9400	X20 power supply module, for bus controller and internal I/O power supply X2X Link power supply	
X20cPS9400	X20 power supply module, coated, for bus controller and internal I/O power supply X2X Link power supply	
	Required accessories	
	System modules for bus controllers	
X20BB80	X20 bus base, for X20 base module (BC, HB, etc.) and X20 power supply module, X20 end cover plates (left and right) X20AC0SL1/X20AC0SR1 included	
X20cBB80	X20 bus base, coated, for X20 base module (BC, HB, etc.) and X20 power supply module, X20 end cover plates (left and right) X20AC0SL1/X20AC0SR1 included	
	System modules for expandable bus controllers	
X20BB81	X20 bus base, for X20 base module (BC, HB, etc.) and X20 power supply module, with one expansion slot for X20 add-on module (IF, HB, etc.), X20 end cover plates (left and right) X20AC0SL1/X20AC0SR1 included	
X20BB82	X20 bus base, for X20 base module (BC, HB, etc.) and X20 power supply module, with 2 expansion slots for 2 X20 add-on modules (IF, HB, etc.), X20 end cover plates (left and right) X20AC0SL1/X20AC0SR1 included	
X20cBB81	X20 bus base, coated, for X20 base module (BC, HB, etc.) and X20 power supply module, with one expansion slot for an X20 add-on module (IF, HB, etc.), X20 locking plates (left and right) X20AC0SL1/X20AC0SR1 included	
X20cBB82	X20 bus base, coated, for X20 base module (BC, HB, etc.) and X20 power supply module, with 2 expansion slots for 2 X20 add-on modules (IF, HB, etc.), X20 end cover plates (left and right) X20AC0SL1/X20AC0SR1 included	
	Terminal blocks	
X20TB12	X20 terminal block, 12-pin, 24 VDC keyed	

Table 1: X20PS9400, X20cPS9400 - Order data

4 Technical data

Order number	X20PS9400	X20cPS9400
Short description		
Power supply module	24 VDC supply module for bus controller, X2X Link power supply and I/O	
Interfaces	1x RS232 service interface	
General information		
B&R ID code	0x1F8C	0xD579
Status indicators	Overload, operating status, module status, RS232	
Diagnostics		
Module run/error	Yes, using LED status indicator and software	
RS232 data transfer	Yes, using LED status indicator	
Overload	Yes, using LED status indicator and software	
Power consumption for X2X Link power supply [1]	1.42 W	
Power consumption [1]		
Internal I/O	0.6 W	
Additional power dissipation caused by actuators (resistive) [W]	-	
Certifications		
CE	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	
DNV	Temperature: **B** (0 - 55°C) Humidity: **B** (up to 100%) Vibration: **B** (4 g) EMC: **B** (bridge and open deck)	
LR	ENV1	
KR	Yes	
ABS	Yes	
EAC	Yes	
KC	Yes	-

Table 2: X20PS9400, X20cPS9400 - Technical data
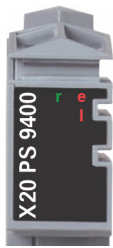
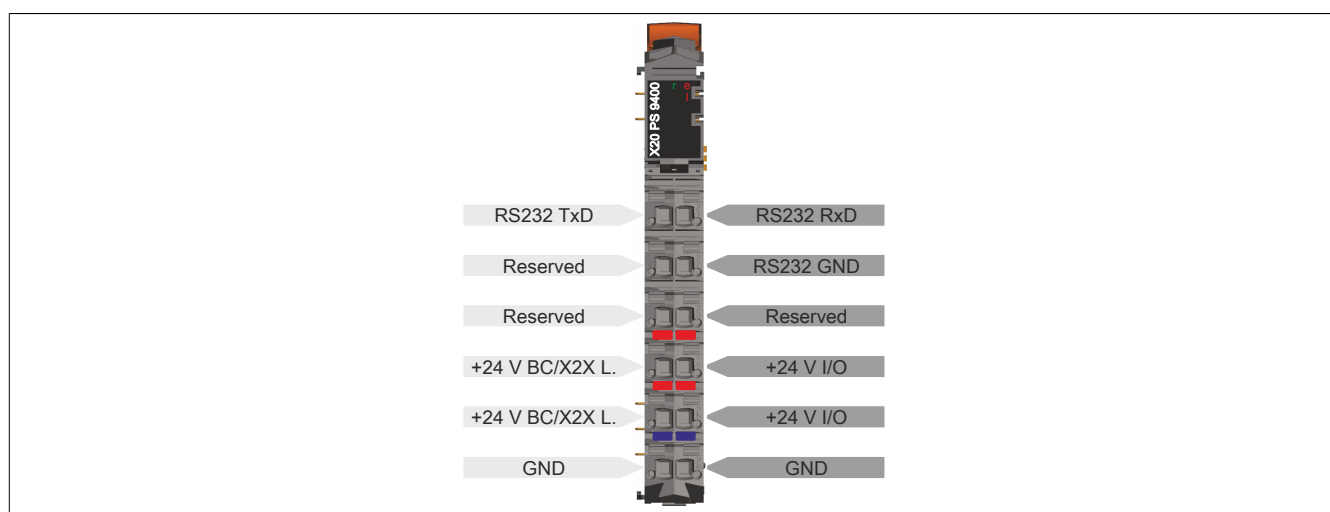| Order number	X20PS9400	X20cPS9400
Bus controller / X2X Link power supply input		
Input voltage	24 VDC -15% / +20%	
Input current	Max. 0.7 A	
Fuse	Integrated, cannot be replaced	
Reverse polarity protection	Yes	
Bus controller / X2X Link power supply output		
Nominal output power	7 W	
Parallel connection	Yes [2]	Yes [3]
Redundant operation	Yes	
Overload characteristics	Short-circuit proof, temporary overload	
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	
Interfaces		
Service interface		
Signal	RS232	
Variant	Connection made using 12-pin terminal block X20TB12	Connection via 12-pin terminal block X20TB12
Max. transfer rate	115.2 kbit/s	
Electrical properties		
Electrical isolation	BC/X2X Link supply isolated from BC/X2X Link power supply I/O supply not isolated from I/O power supply, and RS232 not isolated from bus	
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	See section "Derating".	
Starting temperature	-	Yes, -40°C
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 terminal block X20TB12 separately. Order 1x bus base X20BB8x separately.	Order 1x terminal block X20TB12 separately. Order 1x bus base X20cBB8x separately.
Pitch	12.5$^{+0.2}$ mm	

Table 2: X20PS9400, X20cPS9400 - 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.
2) In parallel operation, it is only permitted to expect 75% of the nominal power. It is important to make sure that all power supplies operated in parallel are switched on and off at the same time.
3) In parallel operation, it is only permitted to expect 75% of the nominal power. It is important to make sure that all power supply units operated in parallel are switched on and off at the same time.

5 LED status indicators

For a description of the various operating modes, see section "Additional information - Diagnostic LEDs" in the X20 system user's manual.
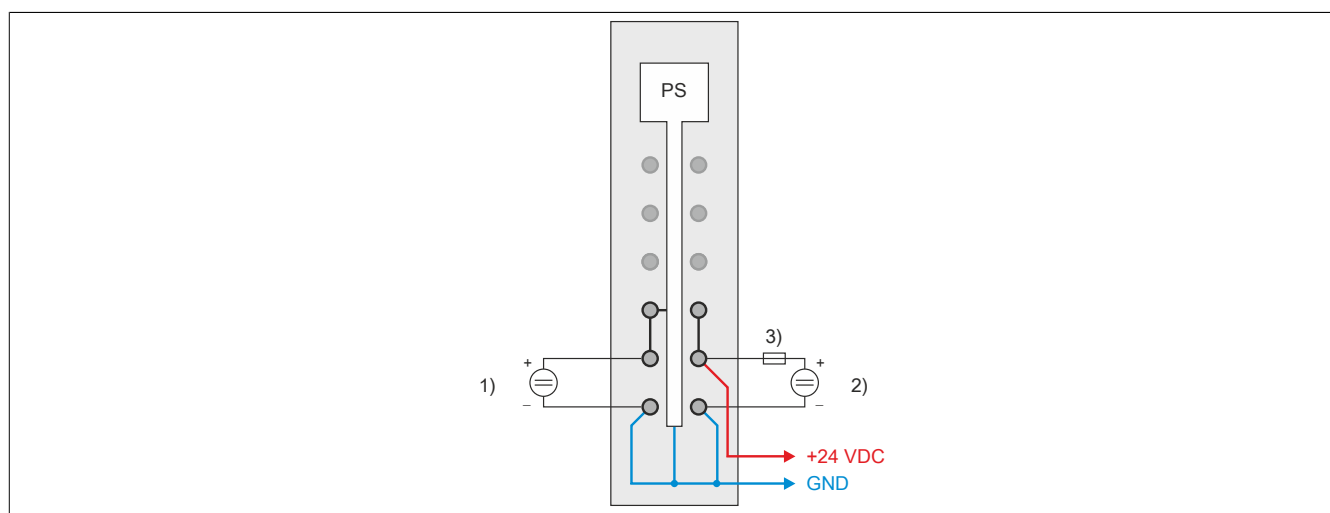
| Figure	LED	Color	Status	Description
	r	Green	Off	No power to module
			Single flash	RESET mode
			Blinking	PREOPERATIONAL mode
			On	RUN mode
	e	Red	Off	No power to module or everything OK
			Double flash	LED indicates one of the following states:
				• The bus controller / X2X Link supply for the power supply is overloaded
				• I/O supply too low
				• Input voltage for bus controller / X2X Link supply too low
	e + r	Red on / Green single flash		Invalid firmware
	l	Red	Off	The bus controller / X2X Link supply is within the valid limits
			On	The bus controller / X2X Link supply for the power supply is overloaded

6 Pinout

RS232 TxD	RS232 RxD
Reserved	RS232 GND
Reserved	Reserved
+24 V BC/X2X L.	+24 V I/O
+24 V BC/X2X L.	+24 V I/O
GND	GND

7 Connection examples

With 2 isolated power supplies

+24 VDC
GND

1) Supply for the bus controller or X2X Link power supply
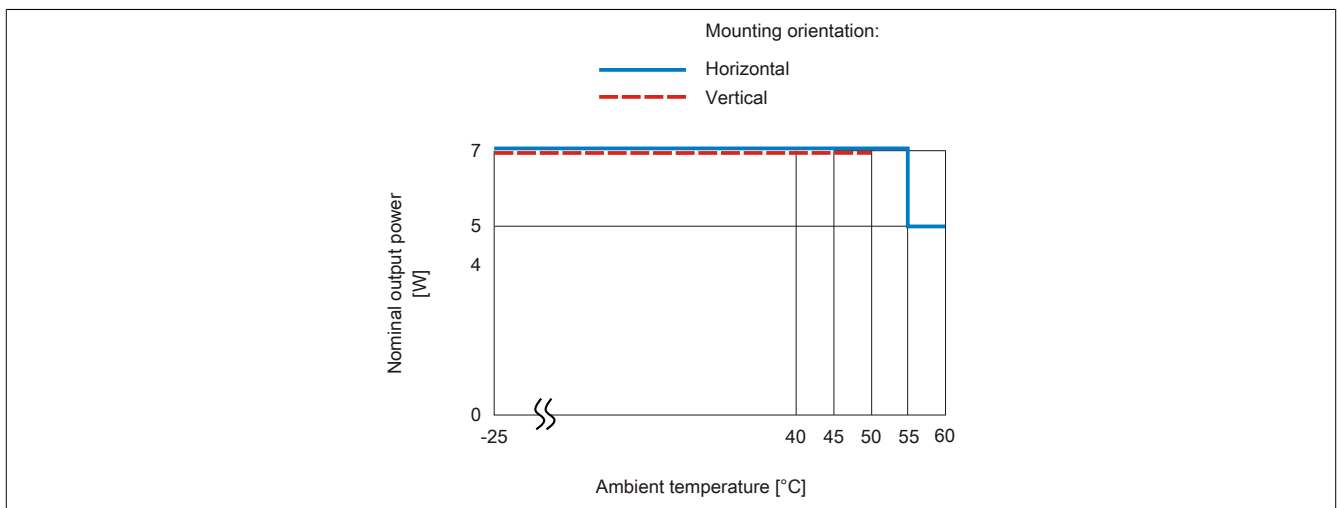2) Supply for the I/O power supply
3) Fuse, 10 A slow-blow

With 1 power supply and jumper
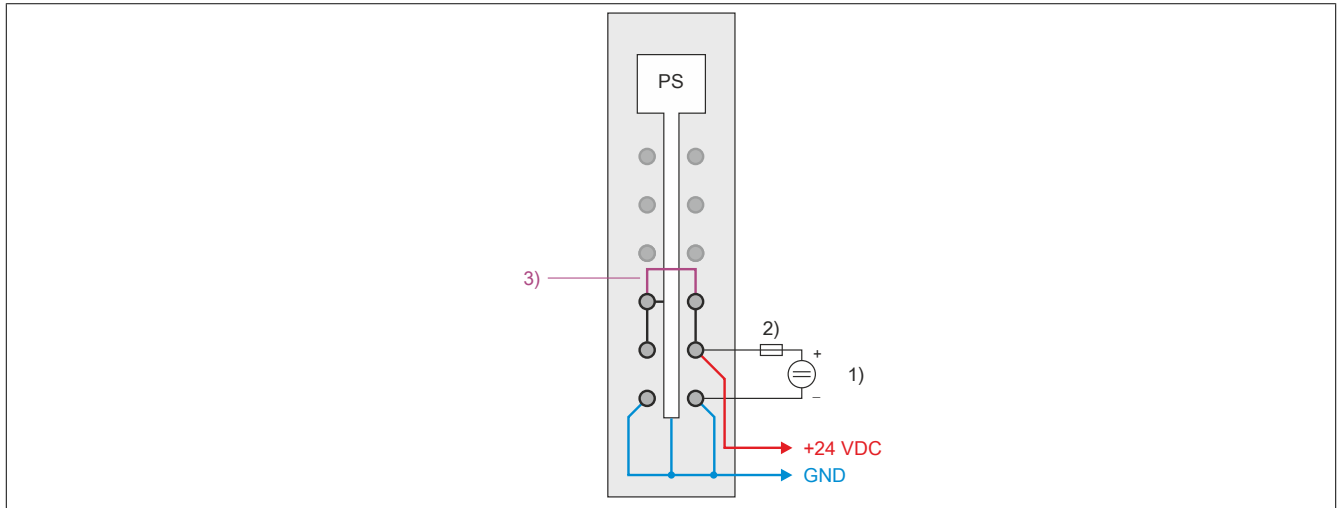
1) Supply for the I/O power supply
2) Fuse, 10 A slow-blow
3) Jumper

8 Derating

The nominal output power for the power supply is 7 W. Depending on the mounting orientation, derating must be taken into account.

9 Using the service interface

The RS232 service interface cannot be used for application purposes. It is only intended for upgrading the firmware of various bus controllers and X2X modules and for storing configurations.

10 Register description

10.1 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.

10.2 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				
2	2	SupplyCurrent	USINT	●			
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	Acyclic	Cyclic	Acyclic
0	0	Status of the module	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.

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" in 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 Status of the module

Name:
Module status

The following voltage and current states of the module are monitored in this register:

Bus power supply current:	Bus power supply current >2.3 A is displayed as a warning.
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	Values
0 - Standard	USINT	See the bit structure.
254 - Bus controller	UINT	See the bit structure.

Bit structure:

Bit	Description	Value	Information
0	StatusInput01	0	No error
		1	Warning in the event of overcurrent (>2.3 A) or 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 power supply current

Name:
SupplyCurrent

This register displays the bus power supply current measured at a resolution of 0.1 A.

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

10.6 Bus supply voltage

Name:
SupplyVoltage

This register indicates the bus supply voltage measured at 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

10.7 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 µs

10.8 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