X20(c)PS9600

1 General information

The power supply module is used together with an X20 Compact-S CPU. It has a feed for the Compact-S CPU, X2X Link and the internal I/O power supply.

- Supply for Compact-S CPU, X2X Link and internal I/O power supply
- Galvanic isolation of supply and CPU / X2X Link power supply
- Redundancy of the CPU / X2X Link power supply possible through parallel operation of multiple power supply modules
- RS232 configurable as an online interface
- CAN bus

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
	System modules for Compact-S CPUs	
X20PS9600	X20 power supply module, for Compact-S CPU and internal I/O power supply, X2X Link power supply	
X20cPS9600	X20 power supply module, coated, for Compact-S CPU and internal I/O power supply, X2X Link power supply	
	Required accessories	
	System modules for Compact-S CPUs	
X20BB52	X20 Compact-S bus base, for Compact-S CPU and Compact-S CPU power supply module, base for integrated RS232 interface, X20 connection, X20 end cover plates (left and right) X20AC0SL1/X20AC0SR1 included	
X20BB57	X20 Compact-S bus base, for Compact-S CPU and Compact-S CPU power supply module, base for integrated RS232 and CAN bus interface, X20 connection, X20 end cover plates (left and right) X20AC0SL1/X20AC0SR1 included	
X20BB62	X20 Compact-S bus base, for Compact-S CPU and Compact-S CPU power supply module, base for integrated RS232 interface, slots for X20 interface module, X20 connection, X20 end cover plates (left and right) X20AC0SL1/X20AC0SR1 included	
X20BB67	X20 Compact-S bus base, for Compact-S CPU and Compact-S CPU power supply module, base for integrated RS232 and CAN bus interface, slot for X20 interface module, X20 connection, X20 end cover plates (left and right) X20AC0SL1/X20AC0SR1 included	
X20BB72	X20 Compact-S bus base, for Compact-S CPU and Compact-S CPU power supply module, base for integrated RS232 interface, 2 slots for X20 interface modules, X20 connection, X20 end cover plates (left and right) X20AC0SL1/X20AC0SR1 included	

Table 1: X20PS9600, X20cPS9600 - Order data

Model number	Short description	Figure
X20BB77	X20 Compact-S bus base, for Compact-S CPU and Compact-S CPU power supply module, base for integrated RS232 and CAN bus interface, 2 slots for X20 interface modules, X20 connection, X20 end cover plates (left and right) X20AC0SL1/X20AC0SR1 included	
X20cBB52	X20c Compact-S bus base, coated, for Compact-S CPU and Compact-S CPU power supply module, base for integrated RS232 interface, X20 connection, X20 end cover plates (left and right) X20AC0SL1/X20AC0SR1 included	
X20cBB57	X20 Compact-S bus base, coated for Compact-S CPU and Compact-S CPU power supply module, base for integrated RS232 and CAN bus interface, X20 connection, X20 end cover plates (left and right) X20AC0SL1/X20AC0SR1 included	
Terminal blocks		
X20TB12	X20 terminal block, 12-pin, 24 VDC keyed	

Table 1: X20PS9600, X20cPS9600 - Order data

4 Technical data

Model number	X20PS9600	X20cPS9600
Short description		
Power supply module	24 VDC power supply module for Compact-S CPU, X2X Link power supply and I/O	
Interfaces	1x RS232, 1x CAN bus [1]	
General information		
B&R ID code	0xEB03	0xFC38
Status indicators	Overload, operating state, module status, RS232, CAN bus [1]	
Diagnostics		
Module run/error	Yes, using LED status indicator and software	
CAN bus data transfer [1]	Yes, using LED status indicator	
RS232 data transfer	Yes, using LED status indicator	
Overload	Yes, using LED status indicator and software	
Power consumption for X2X Link power supply [2]	1.42 W	
Power consumption [2]		
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	-
DNV GL	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	-
CPU / 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	
CPU / X2X Link power supply output		
Nominal output power	7 W	
Parallel connection	Yes [3]	Yes [4]
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	

Table 2: X20PS9600, X20cPS9600 - Technical data

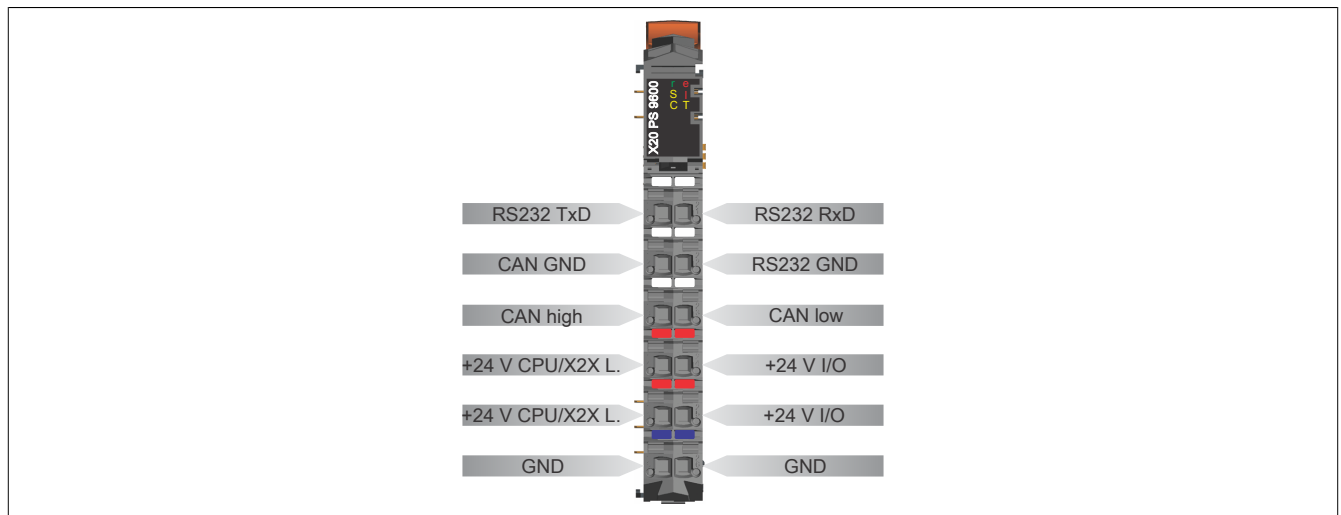| Model number	X20PS9600	X20cPS9600
Interfaces		
Interface IF1		
Signal	RS232	
Variant	Connection made using 12-pin terminal block X20TB12	
Transfer rate	Max. 115.2 kbit/s	
Interface IF3 [1]		
Signal	CAN bus	
Variant	Connection made using 12-pin terminal block X20TB12	
Transfer rate	Max. 1 Mbit/s	
Electrical properties		
Electrical isolation	CPU/X2X Link supply isolated from CPU/X2X Link power supply I/O supply not isolated from I/O power supply	
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".	
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 Compact-S CPU base X20B-B5x, X20BB6x or X20BB7x separately.	Order 1x terminal block X20TB12 separately. Order 1x Compact-S CPU base X20cBB5x separately.
Pitch	12.5$^{+0.2}$ mm	

Table 2: X20PS9600, X20cPS9600 - Technical data

1) CAN bus only when used with bus module X20BB57, X20BB67 or X20BB77.
2) The specified values are maximum values. For examples of the exact calculation, see section "Mechanical and electrical configuration" in the X20 system user's manual.
3) 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.
4) 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.
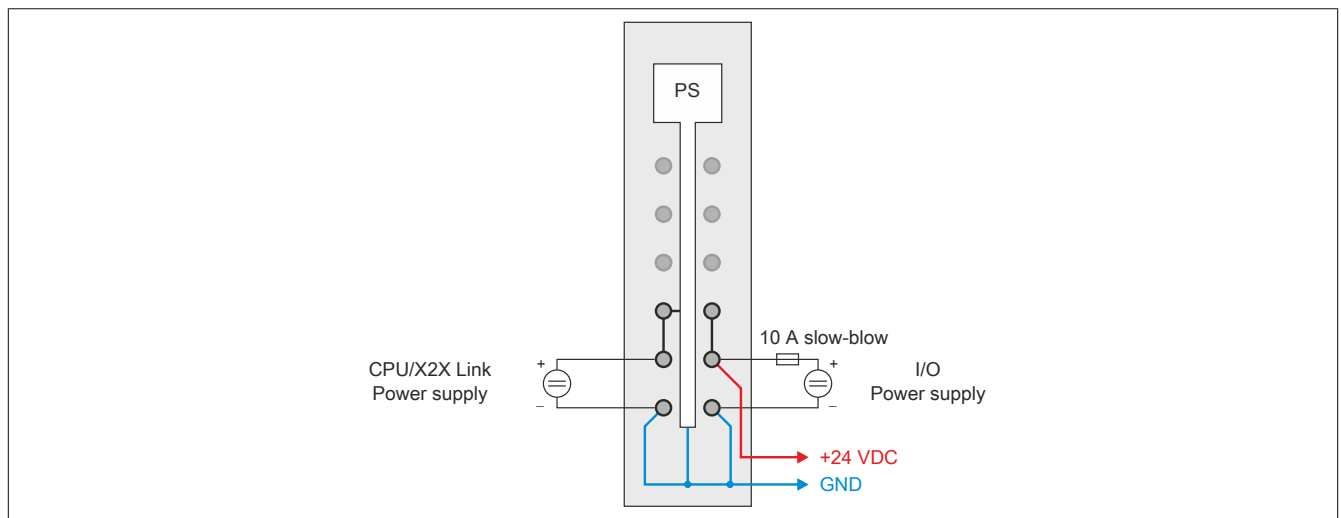
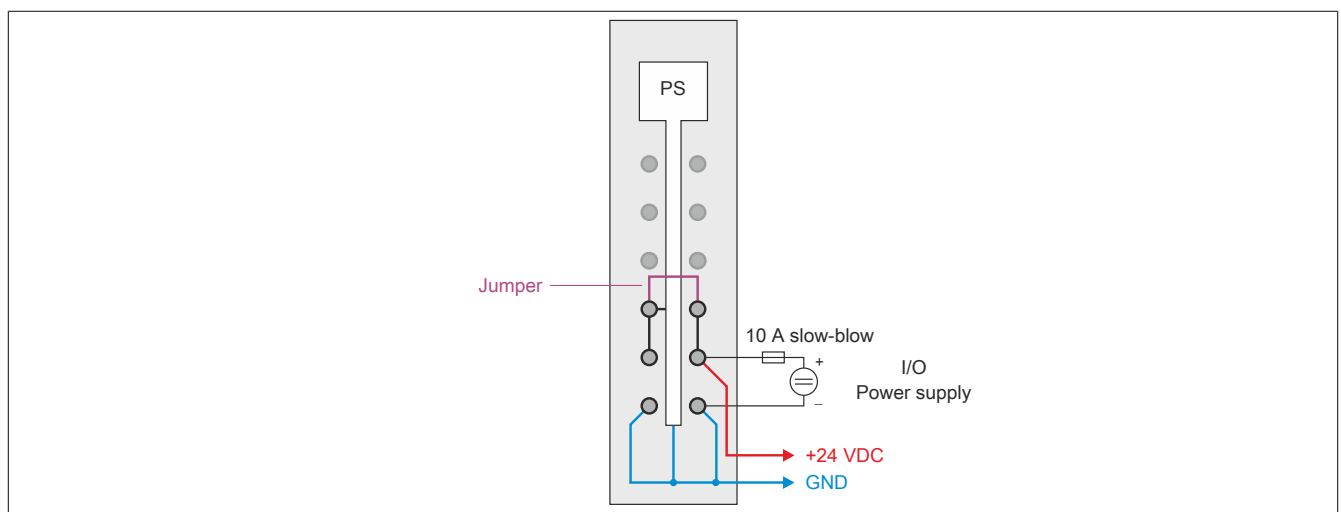| Figure	LED	Color	Status	Description
	r	Green	Off	No power to module
			Single flash	Mode RESET
			Blinking	Mode PREOPERATIONAL
			On	Mode RUN
	e	Red	Off	Module not supplied with power or everything OK
			Double flash	The LED indicates one of the following states: • The CPU / X2X Link power supply is overloaded. • I/O power supply too low • The input voltage for the CPU / X2X Link power supply is too low.
	e + r	Solid red / Single green flash		Invalid firmware
	I	Red	Off	The CPU / X2X Link power supply is within the valid range.
			On	The CPU / X2X Link power supply is overloaded.
	S	Yellow	Off	The CPU is not transmitting data via the RS232 interface.
			On	The CPU is transmitting data via the RS232 interface.
	C	Yellow	Off	The CPU is not transmitting data via the CAN bus interface.
			On	The CPU is transmitting data via the CAN bus interface.
	T	Yellow	Off	The terminating resistor integrated in bus module X20BB57, X20BB67 or X20BB77 is switched off.
			On	The terminating resistor integrated in bus module X20BB57, X20BB67 or X20BB77 is switched on.

6 Pinout

RS232 TxD	RS232 RxD
CAN GND	RS232 GND
CAN high	CAN low
+24 V CPU/X2X L.	+24 V I/O
+24 V CPU/X2X L.	+24 V I/O
GND	GND

7 Connection examples

With 2 isolated power supplies

CPU/X2X Link Power supply

10 A slow-blow

I/O Power supply

+24 VDC

GND

With 1 power supply and jumper
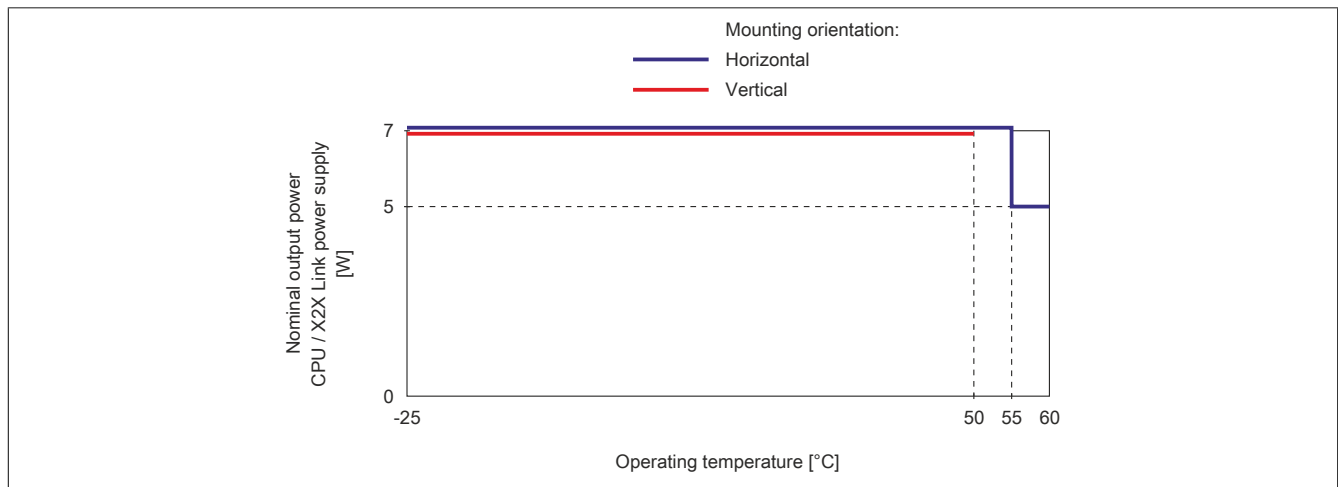

Jumper

10 A slow-blow

I/O Power supply

+24 VDC

GND

8 Derating

8.1 CPU / X2X Link power supply

The nominal output power for the CPU / X2X Link power supply is 7 W. Depending on the mounting orientation, derating must be taken into account.

8.2 I/O power supply

> **Information:**
>
> **The specified maximum temperature and derating values are based on worst-case conditions. The CPU contains an internal temperature sensor that triggers a reset if 95°C is exceeded. Depending on the ambient conditions (artificial convection), maintaining the internal temperature at <90°C can prevent derating.**

8.2.1 X20CP0410, X20CP0411 and X20CP0420

Horizontal mounting orientation

Derating is not required in the temperature range -25 to 55°C. 1 of the following 2 derating variants must be applied at temperatures above 55°C:

Variant 1	Variant 2
Max. 2 A input current on the I/O power supply.	A dummy module must be connected next to the power supply module.

Vertical mounting orientation

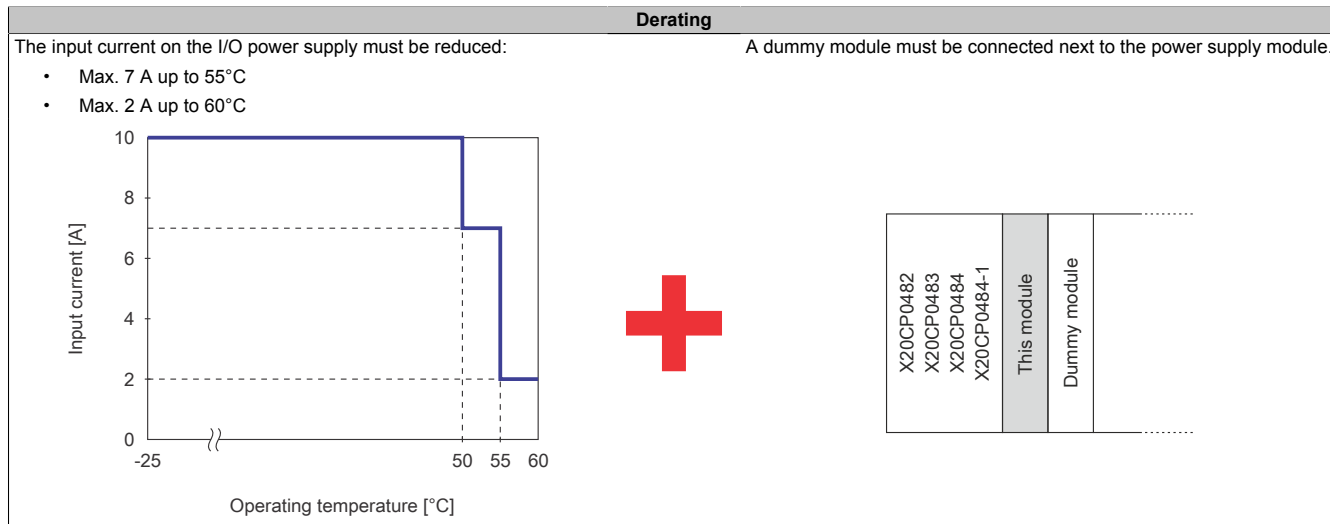Derating is not required in the vertical mounting orientation.

8.2.2 X20CP0482, X20CP0483, X20CP0484 and X20CP0484-1

Horizontal mounting orientation

Derating is not required in the temperature range -25 to 50°C. The following 2 derating variants must be applied at temperatures above 50°C.

> # Information:
>
> **Both derating variants must always be applied!**

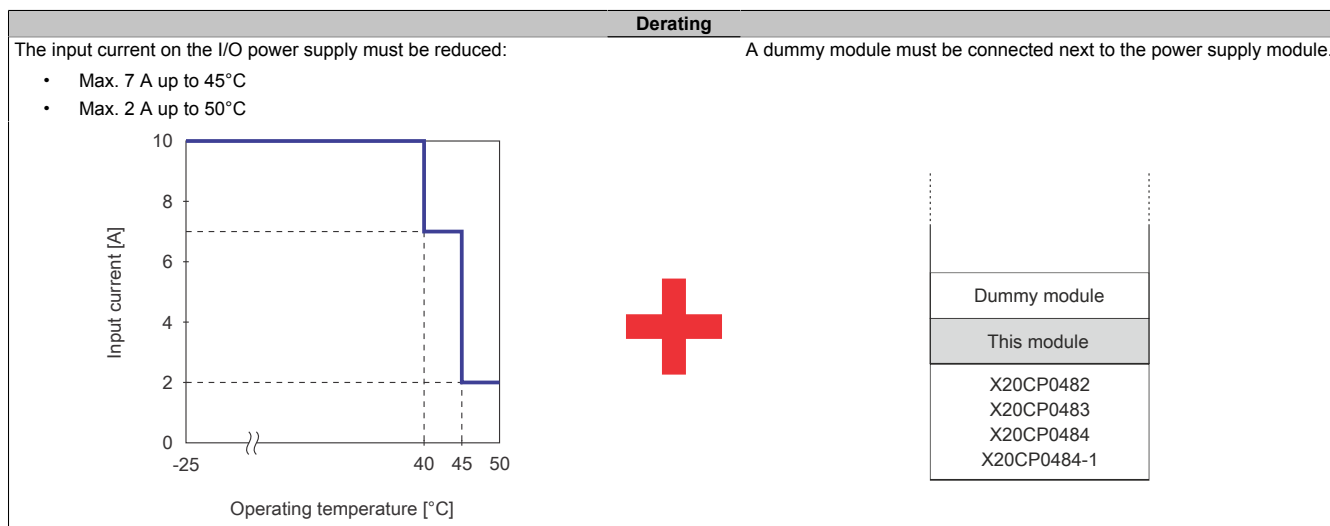| Derating	
The input current on the I/O power supply must be reduced: • Max. 7 A up to 55°C • Max. 2 A up to 60°C	A dummy module must be connected next to the power supply module.

Vertical mounting orientation

Derating is not required in the temperature range -25 to 40°C. The following 2 derating variants must be applied at temperatures above 40°C.

> # Information:
>
> **Both derating variants must always be applied!**

Derating	
The input current on the I/O power supply must be reduced: • Max. 7 A up to 45°C • Max. 2 A up to 50°C	A dummy module must be connected next to the power supply module.

9 Register description

9.1 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.

9.2 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.

9.3 Status of the module

Name:
StatusInput01 to StatusInput02

The following module power supply voltages 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.

Data type	Values
USINT	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	

9.4 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

9.5 Bus supply voltage

Name:
SupplyVoltage

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

Function model	Data type
0 - Standard	USINT

9.6 Minimum cycle time

The minimum cycle time specifies the time up to which 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

9.7 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