Compact-S PLCs and system modules

Data sheets

Version: **1.10 (March 2024)**
Order no.: **Compact-S PLCs and system modules**

Translation of the original documentation

Publishing information

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Compact-S PLCs

Data sheets

Version: **1.10 (March 2024)**
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1.1 X20(c)CP041x, X20CP0420 and X20CP048x

1.1.1 Other applicable documents

For additional and supplementary information, see the following documents.

Other applicable documents

Document name	Title
MAX20	X20 System user's manual
MAEMV	Installation / EMC guide

1.1.2 General information

The controllers in the X20 Compact-S family are available in different variants. This way, customers get the product that best meets the requirements of the machine – technically and economically.

The processor performance of the compact controllers ranges from 166 MHz (compatible) to 667 MHz. The most economical variant is equipped with 128 MB RAM, 8 kB nonvolatile RAM and a 256 MB flash drive. The most powerful variant of the Compact-S controllers achieves cycle times down to 400 µs. It is equipped with 512 MB RAM, 64 kB nonvolatile RAM and a 2 GB internal flash drive.

With POWERLINK, Ethernet, USB and RS232, the controllers offer a wide range of communication options. An optional RS485 or CAN interface is available. If the application requires additional interfaces, the controller can be modularly expanded by 1 or 2 X20 interface slots. This allows the entire product range of X20 fieldbus interfaces to be used.

The fanless, battery-free design of Compact-S controllers means they are completely maintenance-free.

- ARM Cortex-A9 processor with 166 MHz (compatible) to 667 MHz and integrated I/O processor
- Depending on the variant: POWERLINK with poll-response chaining
- 2x onboard USB
- Up to 2 slots for modular interface expansions
- 128 to 512 MB DDR3 SDRAM
- 256 MB to 2 GB onboard flash drive
- Fanless
- No battery
- Extremely compact

1.1.3 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

1.1.4 Order data

X20CP0410, X20CP0411

X20CP0420, X20CP0482,
X20CP0483, X20CP0484, X20CP0484-1

Order number	Short description
	Compact-S PLCs
X20CP0410	X20 Compact-S PLC, ARM Cortex-A9-166 (compatible), 128 MB DDR3 RAM, 8 kB FRAM, 256 MB onboard flash drive, 2 USB interfaces, 1 RS232 interface, 1 Ethernet interface 10/100BASE-T. Order bus base, power supply module and terminal block separately!
X20cCP0410	X20c Compact-S PLC, coated, ARM Cortex-A9-166 (compatible), 128 MB DDR3 RAM, 8 kB FRAM, 256 MB onboard flash drive, 2 USB interfaces, 1 RS232 interface, 1 Ethernet interface 10/100BASE-T. Order bus base, power supply module and terminal block separately!
X20CP0411	X20 Compact-S PLC, ARM Cortex-A9-240, 128 MB DDR3 RAM, 16 kB FRAM, 512 MB onboard flash drive, 2 USB interfaces, 1 RS232 interface, 1 Ethernet interface 10/100BASE-T. Order bus base, power supply module and terminal block separately!
X20CP0420	X20 Compact-S PLC, ARM Cortex-A9-166 (compatible), 128 MB DDR3 RAM, 8 kB FRAM, 256 MB onboard flash drive, 2 USB interfaces, 1 RS232 interface, 1 Ethernet interface 10/100BASE-T (2-port switch). Order bus base, power supply module and terminal block separately!
X20CP0482	X20 Compact-S PLC, ARM Cortex-A9-300, 128 MB DDR3 RAM, 16 kB FRAM, 1 GB onboard flash drive, 2 USB interfaces, 1 RS232 interface, 1 POWERLINK interface, 1 Ethernet interface 10/100BASE-T, can be expanded with X20 interface slot. Order bus base, power supply module and terminal block separately!
X20CP0483	X20 Compact-S PLC, ARM Cortex-A9-500, 256 MB DDR3 RAM, 32 kB FRAM, 1 GB onboard flash drive, 2 USB interfaces, 1 RS232 interface, 1 POWERLINK interface, 1 Ethernet interface 10/100BASE-T, can be expanded with X20 interface slot. Order bus base, power supply module and terminal block separately!
X20CP0484	X20 Compact-S PLC, ARM Cortex-A9-667, 256 MB DDR3 RAM, 64 kB FRAM, 2 GB onboard flash drive, 2 USB interfaces, 1 RS232 interface, 1 POWERLINK interface, 1 Ethernet interface 10/100BASE-T, can be expanded with X20 interface slot. Order bus base, power supply module and terminal block separately!
X20CP0484-1	X20 Compact-S PLC, ARM Cortex-A9-667, 512 MB DDR3 RAM, 64 kB FRAM, 2 GB onboard flash drive, 2 USB interfaces, 1 RS232 interface, 1 POWERLINK interface, 1 Ethernet interface 10/100BASE-T, can be expanded with X20 interface slot. Order bus base, power supply module and terminal block separately!
	Required accessories
	System modules for Compact-S PLCs
X20BB52	X20 Compact-S bus base, for Compact-S PLC and Compact-S PLC power supply module, base for integrated RS232 interface, X20 connection, X20 end cover plates (left and right) X20AC0SL1/X20AC0SR1 included
X20BB53	X20 Compact-S bus base, for Compact-S PLC and Compact-S PLC power supply module, base for integrated RS485 interface, X20 connection, X20 end cover plates (left and right) X20AC0SL1/X20AC0SR1 included
X20BB57	X20 Compact-S bus base, for Compact-S PLC and Compact-S PLC 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 PLC and Compact-S PLC power supply module, base for integrated RS232 interface, slot for X20 interface module, X20 connection, X20 end cover plates (left and right) X20AC0SL1/X20AC0SR1 included
X20BB63	X20 Compact-S bus base, for Compact-S PLC and Compact-S PLC power supply module, base for integrated RS485 interface, slot 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 PLC and Compact-S PLC 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 PLC and Compact-S PLC 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
X20BB77	X20 Compact-S bus base, for Compact-S PLC and Compact-S PLC 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

Table 1: X20(c)CP041x, X20CP0420 and X20CP048x - Order data

X20PS9600	X20 power supply module, for Compact-S PLC and internal I/O power supply, X2X Link power supply
X20PS9602	X20 power supply module, for Compact-S PLC and internal I/O power supply, X2X Link power supply, supply not galvanically isolated
X20cBB52	X20c Compact-S bus base, coated, for Compact-S PLC and Compact-S PLC power supply module, base for integrated RS232 interface, X20 connection, X20 end cover plates (left and right) X20AC0SL1/X20AC0SR1 included
X20cBB57	X20c Compact-S bus base, coated, for Compact-S PLC and Compact-S PLC power supply module, base for integrated RS232 and CAN bus interface, X20 connection, X20 end cover plates (left and right) X20AC0SL1/X20AC0SR1 included
X20cPS9600	X20 power supply module, coated, for Compact-S PLC and internal I/O power supply, X2X Link power supply
	Terminal blocks
X20TB12	X20 terminal block, 12-pin, 24 VDC keyed

Table 1: X20(c)CP041x, X20CP0420 and X20CP048x - Order data

Included in delivery

X20 end cover plates are included with the delivery of the Compact-S PLC bus base.

Order number	Short description
X20AC0SL1	X20 end cover plate, left
X20AC0SR1	X20 end cover plate, right

1.1.5 X20(c)CP041x and X20CP0420 - Technical data

Order number	X20CP0410	X20cCP0410	X20CP0411	X20CP0420
Short description				
Interfaces	1x Ethernet, 2x USB, 1x X2X Link			1x Ethernet (2-port switch), 2x USB, 1x X2X Link
System module	Controller			
General information				
B&R ID code	0xE94F	0xFC36	0xE950	0xF4D3
Cooling	Fanless			
Status indicators	CPU function, Ethernet			
Diagnostics				
CPU function	Yes, using LED status indicator			
Ethernet	Yes, using LED status indicator			
Temperature	Yes, using software register			
Support				
Controller redundancy	No			
Storage health data support [1]	Yes			
ACOPOS support	Yes			
Visual Components support	Yes			
Power consumption	2.2 W [2]			2.5 W [2]
Additional power dissipation caused by actuators (resistive) [W]	-			
Certifications				
CE	Yes			
UKCA	Yes			
UL	cULus E115267 Industrial control equipment			
DNV	Temperature: **B** (0 - 55°C) Humidity: **B** (up to 100%) Vibration: **B** (4 g) EMC: **B** (bridge and open deck)			-
LR	ENV1			-
EAC	Yes	-	Yes	
Controller				
Real-time clock	Retention for at least 300 hours, typ. 1000 hours at 25°C, 1 s resolution, -18 to 28 ppm accuracy at 25°C			
FPU	Yes			
Processor				
Type	ARM Cortex-A9			
Clock frequency	166 MHz (compatible)		240 MHz	166 MHz (compatible)
L1 cache				
Data code	32 kB			
Program code	32 kB			
L2 cache	512 kB			
Integrated I/O processor	Processes I/O data points in the background			
Remanent variables	8 kB FRAM, retention >10 years [3]		16 kB FRAM, retention >10 years [3]	8 kB FRAM, retention >10 years [3]
Shortest task class cycle time	4 ms		2 ms	4 ms
Typical instruction cycle time	0.0446 µs		0.0309 µs	0.0446 µs
Standard memory				
RAM	128 MB DDR3 SDRAM			

Table 2: X20(c)CP041x and X20CP0420 - Technical data

Order number	X20CP0410	X20cCP0410	X20CP0411	X20CP0420
Application memory				
Type	256 MB eMMC flash memory		512 MB eMMC flash memory	256 MB eMMC flash memory
Data retention	10 years			
Writable data amount				
Guaranteed	40 TB			
Results for 5 years	21.9 GB/day			
Guaranteed erase/write cycles	20,000			
Error-correcting code (ECC)	Yes			
Interfaces				
Interface IF2				
Signal	Ethernet			
Variant	1x RJ45 shielded			2x shielded RJ45 (switch)
Line length	Max. 100 m between 2 stations (segment length)			
Transfer rate	10/100 Mbit/s			
Transfer				
Physical layer	10BASE-T/100BASE-TX			
Half-duplex	Yes			
Full-duplex	Yes			
Autonegotiation	Yes			
Auto-MDI/MDIX	Yes			
Interface IF4				
Type	USB 1.1/2.0			
Variant	Type A			
Max. output current	0.2 A			
Interface IF5				
Type	USB 1.1/2.0			
Variant	Type A			
Max. output current	0.2 A			
Interface IF6				
Fieldbus	X2X Link master			
On base module	X20BB52: Compact-S PLC base module with integrated RS232 interface X20BB53: Compact-S PLC base module with integrated RS485 interface X20BB57: Compact-S PLC base module with integrated RS232 and CAN bus interface			
Electrical properties				
Electrical isolation	Ethernet (IF2) isolated from other interfaces and PLC X2X (IF6) isolated from other interfaces and PLC: Yes, with X20PS9600 / No, with X20PS9602 USB (IF4, IF5) not isolated from each other and PLC			
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" in the X20PS960x data sheet.			
Storage	-40 to 85°C			
Transport	-40 to 85°C			
Relative humidity				
Operation	5 to 95%, non-condensing	Up to 100%, condensing	5 to 95%, non-condensing	
Storage	5 to 95%, non-condensing			
Transport	5 to 95%, non-condensing			
Mechanical properties				
Note	Order 1x terminal block X20TB12 separately. Order 1x power supply module X20PS9600 or X20PS9602 separately. Order 1x Compact-S PLC base X20BB5x separately.	Order 1x terminal block X20TB12 separately. Order 1x power supply module X20cPS9600 separately. Order 1x Compact-S PLC base X20cBB5x separately.	Order 1x terminal block X20TB12 separately. Order 1x power supply module X20PS9600 or X20PS9602 separately. Order 1x Compact-S PLC base X20BB5x separately.	
Pitch [4]				
X20BB5x	$37.5^{+0.2}$ mm			

Table 2: X20(c)CP041x and X20CP0420 - Technical data

1) For details about *storage health data*, see Automation Help.
2) Without USB interface.
3) The memory size for remanent variables is configurable in Automation Studio.
4) The pitch is based on the width of the Compact-S PLC base.

1.1.6 X20CP048x - Technical data

Order number	X20CP0482	X20CP0483	X20CP0484	X20CP0484-1
Short description				
Interfaces	1x Ethernet, 1x POWERLINK V2, 2x USB, 1x X2X Link			
System module	Controller			
General information				
B&R ID code	0xE951	0xE952	0xE953	0xFA24
Cooling	Fanless			
Status indicators	CPU function, Ethernet, POWERLINK			
Diagnostics				
CPU function	Yes, using LED status indicator			
Ethernet	Yes, using LED status indicator			
POWERLINK	Yes, using LED status indicator			
Temperature	Yes, using software register			
Support				
Controller redundancy	No			
Storage health data support [1]	Yes			
ACOPOS support	Yes			
Visual Components support	Yes			
Power consumption	2.7 W [2]	2.9 W [2]	2.95 W [2]	2.97 W [2]
Additional power dissipation caused by actuators (resistive) [W]	-			
Certifications				
CE	Yes			
UKCA	Yes			
UL	cULus E115267 Industrial control equipment			
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			-
Controller				
Real-time clock	Retention for at least 300 hours, typ. 1000 hours at 25°C, 1 s resolution, -18 to 28 ppm accuracy at 25°C			
FPU	Yes			
Processor				
Type	ARM Cortex-A9			
Clock frequency	300 MHz	500 MHz	667 MHz	
L1 cache				
Data code	32 kB			
Program code	32 kB			
L2 cache	512 kB			
Integrated I/O processor	Processes I/O data points in the background			
Remanent variables	16 kB FRAM, retention >10 years [3]	32 kB FRAM, retention >10 years [3]	64 kB FRAM, retention >10 years [3]	
Shortest task class cycle time	1 ms	0.8 ms	0.4 ms	
Typical instruction cycle time	0.0247 µs	0.0145 µs	0.0106 µs	
Standard memory				
RAM	128 MB DDR3 SDRAM	256 MB DDR3 SDRAM		512 MB DDR3 SDRAM
Application memory				
Type	1 GB eMMC flash memory		2 GB eMMC flash memory	
Data retention	10 years			
Writable data amount				
Guaranteed	40 TB			
Results for 5 years	21.9 GB/day			
Guaranteed erase/write cycles	20,000			
Error-correcting code (ECC)	Yes			
Slots for interface modules				
X20BB5x	0			
X20BB6x	1			
X20BB7x	2			

Table 3: X20CP048x - Technical data

Order number	X20CP0482	X20CP0483	X20CP0484	X20CP0484-1
Interfaces				
Interface IF2				
Signal	Ethernet			
Variant	1x RJ45 shielded			
Line length	Max. 100 m between 2 stations (segment length)			
Transfer rate	10/100 Mbit/s			
Transfer				
Physical layer	10BASE-T/100BASE-TX			
Half-duplex	Yes			
Full-duplex	Yes			
Autonegotiation	Yes			
Auto-MDI/MDIX	Yes			
Interface IF3				
Fieldbus	POWERLINK V2 managing or controlled node			
Type	Type 6 [4]			
Variant	1x RJ45 shielded			
Line length	Max. 100 m between 2 stations (segment length)			
Transfer rate	100 Mbit/s			
Transfer				
Physical layer	100BASE-TX			
Half-duplex	Yes			
Full-duplex	POWERLINK mode: No / Ethernet mode: Yes			
Autonegotiation	Yes			
Auto-MDI/MDIX	Yes			
Interface IF4				
Type	USB 1.1/2.0			
Variant	Type A			
Max. output current	0.2 A			
Interface IF5				
Type	USB 1.1/2.0			
Variant	Type A			
Max. output current	0.2 A			
Interface IF6				
Fieldbus	X2X Link master			
On base module	X20BBx2: Compact-S PLC base module with integrated RS232 interface X20BBx3: Compact-S PLC base module with integrated RS485 interface X20BBx7: Compact-S PLC base module with integrated RS232 and CAN bus interface			
Electrical properties				
Electrical isolation	Ethernet (IF2) and POWERLINK (IF3) isolated from each other, from other interfaces and from PLC X2X (IF6) isolated from other interfaces and PLC: Yes, with X20PS9600 / No, with X20PS9602 USB (IF4, IF5) not isolated from each other and PLC			
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" in the X20PS960x data sheet.			
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 properties				
Note	Order 1x terminal block X20TB12 separately. Order 1x power supply module X20PS9600 or X20PS9602 separately. Order 1x Compact-S PLC base X20BB5x, X20BB6x or X20BB7x separately.			
Pitch [5]				
X20BB5x	$37.5^{+0.2}$ mm			
X20BB6x	$62.5^{+0.2}$ mm [6]			
X20BB7x	$87.5^{+0.2}$ mm [7]			

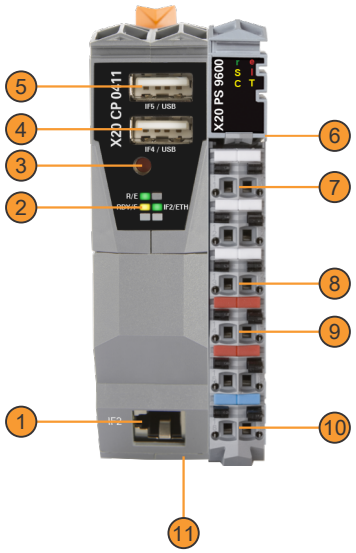
Table 3: X20CP048x - Technical data

1) For details about *storage health data*, see Automation Help.
2) Without USB interface.
3) The memory size for remanent variables is configurable in Automation Studio.
4) For additional information, see section "Communication / POWERLINK / General information / Hardware - IF/LS" in Automation Help.

5) The pitch is based on the width of the Compact-S PLC base.
6) X20CP048x PLCs can be used to operate 1 interface module.
7) X20CP048x PLCs can be used to operate 2 interface modules.

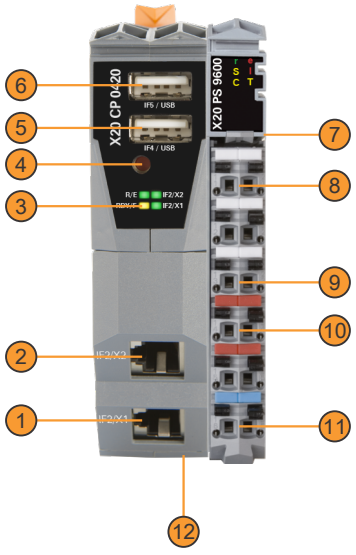
1.1.7 Operating and connection elements

X20CP0410 and X20CP0411



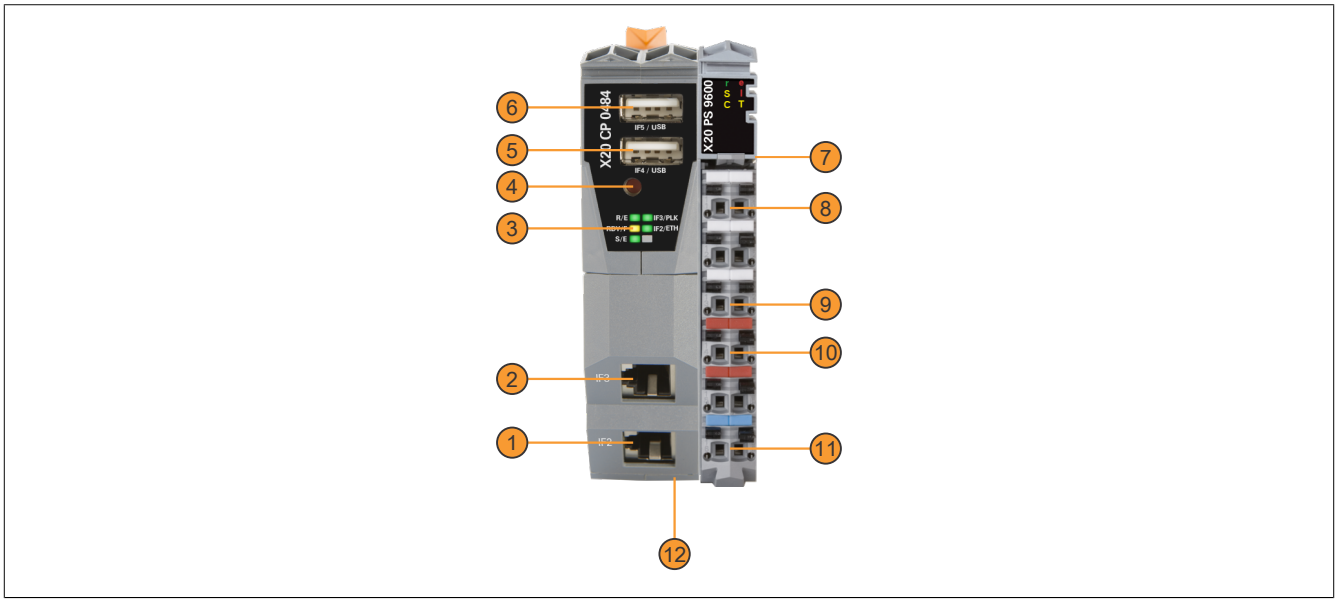
1	IF2 - Ethernet	2	LED status indicators
3	Reset button	4	IF4 - USB
5	IF5 - USB	6	IF6 - X2X Link
7	IF1 - RS232 interface (with X20BB52 or X20BB57)	8	IF1 - RS485 interface (with X20BB53) IF7 - CAN bus (with X20BB57)
9	+24 V I/O	10	GND
11	Switch for terminating resistor: • RS485 interface (with X20BB53) • CAN bus (with X20BB57)	-	-

X20CP0420



1	IF2/X1 - Ethernet	2	IF2/X2 - Ethernet
3	LED status indicators	4	Reset button
5	IF4 - USB	6	IF5 - USB
7	IF6 - X2X Link	8	IF1 - RS232 interface (with X20BB52 or X20BB57)
9	IF1 - RS485 interface (with X20BB53) IF7 - CAN bus (with X20BB57)	10	+24 V I/O
11	GND	12	Switch for terminating resistor: • RS485 interface (with X20BB53) • CAN bus (with X20BB57)

X20CP0482, X20CP0483, X20CP0484 and X20CP0484-1



1	IF2 - Ethernet	2	IF3 - POWERLINK
3	LED status indicators	4	Reset button
5	IF4 - USB	6	IF5 - USB
7	IF6 - X2X Link	8	IF1 - RS232 interface (with X20BBx2 or X20BBx7)
9	IF1 - RS485 interface (with X20BBx3) IF7 - CAN bus (with X20BBx7)	10	+24 V I/O
11	GND	12	Switch for terminating resistor: • RS485 interface (with X20BBx3) • CAN bus (with X20BBx7)

1.1.7.1 LED status indicators

X20CP0410 and X20CP0411

Figure	LED	Color	Status	Description
	R/E	Green	On	Application running
			Blinking	System startup: The controller is initializing the application, all bus systems and I/O modules.[1)]
			Double flash	System startup during firmware update[1)]
		Red	On	Mode SERVICE[2)] or BOOT[2)]
			Blinking	If LED "R/E" blinks red and LED "RDY/F" blinks yellow, a license violation has occurred.
			Double flash	System startup: Installation error[3)]
	RDY/F	Yellow	On	Mode SERVICE[2)] or BOOT[2)]
			Blinking	If LED "RDY/F" blinks yellow and LED "R/E" blinks red, a license violation has occurred.
	IF2/ETH	Green	On	The link to the Ethernet remote station is established.
			Blinking	The link to the Ethernet remote station is established. The LED blinks if Ethernet activity is taking place on the bus.

1) This process can take several minutes depending on the configuration.
2) The operating states are described in Automation Help under "Real-time operating system - Method of operation - Operating states".
3) AR 4.93 and later: The project installation (initial installation or update) via USB flash drive was aborted with an error.

X20CP0420

Figure	LED	Color	Status	Description
	R/E	Green	On	Application running
			Blinking	System startup: The controller is initializing the application, all bus systems and I/O modules.[1)]
			Double flash	System startup during firmware update[1)]
		Red	On	Mode SERVICE[2)] or BOOT[2)]
			Blinking	If LED "R/E" blinks red and LED "RDY/F" blinks yellow, a license violation has occurred.
			Double flash	System startup: Installation error[3)]
	RDY/F	Yellow	On	Mode SERVICE[2)] or BOOT[2)]
			Blinking	If LED "RDY/F" blinks yellow and LED "R/E" blinks red, a license violation has occurred.
	IF2 X1/X2	Green	On	The link to the Ethernet remote station is established.
			Blinking	The link to the Ethernet remote station is established. The LED blinks if Ethernet activity is taking place on the bus.

1) This process can take several minutes depending on the configuration.
2) The operating states are described in Automation Help under "Real-time operating system - Method of operation - Operating states".
3) AR 4.93 and later: The project installation (initial installation or update) via USB flash drive was aborted with an error.

X20CP0482, X20CP0483, X20CP0484 and X20CP0484-1

Figure	LED	Color	Status	Description
	R/E	Green	On	Application running
			Blinking	System startup: The controller is initializing the application, all bus systems and I/O modules.[1)]
			Double flash	System startup during firmware update[1)]
		Red	On	Mode SERVICE[2)] or BOOT[2)]
			Blinking	If LED "R/E" blinks red and LED "RDY/F" blinks yellow, a license violation has occurred.
			Double flash	System startup: Installation error[3)]
	RDY/F	Yellow	On	Mode SERVICE[2)] or BOOT[2)]
			Blinking	If LED "RDY/F" blinks yellow and LED "R/E" blinks red, a license violation has occurred.
	S/E	Green/Red		Status/Error LED. LED states are described in section "LED "S/E" (status/error LED)" on page 12.
	IF3/PLK	Green	On	The link to the POWERLINK remote station is established.
			Blinking	The link to the POWERLINK remote station is established. The LED blinks if Ethernet activity is taking place on the bus.
	IF2/ETH	Green	On	The link to the Ethernet remote station is established.
			Blinking	The link to the Ethernet remote station is established. The LED blinks if Ethernet activity is taking place on the bus.

1) This process can take several minutes depending on the configuration.
2) The operating states are described in Automation Help under "Real-time operating system - Method of operation - Operating states".
3) AR 4.93 and later: The project installation (initial installation or update) via USB flash drive was aborted with an error.

1.1.7.1.1 LED "S/E" (status/error LED)

This LED is a green/red dual LED and indicates the state of the POWERLINK interface. The LED states have a different meaning depending on the operating mode of the POWERLINK interface.

1.1.7.1.1.1 Ethernet mode

In this mode, the interface is operated as an Ethernet interface.

LED "S/E"		
Green	Red	Description
On	Off	The interface is operated as an Ethernet interface.

Table: LED "S/E": Interface in Ethernet mode

1.1.7.1.1.2 POWERLINK V2 mode

Error message

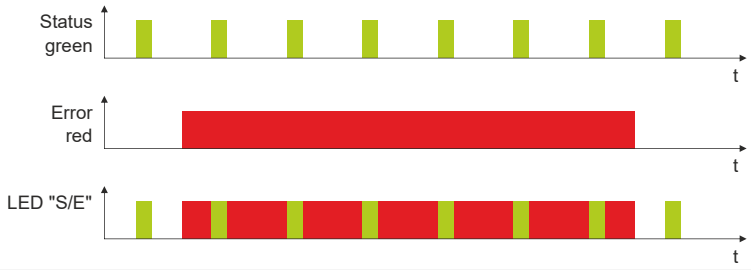
LED "S/E"		
Green	Red	Description
Off	On	The interface is in error mode (failed Ethernet frames, increased number of collisions on the network, etc.). Note: Several red blinking signals are displayed immediately after the device is switched on. These are not errors, however.
Blinking	On	If an error occurs in the following modes, then the green LED blinks over the red LED: • PRE_OPERATIONAL_1 • PRE_OPERATIONAL_2 • READY_TO_OPERATE 

Table: LED "S/E" - Error message (interface in POWERLINK mode)

Interface status

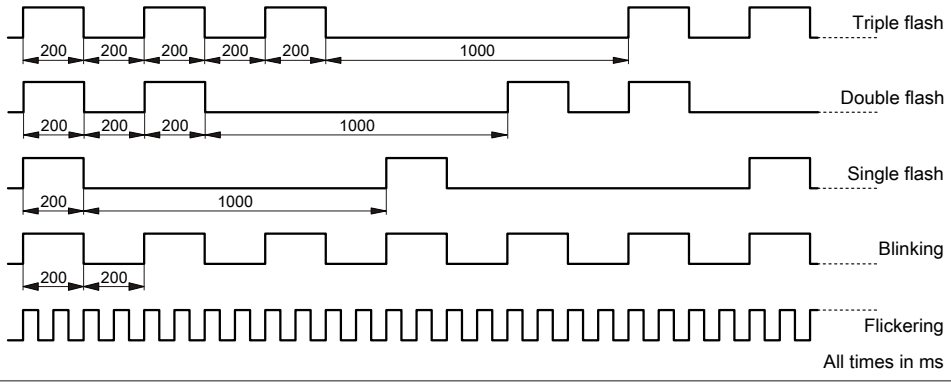
LED "S/E"		
Green	Red	Description
Off	Off	**Mode:** NOT_ACTIVE The interface is either in mode NOT_ACTIVE or one of the following modes or errors is present: • The device is switched off. • The device is in the startup phase. • The interface or device is not configured correctly in Automation Studio. • The interface or device is defective. **Managing node (MN)** The network is monitored for POWERLINK frames. If a frame is not received within the configured time window (timeout), the interface immediately enters mode PRE_OPERATIONAL_1. If POWERLINK communication is detected before the time has elapsed, however, the MN is not started. **Controlled node (CN)** The network is monitored for POWERLINK frames. If a frame is not received within the configured time window (timeout), the interface immediately enters mode BASIC_ETHERNET. If POWERLINK communication is detected before this time expires, however, the interface immediately enters mode PRE_OPERATIONAL_1.
Flickering (approx. 10 Hz)	Off	**Mode:** BASIC_ETHERNET The interface is in mode BASIC_ETHERNET. The interface is operated in Ethernet mode. **Managing node (MN)** This mode can only be exited by resetting the controller. **Controlled node (CN)** If POWERLINK communication is detected during this mode, the interface enters mode PRE_OPERATIONAL_1.
Single flash (approx. 1 Hz)	Off	**Mode:** PRE_OPERATIONAL_1 The interface is in mode PRE_OPERATIONAL_1. **Managing node (MN)** The MN is in "reduced cycle" mode. The CNs are configured in this mode. Cyclic communication is not yet taking place. **Controlled node (CN)** The CN can be configured by the MN in this mode. The CN waits until it receives an SoC frame and then switches to mode PRE_OPERATIONAL_2.
	On	**Controlled node (CN)** If the red LED lights up in this mode, this means that the MN has failed.
Double flash (approx. 1 Hz)	Off	**Mode:** PRE_OPERATIONAL_2 The interface is in mode PRE_OPERATIONAL_2. **Managing node (MN)** The MN starts cyclic communication (cyclic input data is not yet evaluated). The CNs are configured in this mode. **Controlled node (CN)** The CN can be configured by the MN in this mode. A command then switches the mode to READY_TO_OPERATE.
	On	**Controlled node (CN)** If the red LED lights up in this mode, this means that the MN has failed.

Table: LED "S/E" - Interface state (interface in POWERLINK mode)

LED "S/E"		
Green	**Red**	**Description**
Triple flash (approx. 1 Hz)	Off	**Mode:** READY_TO_OPERATE The interface is in mode READY_TO_OPERATE. **Managing node (MN)** Cyclic and asynchronous communication. Received PDO data is ignored. **Controlled node (CN)** The configuration of the CN is completed. Normal cyclic and asynchronous communication. The transmitted PDO data corresponds to the PDO mapping. However, cyclic data is not yet evaluated.
	On	**Controlled node (CN)** If the red LED lights up in this mode, this means that the MN has failed.
On	Off	**Mode:** OPERATIONAL The interface is in mode OPERATIONAL. PDO mapping is active and cyclic data is evaluated.
Blinking (approx. 2.5 Hz)	Off	**Mode:** STOPPED The interface is in mode STOPPED. **Managing node (MN)** This mode does not occur for the MN. **Controlled node (CN)** Output data is not being output, and no input data is being provided. This mode can only be reached and exited by a corresponding command from the MN.

Table: LED "S/E" - Interface state (interface in POWERLINK mode)

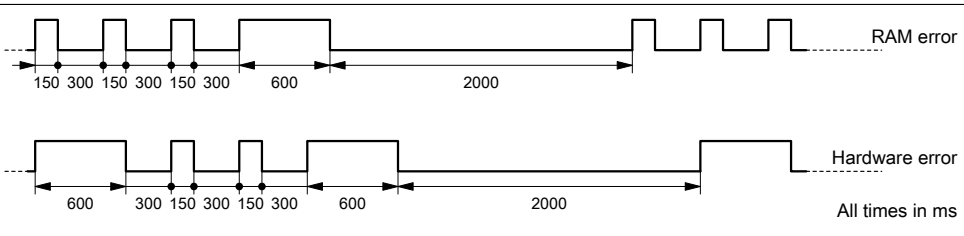
Blink times



1.1.7.1.2 System stop error codes

A system stop error can occur due to incorrect configuration or defective hardware.

The error code is indicated by LED "S/E" blinking red. The blinking signal of the error code consists of 4 switch-on phases with short (150 ms) or long (600 ms) duration. The error code is repeated every 2 seconds.



Error	Error description
RAM error	The device is defective and must be replaced.
Hardware error	The device or a system component is defective and must be replaced.

1.1.7.2 Button for reset and operating mode

1.1.7.2.1 Reset

The button must be pressed for less than 2 seconds to trigger a reset. This triggers a hardware reset on the controller, which means that:

- All application programs are stopped.
- All outputs are set to zero.

The controller then boots into service mode by default. The startup mode after pressing the reset button can be set in Automation Studio:

- Service mode (default)
- Warm restart
- Cold restart
- Diagnostic mode

1.1.7.2.2 Operating mode

3 operating modes can be set using different button sequences:

Operating mode	Button sequence	Description
BOOT[1)]	Boot mode is enabled by the following button sequence: • Press the button for less than 2 s. As soon as LED "Error" lights **RED**, the button can be released. • Then press the button within 2 s for longer than 2 s. As soon as LED "Error" goes out, the button can be released.	Boot AR is started, and the runtime system can be installed via the online interface (Automation Studio). User flash memory is erased only when the download begins.
SERVICE/RUN[1)]	Press the button for less than 2 s. As soon as LED "Error" lights **RED**, the button can be released.	Mode SERVICE/RUN: Triggering and startup behavior correspond to triggering a hardware reset (see "Reset" on page 15).
DIAGNOSE[1)]	Press the button for more than 2 s. LED "Error" lights **RED** and then goes out. As soon as LED "Error" goes out, the button can be released.	The controller is starting up in diagnostic mode. Program sections in User RAM and User FlashPROM are not initialized. After diagnostic mode, the controller always boots with a warm restart.

1) The operating states are described in "Real-time operating system - Method of operation - Operating states" in Automation Help.

1.1.7.3 Flash drive

This application memory is implemented as an integrated flash drive.

1.1.7.4 Project installation

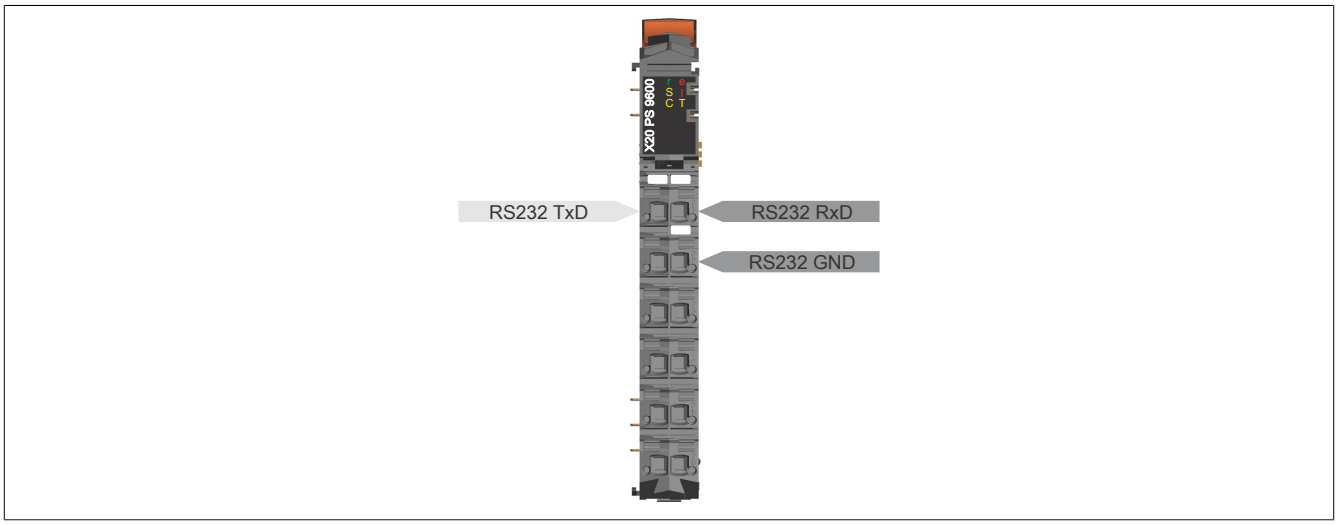
Project installation is described in "Project management - Project installation" in Automation Help.

1.1.7.5 RS232 or RS485 interface (IF1)

Depending on the bus base, the controller is equipped with either an RS232 or RS485 interface.

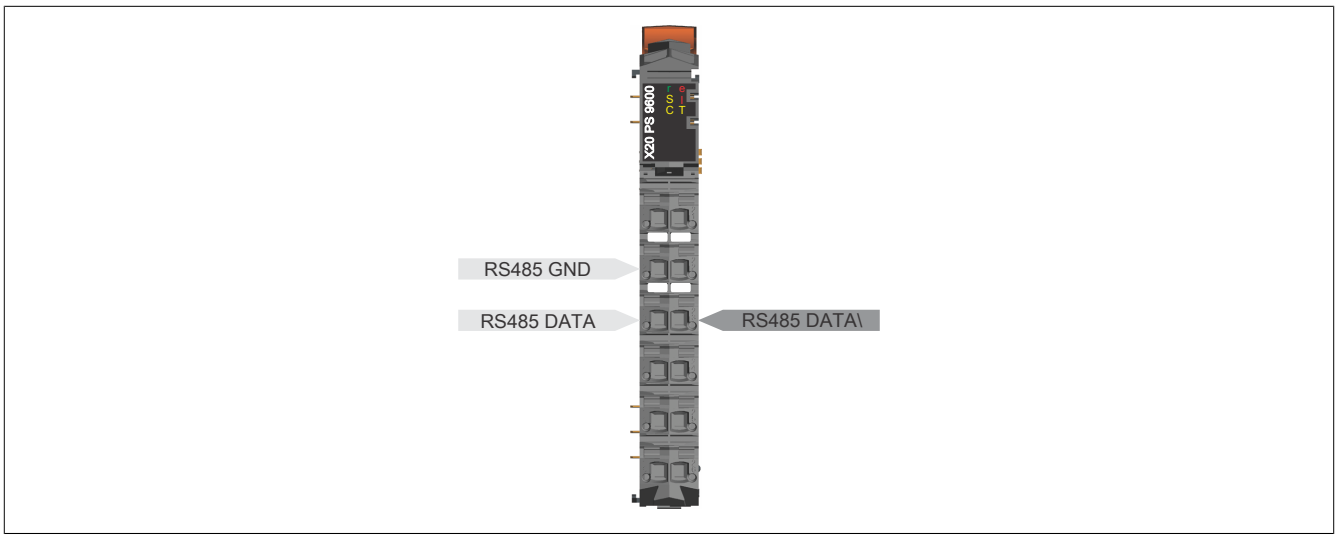
RS232 interface (IF1)

In connection with bus base X20BBx2 or X20BBx7, the controllers are equipped with a RS232 interface. The non-galvanically isolated RS232 interface is designed as an online interface for communication with the programming device. The terminal connections for the signals are located on the power supply module.



RS485 interface (IF1)

In connection with bus base X20BBx3, the controllers are equipped with an RS485 interface. The terminal connections for the signals are located on the power supply module.



1.1.7.6 Ethernet interface (IF2)

General information

IF2 is a 10BASE-T/100BASE-TX Ethernet interface.

The INA2000 station number is set using the B&R Automation Studio software.

For information about wiring X20 modules with an Ethernet interface, see section "Mechanical and electrical configuration - Wiring guidelines for X20 modules with Ethernet cables" in the X20 user's manual.

Information:

The Ethernet interface is not suitable for POWERLINK.

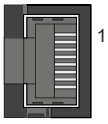
When using the POWERLINK interface, the Ethernet interface is not permitted to be operated with an IP address from the POWERLINK address range.
POWERLINK address range: 192.168.100.x

X20CP0420

The interface is equipped with 2 female RJ45 connections. Both connections result in an integrated switch. This makes daisy-chain wiring easy.

The X20CP0420 supports half-duplex and full-duplex communication. Mixed operation is not possible. Both connections must be operated in either half-duplex or full-duplex communication mode.

Pinout

Interface	Pinout		
	Pin	Ethernet	
 Shielded RJ45	1	RXD	Receive data
	2	RXD\	Receive data\
	3	TXD	Transmit data
	4	Termination	
	5	Termination	
	6	TXD\	Transmit data\
	7	Termination	
	8	Termination	

1.1.7.7 POWERLINK interface (IF3)

X20CP048x Compact-S PLCs are equipped with a POWERLINK V2 interface.

POWERLINK

By default, the POWERLINK interface is operated as a managing node (MN). In the managing node, the node number is set to a fixed value of 240.

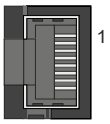
If the POWERLINK node is operated as a controlled node (CN), a node number from 1 to 239 can be set in the POWERLINK configuration in Automation Studio.

Ethernet mode

In this mode, the interface is operated as an Ethernet interface. The INA2000 station number is set using the Automation Studio software.

Pinout

For information about wiring X20 modules with an Ethernet interface, see section "Mechanical and electrical configuration - Wiring guidelines for X20 modules with Ethernet cables" in the X20 user's manual.

Interface	Pinout		
	Pin	Ethernet	
 Shielded RJ45	1	RXD	Receive data
	2	RXD\	Receive data\
	3	TXD	Transmit data
	4	Termination	
	5	Termination	
	6	TXD\	Transmit data\
	7	Termination	
	8	Termination	

1.1.7.8 USB interfaces (IF4 and IF5)

IF4 and IF5 are non-galvanically isolated USB interfaces. The abbreviation USB stands for "Universal Serial Bus". Both USB interfaces support the USB 1.1 and 2.0 standards.

Information:

USB peripheral devices can be connected to the USB interfaces. Automation Runtime supports a selection of USB peripheral devices. For the supported USB classes, see the AR help documentation.

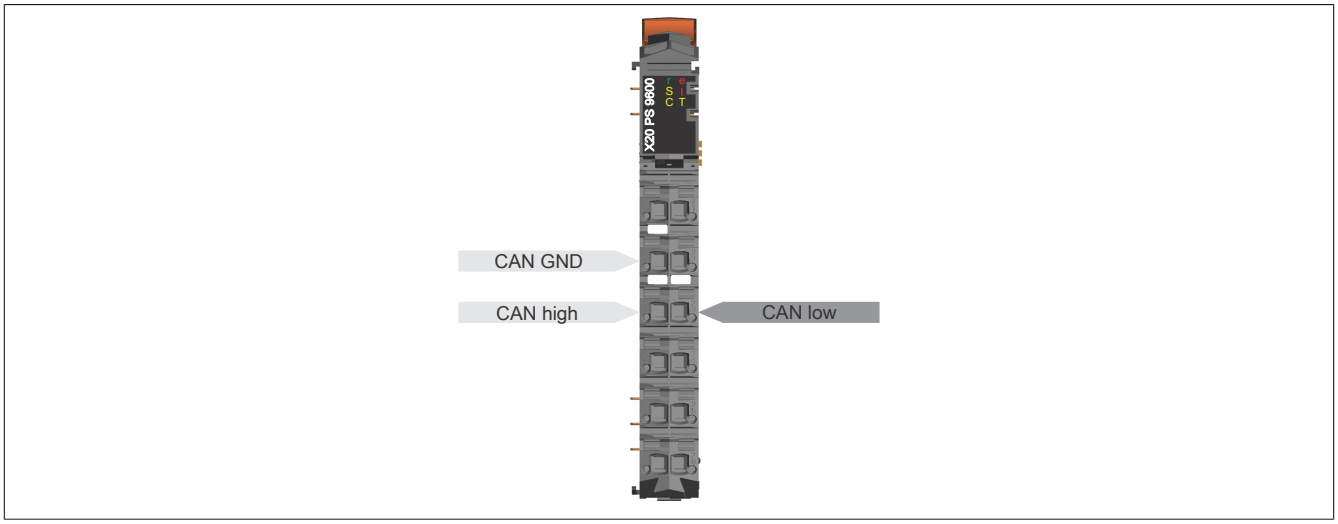
Information:

The following must be taken into account when using a USB peripheral device and grounded controller power supply (PELV):

- **Only USB peripheral devices with no connection between GND and ground are permitted to be connected. This is the case, e.g. with the USB dongle from B&R.**

1.1.7.9 CAN bus interface (IF7)

In connection with bus base X20BBx7, the controllers are equipped with a CAN bus interface. The terminal connections for the signals are located on the power supply module.



1.1.7.10 Slot for interface modules

Depending on the controller base, up to 2 interface modules can be connected to the left side of X20CP048x Compact-S controllers. Different bus or network systems can be flexibly integrated into the X20 system by selecting the appropriate interface module.

Controller base	Slots for interface modules
X20BB62, X20BB63, X20BB67	1
X20BB72, X20BB77	2

1.1.7.10.1 Information regarding operation of interface modules on the X20CP048x

Some X20 interface modules must have a certain minimum firmware version or minimum upgrade version for operation with an X20CP048x, but these are not included in the Automation Studio 4.3.3 release. A hardware upgrade may be necessary. This can be installed from Automation Studio by selecting **Tools / Upgrades** from the menu.

The following table contains a corresponding overview of affected interface modules. No special requirements apply to all other interface modules:

Order number	Minimum upgrade version
X20IF1082-2	1.5.0.0
X20IF1082	1.5.0.0
X20IF1086-2	1.5.0.0
X20IF2181-2	1.3.0.0
X20cIF1082-2	1.5.0.0
X20cIF2181-2	1.3.0.0
X20IF1091	1.1.0.0
X20IF2792	1.1.0.0

1.1.7.11 Data and real-time clock retention

The controllers do not use a battery. This makes them completely maintenance-free. Eliminating the backup battery was made possible by the following measures:

Data and real-time clock retention	Backup type	Note
Remanent variables	FRAM	This FRAM stores its contents ferroelectrically. Unlike normal SRAM, this does not require a battery.
Real-time clock	Gold foil capacitor	The real-time clock is backed up for approx. 1000 hours by a gold foil capacitor. The gold foil capacitor is completely charged after 3 continuous hours of operation.

1.1.8 Overtemperature shutdown

To prevent damage, a shutdown – reset state – of the controller takes place at the following board temperature:

- X20CP041x and X20CP0420: 95°C
- X20CP048x: 105°C

The following errors are entered in the logbook in the event of shutdown:

Error number	Short error text
9204	PLC restart triggered by the PLC CPU's temperature monitoring.
9210	Warning: Halt/Service after watchdog or manual reset.

1.1.9 System requirements

Controllers

The following system requirements must be met to use the full range of functions of the respective controller.

Controller	System requirements
X20CP041x, X20CP048x	The following minimum versions are recommended to generally be able to use all functions: • Automation Studio 4.3.3 • Automation Runtime 4.34 • For error-free support by Automation Studio, **all** Compact-S hardware upgrades must be installed separately via the Automation Studio **Tools / Upgrades** menu: ° X20CP04xx ° X20BB5x/6x/7x ° X20PS960x • Starting with Automation Studio 4.4, all Compact-S components are included in the installation package.
X20cCP0410	The following minimum versions are recommended in order to be able to generally use all functions of coated controller X20cCP0410: • Automation Studio 4.8.1 • Automation Runtime E4.81
X20CP0420	The following minimum versions are recommended to generally be able to use all functions: • Automation Studio 4.7.1 • Automation Runtime 4.73
X20CP0484-1	The following minimum versions are recommended to generally be able to use all functions: • Automation Studio 4.5 • Automation Runtime 4.5

Bus base with RS485 interface

Bus bases X20BB53 and X20BB63 are equipped with an RS485 interface. The following system requirements must be met to use this RS485 interface:

- Automation Studio 4.11 or higher
- Automation Runtime B4.92 or higher

1.1.10 General data points

This controller is equipped with general data points. These are not controller-specific; instead, they contain general information such as system time and heat sink temperature.

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

System modules for Compact-S PLCs

Data sheets

Version: **1.10 (March 2024)**
Order no.: **System modules for Compact-S PLCs**

2.1 X20(c)BB52

2.1.1 General information

2.1.1.1 Other applicable documents

For additional and supplementary information, see the following documents.

Other applicable documents

Document name	Title
MAX20	X20 System user's manual
MAEMV	Installation / EMC guide

2.1.1.2 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

2.1.1.3 Order data

Order number	Short description	Figure
	System modules for Compact-S PLCs	
X20BB52	X20 Compact-S bus base, for Compact-S PLC and Compact-S PLC power supply module, base for integrated RS232 interface, X20 connection, X20 end cover plates (left and right) X20AC0SL1/X20AC0SR1 included	
X20cBB52	X20c Compact-S bus base, coated, for Compact-S PLC and Compact-S PLC power supply module, base for integrated RS232 interface, X20 connection, X20 end cover plates (left and right) X20AC0SL1/X20AC0SR1 included	

Table 4: X20BB52, X20cBB52 - Order data

2.1.1.4 Module description

The bus module is the base for all X20 Compact-S controllers.

The left and right end cover plates are included in delivery.

- Base for all X20 Compact-S controllers
- RS232 connection

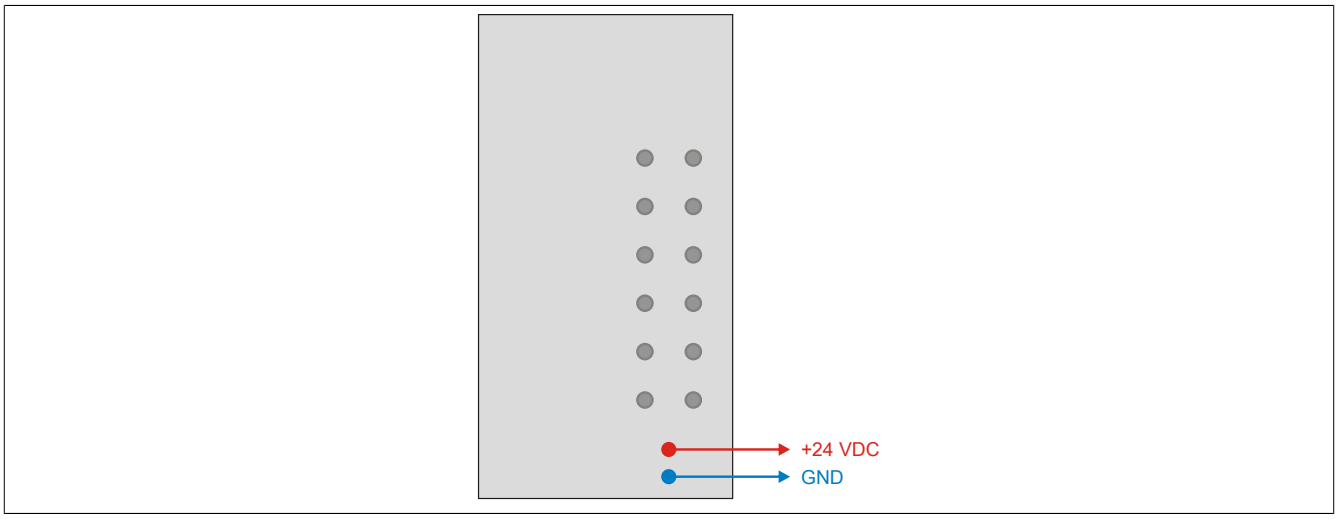
2.1.2 Technical description

2.1.2.1 Technical data

Order number	X20BB52	X20cBB52
Short description		
Bus module	X20 Compact-S PLC base - backplane for Compact-S PLC and Compact-S PLC power supply module	
Interfaces	1x RS232 connection	
General information		
B&R ID code	0xEB0A	0xFC37
Power consumption		
Bus	0.55 W	
Internal I/O	-	
Additional power dissipation caused by actuators (resistive) [W]	-	
Certifications		
CE	Yes	
UKCA	Yes	
UL	cULus E115267 Industrial control equipment	
DNV	Temperature: **B** (0 to 55°C) Humidity: **B** (up to 100%) Vibration: **B** (4 g) EMC: **B** (bridge and open deck)	
LR	ENV1	
KR	Yes	
ABS	Yes	
BV	**EC33B** Temperature: 5 - 55°C Vibration: 4 g EMC: Bridge and open deck	
EAC	Yes	-
I/O power supply		
Nominal voltage	24 VDC	
Permissible contact load	10 A	
Electrical properties		
Electrical isolation	Bus not isolated from RS232	
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	-	
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	Left and right X20 end cover plates included in delivery	
Pitch	$37.5^{+0.2}$ mm	

Table 5: X20BB52, X20cBB52 - Technical data

2.1.2.2 Voltage routing



2.2 X20BB53

2.2.1 General information

2.2.1.1 Other applicable documents

For additional and supplementary information, see the following documents.

Other applicable documents

Document name	Title
MAX20	X20 System user's manual
MAEMV	Installation / EMC guide

2.2.1.2 Order data

Order number	Short description	Figure
	System modules for Compact-S PLCs	
X20BB53	X20 Compact-S bus base, for Compact-S PLC and Compact-S PLC power supply module, base for integrated RS485 interface, X20 connection, X20 end cover plates (left and right) X20AC0SL1/X20AC0SR1 included	

Table 6: X20BB53 - Order data

2.2.1.3 Module description

The bus base is the basis for all X20 Compact-S controllers.

The left and right end cover plates are included in delivery.

- Base for all X20 Compact-S controllers
- RS485 connection
- Integrated terminating resistor

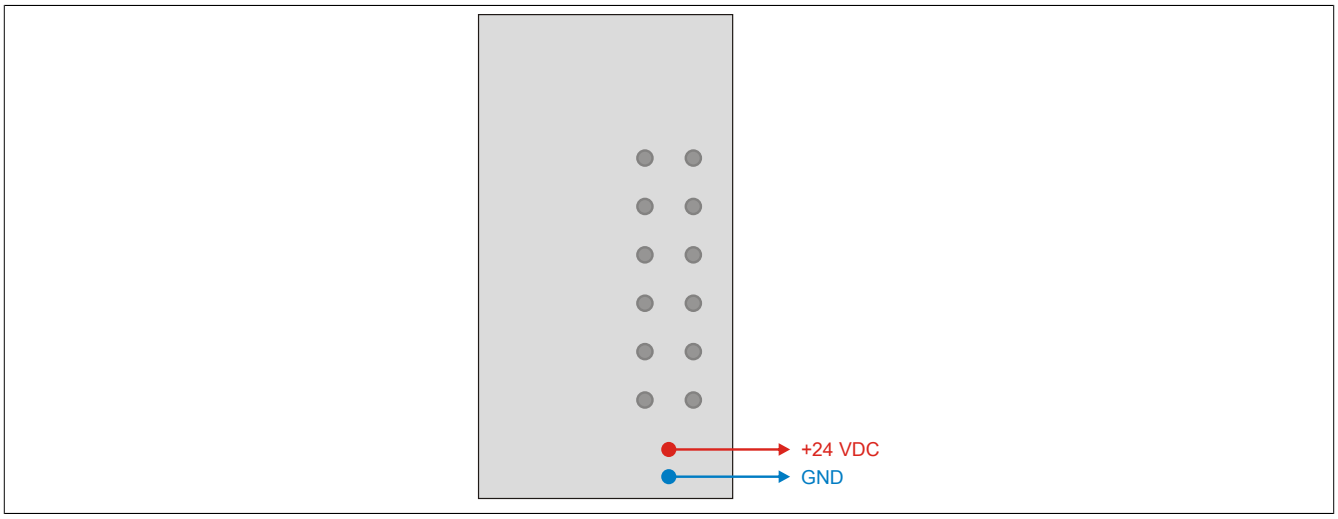
2.2.2 Technical description

2.2.2.1 Technical data

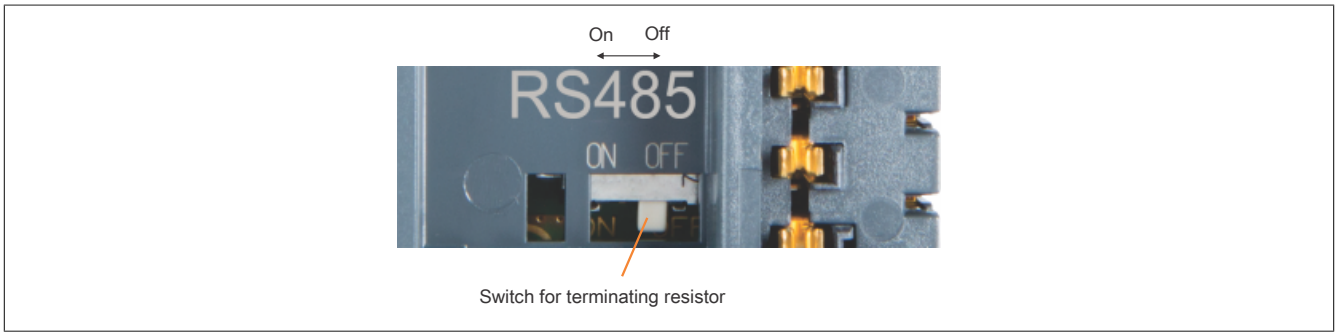
Order number	X20BB53
Short description	
Bus module	X20 Compact-S PLC base - backplane for Compact-S PLC and Compact-S PLC power supply module
Interfaces	1x RS485 connection
General information	
B&R ID code	0xF4D1
Power consumption	
Bus	0.55 W
Internal I/O	-
Additional power dissipation caused by actuators (resistive) [W]	-
Certifications	
CE	Yes
UKCA	Yes
EAC	Yes
I/O power supply	
Nominal voltage	24 VDC
Permissible contact load	10 A
Electrical properties	
Electrical isolation	Bus not isolated from RS485
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	-
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 properties	
Note	Left and right X20 end cover plates included in delivery
Pitch	$37.5^{+0.2}$ mm

Table 7: X20BB53 - Technical data

2.2.2.2 Voltage routing



2.2.2.3 Terminating resistor for RS485 interface



A terminating resistor for the RS485 interface is already integrated on the bus base. The terminating resistor is switched on or off with a switch. An enabled terminating resistor is indicated on the power supply module by LED "T".

2.2.2.4 System requirements

The bus base is equipped with an RS485 interface. The following system requirements must be met to use this RS485 interface:

- Automation Studio 4.11 or higher
- Automation Runtime B4.92 or higher

2.3 X20(c)BB57

2.3.1 General information

2.3.1.1 Other applicable documents

For additional and supplementary information, see the following documents.

Other applicable documents

Document name	Title
MAX20	X20 System user's manual
MAEMV	Installation / EMC guide

2.3.1.2 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

2.3.1.3 Order data

Order number	Short description	Figure
	System modules for Compact-S PLCs	
X20BB57	X20 Compact-S bus base, for Compact-S PLC and Compact-S PLC power supply module, base for integrated RS232 and CAN bus interface, X20 connection, X20 end cover plates (left and right) X20AC0SL1/X20AC0SR1 included	
X20cBB57	X20c Compact-S bus base, coated, for Compact-S PLC and Compact-S PLC power supply module, base for integrated RS232 and CAN bus interface, X20 connection, X20 end cover plates (left and right) X20AC0SL1/X20AC0SR1 included	

Table 8: X20BB57, X20cBB57 - Order data

2.3.1.4 Module description

The bus module is the base for all X20 Compact-S controllers.

The left and right end cover plates are included in delivery.

- Base for all X20 Compact-S controllers
- RS232 connection
- CAN bus connection
- Integrated terminating resistor for CAN bus

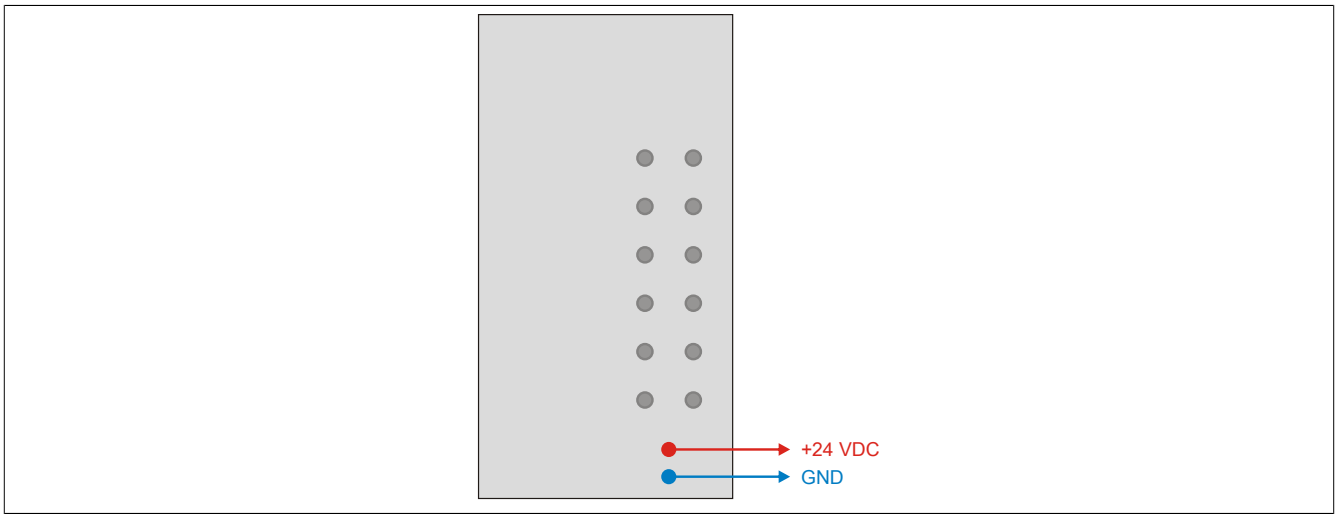
2.3.2 Technical description

2.3.2.1 Technical data

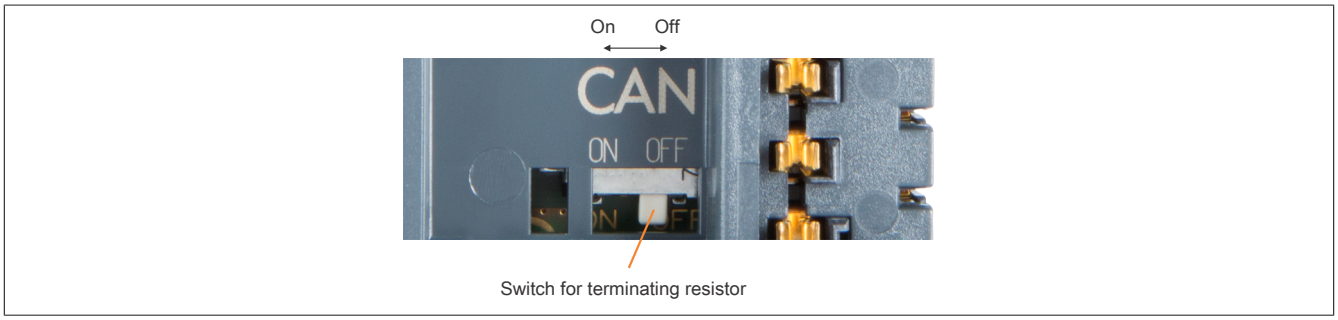
Order number	X20BB57	X20cBB57
Short description		
Bus module	X20 Compact-S PLC base - backplane for Compact-S PLC and Compact-S PLC power supply module	
Interfaces	1x RS232 connection, 1x CAN bus connection	
General information		
B&R ID code	0xEB09	0xA457
Power consumption		
Bus	0.55 W	
Internal I/O	-	
Additional power dissipation caused by actuators (resistive) [W]	-	
Certifications		
CE	Yes	
UKCA	Yes	
UL	cULus E115267 Industrial control equipment	
DNV	Temperature: **B** (0 to 55°C) Humidity: **B** (up to 100%) Vibration: **B** (4 g) EMC: **B** (bridge and open deck)	
LR	ENV1	
KR	Yes	
ABS	Yes	
BV	**EC33B** Temperature: 5 - 55°C Vibration: 4 g EMC: Bridge and open deck	
EAC	Yes	-
I/O power supply		
Nominal voltage	24 VDC	
Permissible contact load	10 A	
Electrical properties		
Electrical isolation	Bus, CAN bus and RS232 not isolated from each other	
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	-	
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	Left and right X20 end cover plates included in delivery	
Pitch	$37.5^{+0.2}$ mm	

Table 9: X20BB57, X20cBB57 - Technical data

2.3.2.2 Voltage routing



2.3.2.3 Terminating resistor for CAN bus



The bus module has an integrated CAN bus terminating resistor. The terminating resistor is switched on or off with a switch. An enabled terminating resistor is indicated on the power supply module by LED "T".

2.4 X20BB62

2.4.1 General information

2.4.1.1 Other applicable documents

For additional and supplementary information, see the following documents.

Other applicable documents

Document name	Title
MAX20	X20 System user's manual
MAEMV	Installation / EMC guide

2.4.1.2 Order data

Order number	Short description	Figure
	System modules for Compact-S PLCs	
X20BB62	X20 Compact-S bus base, for Compact-S PLC and Compact-S PLC power supply module, base for integrated RS232 interface, slot for X20 interface module, X20 connection, X20 end cover plates (left and right) X20AC0SL1/X20AC0SR1 included	

Table 10: X20BB62 - Order data

2.4.1.3 Module description

The bus module is the base for all X20CP048x Compact-S controllers in the X20 family. It is equipped with 1 slot for X20 interface modules.

The left and right end cover plates are included in delivery.

- Base for X20 Compact-S controllers
- 1 slot for X20 interface modules
- RS232 connection

Information:

Compact-S controllers must be inserted into the slot on the far right.

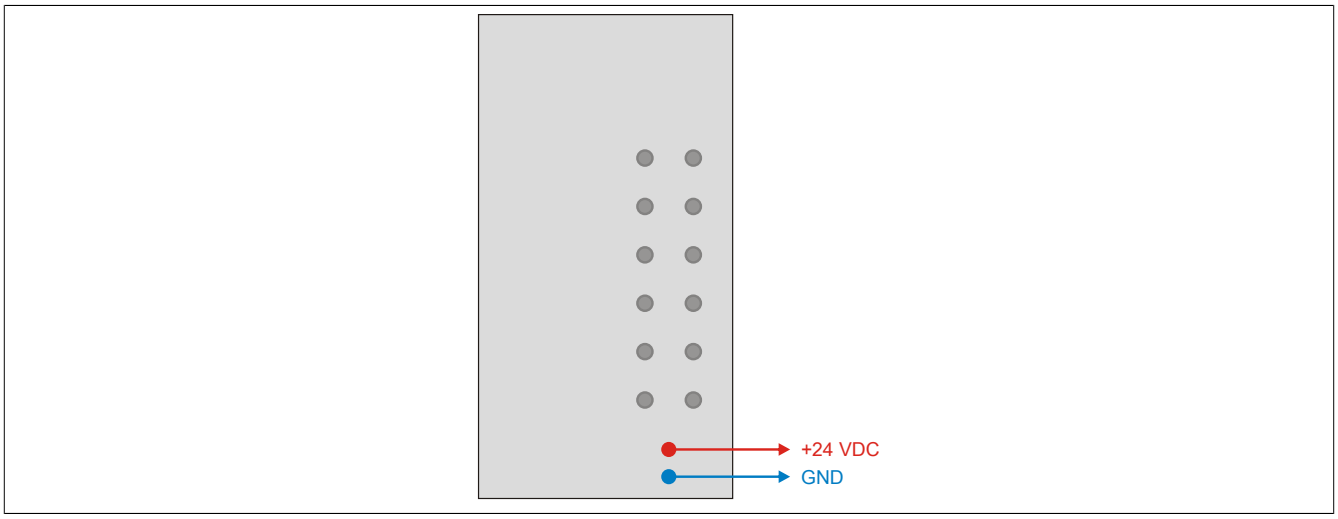
2.4.2 Technical description

2.4.2.1 Technical data

Order number	X20BB62
Short description	
Bus module	X20 Compact-S PLC base - backplane for Compact-S PLC and Compact-S PLC power supply module and X20 interface module
Interfaces	1x RS232 connection
General information	
B&R ID code	0xEB08
Power consumption	
Bus	0.94 W
Internal I/O	-
Additional power dissipation caused by actuators (resistive) [W]	-
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E115267 Industrial control equipment
DNV	Temperature: **B** (0 to 55°C) Humidity: **B** (up to 100%) Vibration: **B** (4 g) EMC: **B** (bridge and open deck)
LR	ENV1
ABS	Yes
BV	**EC33B** Temperature: 5 - 55°C Vibration: 4 g EMC: Bridge and open deck
EAC	Yes
I/O power supply	
Nominal voltage	24 VDC
Permissible contact load	10 A
Electrical properties	
Electrical isolation	Bus not isolated from RS232
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	-
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 properties	
Note	Left and right X20 end cover plates included in delivery
Pitch	$62.5^{+0.2}$ mm

Table 11: X20BB62 - Technical data

2.4.2.2 Voltage routing



2.5 X20BB63

2.5.1 General information

2.5.1.1 Other applicable documents

For additional and supplementary information, see the following documents.

Other applicable documents

Document name	Title
MAX20	X20 System user's manual
MAEMV	Installation / EMC guide

2.5.1.2 Order data

Order number	Short description	Figure
	System modules for Compact-S PLCs	
X20BB63	X20 Compact-S bus base, for Compact-S PLC and Compact-S PLC power supply module, base for integrated RS485 interface, slot for X20 interface module, X20 connection, X20 end cover plates (left and right) X20AC0SL1/X20AC0SR1 included	

Table 12: X20BB63 - Order data

2.5.1.3 Module description

The bus base is a base for all X20 Compact-S controllers with the designation X20CP048x. It is equipped with 1 slot for X20 interface modules.

The left and right end cover plates are included in delivery.

- Base for X20 Compact-S controllers
- 1 slot for X20 interface modules
- RS485 connection
- Integrated terminating resistor

Information:

Compact-S controllers must be inserted into the slot on the far right.

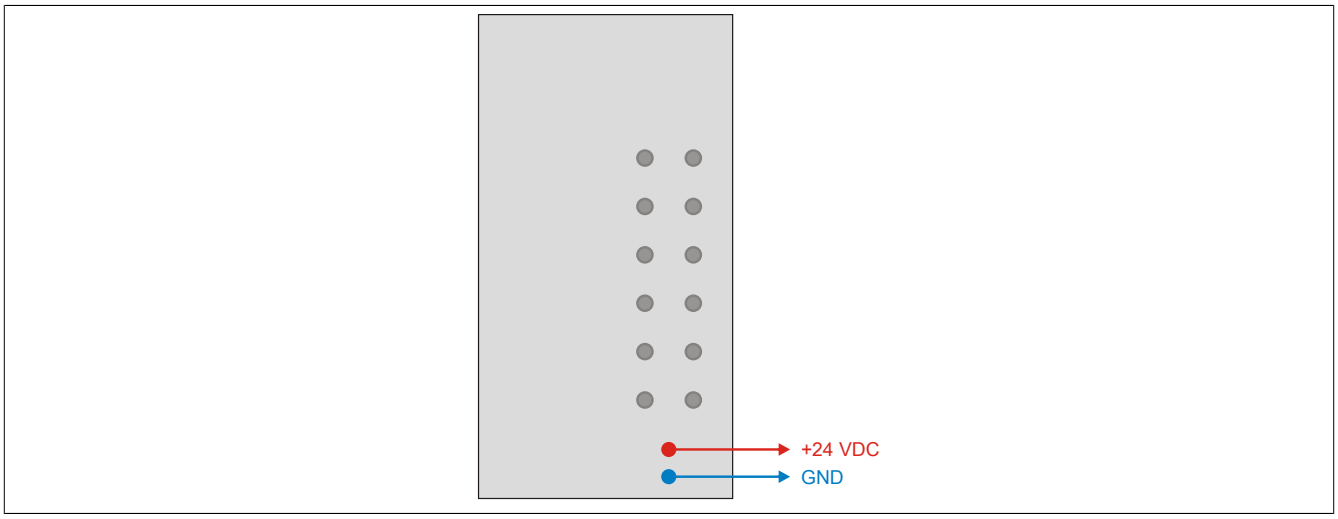
2.5.2 Technical description

2.5.2.1 Technical data

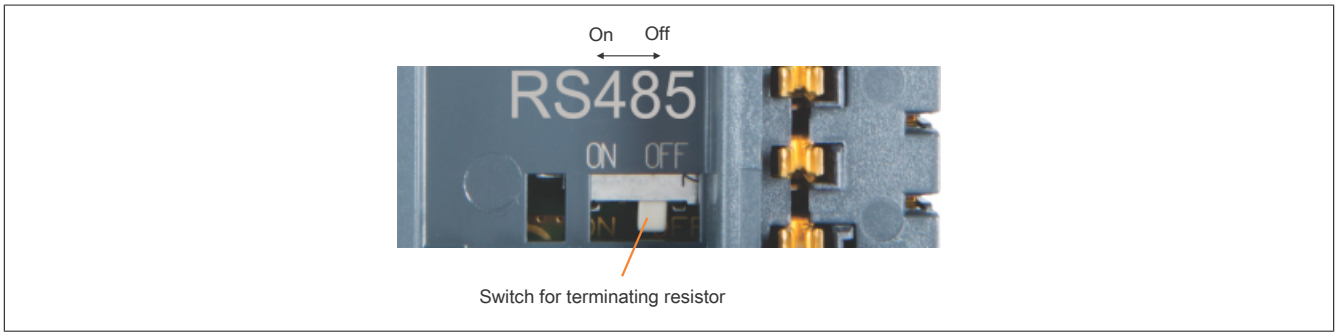
Order number	X20BB63
Short description	
Bus module	X20 Compact-S PLC base - backplane for Compact-S PLC and Compact-S PLC power supply module and X20 interface module
Interfaces	1x RS485 connection
General information	
B&R ID code	0x2A59
Power consumption	
Bus	0.94 W
Internal I/O	-
Additional power dissipation caused by actuators (resistive) [W]	-
Certifications	
CE	Yes
UKCA	Yes
I/O power supply	
Nominal voltage	24 VDC
Permissible contact load	10 A
Electrical properties	
Electrical isolation	Bus not isolated from RS485
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	-
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 properties	
Note	Left and right X20 end cover plates included in delivery
Pitch	$62.5^{+0.2}$ mm

Table 13: X20BB63 - Technical data

2.5.2.2 Voltage routing



2.5.2.3 Terminating resistor for RS485 interface



A terminating resistor for the RS485 interface is already integrated on the bus base. The terminating resistor is switched on or off with a switch. An enabled terminating resistor is indicated on the power supply module by LED "T".

2.5.2.4 System requirements

The bus base is equipped with an RS485 interface. The following system requirements must be met to use this RS485 interface:

- Automation Studio 4.11 or higher
- Automation Runtime B4.92 or higher

2.6 X20BB67

2.6.1 General information

2.6.1.1 Other applicable documents

For additional and supplementary information, see the following documents.

Other applicable documents

Document name	Title
MAX20	X20 System user's manual
MAEMV	Installation / EMC guide

2.6.1.2 Order data

Order number	Short description	Figure
	System modules for Compact-S PLCs	
X20BB67	X20 Compact-S bus base, for Compact-S PLC and Compact-S PLC 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	

Table 14: X20BB67 - Order data

2.6.1.3 Module description

The bus module is a base for all X20 Compact-S controllers with the designation X20CP048x. It is equipped with 1 slot for X20 interface modules.

The left and right end cover plates are included in delivery.

- Base for X20 Compact-S controllers
- 1 slot for X20 interface modules
- RS232 connection
- CAN bus connection
- Integrated terminating resistor for CAN bus

Information:

Compact-S controllers must be inserted into the slot on the far right.

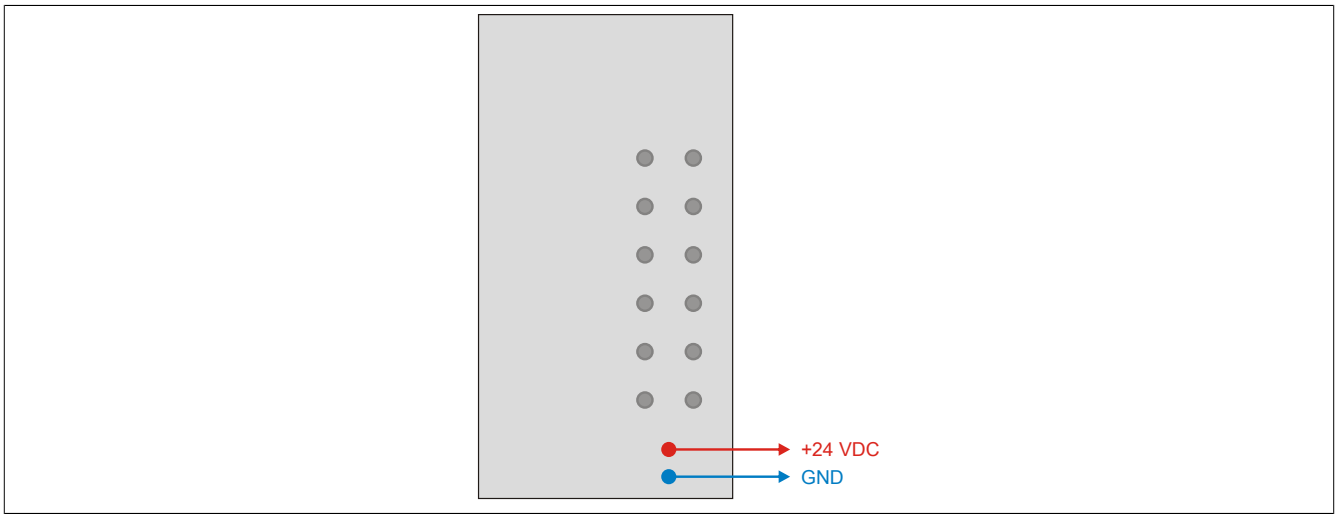
2.6.2 Technical description

2.6.2.1 Technical data

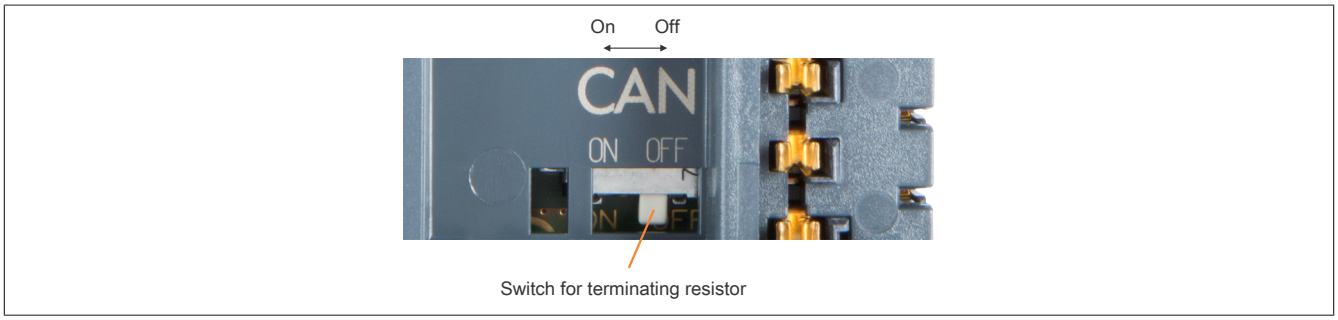
Order number	X20BB67
Short description	
Bus module	X20 Compact-S PLC base - backplane for Compact-S PLC and Compact-S PLC power supply module and X20 interface module
Interfaces	1x RS232 connection, 1x CAN bus connection
General information	
B&R ID code	0xEB07
Power consumption	
Bus	0.94 W
Internal I/O	-
Additional power dissipation caused by actuators (resistive) [W]	-
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E115267 Industrial control equipment
DNV	Temperature: **B** (0 to 55°C) Humidity: **B** (up to 100%) Vibration: **B** (4 g) EMC: **B** (bridge and open deck)
LR	ENV1
ABS	Yes
BV	**EC33B** Temperature: 5 - 55°C Vibration: 4 g EMC: Bridge and open deck
EAC	Yes
I/O power supply	
Nominal voltage	24 VDC
Permissible contact load	10 A
Electrical properties	
Electrical isolation	Bus, CAN bus and RS232 not isolated from each other
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	-
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 properties	
Note	Left and right X20 end cover plates included in delivery
Pitch	$62.5^{+0.2}$ mm

Table 15: X20BB67 - Technical data

2.6.2.2 Voltage routing



2.6.2.3 Terminating resistor for CAN bus



The bus module has an integrated CAN bus terminating resistor. The terminating resistor is switched on or off with a switch. An enabled terminating resistor is indicated on the power supply module by LED "T".

2.7 X20BB72

2.7.1 General information

2.7.1.1 Other applicable documents

For additional and supplementary information, see the following documents.

Other applicable documents

Document name	Title
MAX20	X20 System user's manual
MAEMV	Installation / EMC guide

2.7.1.2 Order data

Order number	Short description	Figure
	System modules for Compact-S PLCs	
X20BB72	X20 Compact-S bus base, for Compact-S PLC and Compact-S PLC 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 16: X20BB72 - Order data

2.7.1.3 Module description

The bus module is a base for all X20 Compact-S controllers with the designation X20CP048x. It is equipped with 2 slots for X20 interface modules.

The left and right end cover plates are included in delivery.

- Base for X20 Compact-S controllers
- 2 slots for X20 interface modules
- RS232 connection

Information:

Compact-S controllers must be inserted into the slot on the far right.

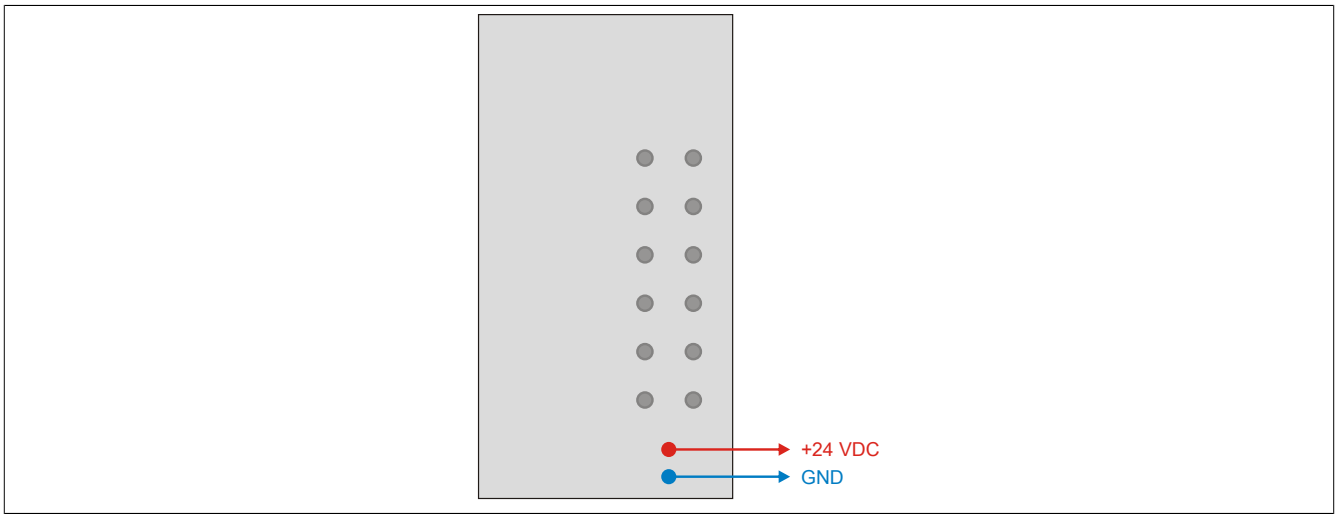
2.7.2 Technical description

2.7.2.1 Technical data

Order number	X20BB72
Short description	
Bus module	X20 Compact-S PLC base - backplane for Compact-S PLC and Compact-S PLC power supply module and 2 X20 interface modules
Interfaces	1x RS232 connection
General information	
B&R ID code	0xEB06
Power consumption	
Bus	1.17 W
Internal I/O	-
Additional power dissipation caused by actuators (resistive) [W]	-
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E115267 Industrial control equipment
DNV	Temperature: **B** (0 to 55°C) Humidity: **B** (up to 100%) Vibration: **B** (4 g) EMC: **B** (bridge and open deck)
LR	ENV1
ABS	Yes
BV	**EC33B** Temperature: 5 - 55°C Vibration: 4 g EMC: Bridge and open deck
EAC	Yes
I/O power supply	
Nominal voltage	24 VDC
Permissible contact load	10 A
Electrical properties	
Electrical isolation	Bus not isolated from RS232
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	-
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 properties	
Note	Left and right X20 end cover plates included in delivery
Pitch	$87.5^{+0.2}$ mm

Table 17: X20BB72 - Technical data

2.7.2.2 Voltage routing



2.8 X20BB77

2.8.1 General information

2.8.1.1 Other applicable documents

For additional and supplementary information, see the following documents.

Other applicable documents

Document name	Title
MAX20	X20 System user's manual
MAEMV	Installation / EMC guide

2.8.1.2 Order data

Order number	Short description	Figure
	System modules for Compact-S PLCs	
X20BB77	X20 Compact-S bus base, for Compact-S PLC and Compact-S PLC 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	

Table 18: X20BB77 - Order data

2.8.1.3 Module description

The bus module is a base for all X20 Compact-S controllers with the designation X20CP048x. It is equipped with 2 slots for X20 interface modules.

The left and right end cover plates are included in delivery.

- Base for X20 Compact-S controllers
- 2 slots for X20 interface modules
- RS232 connection
- CAN bus connection
- Integrated terminating resistor for CAN bus

Information:

Compact-S controllers must be inserted into the slot on the far right.

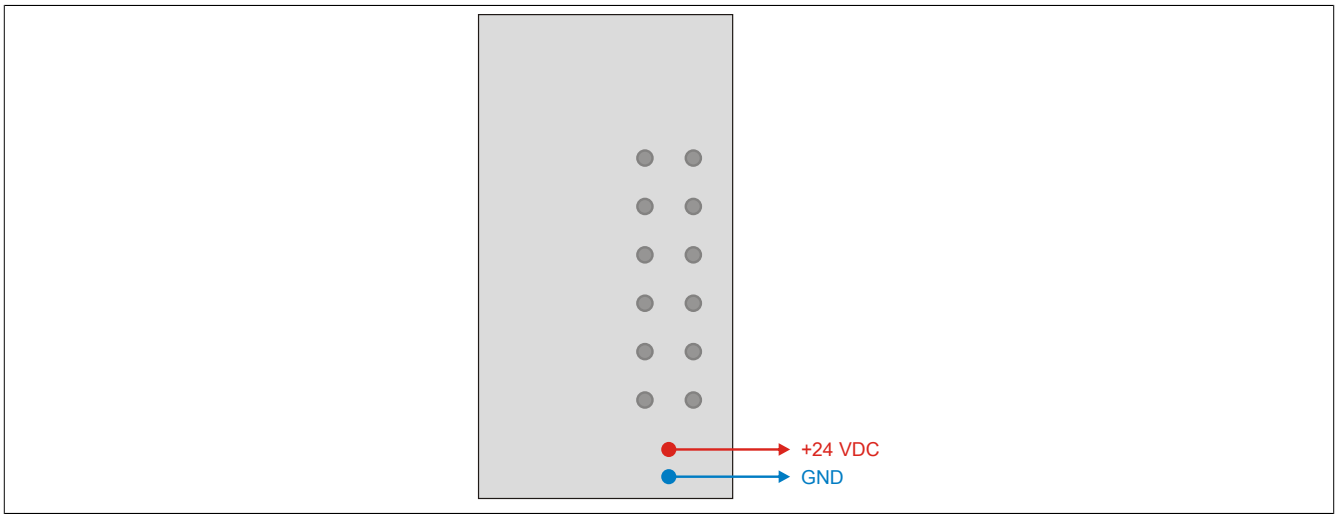
2.8.2 Technical description

2.8.2.1 Technical data

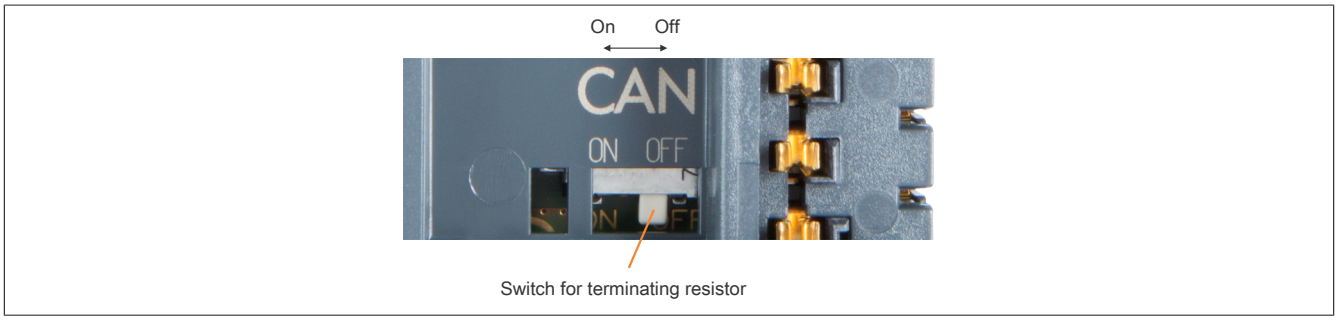
Order number	X20BB77
Short description	
Bus module	X20 Compact-S PLC base - backplane for Compact-S PLC and Compact-S PLC power supply module and 2 X20 interface modules
Interfaces	1x RS232 connection, 1x CAN bus connection
General information	
B&R ID code	0xEB05
Power consumption	
Bus	1.17 W
Internal I/O	-
Additional power dissipation caused by actuators (resistive) [W]	-
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E115267 Industrial control equipment
DNV	Temperature: **B** (0 to 55°C) Humidity: **B** (up to 100%) Vibration: **B** (4 g) EMC: **B** (bridge and open deck)
LR	ENV1
ABS	Yes
BV	**EC33B** Temperature: 5 - 55°C Vibration: 4 g EMC: Bridge and open deck
EAC	Yes
I/O power supply	
Nominal voltage	24 VDC
Permissible contact load	10 A
Electrical properties	
Electrical isolation	Bus, CAN bus and RS232 not isolated from each other
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	-
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 properties	
Note	Left and right X20 end cover plates included in delivery
Pitch	$87.5^{+0.2}$ mm

Table 19: X20BB77 - Technical data

2.8.2.2 Voltage routing



2.8.2.3 Terminating resistor for CAN bus



The bus module has an integrated CAN bus terminating resistor. The terminating resistor is switched on or off with a switch. An enabled terminating resistor is indicated on the power supply module by LED "T".

2.9 X20(c)PS9600

2.9.1 Other applicable documents

For additional and supplementary information, see the following documents.

Other applicable documents

Document name	Title
MAX20	X20 System user's manual
MAEMV	Installation / EMC guide

2.9.2 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 online interface (if available on bus base)
- CAN bus or RS485 (if available on bus base)

2.9.3 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

2.9.4 Order data

Order number	Short description	Figure
	System modules for Compact-S PLCs	
X20PS9600	X20 power supply module, for Compact-S PLC and internal I/O power supply, X2X Link power supply	
X20cPS9600	X20 power supply module, coated, for Compact-S PLC and internal I/O power supply, X2X Link power supply	
	Required accessories	
	System modules for Compact-S PLCs	
X20BB52	X20 Compact-S bus base, for Compact-S PLC and Compact-S PLC power supply module, base for integrated RS232 interface, X20 connection, X20 end cover plates (left and right) X20AC0SL1/X20AC0SR1 included	
X20BB53	X20 Compact-S bus base, for Compact-S PLC and Compact-S PLC power supply module, base for integrated RS485 interface, X20 connection, X20 end cover plates (left and right) X20AC0SL1/X20AC0SR1 included	
X20BB57	X20 Compact-S bus base, for Compact-S PLC and Compact-S PLC 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 PLC and Compact-S PLC power supply module, base for integrated RS232 interface, slot for X20 interface module, X20 connection, X20 end cover plates (left and right) X20AC0SL1/X20AC0SR1 included	
X20BB63	X20 Compact-S bus base, for Compact-S PLC and Compact-S PLC power supply module, base for integrated RS485 interface, slot 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 PLC and Compact-S PLC 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 PLC and Compact-S PLC 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	
X20BB77	X20 Compact-S bus base, for Compact-S PLC and Compact-S PLC 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 PLC and Compact-S PLC power supply module, base for integrated RS232 interface, X20 connection, X20 end cover plates (left and right) X20AC0SL1/X20AC0SR1 included	
X20cBB57	X20c Compact-S bus base, coated, for Compact-S PLC and Compact-S PLC 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 20: X20PS9600, X20cPS9600 - Order data

2.9.5 Technical data

Order 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 RS485, 1x CAN bus [1]	
General information		
B&R ID code	0xEB03	0xFC38
Status indicators	Overload, operating state, module status, RS232, RS485, CAN bus [1]	
Diagnostics		
Module run/error	Yes, using LED status indicator and software	
CAN bus data transfer [2]	Yes, using LED status indicator	
RS232 data transfer [3]	Yes, using LED status indicator	
RS485 data transfer [4]	Yes, using LED status indicator	
Overload	Yes, using LED status indicator and software	
Power consumption for X2X Link power supply [5]	1.42 W	
Power consumption [5]		
Internal I/O	0.6 W	
Additional power dissipation caused by actuators (resistive) [W]	-	

Table 21: X20PS9600, X20cPS9600 - Technical data

Order number	X20PS9600	X20cPS9600
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	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 [6)]	Yes [7)]
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		
Interface IF1		
Signal	RS232 or RS485 [8)]	
Variant	Connection made using 12-pin terminal block X20TB12	
Transfer rate	Max. 115.2 kbit/s	
Interface IF3		
Signal	CAN bus [9)]	
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 21: X20PS9600, X20cPS9600 - Technical data

1) RS232 interface only in connection with bus module X20BBx2 or X20BBx7.
RS485 interface only in connection with bus module X20BB53 or X20BB63.
CAN bus only in connection with bus module X20BB57, X20BB67 or X20BB77.
2) CAN bus only when used with bus module X20BB57, X20BB67 or X20BB77.

3) RS232 interface only in connection with bus module X20BBx2 or X20BBx7.
4) RS485 interface only in connection with bus module X20BB53 or X20BB63.
5) 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.
6) 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.
7) 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.
8) RS232 interface only in connection with bus module X20BBx2 or X20BBx7.
RS485 interface only in connection with bus module X20BB53 or X20BB63.
9) CAN bus only in connection with bus module X20BB57, X20BB67 or X20BB77.

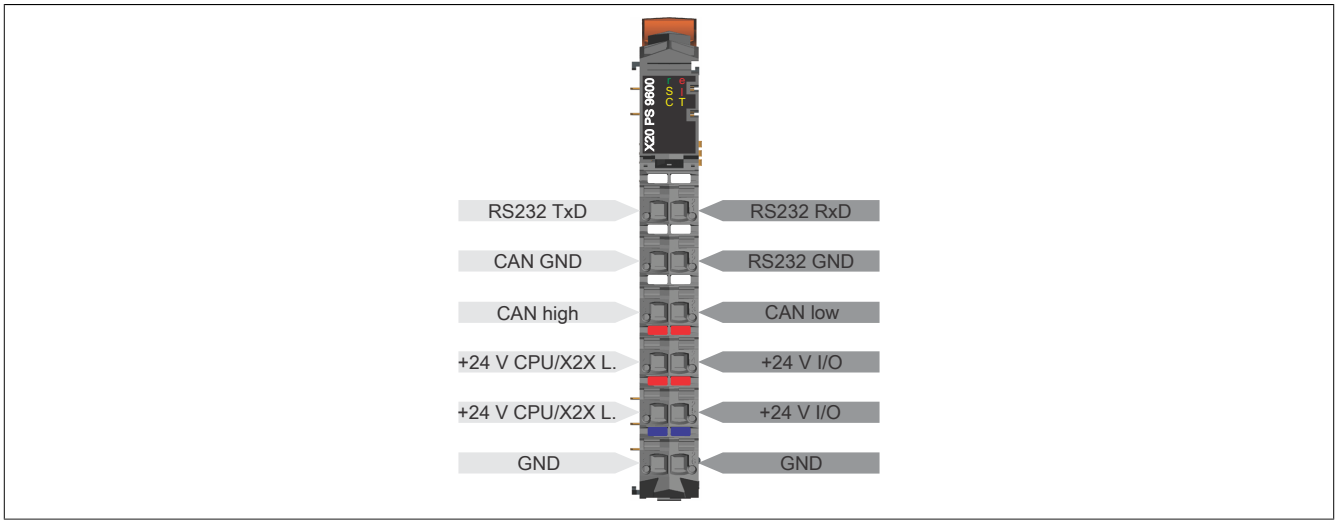
2.9.6 LED status indicators

For a description of the various operating modes, see section "Additional information - Diagnostic LEDs" in the X20 System user's manual.

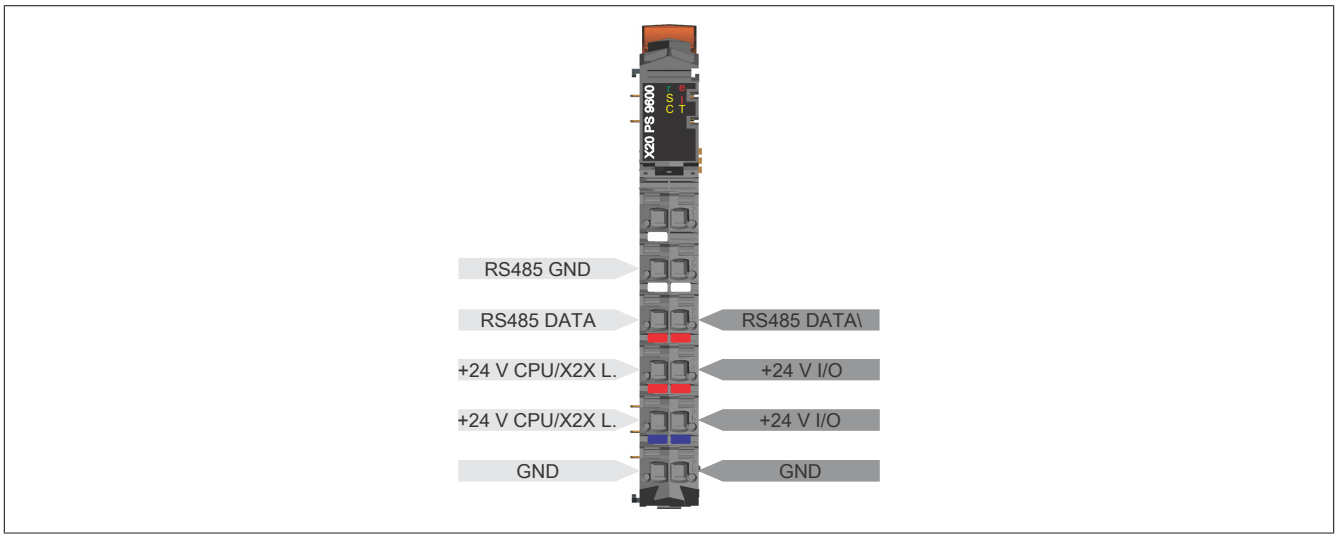
Figure	LED	Color	Status	Description
	r	Green	Off	No power to module
			Single flash	Mode RESET
			Blinking	Mode PREOPERATIONAL
			On	Mode RUN
	e	Red	Off	Module not supplied with power or everything OK
			Double flash	The LED indicates one of the following states: • The CPU / X2X Link power supply is 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/RS485 interface.
			On	The CPU is transmitting data via the RS232/RS485 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 X20BBx3 or X20BBx7 is switched off.
			On	The terminating resistor integrated in bus module X20BBx3 or X20BBx7 is switched on.

2.9.7 Pinout

With bus base X20BBx2 or X20BBx7

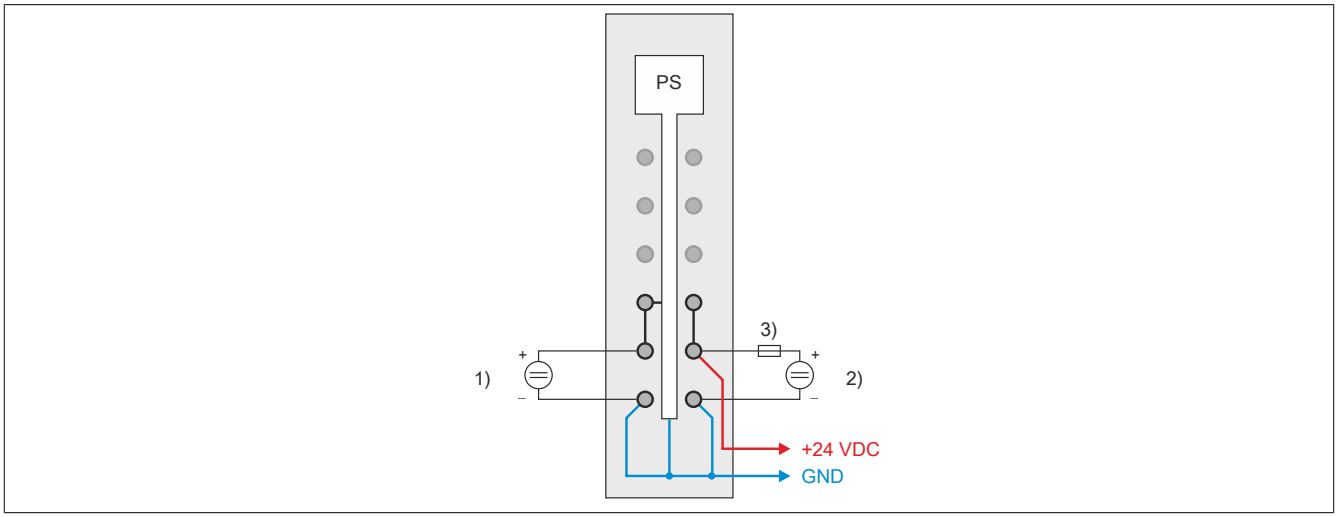


With bus base X20BBx3



2.9.8 Connection examples

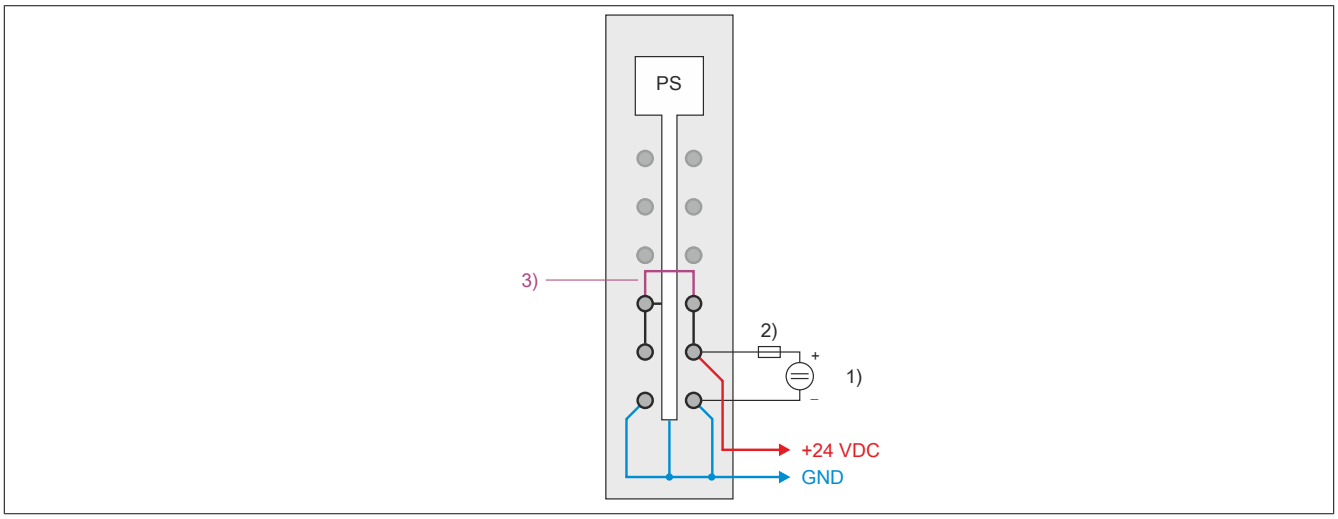
With 2 isolated power supplies



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

1) Supply for the CPU 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

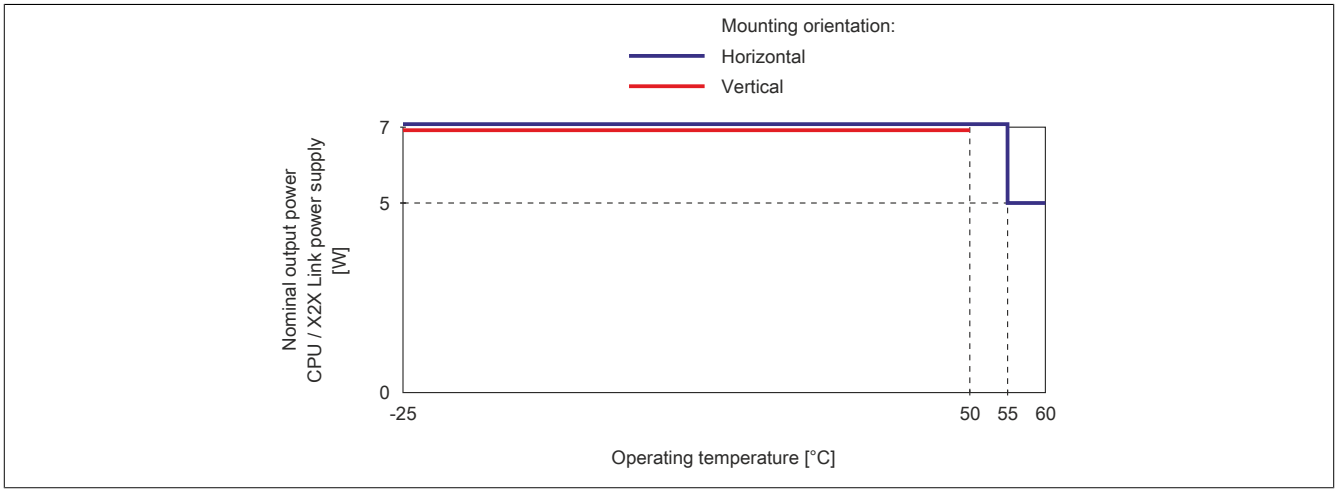


1) Supply for the I/O power supply
2) Fuse, 10 A slow-blow
3) Jumper

2.9.9 Derating

2.9.9.1 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.



2.9.9.2 I/O power supply

Information:

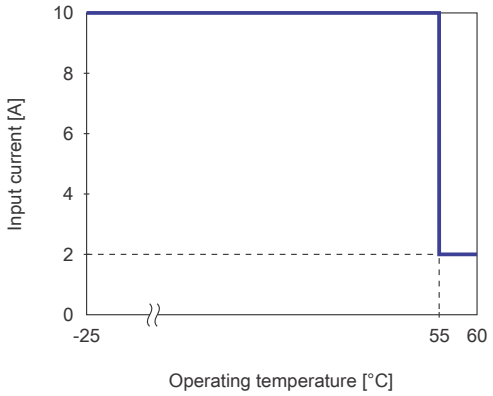
The specified maximum temperature and derating values are based on worst-case conditions. The CPU contains an internal temperature sensor that triggers a reset if 95°C is exceeded. Depending on the ambient conditions (artificial convection), maintaining the internal temperature at <90°C can prevent derating.

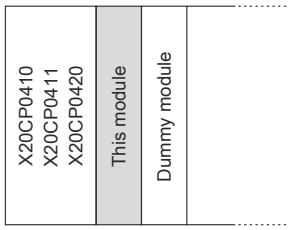
2.9.9.2.1 X20CP0410, X20CP0411 and X20CP0420

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.

2.9.9.2.2 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.

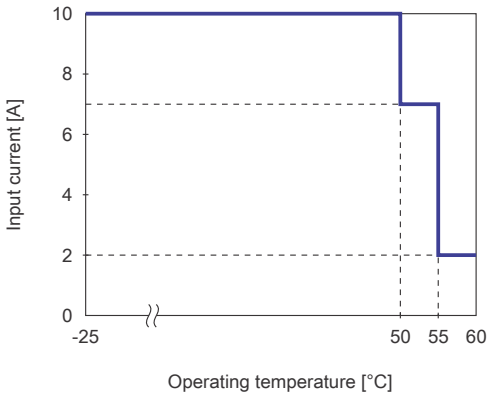
Information:

Both derating variants must always be applied!

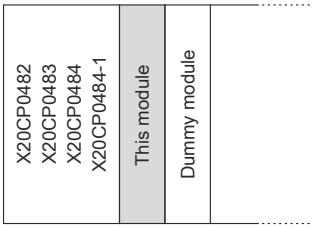
Derating

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.

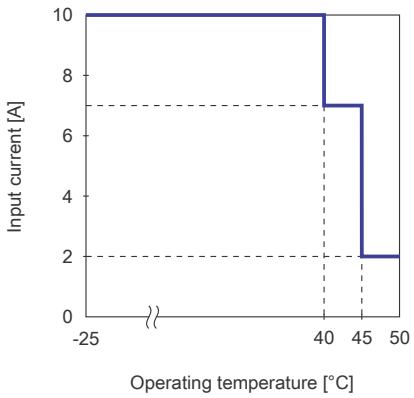
Information:

Both derating variants must always be applied!

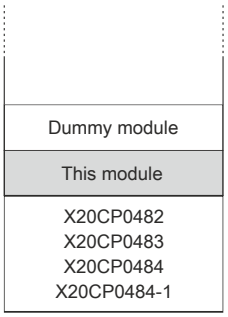
Derating

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.



2.9.10 Register description

2.9.10.1 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.

2.9.10.2 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.

2.9.10.3 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	

2.9.10.4 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

2.9.10.5 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

2.9.10.6 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

2.9.10.7 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

2.10 X20PS9602

2.10.1 Other applicable documents

For additional and supplementary information, see the following documents.

Other applicable documents

Document name	Title
MAX20	X20 System user's manual
MAEMV	Installation / EMC guide

2.10.2 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.

This module is intended as a cost-effective power supply module for small X20 systems. The use of potential groups is possible. Expansion or redundancy of the X2X Link network with power supply module X20PS3300 or X20PS3310 is not possible. Expanding the X20 system with a bus transmitter is also not permitted.

- Supply for Compact-S CPU, X2X Link and internal I/O power supply
- Cost-effective power supply module for small X20 systems
- No galvanic isolation of supply and CPU / X2X Link power supply
- Expansion or redundancy of CPU / X2X Link power supply not possible through parallel operation of multiple power supply modules
- RS232 configurable as online interface (if available on bus base)
- CAN bus or RS485 (if available on bus base)

2.10.3 Order data

Order number	Short description	Figure
	System modules for Compact-S PLCs	
X20PS9602	X20 power supply module, for Compact-S PLC and internal I/O power supply, X2X Link power supply, supply not galvanically isolated	
	Required accessories	
	System modules for Compact-S PLCs	
X20BB52	X20 Compact-S bus base, for Compact-S PLC and Compact-S PLC power supply module, base for integrated RS232 interface, X20 connection, X20 end cover plates (left and right) X20AC0SL1/X20AC0SR1 included	
X20BB53	X20 Compact-S bus base, for Compact-S PLC and Compact-S PLC power supply module, base for integrated RS485 interface, X20 connection, X20 end cover plates (left and right) X20AC0SL1/X20AC0SR1 included	
X20BB57	X20 Compact-S bus base, for Compact-S PLC and Compact-S PLC 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 PLC and Compact-S PLC power supply module, base for integrated RS232 interface, slot for X20 interface module, X20 connection, X20 end cover plates (left and right) X20AC0SL1/X20AC0SR1 included	
X20BB63	X20 Compact-S bus base, for Compact-S PLC and Compact-S PLC power supply module, base for integrated RS485 interface, slot 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 PLC and Compact-S PLC 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 PLC and Compact-S PLC 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	
X20BB77	X20 Compact-S bus base, for Compact-S PLC and Compact-S PLC 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 PLC and Compact-S PLC power supply module, base for integrated RS232 interface, X20 connection, X20 end cover plates (left and right) X20AC0SL1/X20AC0SR1 included	
X20cBB57	X20c Compact-S bus base, coated, for Compact-S PLC and Compact-S PLC 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 22: X20PS9602 - Order data

2.10.4 Technical data

Order number	X20PS9602
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 RS485, 1x CAN bus [1]
General information	
B&R ID code	0xEB04
Status indicators	Operating state, module status, RS232, RS485, CAN bus [1]
Diagnostics	
Module run/error	Yes, using LED status indicator and software
CAN bus data transfer [2]	Yes, using LED status indicator
RS232 data transfer [3]	Yes, using LED status indicator
RS485 data transfer [4]	Yes, using LED status indicator
Overload	Yes, using LED status indicator and software
Power consumption for X2X Link power supply [5]	1.64 W
Power consumption [5]	
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	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	No
Redundant operation	No
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	
Interface IF1	
Signal	RS232 or RS485 [6]
Variant	Connection via 12-pin terminal block X20TB12
Transfer rate	Max. 115.2 kbit/s
Interface IF3	
Signal	CAN bus [2]
Variant	Connection via 12-pin terminal block X20TB12
Transfer rate	Max. 1 Mbit/s
Electrical properties	
Electrical isolation	CPU/X2X Link supply not isolated from CPU/X2X Link power supply, and 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

Table 23: X20PS9602 - Technical data

Order number	X20PS9602
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
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 X20BB5x, X20BB6x or X20BB7x separately.
Pitch	12.5$^{+0.2}$ mm

Table 23: X20PS9602 - Technical data

1) RS232 interface only in connection with bus module X20BBx2 or X20BBx7.
RS485 interface only in connection with bus module X20BB53 or X20BB63.
CAN bus only in connection with bus module X20BB57, X20BB67 or X20BB77.
2) CAN bus only in connection with bus module X20BB57, X20BB67 or X20BB77.
3) RS232 interface only in connection with bus module X20BBx2 or X20BBx7.
4) RS485 interface only in connection with bus module X20BB53 or X20BB63.
5) 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.
6) RS232 interface only in connection with bus module X20BBx2 or X20BBx7.
RS485 interface only in connection with bus module X20BB53 or X20BB63.

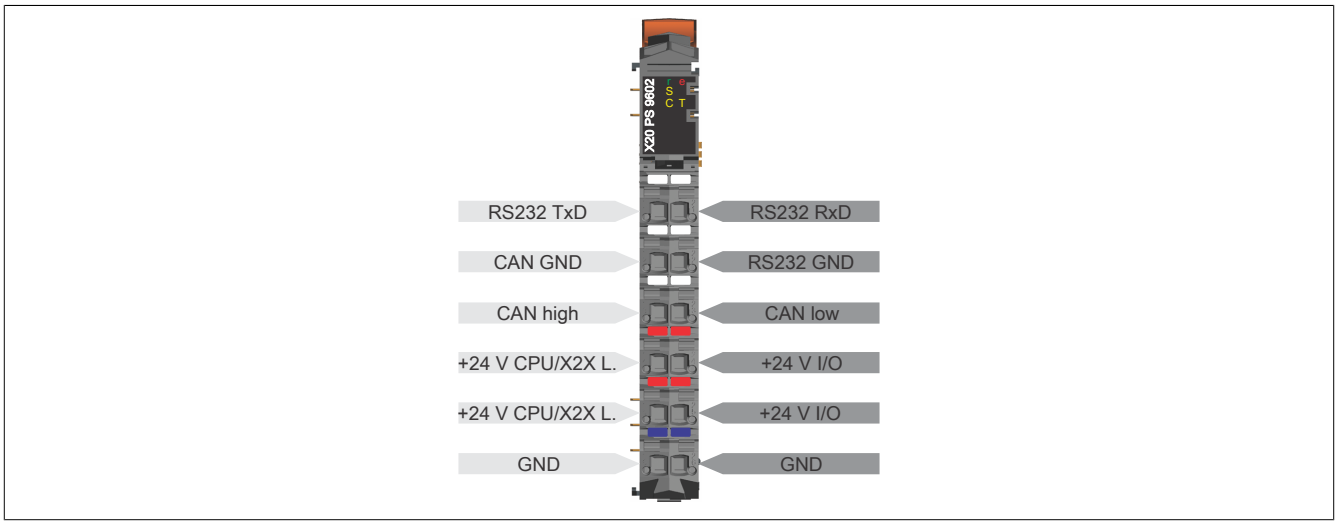
2.10.5 LED status indicators

For a description of the various operating modes, see section "Additional information - Diagnostic LEDs" in the X20 System user's manual.

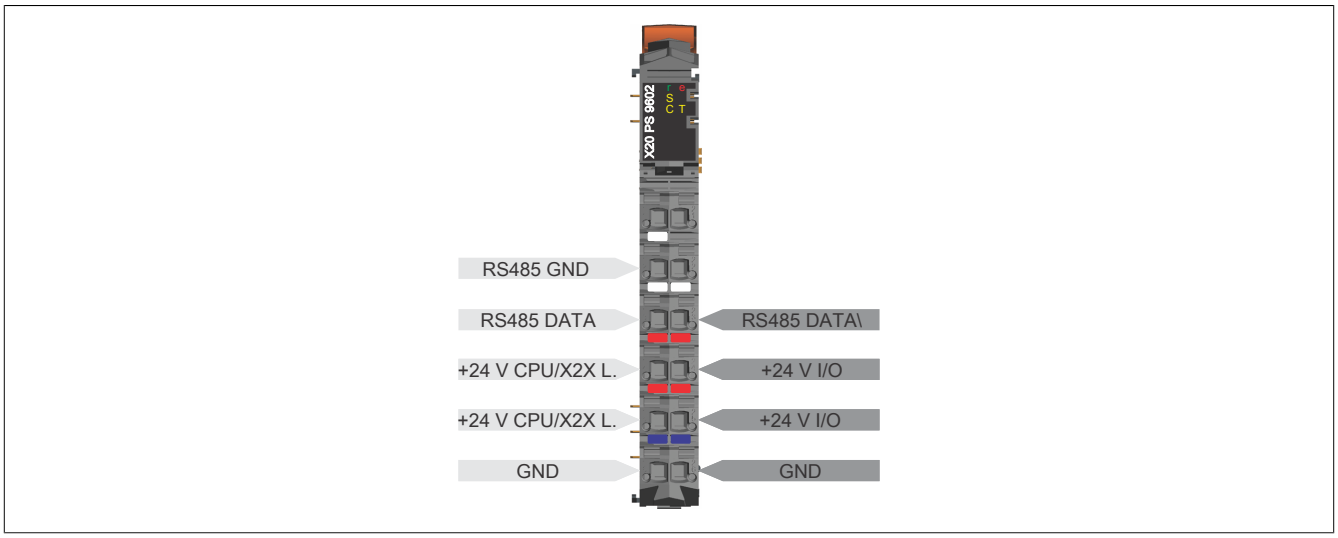
Figure	LED	Color	Status	Description
	r	Green	Off	No power to module
			Single flash	Mode RESET
			Blinking	Mode PREOPERATIONAL
			On	Mode RUN
	e	Red	Off	Module not supplied with power or everything OK
			Double flash	The LED indicates one of the following states: • The CPU / X2X Link power supply is 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
	S	Yellow	Off	The CPU is not transmitting data via the RS232/RS485 interface.
			On	The CPU is transmitting data via the RS232/RS485 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 X20BBx3 or X20BBx7 is switched off.
			On	The terminating resistor integrated in bus module X20BBx3 or X20BBx7 is switched on.

2.10.6 Pinout

With bus base X20BBx2 or X20BBx7

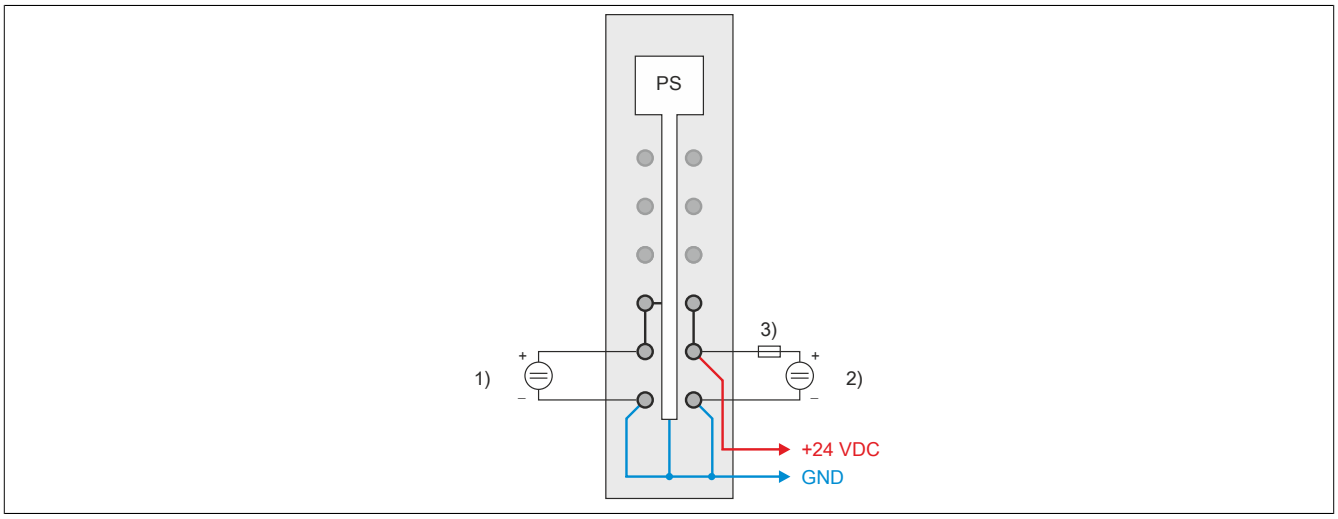


With bus base X20BBx3



2.10.7 Connection examples

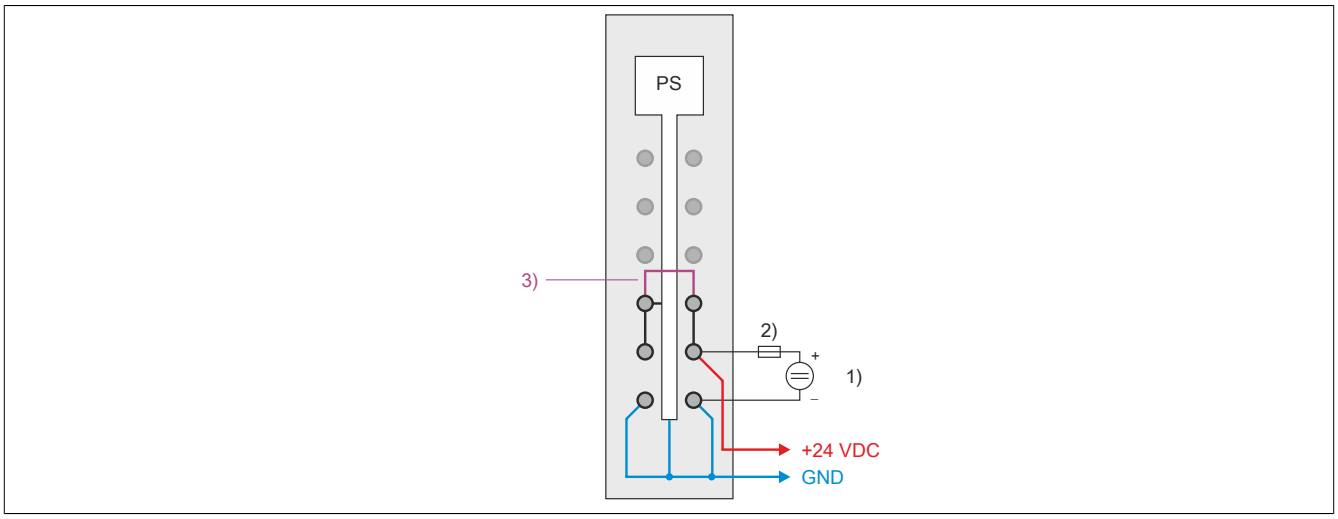
With 2 isolated power supplies



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

1) Supply for the CPU 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

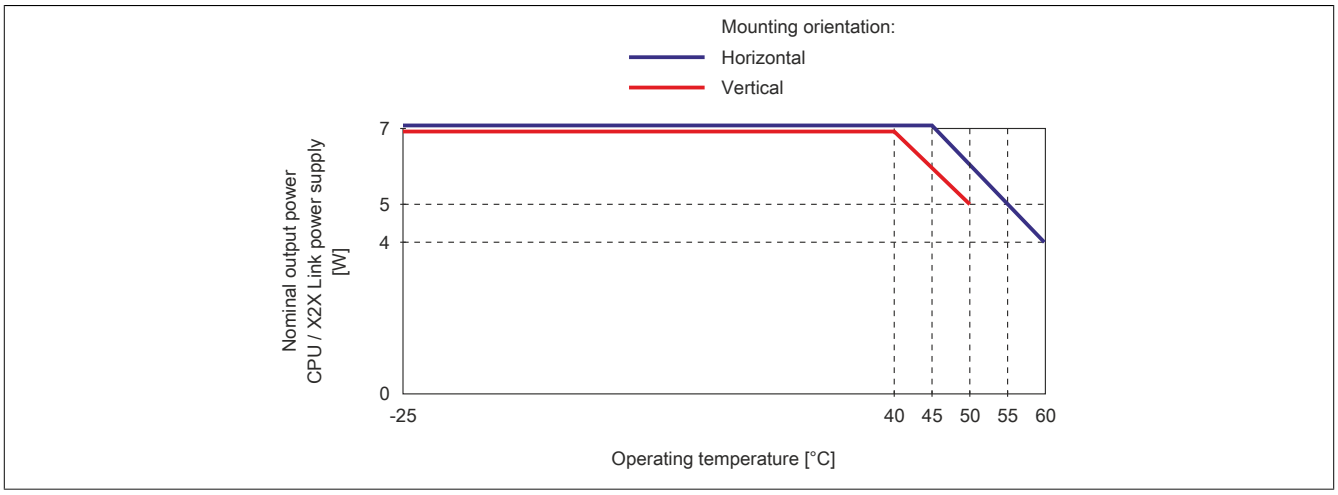


1) Supply for the I/O power supply
2) Fuse, 10 A slow-blow
3) Jumper

2.10.8 Derating

2.10.8.1 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.


Mounting orientation:
Horizontal
Vertical
Nominal output power
CPU / X2X Link power supply
[W]
7
5
4
0
-25
40
45
50
55
60
Operating temperature [°C]

2.10.8.2 I/O power supply

Information:

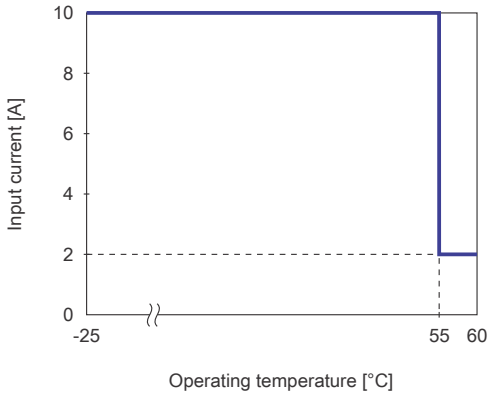
The specified maximum temperature and derating values are based on worst-case conditions. The CPU contains an internal temperature sensor that triggers a reset if 95°C is exceeded. Depending on the ambient conditions (artificial convection), maintaining the internal temperature at <90°C can prevent derating.

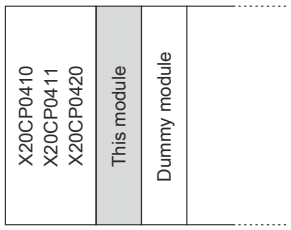
2.10.8.2.1 X20CP0410, X20CP0411 and X20CP0420

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.

2.10.8.2.2 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.

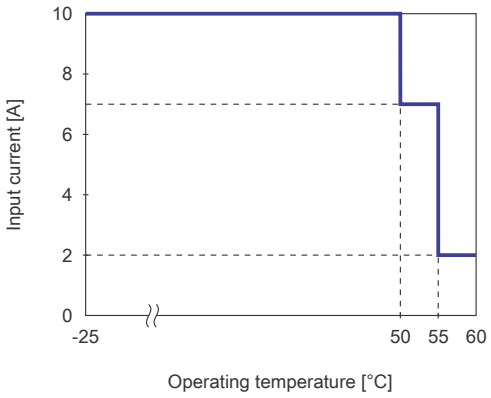
Information:

Both derating variants must always be applied!

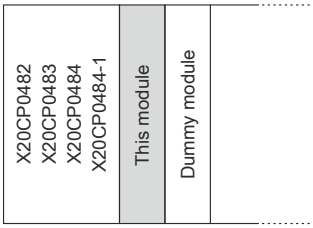
Derating

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.

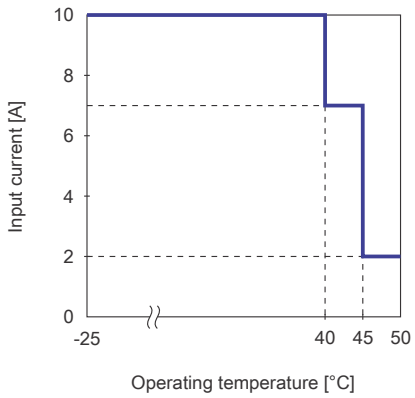
Information:

Both derating variants must always be applied!

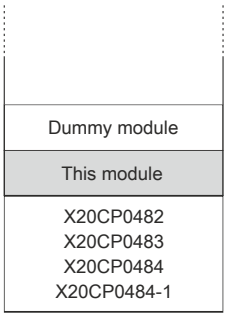
Derating

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.



2.10.9 Register description

2.10.9.1 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.

2.10.9.2 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				
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.

2.10.9.3 Status of the module

Name:
Module status

The following module power 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.

Data type	Values
USINT	See the bit structure.

Bit structure:

Bit	Name	Value	Information
0	StatusInput01	0	No error
		1	Bus power 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	

2.10.9.4 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

2.10.9.5 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

2.10.9.6 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