

X20XC02xx

1 General information

Fieldbus CPUs are variants of Compact CPUs. In addition to these features, fieldbus modules can be connected to the left side. These CPUs make applications possible in which data preprocessing must take place remotely on the I/O bus interface.

- Embedded μ P 16 / μ P 25 with additional I/O processor
- 100/750 kB User SRAM
- 1 MB / 3 MB User FlashPROM
- X20XC0292: Onboard Ethernet
- Up to 2 slots for fieldbus modules
- No battery
- Width
 - 1 fieldbus slot: 62.5 mm
 - 2 fieldbus slots: 87.5 mm

2 Order data

	
XC0201, XC0202	XP0292
Model number	Short description
Fieldbus CPUs	
X20XC0201	X20 fieldbus CPU, μ P 16, 100 kB SRAM, 1 MB FlashPROM, support of RS232, CAN bus and interface module according to fieldbus CPU base, order power supply module, bus base and terminal block separately
X20XC0202	X20 fieldbus CPU, μ P 25, 750 kB SRAM, 3 MB FlashPROM, support of RS232, CAN bus and interface module according to fieldbus CPU base, order power supply module, bus base and terminal block separately
X20XC0292	X20 fieldbus CPU, μ P 25 750 kB SRAM, 3 MB FlashPROM, support of RS232, CAN bus and interface module, according to fieldbus CPU base, 1 Ethernet interface 100 Base-T, order bus base, power supply module and terminal block separately
Required accessories	
System modules for compact CPUs	
X20PS9500	X20 power supply module for Compact and Fieldbus CPUs and internal I/O power supply, X2X Link power supply
X20PS9502	X20 power supply module, for Compact and Fieldbus CPUs and internal I/O power supply, X2X Link power supply, supply not electrically isolated
System modules for fieldbus CPUs	
X20BB32	X20 fieldbus CPU base, for fieldbus CPU and compact CPU power supply module, base for integrated RS232 interface, Slot for X20 interface module, X20 connection, X20 locking plates (left and right) X20AC0SL1/X20AC0SR1 included
X20BB37	X20 fieldbus CPU base, for fieldbus CPU and compact CPU power supply module, base for integrated RS232 and CAN bus interface, Slot for X20 interface module, X20 connection, X20 locking plates X20AC0SL1/X20AC0SR1 (left and right) included
X20BB42	X20 fieldbus CPU base, for fieldbus CPU and compact CPU power supply module, base for integrated RS232 interface, 2 slots for X20 interface modules, X20 connection, X20 locking plates (left and right) X20AC0SL1/X20AC0SR1 included
X20BB47	X20 fieldbus CPU base, for fieldbus CPU and compact CPU power supply module, base for integrated RS232 and CAN bus interface, 2 slots for X20 interface modules, X20 connection, X20 locking plates (left and right) X20AC0SL1/X20AC0SR1 included
Terminal blocks	
X20TB12	X20 terminal block, 12-pin, 24 VDC keyed

Table 1: X20XC0201, X20XC0202, X20XC0292 - Order data

Model number	Included in delivery
X20AC0SL1	X20 locking plate, left
X20AC0SR1	X20 locking plate, right

3 Technical data

Model number	X20XC0201	X20XC0202	X20XC0292
Short description			
Interfaces	-		1x Ethernet onboard
System module	CPU		
General information			
B&R ID code	0x2563	0x2564	0xA252
Status indicators	CPU function		CPU function, Ethernet
Diagnostics			
CPU function	Yes, using status LED		
Ethernet	-		Yes, using status LED
Overtemperature	-	Yes, using software	
Power consumption	2 W	2.2 W	2.8 W
Temperature sensor	No	Yes	
ACOPOS support	Restricted (user PROM) via CAN bus	Yes, via CAN bus	
Visual Components support	Limited (User PROM)	Yes	
Additional power dissipation caused by actuators (resistive) [W]	-		
Certifications			
CE	Yes		
KC	Yes		
EAC	Yes		
UL	cULus E115267 Industrial control equipment		
HazLoc	cCSAus 244665 Process control equipment for hazardous locations Class I, Division 2, Groups ABCD, T5		
ATEX	Zone 2, II 3G Ex nA nC IIA T5 Gc IP20, Ta (see X20 user's manual) FTZÚ 09 ATEX 0083X		
DNV GL	Temperature: B (0 - 55°C) Humidity: B (up to 100%) Vibration: B (4 g) EMC: B (bridge and open deck)		
KR	Yes		
Controller			
Real-time clock ¹⁾	Yes, 1 s resolution, -18 to 28 ppm accuracy at 25°C		
Processor			
Type	Embedded μ P 16	Embedded μ P 25	
Integrated I/O processor	Processes I/O data points in the background		
Backup battery	No		
Shortest task class cycle time	4 ms	2 ms	
Typical instruction cycle time	0.8 μ s	0.5 μ s	
Permanent variables			
Self-discharge time	>10 years		
Memory	2.75 kB FRAM ²⁾		
Standard memory			
User PROM	1 MB FlashPROM	3 MB FlashPROM	
User RAM	100 kB SRAM ³⁾	750 kB SRAM ³⁾	
Slots for interface modules			
X20BB3x	1		
X20BB4x	2		
Interfaces			
Interface IF2			
Signal	-		Ethernet
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	-		No
Autonegotiation	-		No
Auto-MDI/MDIX	-		Yes
On base module			
X20BB32 and X20BB42 ⁴⁾	Fieldbus CPU base module with integrated RS232 interface		
X20BB37 and X20BB47 ⁵⁾	Fieldbus CPU base module with integrated RS232 and CAN interfaces		
Operating conditions			
Mounting orientation			
Horizontal	Yes		
Vertical	Yes		

Table 2: X20XC0201, X20XC0202, X20XC0292 - Technical data


Model number	X20XC0201	X20XC0202	X20XC0292
Installation elevation above sea level			
0 to 2000 m	No limitations		
>2000 m	Reduction of ambient temperature by 0.5°C per 100 m		
Degree of protection per EN 60529	IP20		
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	Order 1x X20TB12 terminal block separately Order 1x X20PS9500 or X20PS9502 power supply module separately Order 1x X20BB3x/4x fieldbus CPU base separately		
Spacing ⁶⁾			
X20BB3x	62.5 ^{+0.2} mm		
X20BB4x	87.5 ^{+0.2} mm		

Table 2: X20XC0201, X20XC0202, X20XC0292 - Technical data

- 1) The real-time clock is buffered for approx. 1000 hours by a gold foil capacitor. The gold foil capacitor is completely charged after 18 continuous hours of operation.
- 2) This FRAM stores its contents ferroelectrically. Therefore, no backup battery is needed.
- 3) Not buffered.
- 4) For technical data, see the data sheet for the X20PS9500 power supply module.
- 5) For technical data, see the data sheet for the X20PS9502 power supply module.
- 6) Spacing is based on the width of the X20BB3x/4x fieldbus CPU base. The CPU always requires up to two fieldbus modules and one supply module X20PS9500 or X20PS9502.


4 LED status indicators

X20XC020x

Figure	LED	Color	Status	Description
	R/E	Green	On	Application running
		Red	On	SERVICE mode
			Off	¹⁾
	RDY	Yellow	On	SERVICE mode
			Off	¹⁾

- 1) BOOT mode: R/E and RDY LEDs are off and the power supply LED is blinking

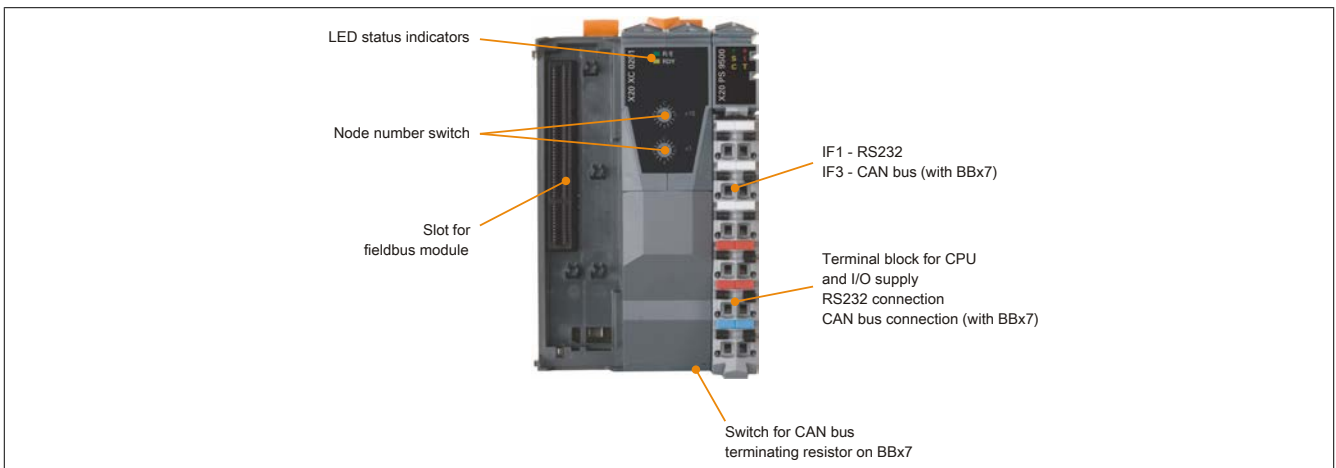
X20XC0292

Figure	LED	Color	Status	Description
	R/E	Green	On	Application running
		Red	On	SERVICE mode
			Off	¹⁾
	RDY	Yellow	On	SERVICE mode
			Off	¹⁾
	L/A	Green	On	A link to the peer station has been established.
			Blinking	A link to the peer station has been established. Indicates Ethernet activity is taking place on the bus.

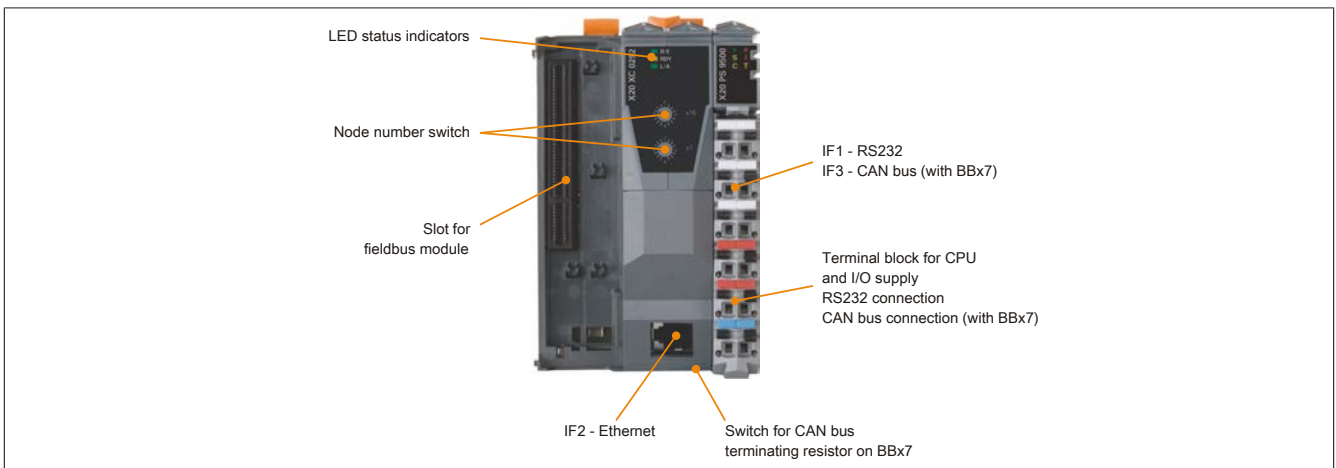
- 1) BOOT mode: R/E and RDY LEDs are off and the power supply LED is blinking

5 Operating and connection elements

X20XC0201 and X20XC0202



X20XC0292



6 Node number switches



The node number is set using the two hex switches. The switch setting can be evaluated by the application program at any time. The operating system only evaluates the switch position when the device is switched on.

Switch position	Operating mode	Description
0x00	BOOT	In this switch position, the operating system can be installed via the RS232 interface configured as the online interface. User Flash is deleted only after the update begins.
0x01 - 0xFE	RUN	RUN mode, the application is running.
0xFF	Diagnostics	Boots the CPU in Diagnostics mode. Program sections in User RAM and User FlashPROM are not initialized. Following diagnostics mode, the CPU always boots with a cold restart .

X20XP0201 and X20XP0202

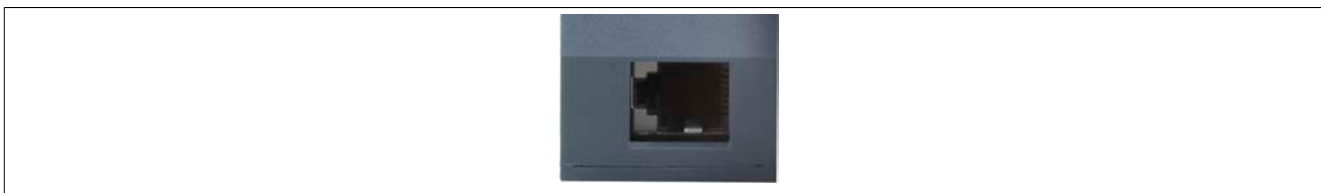
When used with the X20BB37 or X20BB47 bus module, the CPUs have access to a CAN bus interface. The INA2000 station number for CAN is set using the node number switches.

X20XP0292

This CPU is equipped with an onboard Ethernet interface. When used with the X20BB37 or X20BB47 bus module, it also has access to a CAN bus interface.

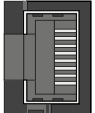
The number set using the two hex switches defines the INA2000 station number of both the CAN and the Ethernet interface.

7 Ethernet interface (IF2)



The X20XC0292 is equipped with an Ethernet interface. The connection is made using a 100 BASE-T twisted pair RJ45 socket.

Pinout

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

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

Information:

The Ethernet interface (IF2) is not suited for POWERLINK.

Starting with operating system version 1.07, CPUs have a default IP address.

IP address: 192.168.0.1
 Subnet mask: 255.255.0.0

8 Slot for fieldbus modules

Up to two fieldbus modules can be connected to the left side of the Fieldbus CPUs depending on the CPU base:

CPU base	Slots for fieldbus modules
X20BB32, X20BB37	1
X20BB42, X20BB47	2

Table 3: X20 Fieldbus CPUs - Slots for fieldbus modules depending on CPU base

The X20 system can be connected to various bus and network systems by selecting the appropriate fieldbus modules. The following fieldbus modules can be operated with the CPUs:

Module	Description
X20IF1020	X20 interface module, 1 RS232, max. 115.2 kbit/s, electrically isolated
X20IF1030	X20 interface module, 1 RS485/RS422, max. 115.2 kbit/s, electrically isolated
X20IF1041-1	X20 interface module for DTM configuration, 1 CANopen master interface, electrically isolated
X20IF1043-1	X20 interface module for DTM configuration, 1 CANopen slave interface, electrically isolated
X20IF1051-1	X20 interface module for DTM configuration, 1 DeviceNet scanner interface, electrically isolated
X20IF1053-1	X20 interface module for DTM configuration, 1 DeviceNet slave (adapter) interface, electrically isolated
X20IF1061	X20 interface module, 1 Profibus DP master interface, max.12 Mbit/s, max. 3.5 KB input data and max. 3.5 KB output data, electrically isolated
X20IF1061-1	X20 interface module for DTM configuration, 1 PROFIBUS DP V1 master interface, electrically isolated
X20IF1063	X20 interface module, 1 Profibus DP slave interface, max.12 Mbit/s, electrically isolated
X20IF1063-1	X20 interface module for DTM configuration, 1 PROFIBUS DP V1 slave interface, electrically isolated
X20IF1074	X20 interface module for SGC, 1 CAN interface, max. 1 Mbit/s, electrically isolated,...
X20IF10A1-1	X20 interface module for DTM configuration, 1 ASI master interface, electrically isolated
X20IF10D1-1	X20 interface module for DTM configuration, 1 EtherNet/IP scanner interface, electrically isolated
X20IF10D3-1	X20 interface module for DTM configuration, 1 EtherNet/IP slave interface, electrically isolated
X20IF10E1-1	X20 interface module for DTM configuration, 1 PROFINET RT controller (master), electrically isolated
X20IF10E3-1	X20 interface module for DTM configuration, 1 PROFINET RT device (slave), electrically isolated
X20IF10G3-1	X20 interface module for DTM configuration, 1 EtherCAT slave interface, electrically isolated
X20IF10H3-1	X20 interface module for DTM configuration, 1 Sercos III slave interface, electrically isolated

Table 4: X20 fieldbus CPUs - Possible fieldbus modules

9 Programming the system flash memory

General information

CPUs are delivered with a runtime system. When delivered, the node number switch is set to switch position 0x00 (bootstrap loader mode).

A suitable switch position must be set (0x01 to 0xFE) in order to boot the PLC in RUN mode. Updating the runtime system is only possible in RUN mode.

Runtime system update

The runtime system can be updated via the programming environment. When updating the runtime system via an online connection, the following procedure must be carried out:

1. An online runtime system update is only possible if the processor is in RUN mode. For this to be true, the node number must be set to a value in the range 0x01 to 0xFE.
2. Switch on the power.
3. The runtime system update is performed via the existing online connection. The online connection can be established via the onboard serial RS232 interface, for example. If a CPU has an Ethernet interface, then it too can be used to perform the update.
4. Start B&R Automation Studio.
5. Start the update procedure by selecting **Online** from the **Project** menu. Select **Transfer Automation Runtime** from the pop-up menu. Now follow the instructions given by B&R Automation Studio.
6. A window opens up for setting the runtime system version. The runtime system version is already pre-selected by the project settings made by the user. The drop-down menu can be used to select one of the runtime system versions stored in the project. Clicking on the **Browse** button allows a runtime system version to be loaded from the hard drive or CD.

Clicking on **Next** opens a pop-up window that allows the user to select whether modules with target memory SYSTEM ROM should be transferred during the subsequent runtime system update. If not, these modules can also be transferred later during an application download.

Clicking on **Next** opens a dialog box where the user can set the CAN transfer rate, CAN ID and CAN node number (the CAN node number set here is only relevant if an interface module does not have a CAN node number switch). The CAN node number must be between decimal 01 and 99. Assigning a unique node number is especially important with online communication over a CAN network (INA2000 protocol).

7. The update procedure is started by clicking on **Next**. Update progress is shown in a message box.

Information:

User flash memory is deleted.

8. When the update procedure is complete, the online connection is reestablished automatically.
9. The PLC is now ready for use.

Updating the runtime system is possible not only via an online connection, but also via a CAN network, serial network (INA2000 protocol) or Ethernet network, depending on the system configuration.