6 CPU INSERT - XP152

6.1 GENERAL INFORMATION

The XP152 module is a CPU insert for the power supply modules. This means that the CPU does not require its own slot. The XP152 can be operated as an intelligent CAN bus processor in addition to a CPU (e.g. CP15x or CP260). With this type of operation, the XP152 cannot access local modules on the 2005 unit. This module is controlled by the CPU. It collects data from the CAN stations (e.g. I/O) and makes this data available to the CPU.

6.2 TECHNICAL DATA

Module ID	XP152-1	XP152-2
Model Number	3XP152.60-1	3XP152.60-2
Description	2005 CPU, 118 KB SRAM, 256 KB FlashPROM, 1 RS232 interface, 1 CAN interface, CAN: electrically isolated, network capable, power supply module insert	2005 CPU, 118 KB SRAM, 512 KB FlashPROM, 1 RS232 Interface, 1 CAN interface, CAN: electrically isolated, network capable, power supply module insert
C-UL-US Listed	Yes	Yes
B&R ID Code	$11	
Slot	Insert in power supply PS465, PS694, PS754 or PS794	
Instruction Cycle Time	0.8 µsec	
SRAM User RAM / DPR System RAM	118 KByte 138 KByte	
FlashPROM User PROM System PROM	256 KByte 256 KByte	512 KByte 512 KByte

Module ID	XP152-1	XP152-2
Real Time Clock Resolution	Nonvolatile memory (external buffering) 1 sec	
Standard Communication Interface		

Application Interface IF1
        Connection
        Electrical Isolation
        Max. Baudrate
        Max. Baudrate
	RS232
	9 pin D-type connector (M)
	No
	15 m /19200 Baud
	64 Baud	

Application Interface IF2
        Connection
        Electrical Isolation
        Max. Distance
        Max. Baudrate
            Bus Length 10 - 60 m
            Bus Length 100 - 200 m
            Bus Length 800 - 1000 m
	CAN
	9 pin D-type connector (M)
	Yes
	1000 m
	
	500 KBits/sec
	250 KBits/sec
	50 KBits/sec	

Reset Button	Yes	
Status Display	LEDs	

Buffer Time
    Backup Battery in 2005 Base Plate
    with Battery Module AC240
 	
    Battery Monitoring
	min. 4 years
	min. 2 years
	
	Yes, when operated as main CPU (Rev. 12.00 or higher)	

Power Consumption	max. 4 W	
Dimensions (H, W, D) [mm]	130, 28, 105	

6.3 OPERATIONAL AND CONNECTION ELEMENTS

The module is equipped with a RESET button, status-LEDs, two HEX number dials for the CAN bus station numbers and the connectors for an RS232 and CAN interface.
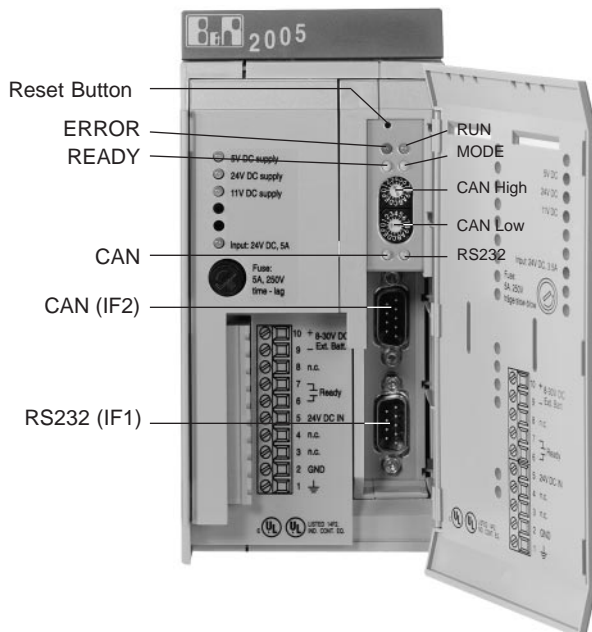
6.4 DATA/REAL TIME CLOCK BUFFERING

The following areas are buffered

❍ User RAM

❍ System RAM

❍ Real Time Clock

The buffer battery can be installed in either the B&R 2005 main base plate module or in the battery module AC240. Data buffering can also be carried out by installing modules equipped with a rechargeable battery or battery e.g. CP15x.

Battery Monitoring

Battery monitoring is carried out by the following XP152 modules:

Model No.	Revision
3XP152.60-1	from revision 12.00
3XP152.60-2	with all revisions

The XP152 carries out a cyclic battery voltage test when used as the CPU. The cyclic load test does not shorten the battery life significantly, but serves to give an early warning of weakened battery capacity. The status information "Battery OK" is available from the B&R TRAP function "SYS_battery".

Buffer Time

Buffer life is halved when additional processors such as the IP151, IF152 or IF260, are operated from the same base plate and if the rechargeable battery in the module is already empty.

Reduction factor = number of all process modules on the base plate

6.5 RESET BUTTON

The RESET button can be pressed with a small pointed object (e.g. pencil). The reset button is protected by the module door. Pressing the reset button has different implications depending on the type of operation in use.

Operation	Effect
CAN Bus Processor	Local reset - All XP152 application programs are stopped
CPU	Local reset and global bus reset - All application programs are stopped - All outputs are set to zero

6.6 STATUS LEDS

LED	Description
ERROR	Lit in service and diagnosis modes
RUN	Lit in RUN, service and diagnosis modes
READY	Lit in service and diagnosis modes
MODE	Lit when programming the FlashPROM
CAN	Lit during data exchange through the CAN interface
RS232	Lit during data exchange through the RS232 interface

Pressing the reset button causes all the LEDs to light up. The LEDS remain lit for 0.4 sec after releasing the button.

6.7 CAN NODE NUMBER DIALS

Both Hex dials are used to set the CAN node number. The position of the dial can be evaluated by the application program. When the dial is turned during operation a relevant warning message can be generated. The dial status can only be identified by the operating system during start up.
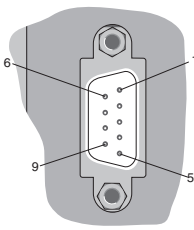
Positions 00 and FF are reserved for special functions.

Switch position: 00 ... System flash programming (see section 6.10)
                            FF ... Diagnosis mode
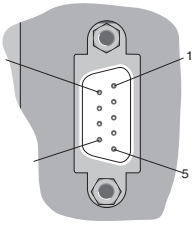
6.8 RS232 INTERFACE (IF1)

A RS232 cable is available from B&R for connecting the CPU and the PC.

    Model Number: 0G0001.00-090

Interface	Description	Pin Assignment	
Application Interface RS232 9 pin. D-type connector (M)	The RS232 interface is freely available to the user (not electrically isolated). The status LED RS232 lights during data transfer via the RS232 interface. Max. Baudrate: 64 kBaud Max. Cable length: 15 m		**RS232**
		1	
		2	RXD
		3	TXD
		4	
		5	GND
		6	
		7	RTS
		8	CTS
		9	

6.9 CAN INTERFACE (IF2)

Interface	Description	Pin Assignment	
Application Interface CAN 9 pin D-type connector (M)	The controller 82527 processor is used as a CAN controller. The interface is electrically isolated. The connection is made by a T-type connector (7AC911.9). The status LED CAN is lit during data exchange with the CAN interface. Max. Baudrate: 500 kBit/sec Bus length: 60 m 250 kBit/sec Bus length: 200 m 50 kBit/sec Bus length: 1000 m		**CAN**
		1	
		2	CAN_L
		3	CAN_GND
		4	
		5	
		6	res.
		7	CAN_H
		8	
		9	

6.10 SYSTEM FLASH PROGRAMMING

6.10.1 General Information

The XP152 is delivered without an operating system. Operating system download and an operating system update can be carried out with the help of the programming system.

The operating system installation is possible with PG2000 starting with version V 2.20.

6.10.2 Operating System Download

The XP152 CPU is delivered without an operating system. An operating system download is carried out as follows:

1) Establish online connection between programming device (PC or Industrial PC) and XP152.

2) Start programming system PG2000.

3) Call up in PG2000 the PCCSW Update function (see menu point "Service" in pull down menu "System").

4) A dialog box appears in which the baudrate for the download process and the PC interface (used for the online connection) can be entered (e.g. 57600 baud, COM1).

5) Selecting OK opens the next dialog box.

6) In this dialog box the operating system version can be selected. Selecting [Yes] closes the dialog box and the download process is started. The download progress is displayed in the message box

⚠ **User Flash is deleted !**

7) If the download process is stopped, an number apart from 00 or FF must be chosen with the CAN node number switch.

8) Switch PC off and then on again

9) The CPU XP152 is now ready for operation

6.10.3 Operating System Update

When updating the operating system, the following steps should be carried out:

1) Switch off the PCC supply voltage,

2) An operating system update is only possible if the processor is in bootstrap mode. Both CAN node number switches must also be in position 0 (in operating system version 2.0 or higher this step is not necessary).

3) Switch on the PCC supply voltage

4) Establish online connection between programming device (PC or Industrial PC) and CPU.

5) Start programming system PG2000.

6) Call up in PG2000 the PCCSW Update function (see menu point service in pull down menu).

7) A dialog box appears in which the baudrate for the download process and the PC interface (used for the online connection) can be entered (E.g. 57600 baud, COM1).

8) Selecting OK opens the next dialog box.

9) The operating system version can be selected in this dialog box. [Yes] closes the dialog box and the System-ROM (including the operating system) is deleted. The selected operating system is transferred into the system ROM. The progress of the update is displayed in the message box.

⚠ **User Flash is deleted !**

10) If the download process is stopped, an number apart from 00 or FF must be chosen with the CAN node number switch. (in operating system version 2.0 or higher this step is not necessary).

11) Switch PCC on and off

12) The CPU XP152 is now ready for operation

⚠️ **If the installed operating system version is PCCSW ≥V 2.0, an operating system update can also be carried out if the processor is not in the bootstraploader mode. In this case, the settings for the CAN node number switch do not have to be changed in steps 1, 2, 3 and 10 of the above list.**

Additionally, on operating systems PCCSW 2.0 or higher with processors without application memory, an operating system update is not only possible through an online connection, but also through a CAN network or a serial network (INA2000 protocol).

6.11 MODULE ATTACHMENT

Starting with the following revision, the XP152 will be equipped with a module attachment. This prevents the CPU from becoming detached from the power supply during transport.

Model Number	Revision
3XP152.60-1	Revision 14.00 or higher
3XP152.60-2	Revision 12.00 or higher

A screw driver is required to remove the module. The screw driver should be inserted between the power supply and the XP152 (see illustration). The CPU can be removed from the power supply by turning the screw driver towards the power supply, and extracting the XP152.

Insert screw driver between the power supply and XP152
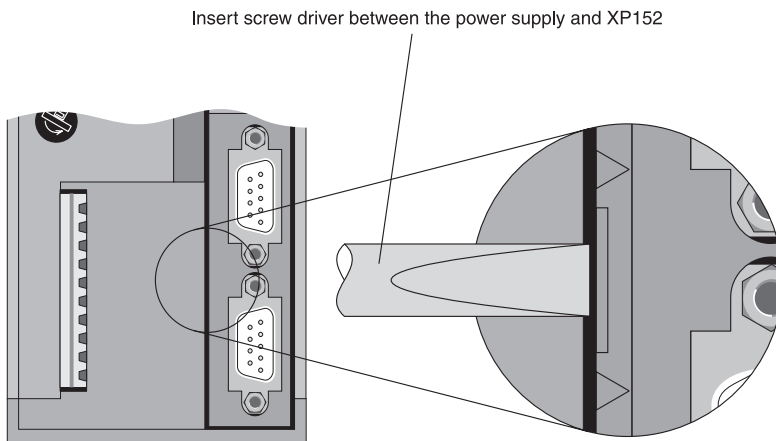
6.12 ONLINE CONNECTION

The RS232 interface is used for programming the CPU.
A standard RS232 cable is used for online connection (available from B&R).

6.13 PROGRAMMING

Programming the CPU is carried out by a programming system. Several programming languages are available:

❍ STL (Statement Lists)

❍ LAD (Ladder Diagram)

❍ Higher level language PL2000

6.14 BUFFERING THE RAMS

RAM (program and data memory) is buffered by ...

… the buffer battery built into the B&R 2005 base plate module

… an external buffer voltage which is supplied by the battery module AC240 on the power supply.

… the attached module with a rechargeable or lithium battery such as CPU CP15x

6.15 PROGRAMMING THE FLASHPROM

Programming and deleting the built in FlashPROM memory is carried out by the programming system.