5.2 CP260

5.2.1 General Information

The CPU is inserted in the main rack directly next to the power supply module. It requires two slots. Only the status LEDs can be seen with the module door closed. The CP260 module is equipped with two insert slots for interface modules and a PCMCIA interface for memory cards.

The possibility of combining interface modules allows various bus and network systems to be integrated into the B&R SYSTEM 2005.

A PCMCIA interface allows the memory size to be adjusted to suit different memory needs. Exchanging programs in the field can be carried out using the memory card.

5.2.2 Order Data

Model Number	Short Description	Image
	CPU	
3CP260.60-1	2005 CPU, 4 MB DRAM, 850 KB SRAM, 512 KB FlashPROM, 2 insert slots, 1 PCMCIA slot, 1 RS232 interface	
	Memory Cards	
0MC111.9	PCMCIA memory card, 2 MB FlashPROM	
0MC112.9	PCMCIA memory card, 4 MB FlashPROM	
0MC211.9	PCMCIA memory card, 2 MB SRAM	
	Accessories	
0G0001.00-090	Cable PC <-> PLC/PW, RS232, online cable	

Table 47: CP260 order data

5.2.3 Technical Data

Product ID	CP260
C-UL-US Listed	Yes
B&R ID Code	$27
Slot Main Rack Expansion Rack	 3 + 4 No
Power Consumption 5 V 24 V Total	 Max. 5.7 W Max. 2.3 W Max. 8 W, without memory cards and without interface modules
Controller	
Typical Instruction Cycle Time	0.2 µs
Data and Program Code Cache	2 x 256 bytes
Standard Memory for the CP260 RAM System RAM User RAM System PROM User PROM	 4 MB DRAM 174 KB SRAM 850 KB SRAM 512 KB FlashPROM 512 KB FlashPROM
NC-Synchronization	Yes
PCMCIA Interface Standard Card Height Card Type Memory Size SRAM FlashPROM	1 JEIDA V4.0 or PCMCIA Standard Release 2.0 Max. 3 mm Memory cards Max. 16 MB Max. 16 MB
Real-time Clock Resolution	Nonvolatile 1 s
Standard communication interface Application Interface (IF1) Electrical Isolation Design Max. Distance Max. Baud Rate	 RS232 No 9-pin DSUB plug 15 m / 19200 Baud 64 kBaud
Insert Slots	2 (for interface module inserts)
Reset Button	Yes
Status Display	LEDs
Data Buffering Backup Battery in 2005 Backplane Buffering with AC240 Battery Module Buffering with NiMH Rech. Battery Battery Monitoring	 At least 4 years At least 2.5 years At least 2 months Yes
Mechanical Characteristics	
Dimensions	B&R 2005 double-width

Table 48: CP260 technical data

5.2.4 Status LEDs

Image	LED	Description
	READY	CPU is active
	RUN	Application running
	MODE	Spool or programming function is active
	ERROR	SERVICE mode
	BAT	Battery and rechargeable battery empty

Table 49: CP260 status LEDs

5.2.5 Operational and Connection Elements

Operational and display elements, two insertion slots for interface modules, the PCMCIA interface and the RS232 interface are all located behind the module door.

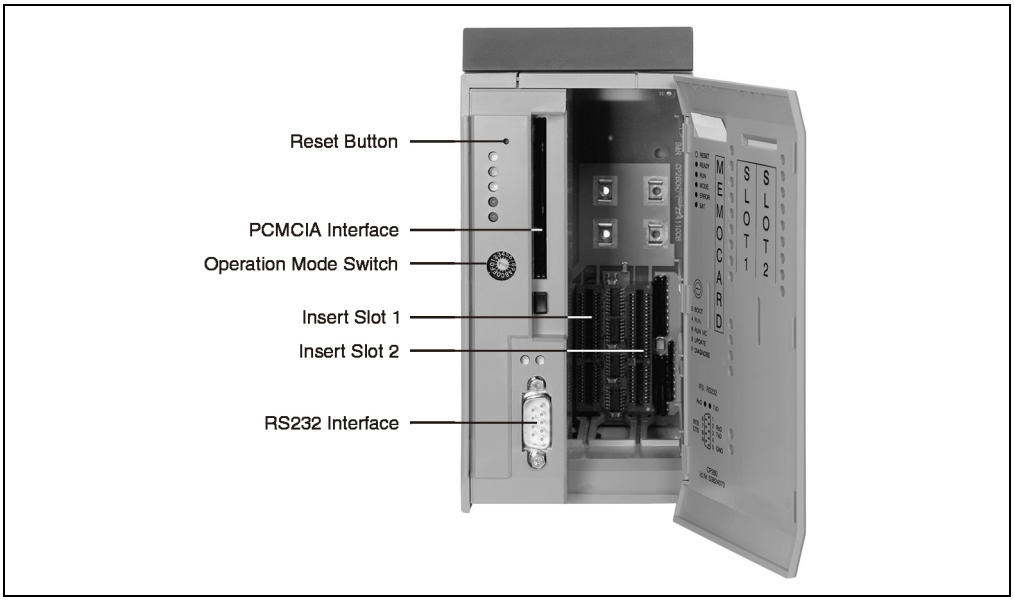


Figure 56: CP260 operational and connection elements

5.2.6 Reset Button

The reset button can be pressed with any small pointed object (e.g. paper clip). The reset button is protected by the module door. Pressing the reset button triggers a hardware reset, which means:

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

The PLC then goes into SERVICE mode.

5.2.7 Operating Mode Switch

The CP260 is equipped with a hex switch, which is used as an operating mode switch. Different operating modes are available depending on the PLC software version:

PLC Software ≤ V2.0

Switch Position	Operating Mode	Description
$0	Bootstrap Loader	In this switch position, the operating system can be programmed via the online interface. User Flash is only deleted after the update begins. Bootstrap loader mode is only required when PCCSW <2.0 is installed. The procedure is the same as described in Section 5.2.14 "Programming System Flash", on page 127. In an additional dialog box, only the baud rate and the interface, which are used to created a connection to the PLC, have to be set.
$1 - $E	Run with MC	The CPU boots and installs all modules from the internal User RAM and User FlashPROM. Apart from data modules, all other modules are additionally installed from the memory card. The code for all programs is then copied to DRAM. The program code is carried out in DRAM to increase the speed of the operation.
$F	Diagnostics	The CPU boots in Diagnostics mode. Program sections in User RAM and User FlashPROM are not initialized. After diagnostics mode, the CPU always boots with a cold restart.

Table 50: CP260 operating modes for PLC software ≤ V2.0

PLC Software > V2.0

Switch Position	Operating Mode	Description
$0	Bootstrap Loader	In this switch position, the operating system can be programmed via the online interface. User Flash is only deleted after the update begins. Bootstrap loader mode is only required when PCCSW <2.0 is installed. The procedure is the same as described in Section 5.2.14 "Programming System Flash", on page 127. In an additional dialog box, only the baud rate and the interface, which are used to created a connection to the PLC, have to be set.
$4	Run without MC	The CPU boots and installs all modules from the internal User RAM and User FlashPROM. The code for all programs is then copied to DRAM. The program code is carried out in DRAM to increase the speed of the operation. Any memory card found in the PCMCIA interface is ignored.
$6	Run with MC	The CPU boots and installs modules as described in switch position 4. Apart from data modules, all other modules are additionally installed from the memory card. They are also copied to DRAM.
$8	Update	In this switch position, the CPU checks if an update memory card is inserted. If not, the CPU goes into SERVICE mode. Otherwise the operating system, System ROM, User ROM and, if available, FIX RAM on the CP260 is deleted and reinstalled from the memory card. This operating mode is already supported by PLC software V2.0. If an error occurs during installation, the ERROR and BAT LEDs blink. When no errors have occurred during installation, the READY LED and RUN LEDs blink.
$F	Diagnostics	The CPU boots in Diagnostics mode. Program sections in User RAM and User FlashPROM are not initialized. After diagnostics mode, the CPU always boots with a cold restart.

Table 51: CP260 operating modes for PLC software > V2.0

5.2.8 RS232 Interface (IF1)

The RS232 interface is not electrically isolated. It can be used as an online interface for communicating with the programming device.

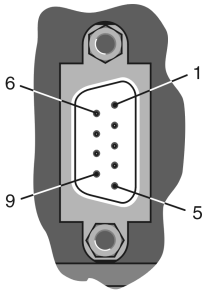
Interface	Description	Pin Assignments		
PG interface RS232  9-pin DSUB plug	The RS232 interface operates as an online interface. Online connection to the PG is achieved using a standard RS232 cable that is available from B&R: Product ID: RS232 cable Model Number: 0G0001.00-090 Max. Baud Rate: 64 kBaud Max. Cable Length: 15 m		RS232	
		1	NC	
		2	RXD	Receive Signal
		3	TXD	Transmit Signal
		4	NC	
		5	GND	Ground
		6	NC	
		7	RTS	Request To Send
		8	CTS	Clear To Send
		9	NC	

Table 52: CP260 RS232 Interface (IF1)

5.2.9 PCMCIA Interface

The CP260 is equipped with a PCMCIA interface. PCMCIA memory cards conforming to JEIDA V4.0 Type I or PCMCIA Standard Release 2.0 (max. 3 mm high) are supported.

The CP260 supports memory cards with up to 16 MB SRAM or with up to 16 MB FlashPROM. The following memory card can be ordered from B&R:

Model Number	Short Description	Power Consumption
0MC111.9	PCMCIA memory card, 2 MB FlashPROM	Max. 0.8 W
0MC112.9	PCMCIA memory card, 4 MB FlashPROM	Max. 0.8 W
0MC211.9	PCMCIA memory card, 2 MB SRAM	Max. 0.8 W

Table 53: CP260 PCMCIA memory cards

The memory cards are used by the CP260 as ROM Type "MEMCARD".

Limitations when using memory cards:

- Internal variables cannot be stored on the memory card.
- Memory cannot be allocated on the memory cards.
- The data format is not compatible to the B&R SYSTEM 2003 CPU CP476.

The SRAM and FlashPROM memory cards can only be written to by the CP260. Therefore, it is not possible to program system software or the application on a memory card directly on a PC with a PCMCIA interface.

5.2.10 Insert Slots

The CP260 CPU is equipped with two insert slots for interface modules.

The possibility of combining interface modules allows various bus and network systems to be integrated into the B&R SYSTEM 2005.

The following interface modules can be operated with the CP260:

Module	Description
3IF613.9	Interface module with three RS232 interfaces
3IF621.9	Interface module with one RS485/RS422 interface and one CAN interface
3IF622.9	Interface module with one RS232 interface and two RS485/RS422 interfaces
3IF661.9	Interface module with one RS485 interface (PROFIBUS DP slave)
3IF671.9	Interface module with one RS232 interface, one RS485/RS422 interface and one CAN interface
3IF672.9	Interface module with one RS232 interface and two CAN interfaces
3IF681.95	Interface module with one RS232 interface and one ETHERNET interface with 10 BASE2 connection (Cheapernet BNC-socket)
3IF681.96	Interface module with one RS232 interface and one ETHERNET interface with 10 BASE-T connection (Twisted Pair / RJ45-socket)
3IF686.9	2005 interface module, 1 ETHERNET Powerlink interface, manager or controller function, electrically isolated

Table 54: CP260 interface module inserts

5.2.11 Data/Real-time Buffering

The following areas are buffered:

- User RAM
- System RAM
- Real-time clock

Buffering is carried out with a NiMH rechargeable battery and with a battery in the following order:

1) NiMH rechargeable battery: The rechargeable battery is located in the CPU.

2) Backup battery: The backup battery is located either in the B&R 2005 rack or in the AC240 battery module

Battery Monitoring

The battery voltage is checked cyclically. The cyclic load test of the battery does not considerably shorten the battery life, instead it gives an early warning of weakened buffer capacity.

The status information "Battery OK" is available to the user from the SYS_lib function "SYS_battery".

Battery Change Interval

See section "Backup Battery" in sections 2 "Module Racks" and 17.2 "AC240" (battery module).

5.2.12 Local I/O Bus Expansion

Since the CP260 does not have its own expansion master, the EX350 I/O master controller is needed for local I/O bus expansion. By using this controller, up to four expansion racks with all I/O modules can be used with the CP260.

The I/O master controller is operated in the expansion slot of a PS465 power supply module. I/O modules on the main rack are handled by the CPU. The EX350 module supports the CPU by processing I/O module data on the expansion racks.

5.2.13 Axis Coupling over Multiple Modules

When coupling axes over multiple modules (gears, cams, CNC), the set positions of the master axes are sent to the NC154 modules with the slave axes in an interrupt routine running on the main CPU. The interrupt routine is not allowed to be stopped. These requirements are fulfilled by the following CPUs:

- CP260
- IF260 when it is used as a main CPU

5.2.14 Programming System Flash

General Information

CPUs are delivered with a runtime system. The operating mode switch is set to switch position 0 when delivered i.e. bootstrap loader mode is set.

A switch position must be set in order to boot the PLC in RUN mode (see Section 5.2.7 "Operating Mode Switch", on page 124). A runtime system update is only possible in RUN mode.

Runtime System Update

The runtime system can be updated using the programming system. When updating the runtime system (online runtime system update), the following procedure must be carried out:

1) An online runtime system update is only possible if the processor is in RUN mode. To do this, the operating mode switch must be turned to 4 or 6.
2) Switch on the supply voltage.
3) Establish online connection (online cable) between programming device (PC or Industrial PC) and the CP260. An online runtime update is possible using the serial RS232 onboard interface.
4) Start B&R Automation Studio™:

5) Start the update procedure by calling the **Services** command from the **Project** menu. Select **Transfer Operating System...** from the menu shown. Follow the instructions from B&R Automation Studio™.

6) A dialog box is displayed for configuring the runtime system version. The runtime system version is already preselected by the user's project settings. Using the drop-down menu, the runtime system versions stored in the project can be selected. Clicking on the **Browse** button allows the selected runtime system version to be loaded from the hard drive or from the CD.

   Pressing **Next >** opens a pop-up window, which allows the user to select whether the modules should be downloaded with SYSTEM ROM target memory using the following runtime system update. Otherwise, modules can also be downloaded using a later application download.

   After pressing **Next >**, a dialog box appears where the user can set the CAN baud rate, CAN ID and the CAN node number (the CAN node number set here is only relevant if an interface module does not contain a CAN node number switch). Assigning a unique node number is especially important with online communication over a CAN network (INA2000 protocol).

7) The update procedure is started by pressing **Next >**. The update progress is shown in a message window.

User Flash will be deleted.

8) When the update procedure is complete, the online connection is automatically established again.

9) The PLC is now ready for use.

An operating system update is not only possible through an online connection, but also through a CAN network, serial network (INA2000 protocol) or an ETHERNET network, depending on the system configuration.