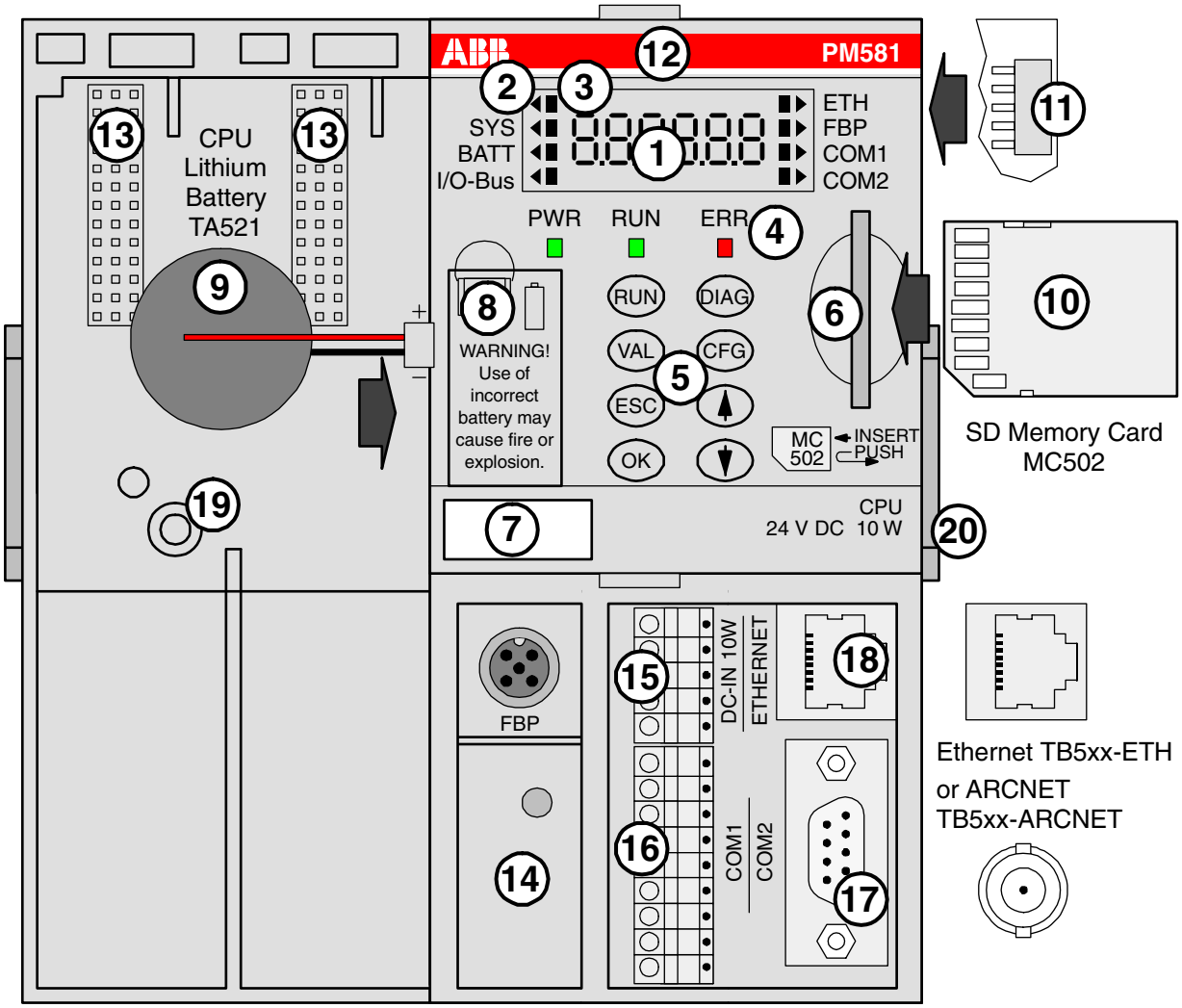
Contents

AC500 CPUs

AC500 CPUs PM571, PM581, PM582, PM590 and PM591
- PM5xx-ETH: CPU with network interface Ethernet RJ45
- PM5xx-ARCNET: CPU with network interface ARCNET BNC



Elements of the CPU

1 Six 7-segment status displays with background lighting
2 Triangle displays for ”Item”
3 Square displays for ”Status”
4 Status LEDs
5 Pushbuttons
6 Slot for the SD Memory Card
7 Label
8 Compartment for the Lithium battery
9 Lithium battery TA521
10 SD Memory Card MC502

Elements of the CPU Terminal Base

11 I/O-Bus (10-pole, female) to electrically connect the first I/O Terminal Unit
12 Slot for the CPU (CPU is mounted)
13 Slots for couplers (max. 4)
14 Interface for FieldBusPlug
15 Supply for 24 V DC
16 Serial interface COM1
17 Serial interface COM2
18 Network interface (Ethernet or ARCNET)
19 Holes for wall mounting
20 DIN rail

Figure: CPU PM581-ETH plugged on a Terminal Base TB521

The CPUs PM571, PM581, PM582, PM590 and PM591 are the central units (basic units) of the control system Advant Controller 500 (AC500). The types differ in their performance (memory size, speed etc.). Each CPU must be mounted on a suitable Terminal Base. The Terminal Base type depends on the number of communication modules (couplers) which are used together with the CPU and on the CPU-

own network interface type (Ethernet or ARCNET). At the right side of the CPU, up to 7 I/O expansion modules can be attached.

If both of the following conditions are fulfilled, **max. 10 I/O expansion modules can be connected to the I/O-Bus of the CPU:**
- PS501 as of version V1.2
- CPUs as of firmware V1.2.0

The CPUs have several interfaces.

Note: Mounting, disassembling, electrical connection and dimensioned drawings for the Terminal Bases, CPUs, communication modules, I/O Terminal Units and the I/O expansion modules are described in detail in the AC500 system data chapters.

Contents

Short description

Important: Currently, the AC500 CPU can only be used as slave together with the PROFIBUS DP **"Modular"** FBP V0/V1 (order No. 1SAJ 240 100 R10xx) and the corresponding GSD file ABB_091F.GSD.

Hardware configuration

Each CPU can operate up to 4 couplers through its coupler interface. The couplers are mounted on the left side of the CPU on the same Terminal Base. On the right side of the CPU, up to 7 digital or analog I/O expansion modules can be attached which are automatically interconnected by the I/O-Bus. Each of these modules requires its own I/O Terminal Unit, whose type depends on the module type.

If both of the following conditions are fulfilled, **max. 10 I/O expansion modules can be connected to the I/O-Bus of the CPU:**
- PS501 as of version V1.2
- CPUs as of firmware V1.2.0

Terminal Bases, Terminal Units, I/O modules, couplers and accessories have their own technical descriptions which can be found under "Hardware AC500" and "Hardware S500".

Each CPU can be used as

- bus master within the control system AC500 together with several field buses and networkings
- slave (remote processor together with the FieldBusPlug) within the control system AC500
- stand-alone CPU

The CPUs are powered with 24 V DC.

CAUTION: Removal of energized modules is not permitted. All power sources (supply and process voltages) must be switched off while working on any AC500 system.

The following figure shows a CPU with Terminal Base, couplers and I/O modules.

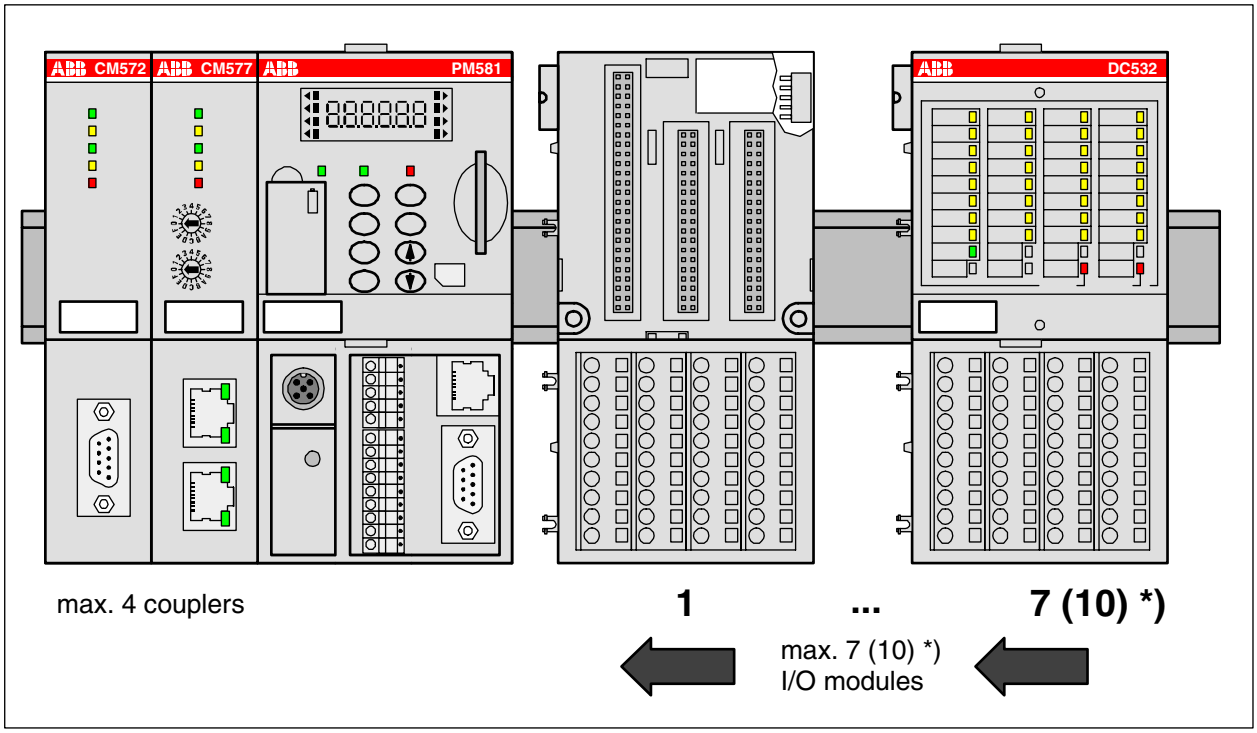


Figure: CPU with Terminal Base, couplers and I/O modules

***)** If both of the following conditions are fulfilled, **max. 10 I/O expansion modules can be connected to the I/O-Bus of the CPU:**
- PS501 as of version V1.2
- CPUs as of firmware V1.2.0

Assortment

CPUs

CPU	Program memory	Cycle time for 1000 instructions	Network interface		Other interfaces	Suitable Terminal Bases
			Ether-net	ARC-NET		
PM571	64 kB	Binary: 0.3 ms Word: 0.3 ms Floating point: 6 ms			Serial interfaces COM1 and COM2, FBP, coupler interface, I/O-Bus	TB5xx-xx
PM571-ETH			yes			TB5xx-ETH
PM581	256 kB	Binary: 0.15 ms Word: 0.15 ms Floating point: 3 ms				TB5xx-xx
PM581-ETH			yes			TB5xx-ETH
PM581-ARCNET				yes		TB5xx-ARCNET
PM582	512 kB					TB5xx-xx
PM582-ETH			yes			TB5xx-ETH
PM590	2 MB	Binary: 0.02 ms Word: 0.01 ms Floating point: 0.02 ms				TB5xx-xx
PM590-ETH			yes			TB5xx-ETH
PM590-ARCNET				yes		TB5xx-ARCNET
PM591	4 MB					TB5xx-xx
PM591-ETH			yes			TB5xx-ETH
PM591-ARCNET				yes		TB5xx-ARCNET

For further information see Technical data and Ordering data

Terminal Bases

Number of slots

Terminal Base	TB511	TB521	TB541
Slots for CPUs	1	1	1
Slots for communication modules	1	2	4

Terminals and interfaces

Terminal Base	TB511-		TB521-		TB541-	
available = (x)	ETH (x)	ARCNET	ETH (x)	ARCNET (x)	ETH (x)	ARCNET
Connection						
I/O-Bus	I/O interface for directly adding up to 7 I/O Terminal Units *)					
Power supply	5-pole removable terminal block					
COM1	serial interface, 9-pole removable terminal block					
COM2	serial interface, 9-pole SUB-D connector (female)					
Network interface (type must be equal to the type of the used CPU)	Ethernet RJ45	ARCNET BNC	Ethernet RJ45	ARCNET BNC	Ethernet RJ45	ARCNET BNC
FBP interface	Fieldbus-neutral slave interface (M12, 5-pole, male, fastening with screw)					

***)** If both of the following conditions are fulfilled, **max. 10 I/O expansion modules can be connected to the I/O-Bus of the CPU:**
- PS501 as of version V1.2
- CPUs as of firmware V1.2.0

Connections

I/O-Bus

The I/O-Bus is the I/O data bus for the S500 expansion modules. Through this bus, I/O and diagnosis data are transferred between the AC500 CPU and the I/O expansion modules. Up to 7 I/O Terminal Units (for 1 I/O expansion module each) can be added to one Terminal Base.

If both of the following conditions are fulfilled, **max. 10 I/O expansion modules can be connected to the I/O-Bus of the CPU:**
- PS501 as of version V1.2
- CPUs as of firmware V1.2.0

The I/O Terminal Units have a bus input at the left side and a bus output at the right side. Thus the length of the I/O-Bus increases with the number of the I/O expansion modules used.

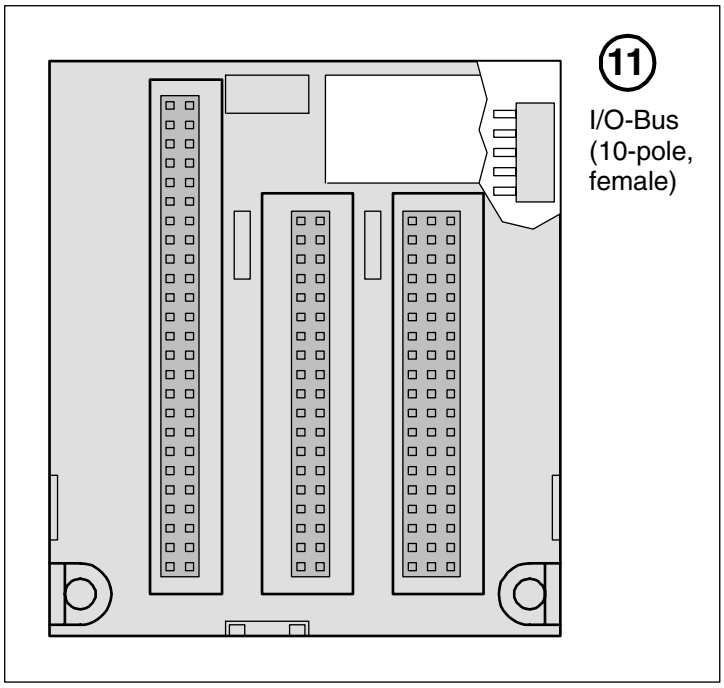
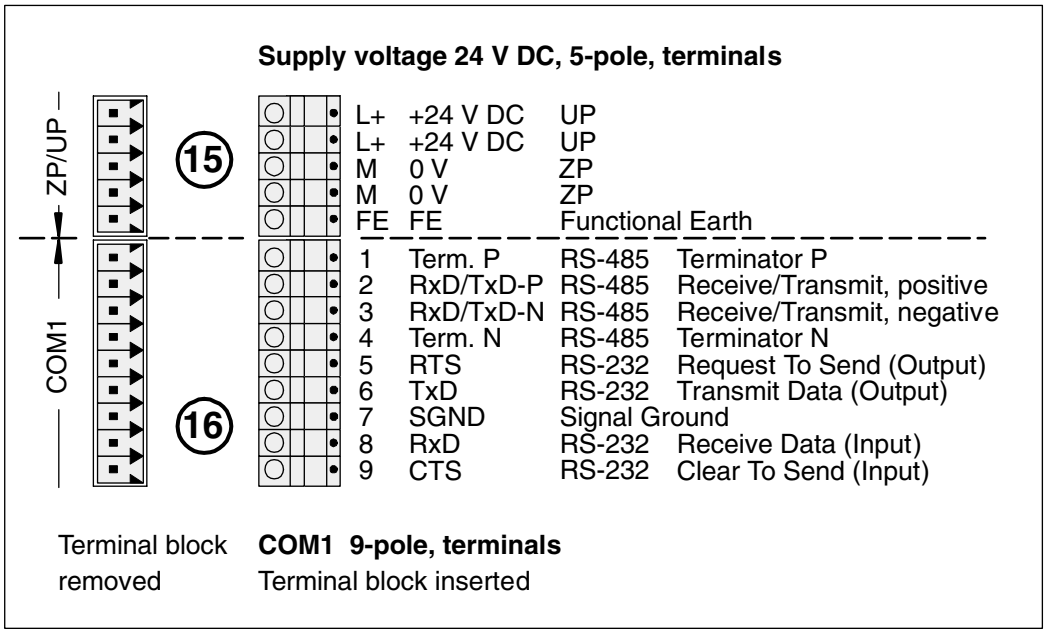


Figure: I/O-Bus

Power supply

The supply voltage of 24 V DC is connected to a 5-pole removable terminal block. ZP and UP exist twice. So it is possible to supply external sensors from these terminals, for instance.

Important: Exceeding the maximum power supply voltage (>30 V DC) for process or supply voltages could lead to unrecoverable damage of the system. The system could be destroyed.



Figure, upper part: Power supply via a 5-pole terminal block
Figure, lower part: Terminal assignment of the serial interface COM1

Bad wiring on power supply terminals

Attention: The product should be installed by trained people who have the knowledge of wiring electronic devices. In case of bad wiring, although the modules are protected against various errors (reverse polarity, short circuit, etc.), some problems could always happen:

- On the CPU Terminal Base, the terminals L+ and M are doubled. If the power supply is badly connected, a short circuit could happen and lead to a destruction of the power supply or its fuse. If no suitable fuse exists, the Terminal Base itself could be destroyed.

- The CPUs (Terminal Bases) and all electronic modules (and Terminal Units) are protected against reverse polarity.

- All necessary measures should be carried out to avoid damages to modules and wiring. Notice the wiring plans and connection examples.

Serial interface COM1 (for terminal assignment see the figure above)

The serial interface COM1 is connected to a removable 9-pole terminal block. It is configurable for RS-232 and RS-485 and can be used for

- an online access (RS-232 programming interface for PC/Control Builder)
- a free protocol (communication via the function blocks COMSND and COMREC)
- Modbus RTU, master and slave or
- a CS31 system bus (RS-485), as master only

A detailed description for COM1 can be found under "Hardware AC500 / System data / System data and System construction / Serial interface COM1 or Serial interfaces".

Serial interface COM2

The serial interface COM2 is connected to a 9-pole SUB-D connector. It is configurable for RS-232 and RS-485 and can be used for

- an online access (RS-232 programming interface for PC/Control Builder)
- a free protocol (communication via the function blocks COMSND and COMREC)
- MODBUS RTU, master and slave

COM2 is not intended to establish a CS31 system bus.

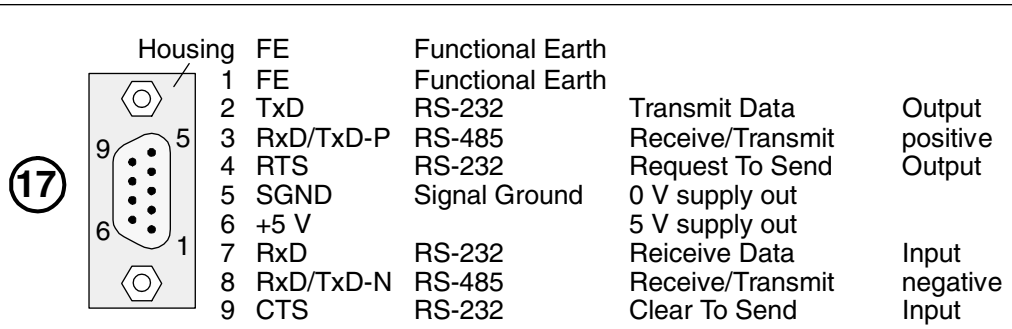


Figure: Pin assignment of the serial interface COM2

A detailed description for COM2 can be found under "Hardware AC500 / System data / System data and System construction / Serial interface COM2 or Serial interfaces".

Network interface Ethernet

This interface is the connection to the internal Ethernet coupler of the CPUs PM5xx-ETH. Applications are:

- TCP/IP for PC/Control Builder (programming)
- UDP (communication via function blocks ETH_UDP_SEND and ETH_UDP_REC)
- Modbus on TCP/IP (Modbus on TCP/IP, master and slave)

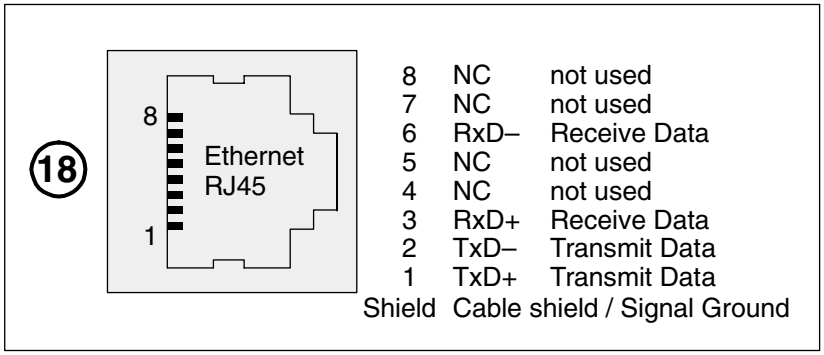


Figure: Pin assignment of the Ethernet interface

Network interface ARCNET

This interface is the connection to the internal ARCNET coupler of the CPUs PM5xx-ARCNET.

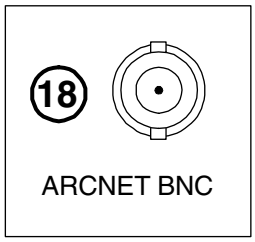


Figure: ARCNET interface

FBP interface

Through this 5-pole fieldbus-neutral interface, the AC500 CPU can be connected **as a slave** to a fieldbus master. The FieldBusPlug is fastened by a screw.

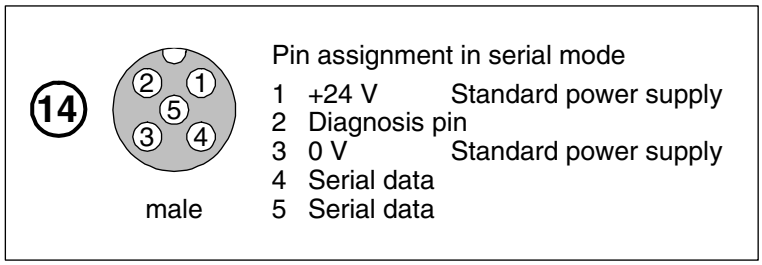


Figure: Pin assignment of the FBP interface

Insertion / replacement of the Lithium battery TA521

AC500 CPUs are supplied without a Lithium battery. It therefore must be ordered separately. The TA521 Lithium Battery is used to save RAM contents of AC500 CPUs and back-up the real-time clock. Although the CPUs can work without a battery, its use is still recommended in order to avoid process data being lost.

The CPU monitors the battery status. A low battery error is output before the battery condition becomes critical (about 2 weeks before). After the error message appears, the battery should be replaced as soon as possible.

Attention: The TA521 Lithium Battery is the only one, which can be used with AC500 CPUs.

The following procedures describe the insertion / replacement of the Lithium battery.

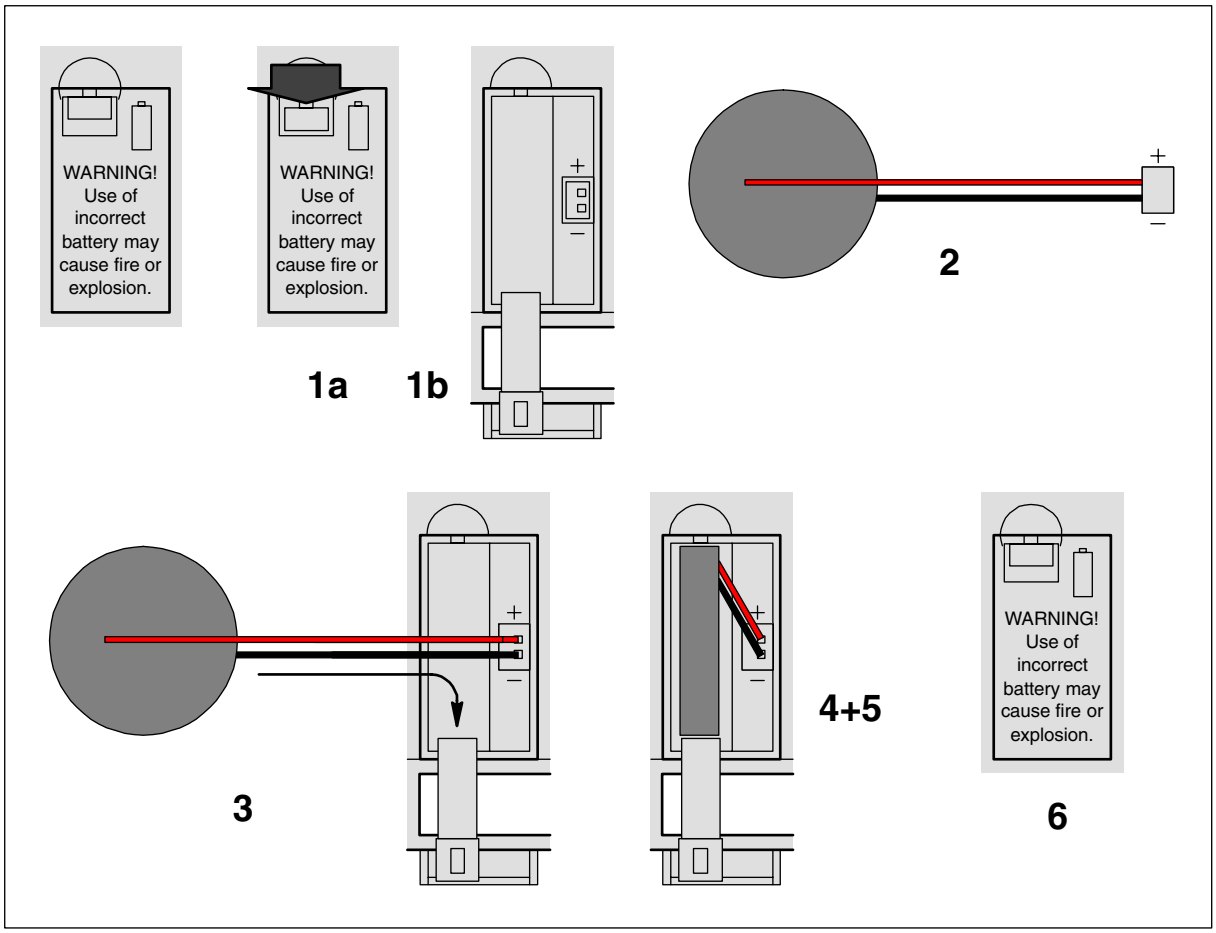


Figure: Insertion / replacement of the Lithium battery

Insertion of the battery:

1. Open the battery compartment by inserting a fingernail in the small locking mechanism, press it down and slip down the door. The door is attached to the front face of the CPU and cannot be removed.
2. Remove the TA521 battery from its package and hold it by the small cable.
3. Insert the battery connector into the small connector port of the compartment. The connector is keyed to find the correct polarity (red = plus-pole = above).
4. Insert first the cable and then the battery into the compartment, push it until it reaches the bottom of the compartment.
5. Arrange the cable in order not to inhibit the door to close.

6. Pull-up the door and press until the locking mechanism snaps.

Note: In order to prevent data losses or problems, the battery should be replaced after 3 years of utilisation or **at least** as soon as possible after receiving the "Low battery warning" indication.
Do not use a battery older than 3 years for replacement, do not keep batteries too long in stock.

Replacement of the battery:

Attention: In order to avoid any data losses (if needed), the battery replacement should be done with the system under power. Without battery and power supply there is no data buffering possible.

1. Open the battery compartment by inserting a fingernail in the small locking mechanism, press it down and slip down the door. The door is attached to the front face of the CPU and cannot be removed.

2. Remove the old TA521 battery from the battery compartment by pulling it by the small cable. Remove then the small connector from the socket, do this best by lifting it out with a screwdriver (see photo).

3. Follow the previous instructions to insert a new battery.

Attention: Lithium batteries must not be re-charged, not be disassembled and not be disposed of in fire. They must be stored in a dry place. Exhausted batteries must be recycled to respect the environment.

The technical data sheet for the Lithium battery can be found in the chapter "Accessories / Lithium Battery TA521".

Insertion of the SD Memory Card MC502

AC500 CPUs are supplied without an SD Memory Card. It therefore must be ordered separately. The SD Memory Card is used to back-up user data and store user programs as well as to update the internal CPU firmware. AC500 CPUs can be operated with and without SD Memory Cards.

The CPU uses a standard file system. This allows standard card readers to read the MC502 SD Memory Cards.

Attention: The use of memory cards other than the MC502 SD Memory Card is prohibited. ABB is not responsible nor liable for consequences resulting from the use of unapproved memory cards.

Attention: In operation, the plugged-in SD Memory Card withstands vibrations up to 1 g. Without using an SD Memory Card, the CPU itself withstands vibrations up to 4 g.

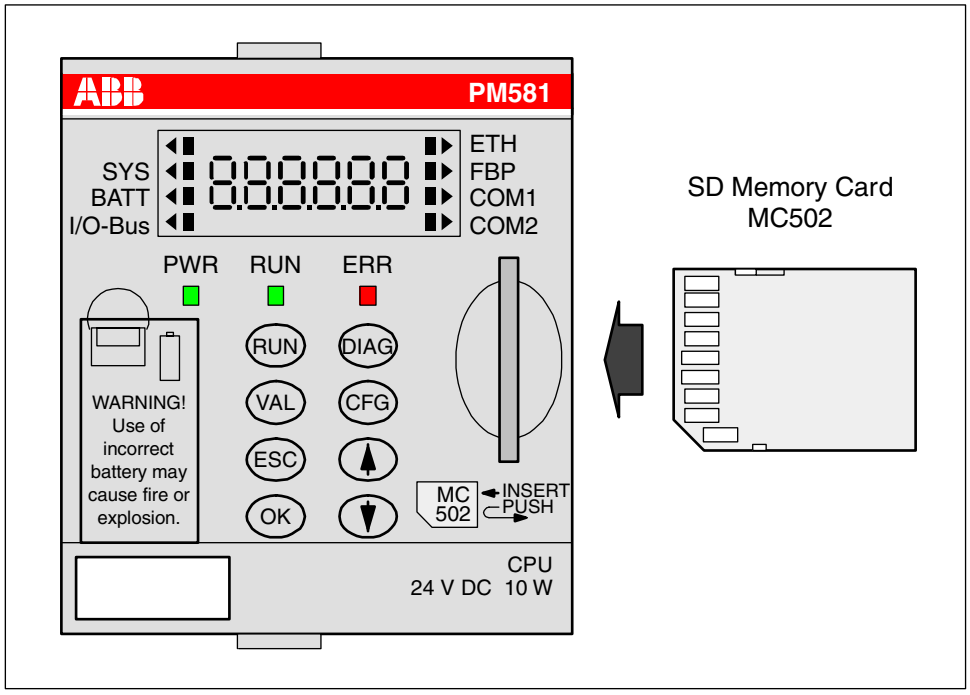


Figure: Insertion of the SD Memory Card

To insert the SD Memory Card, follow the procedure shown below.

1. Remove the SD Memory Card from its package.
2. Insert the memory card into the opening of the front face of the CPU with the memory aligned as shown above (contacts are visible on the left side, bevelled edge below).
3. Push on the card until it moves forward, then release your pressure, the SD card comes slightly backward and it locks into the card slot.

Removing the SD Memory Card

To remove the card, first push on the card until it moves forward (that unlocks the card), then release your pressure, the card will go forward out of the slot and can be easily removed.

The technical data sheet for the SD Memory Card can be found in the chapter "Accessories / SD Memory Card MC502".

Project planning / start-up

Programming is carried out with the AC500 Control Builder software, which is based on the CodeSys standard. The software can be run on the operating systems Windows 2000 and XP.

A fast Online Program Modification of the user program is possible without interrupting the running operation.

If data areas should be saved during power OFF/ON, they can be stored in the Flash EPROM. The installed Lithium battery saves data in the RAM.

Behaviour of the system in case of power supply interruptions and power recovering

AC500 system supply (terminals L+, M)

As soon as the CPU power supply is higher than 19.2 V DC, the power supply detection is activated and the CPU is started. When during operation the power supply is going down to lower than 19.2 V DC for more than 10 ms, the CPU is switched to safety mode (see System Technology of the CPUs).

A warm restart of the CPU only occurs by switching the power supply off and on again (see also the description of the function modes of the CPU in the "AC500 System Technology" chapters.

Displays and operating elements on the front panel of the CPU

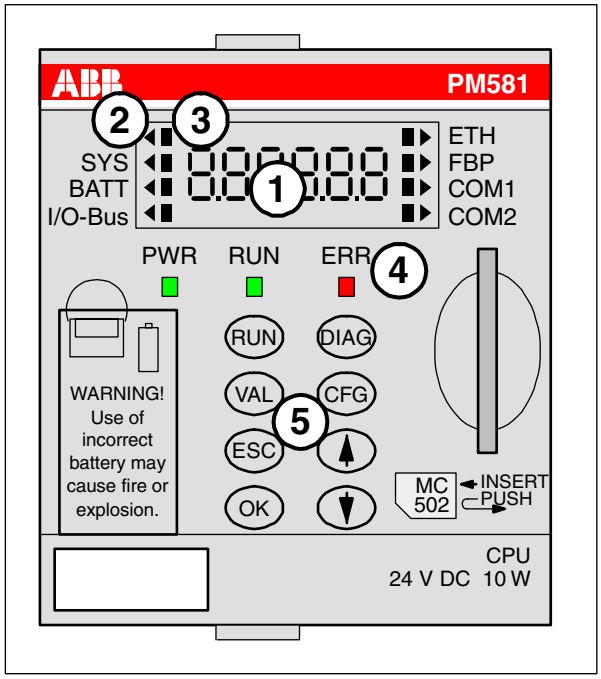


Figure: Displays and operating elements on the front panel of the CPU

LCD display with background lighting

1 Six 7-segment status displays for displaying

- the CPU status (e.g. RUN or STOP)
- error codes and error classes
- address modifications and parameters of the integrated couplers (Ethernet or ARCNET)
- values at the channels of I/O modules

2 Triangle displays

- show what is just selected (active)

3 Square displays

- show that the communication is running between the CPU and the bus

Status LEDs

4 Meaning of the status LEDs

LED	Color	Function
PWR	green	indicates that the power supply of the CPU is ON
RUN	green	indicates that the CPU is running (is OFF with STOP)
ERR	red	indicates an error occurred (goes off after error acknowledgement)

Pushbuttons

5 The CPU can be operated manually using the eight pushbuttons on the front panel. Meaning of the pushbuttons:

Button	Meaning
RUN	toggles the CPU between RUN and STOP mode
VAL	reserved for future use
ESC	ESC, quit menu without saving
OK	OK, leave menu after saving
DIAG	diagnosis, evaluate error message in detail
CFG	set address for ARCNET, CS31 and FBP
↑	Move up selection or increase value (e.g. address) by 1
↓	Move down selection or decrease value (e.g. address) by 1

The entire functionality of the CPUs is described in detail under "System technology of the CPUs".

In the following examples, the use of the displays and pushbuttons is represented in detail.

Examples for the use of the displays and pushbuttons

Example 1: Setting of the slave address of the FBP plug onto the AC500 CPU (if needed, but not recommended)

The FieldBusPlug must have a properly assigned slave module address. The AC500 CPU gives them an address at system power-up. The address could be set with the use of the display and the pushbutton on the top of the module, but it is mainly assigned by the AC500 Control Builder configuration.

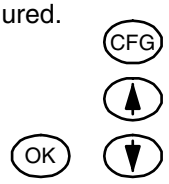
Attention: The **local** setting of an FBP address by means of pushbuttons and display has a higher priority than an FBP address configured by the AC500 Control Builder!

The locally set address replaces the address configured by the software.

It is highly recommended to be extremely careful when modifying the address locally, because it has high influence on the behaviour of the application.

Up to 99 addresses can be then set with the display.

By using the **CFG**, the **arrow keys** and the **OK** pusbutton, some parameters of the CPU can be configured.



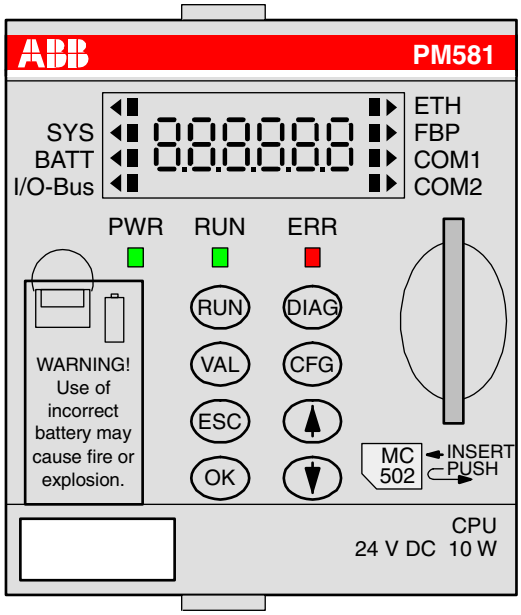


Figure: Configuration on the CPU

Attention: If the FBP address set on the AC500 CPU module (or by the AC500 Control Builder software) is different from that address assigned by the Master device for the same station, the station cannot be accessed and the complete Fieldbus cannot work properly or is completely down!

To configure the FBP address, please follow the procedure described below:

1. First select the item to be configured by pressing the **CFG** key, the CPU changes to configuration mode and a small triangle is displayed on the LCD on the first right up position of the display beside the ETH inscription and the already configured address is displayed.
   Press one time more the **CFG** key to move the triangle to the position below "FBP". The FBP is then selected, and the current address is shown.
2. Press then the arrow keys UP or DOWN to increase or decrease the address, the modified value blinks to indicate that it differs from the previously stored one.
3. Once the desired address is reached, press **OK** to accept and quit or only **ESC** to exit the menu without saving the changes. The CPU status is then displayed **run/StoP.**

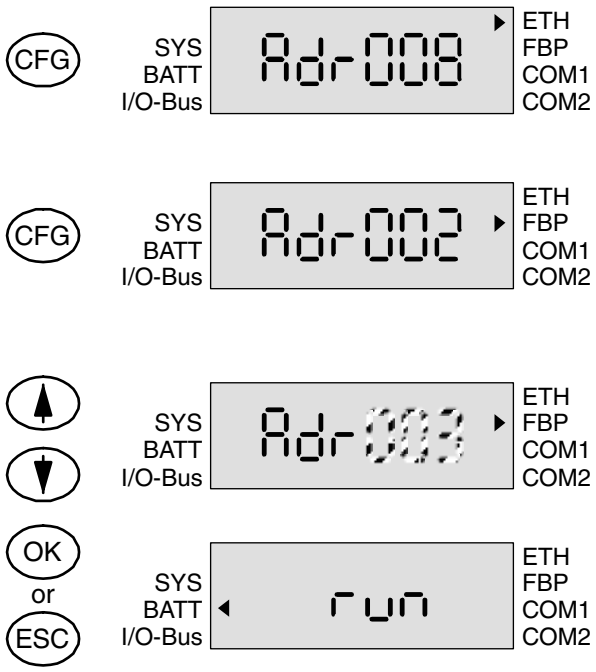


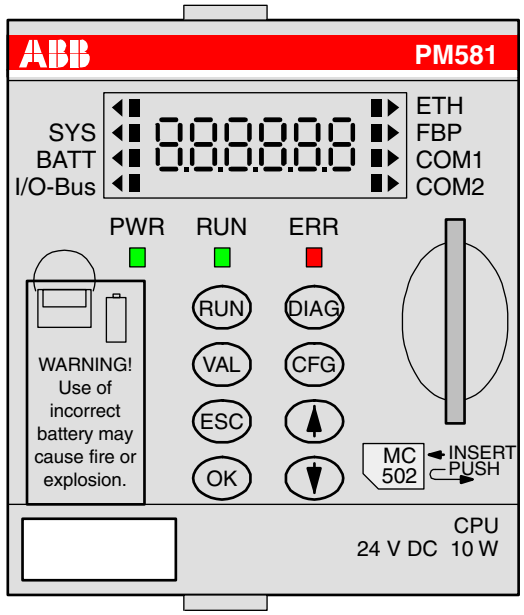
Figure: Configuration of an FBP address

A AC500 CPU equipped with a FieldBusPlug is always a slave device on the bus. To act as a master, a AC500 CPU should be equipped with master couplers (e.g CM572-DP for PROFIBUS DP).

Attention: The locally modified address will only be valid after a power OFF/ON of the CPU!

Example 2: AC500-CPU, status display and error indication

All AC500 CPUs have LEDs and a LC Display for indicating operating statuses and errors. The following drawing shows the front face of a AC500 CPU.



The CPU statuses are displayed on the CPU front face with 3 LEDs:

- PWR
- RUN
- ERR
- and by means of a background-lighted display

The display contains the following indications:

- ■ small black squares indications acting as a LED status for the device written beneath
- ▶ small black arrows used for indication by pointing the selected device to be configured or read
- 6 x 7-segment displays for ”plain text” or error codes display

Figure: Front face of a AC500 CPU

The display is normally OFF and the status of the CPU is shown as plain text "run" or "Stop", which reflects the operating status of the CPU program.

By pressing one of the dialog keys **"RUN, DIAG, CFG** or **VAL"**, the background lighting is turned ON and the desired function is performed.

In case of a function error, the display background lighting is also switched on and an error code is displayed.

The meaning of the LEDs and of LCD is given in the following table.

AC500 CPU module LEDs

LED	Status	Color	LED = ON	LED = OFF	LED flashes
PWR	24 V DC power supply is provided	green	voltage is present	voltage is missing	--
RUN	activity status	green	CPU is in RUN mode	CPU is in STOP mode	If flashes fast (4 Hz): The CPU is reading/writing the SD card, indicates together with the blinking error LED that the CPU is writing the internal Flash EEPROM. If flashes slow (1 Hz): The firmware update from the SD card is finished without errors.
ERR	error indication	red	An error has occurred. After pressing the DIAG key, the error type and code is displayed in the LC Display. The error codes can be shown by means of the DIAG and OK keys.	No errors are encountered or only warnings (E4 errors). This is configurable (by error 2 - 4, the LED behaviour is configurable.	Flashing fast (4 Hz): Indicates together with RUN a firmware update process and a Flash EEPROM write.
■	Working activity of the beneath described device (e.g. top right of the display ETH communication line).	black	Device is present and OK (e.g. the battery is present and OK).	No activity or device not present	Flashing according to the device activity, e.g. when data exchange on ETH, COM1, etc... communication lines.
▶ or ◀	Indicates the selected device to be read or configured. Acts as a cursor moving with the arrow ▲▼ keys	black	Points out the selected device of which the name is written beneath (e.g. top right of the display ETH communication line).	No device selected	--

Displaying error messages (error codes) on the AC500 CPU

When an error occurs, the red error LED goes on.

By pressing the **DIAG** key, the complete error code can be shown and an acknowledgement of the error can be performed.

By using the **DIAG** and the **OK** or the **ESC** push-buttons, the error message/code can be displayed and the error can be acknowledged.

DIAG OK ESC

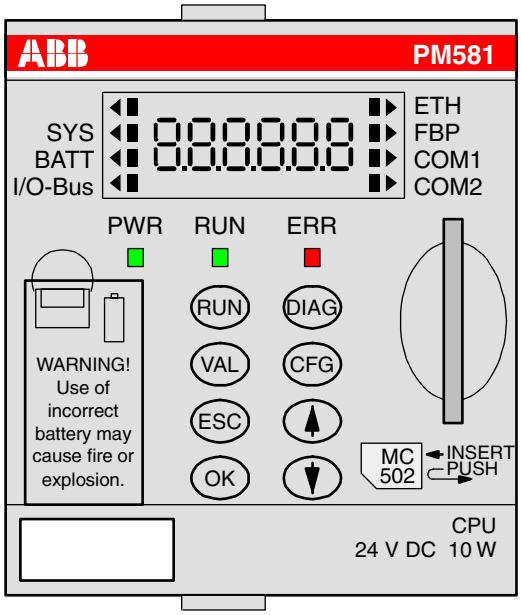


Figure: Error display on the CPU

The AC500 CPU can display various errors according to the error classes. The following error classes are possible. The reaction of the CPU is different for each type of error.

Error class	Type	Meaning	Example
E1	Fatal error	A safe function of the operating system is no longer guaranteed.	Checksum error in the system Flash or RAM error
E2	Severe error	The operating system is functioning without problems, but the error-free processing of the user program is no longer guaranteed.	Checksum error in the user Flash, independent of the task duration
E3	Light error	It depends on the application, if the user program should be stopped by the operating system or not. The user should decide, which reaction is necessary.	Flash could not be programmed, I/O module has failed.
E4	Warning	Error in the periphery (e.g. I/O) which only can have influence in the future. The user should decide the reaction to provide.	Short-circuit at an I/O module, the battery is exhausted or not inserted.

How an error message is built-up in the display

An error always consists of an Error Class (E1 to E4, see the previous table) and a number (0 to 63) which indicates the identifier of the error for direct error recognition. Moreover, there are further four detailed error codes from d1 to d4 which define the error in detail:

E1...E4 = 00...63 (error identifier)		e.g. wrong value, checksum error, short-circuit, exhausted or missing battery, etc. which is directly displayed in the LCD
->	d1 = 000...015	indicates the component which has sent the error (coupler, CPU, COM1, FBP, IO-Bus, etc.)
	d2 = 000...255	defines the faulty device within the component
	d3 = 000...030	defines the part of the module with an error (slot)
	d4 = 000...031	defines the channel within the module

Example of an error display for an exhausted battery

To display the complete error codes, please follow the procedure described below:

The CPU is running. The display only shows the RUN status and the background lighting is OFF.

When an error occurs, the red ERR LED goes on. An error message is output after pressing the **DIAG** key and, for example, the screen shown to the right displays ”E4=008”. According to the error level, E1 to E4 can be displayed.

In this example, ”**E4=008**” is a warning **(E4)** and **”008”** means ”Empty/Missing”.

By pressing on the **DIAG** button, the LCD background lighting is turned ON, the error codes can be displayed to achieve more (deaper) diagnostic. The display shows ”d1=009” (detail level 1) and ”009” indicates that the CPU has sent the error.

By pressing **DIAG** one more time, the display shows ”d2=022” (detail level 2) and ”022” indicates that the device type = battery.

By pressing **DIAG** one more time, the display shows ”d3=031” (detail level 3) and ”031” means ”no module type” (= device itself).

By pressing **DIAG** one more time, the display shows ”d4=031” (detail level 4) and ”031” means ”no channel” (= device itself).

By pressing **OK,** the error is acknowledged and the display returns to the normal state. ESC returns to the normal state without acknowledging the error!

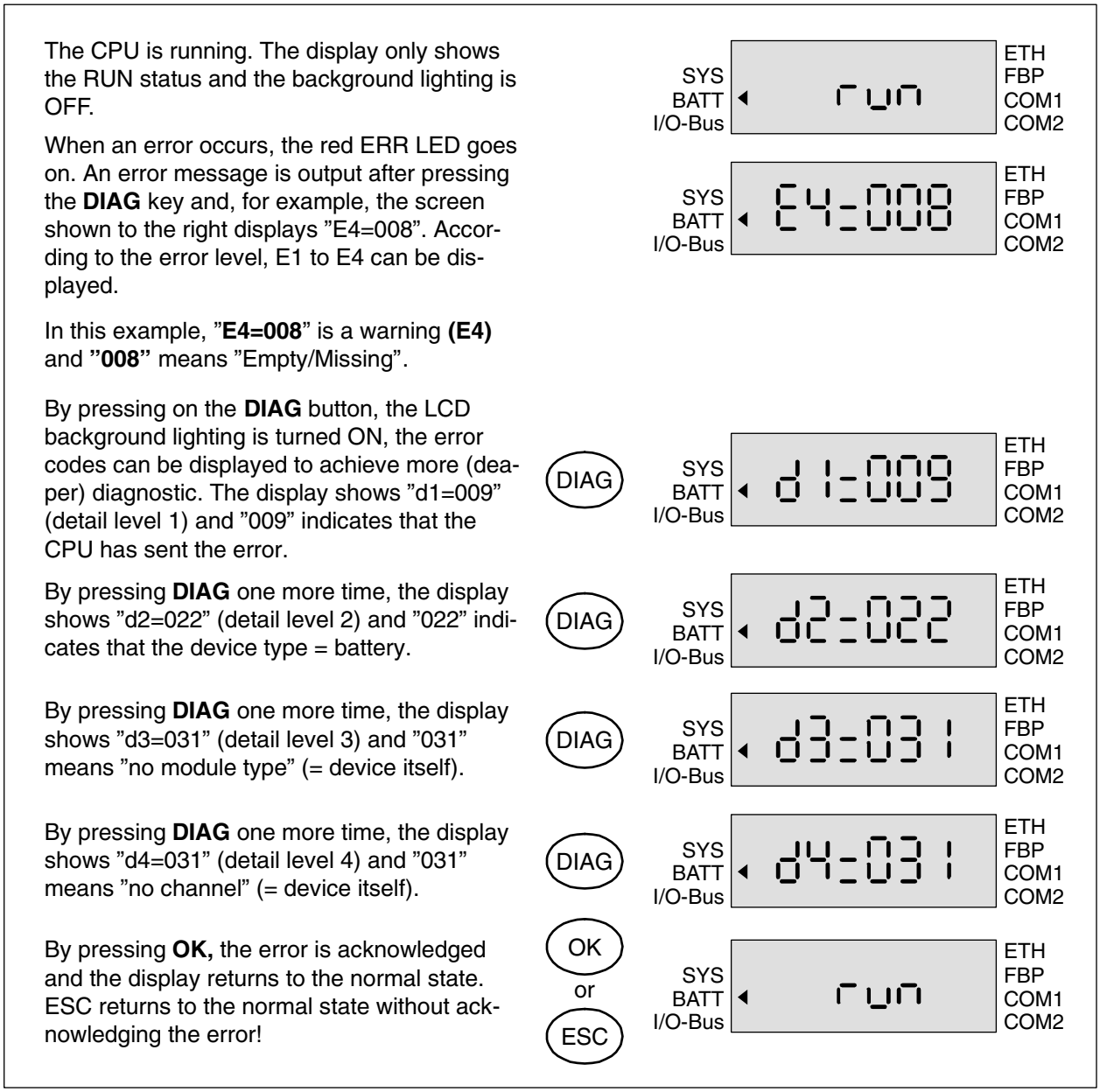


Figure: Example of an error display for an exhausted battery

Technical data

The system data of AC500 and S500 are valid here. Only additional details are therefore documented below.

General data of the CPUs and the Terminal Bases

For more information, please refer to the "AC500 System Data" chapters.

Connection of the supply voltage 24 V DC at the Terminal Base of the CPU	at a 5-pole removable terminal block with spring connection
Current consumption from 24 V DC	PM571: 50 mA PM571-ETH: 110 mA
	PM581: 50 mA PM581-ETH: 110 mA PM581-ARCNET: 110 mA
	PM582: 50 mA PM582-ETH: 110 mA
	PM59x: 90 mA PM59x-ETH: 150 mA PM59x-ARCNET: 150 mA
Inrush current at 24 V DC	PM571: 1 A^2s PM571-ETH: 1 A^2s
	PM581: 1 A^2s PM581-ETH: 1 A^2s PM581-ARCNET: 1 A^2s
	PM582: 1 A^2s PM582-ETH: 1 A^2s
	PM59x: 1 A^2s PM59x-ETH: 1 A^2s PM59x-ARCNET: 1 A^2s
Max. power dissipation within the module	10 W
Slots on the Terminal Bases	TB511: 1 CPU, 1 communication module
	TB521: 1 CPU, 2 communication modules
	TB524: 1 CPU, 4 communication modules
CPU interfaces at the Terminal Bases	I/O-Bus, COM1, COM2, FBP
CPU network interfaces at the Terminal Bases	TB5xx-ETH / PM5xx-ETH: Ethernet
	TB5xx-ARCNET / PM5xx-ARCNET: ARCNET
Connection system	see AC500 system data
Dimensions	further details see AC500 system data
Width x height x depth	TB511 with CPU: 95.5 x 135 x 75 mm
	TB521 with CPU: 123.5 x 135 x 75 mm
	TB541 with CPU: 179.5 x 135 x 75 mm
Weight (CPU without Terminal Base)	PM571: 135 g PM571-ETH: 150 g
	PM581: 135 g PM581-ETH: 150 g PM581-ARCNET: 160 g
	PM582: 135 g PM582-ETH: 150 g
	PM59x: 135 g PM59x-ETH: 150 g PM59x-ARCNET: 160 g
Mounting position	horizontal or vertical with derating (50 % output load, reduction of temperature to 40°C)

Detailed data of the CPUs

CPU	PM571	PM571 -ETH	PM58x	PM58x -ETH	PM581-ARCNET	PM59x	PM59x -ETH	PM59x-ARCNET
Program memory Flash EPROM and RAM	64 kB		PM581: 256 kB PM582: 512 kB			PM590: 2048 kB PM591: 4096 kB		
Data memory, integrated	24 kB, incl. 4 kB RETAIN		288 kB, incl. 32 kB RETAIN			PM590: 2048 kB, PM591:3072 kB, incl. 512 kB RETAIN		
Expandable memory	none		none			none		
Pluggable SD Memory Card for: - User data storage - Program storage - Firmware update	128 MB		128 MB			128 MB		
Cycle time for 1000 instructions - Binary - Word - Floating point	 0.3 ms 0.3 ms 6.0 ms		 0.15 ms 0.15 ms 3.0 ms			 0.05 ms 0.05 ms 0.5 ms		
Max. number of central inputs and outputs (up to 7 exp. modules): - Digital inputs - Digital outputs - Analog inputs - Analog outputs	 224 168 112 112		 224 168 112 112			 224 168 112 112		
Max. number of central inputs and outputs (up to 10 exp. modules): *) - Digital inputs - Digital outputs - Analog inputs - Analog outputs	 320 240 160 160		 320 240 160 160			 320 240 160 160		
Number of decentralized inputs and outputs	depends on the used field bus (as an info on the CS31 bus: up to 31 stations with up to 120 DI / 120 DO each)							
Data backup	battery		battery			battery		
Data buffering time at 25°C	about 3 years							
Battery low indication	warning indication issued about 2 weeks before the battery charge becomes critical							
Real-time clock - with battery back-up	X		X			X		
Program execution - cyclic - time-controlled - multitasking	 X X X		 X X X			 X X X		
Protection of the user program by a password	X		X			X		
Serial interface COM1 - Physical link: - Connection: - Usage:	configurable for RS-232 or RS-485 (from 0.3 to 187.5 kB/s) pluggable terminal block, spring connection for programming, as Modbus (master/slave), as serial ASCI communication, as CS31 master							
Serial interface COM2 - Physical link: - Connection: - Usage:	configurable for RS-232 or RS-485 (from 0.3 to 187.5 kB/s) SUB-D connector for programming, as Modbus (master/slave), as serial ASCI communication							
Integrated coupler, ETH = Ethernet RJ45 ARCNET = ARCNET BNC		ETH		ETH	ARCNET		ETH	ARCNET

Number of external couplers	up to 4 communication couplers like PROFIBUS DP, Ethernet, CANopen, DeviceNet. There is no restriction concerning the coupler types and coupler combinations (e.g. up to 4 PROFIBUS DP couplers are possible)		
LEDs, LCD display, 8 function keys	for RUN/STOP switch-over, status displays and diagnosis		
Number of timers	unlimited	unlimited	unlimited
Number of counters	unlimited	unlimited	unlimited
Programming languages - Instruction List IL - Function Block Diagram FBD - Ladder Diagram LD - Sequential Function Chart SFC - Continuous Function Chart (CFC)	 X X X X X	 X X X X X	 X X X X X
Certifications	CE, GL, DNV, BV, RINA, LRS, cUL		

***)** If both of the following conditions are fulfilled, **max. 10 I/O expansion modules can be connected to the I/O-Bus of the CPU:**
- PS501 as of version V1.2
- CPUs as of firmware V1.2.0

Ordering data

Order No.	Scope of delivery
1SAP 130 100 R0100	PM571, CPU, memory 64 kB, 24 V DC, Memory Card Slot, interfaces 2 x RS-232/485 (programming, Modbus/CS31), 1 x FBP, Display
1SAP 130 100 R0170	PM571-ETH, CPU, memory 64 kB, 24 V DC, Memory Card Slot, interfaces 2 x RS-232/485 (programming, Modbus/CS31), 1 x FBP, Display, integrated coupler Ethernet TCP/IP
1SAP 140 100 R0100	PM581, CPU, memory 256 kB, 24 V DC, Memory Card Slot, interfaces 2 x RS-232/485 (programming, Modbus/CS31), 1 x FBP, Display
1SAP 140 100 R0160	PM581-ARCNET, CPU, memory 256 kB, 24 V DC, Memory Card Slot, interfaces 2 x RS-232/485 (programming, Modbus/CS31), 1 x FBP, Display, integrated coupler ARCNET
1SAP 140 100 R0170	PM581-ETH, CPU, memory 256 kB, 24 V DC, Memory Card Slot, interfaces 2 x RS-232/485 (programming, Modbus/CS31), 1 x FBP, Display, integrated coupler Ethernet TCP/IP
1SAP 140 200 R0100	PM582, CPU, memory 512 kB, 24 V DC, Memory Card Slot, interfaces 2 x RS-232/485 (programming, Modbus/CS31), 1 x FBP, Display
1SAP 140 200 R0170	PM582-ETH, CPU, memory 512 kB, 24 V DC, Memory Card Slot, interfaces 2 x RS-232/485 (programming, Modbus/CS31), 1 x FBP, Display, integrated coupler Ethernet TCP/IP
1SAP 150 000 R0100	PM590, CPU, memory 2 MB, 24 V DC, Memory Card Slot, interfaces 2 x RS-232/485 (programming, Modbus/CS31), 1 x FBP, Display
1SAP 150 000 R0160	PM590-ARCNET, CPU, memory 2 MB, 24 V DC, Memory Card Slot, interfaces 2 x RS-232/485 (programming, Modbus/CS31), 1 x FBP, Display, integrated coupler ARCNET
1SAP 150 000 R0170	PM590-ETH, CPU, memory 2 MB, 24 V DC, Memory Card Slot, interfaces 2 x RS-232/485 (programming, Modbus/CS31), 1 x FBP, Display, integrated coupler Ethernet TCP/IP
1SAP 150 100 R0100	PM591, CPU, memory 4 MB, 24 V DC, Memory Card Slot, interfaces 2 x RS-232/485 (programming, Modbus/CS31), 1 x FBP, Display
1SAP 150 100 R0160	PM591-ARCNET, CPU, memory 4 MB, 24 V DC, Memory Card Slot, interfaces 2 x RS-232/485 (programming, Modbus/CS31), 1 x FBP, Display, integrated coupler ARCNET
1SAP 150 100 R0170	PM591-ETH, CPU, memory 4 MB, 24 V DC, Memory Card Slot, interfaces 2 x RS-232/485 (programming, Modbus/CS31), 1 x FBP, Display, integrated coupler Ethernet TCP/IP
1SAP 180 300 R0001	TA521, Lithium Battery
1SAP 180 100 R0001	MC502, SD Memory Card 128 MB
1SAP 180 200 R0001	TK501, Programming cable SUB-D / SUB-D, length: 5 m
1SAP 180 200 R0101	TK502, Programming cable terminal block / SUB-D, length: 5 m
1SAP 180 800 R0001	TA526, Wall Mounting Accessory
1SAP 111 100 R0170	TB511-ETH, CPU Terminal Base AC500, slots: 1 CPU, 1 communication module, Ethernet RJ45 connector
1SAP 112 100 R0160	TB521-ARCNET, CPU Terminal Base AC500, slots: 1 CPU, 2 communication modules, ARCNET COAX connector
1SAP 112 100 R0170	TB521-ETH, CPU Terminal Base AC500, slots: 1 CPU, 2 communication modules, Ethernet RJ45 connector
1SAP 114 100 R0170	TB541-ETH, CPU Terminal Base AC500, slots: 1 CPU, 4 communication modules, Ethernet RJ45 connector
1SAP 212 200 R0001	TU515, I/O Terminal Unit, 24 V DC, screw-type terminals
1SAP 212 000 R0001	TU516, I/O Terminal Unit, 24 V DC, spring terminals
1SAP 217 200 R0001	TU531, I/O Terminal Unit, 230 V AC, relays, screw-type terminals
1SAP 217 000 R0001	TU532, I/O Terminal Unit, 230 V AC, relays, spring terminals