



Operating Instructions

Operation and Settings of CPU & Power Modules, Type 9440

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Order Number:

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Valid for: 9440, firmware version V01-22 (Profibus) and V11-01 (Modbus) and later

Target group:

Trained, qualified staff
(in accordance with ElexV, IEC 79-17)

Subject to change and correction without notice

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IS1 Operation

The LCD display in running operation.

FBAdr	FB	I/O
vvvxxx	yyyy	zzz

<i>Text</i>	<i>Meaning</i>	<i>Range of Values</i>	
vvv	FB address	--- vvv	No valid address Address 0...127
xxx	Only for Profibus	+xx	Primary CPM, no further details. Redundant CPM, Profibus address incremented
yyyy	FB state	off baud	No activity on the bus Activity on the bus, no data exchange yet
	Without redundancy	OK	FB OK, with one CPM in operation
	With redundancy	OK-A OK-I	FB OK in redundant operation, CPM active FB OK in redundant operation, CPM not active
zzz	State of the modules	---	Still no module data available
		OK	All modules OK
		err	Common alarm for I/O modules

See the operating instructions of the I.S. 1 system for further descriptions concerning the CPM.

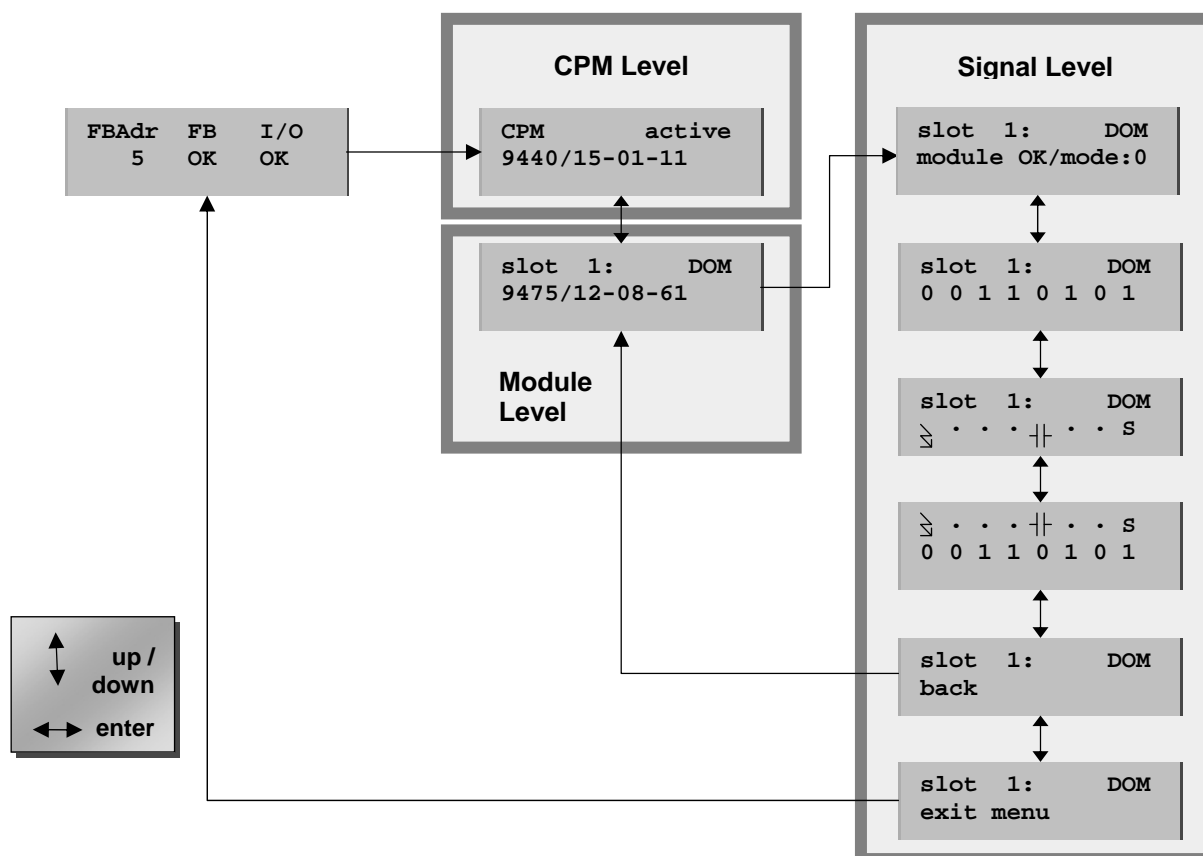
Definitions

- English is the standard language used in the menu.
- When reconfiguration is carried out during normal operation, a message appears that the menu will be closed and reopened if the signal level had been displayed prior to that. The menu is not closed at the module or CPM level.
- Representation of the modules using the actual state of the BusRail. If no configuration has been carried out, only the CPM and module levels are displayed; no signal or line faults are shown.
- If the fieldbus is not running, the information is called up via the primary CPM. Only data from the CPM and menu levels are displayed.

The Menu Structure - Stage 2

The menu consists of three levels. The CPM level, the module level and the signal level.

Level	Meaning
CPM level	Displays all CPM data (FB address, data link type, FW version)
Module level	Actual state on the BusRail. All plugged-in I/O modules are displayed.
Signal level	Signals, faults and information regarding an I/O module.



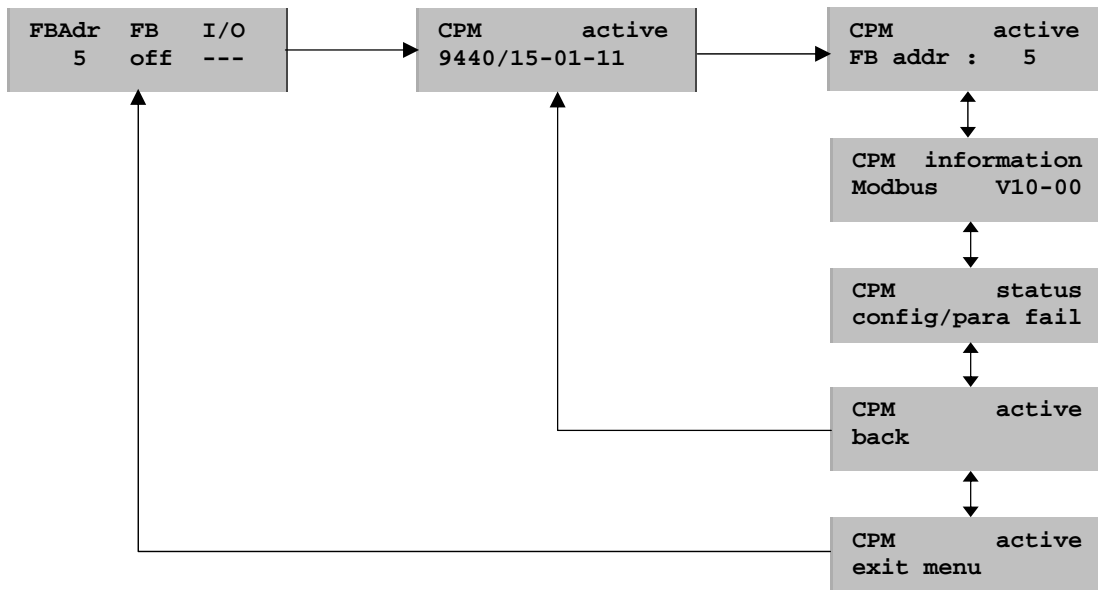
The levels that are visible depend on the parameter set and the number of modules plugged in.

Level	No parameter set		Parameter set OK		Parameter change	
	Modules	No modules	Modules	No modules	Modules	No modules
CPM	All information	All information	All information	All information	No reaction	No reaction
Module	Actual state	Not visible	Actual state	Not visible	No reaction	Not visible
Signal	Not visible	Not visible	Desired state	Not visible	Close menu	Not visible

In the case of redundancy, no information is displayed about the other CPM. This information must be called up directly via the respective CPM.

CPM level

All status displays are updated cyclically.



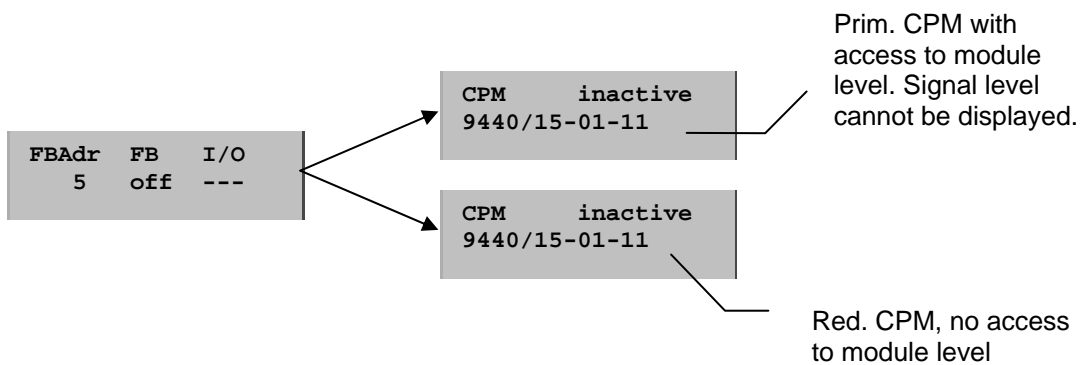
Since the "exit menu" item occurs at the end of each menu, it is not shown explicitly in the diagrams. It is nevertheless present.

The table gives an overview of which level is shown, dependent on the state of the CPM.

After power-up			Parameters loaded			Data exchange		
CPM (prim.)		CPM (red.)	CPM (prim.)		CPM (red.)	CPM (prim.)		CPM (red.)
Inactive		Inactive	Active		Inactive	Active		Inactive
C	M	-	C	M	S	C	-	-

Inactive			Active		
C	-	-	C	M	S

- C CPM level
- M Module level
- S Signal level

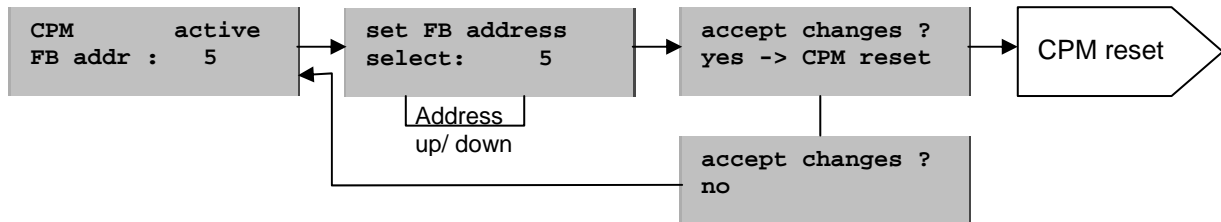


FB address

Display of the FB address

CPM active FB addr : 5	FB address available
CPM active FB addr : ---	FB address not available

Setting the FB address



Special cases

set FB address no change	When the fieldbus is active, the FB address cannot be changed.
accept changes yes -> no change	Fieldbus address was not changed, pressing enter returns to previous menu item, the CPM does not carry out a reset.

Information

The HW revision is externally visible and is not displayed.

CPM information Profibus V01-19	Display of firmware version and data link type.
------------------------------------	---

Status display

CPM status config/para fail	Status of the CPM
--------------------------------	-------------------

Status messages possible:

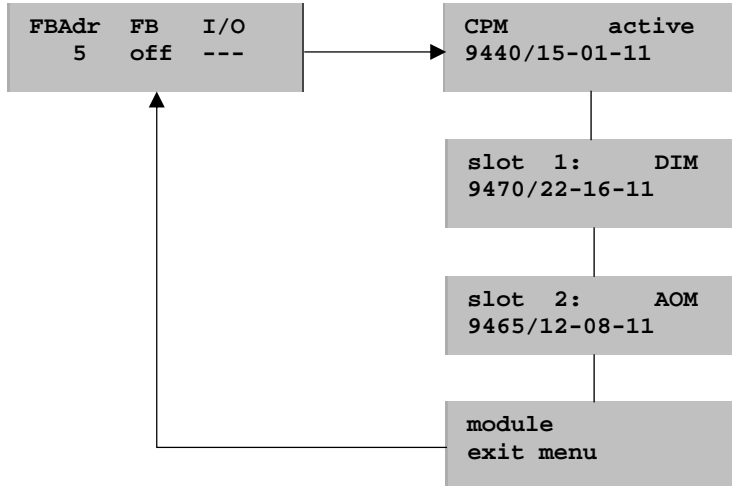
Text on the LCD	Meaning
no error	No error
hardware fail(1)	Failure
hardware fail(2)	Wrong hardware identifier
hardware fail(3)	No communication between CPR and IOP (μ P communication interrupted)
DataExch AS (2)	Data exchange with AS, wizard is parameterised
no DataExch	No data exchange
config/para fail	Configuration or parameter error
quit DataExch	No longer any data exchange
DataExch AS (6)	Data exchange with AS, Profibus is parameterised

The status messages are updated during normal operation.

Module level

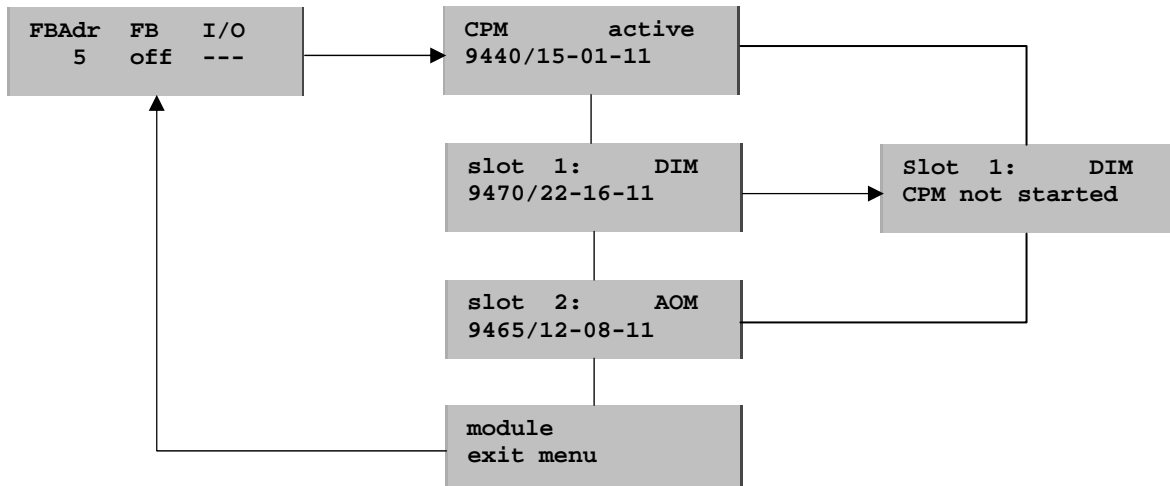
Only the active or primary CPM can display data at the module level.

The module level displays the actual state on the BusRail. The module abbreviation consists of the four basic types AIM, AOM, DIM and DOM. The HART modules (9461/ and 9466/) are not marked as AIMH or AOMH.



The number of items in the menu is variable and dependent on the configuration. A menu item is created for each module on the BusRail. The module whose details are to be displayed is selected using the *up / down* keys.

If the CPM has not been started, branching from the module level to the signal level cannot take place. The following message appears:



```
slot 3: ---
IOM no response
```

Empty modules and modules that give no reply to the CPM are shown in the module level (actual state) as unknown modules.

```
slot 3: ---
hardware failure
```

Modules that respond with a hardware failure are shown as unknown modules.

Signal level

Only the data of the active or primary CPM can be displayed on the signal level.

Module status

Text on the LCD	Meaning	Prio
IOM no response	Communication with the module is not possible. Module is defective, not inserted or both BusRails are faulty.	1
hardware failure	Module indicates a hardware failure	2
conf unequal mod	Configuration error or incorrect module inserted	3
HW disable outp.	Outputs switched off by external switch (plant STOP). This function is only possible with the DO 9475/2. The state is only displayed when the module is in data exchange.	4
prim Rail fail	No communication primary BusRail	On failure of both BusRails: IOM no response 5
red Rail fail	No communication redundant BusRail	
module OK/mode:x	Module is OK. No module fault Signal errors can, however, still be present. The operating mode (<i>mode:x</i>) is also shown. With the current modules, only the DIM has several operating modes.	6
(reserved)	For extensions	-

Only one module state can be shown at any one time. In the case of more than one fault, the priority determines which fault shall be displayed. If the displayed fault is cleared, the next is shown till all faults are cleared.

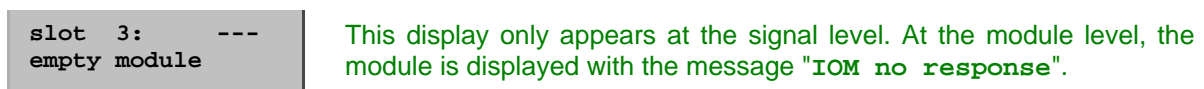
Signal data can be displayed, even when a module fault is present. These are displayed exactly as the CPM reports the data to the PC (substitute values...).

If a configuration error exists, the data of the configured module are displayed.



In this case, a DOM has been inserted. When the signal level is called up, a **conf unequal mod** is displayed because a DIM has been configured. The display of the signals and faults corresponds to the configured module.

Configured empty modules are indicated by "empty module".



Signal display

The actual value is displayed for the input modules; the desired value in the case of the output modules. Those data present in the CPM are displayed and in the form as they are reported to the PC.

Display for digital modules: On Off
 1 0 ⇨ ASCII chars. "One" and "Zero"

Display for analogue modules: Bar chart with 8 bars



For the digital modules, the LSB (the bit for input/output 0) is shown at the far right in the display. For the analogue modules, the procedure is the same: the display of input/output 0 is shown at the far

right in the display. In addition, for the analogue modules, the channels are represented using the numbers '0' to '7' are shown.

If the output module is in the safety position, no signal is shown.

```
slot 3:    AOM
s7s s s s s s s0
```

For an AOM, the safety position for each channel is indicated by an **s**. This is overwritten when a value is output.

```
slot 3:  single
I/O 1:safety pos
```

When outputting a single channel (**single I/O**), only the message is shown. Line faults are not displayed.

```
slot 3:    DOM
safety position
```

A message is output instead of the digital signals. This message disappears as soon as a value is written to the outputs.

This indication disappears as soon as a value is output on this channel. The output value (with error) is then displayed.

If a module is in the safety position and line faults exist, these are shown. Exception: In the case of the AOM, no fault can be displayed for a single output value (**single I/O**) for space reasons.

I/O errors

As an agreed-upon convention, special characters have been assigned to certain states. Other messages are represented by error codes.

Error code		Representation		Meaning
Decimal	Hex	Overview	Single I/O	
0	0x00	0	·	No error
1	0x01	⚡	⚡	Short-circuit (special character)
2...5	0x02...0x05	2...5	2...5	
6	0x06	⚡	⚡	Open-circuit (special character)
7...15	0x07...0x0F	7...F	7...F	
16...47	0x10...0x2F	x	10...2F	

The error codes are defined in the descriptions for the individual modules.

```
slot 3:    AIM
. . 7 . . . x .
```

In the overview, the error codes < 16 appear with the code in a hexadecimal form; the codes >=16 with an **x**, as there is only one character available.

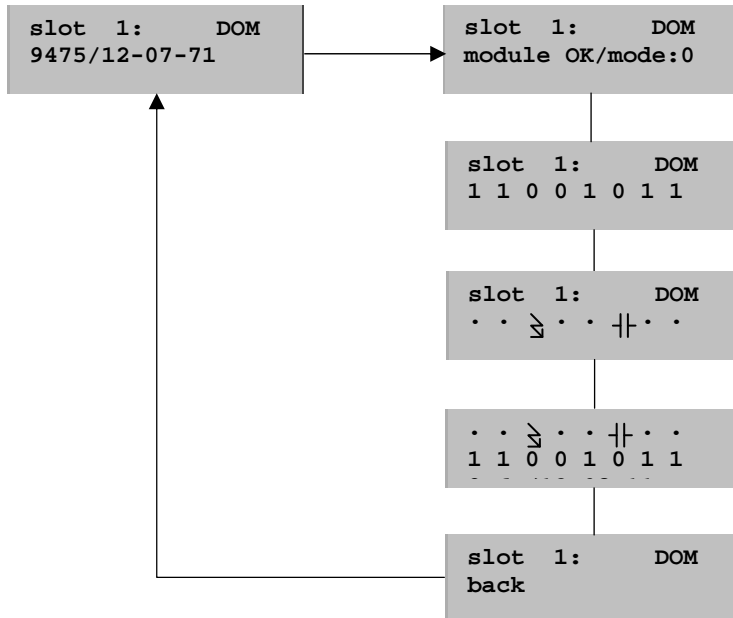
```
slot 3:  single
I/O 1:10 -32752
```

When outputting a single channel (**single I/O**), the complete error code is shown.

If a module fault is also present, then this is shown instead of the line faults. Exception: If the primary or redundant BusRail is faulty, the line faults will continue to be displayed.

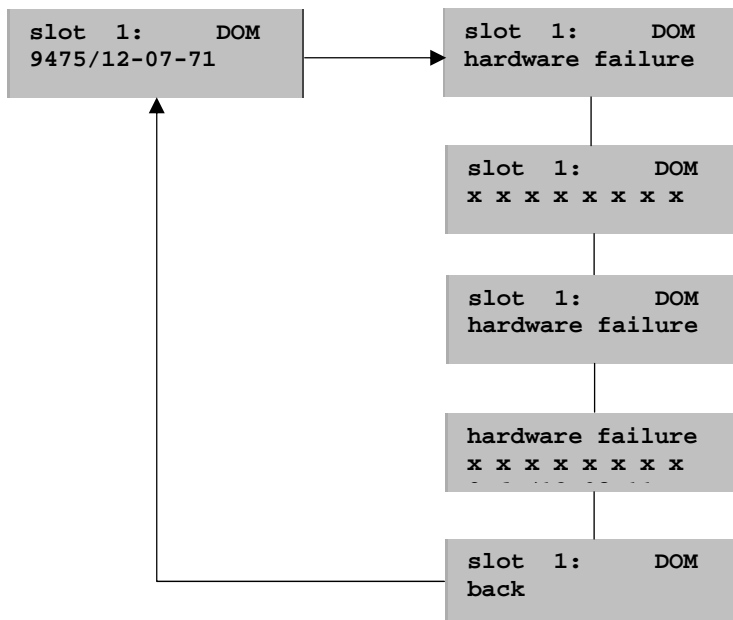
Individual Module Displays

Digital I/O modules



For a DOM with 7 outputs, 8 signals are shown – where the last bit is fixed.

Display showing module failures:



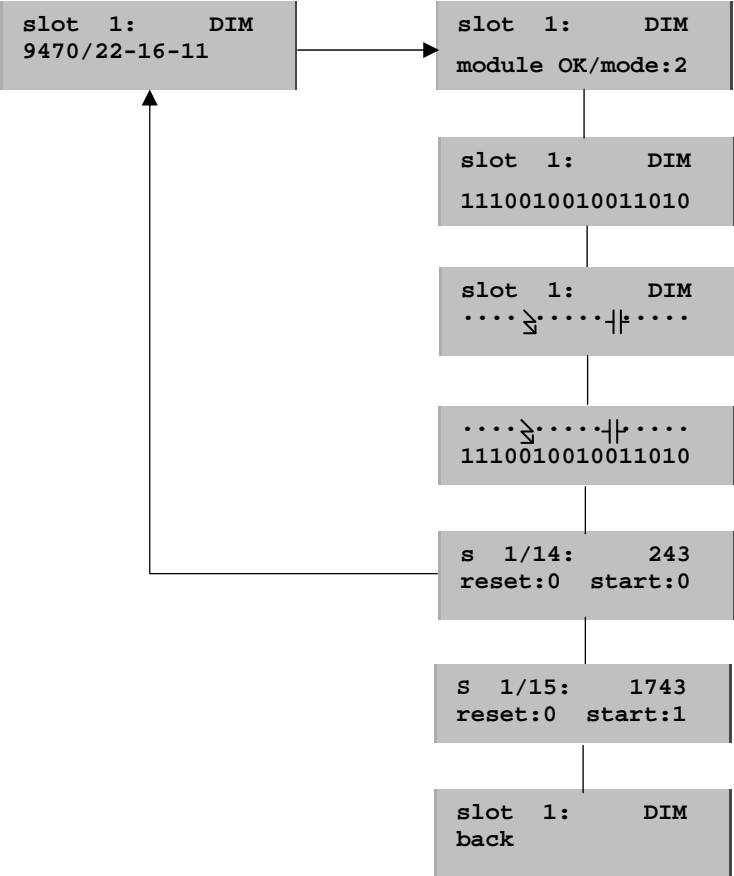
The displayed 'X' indicates how signals are represented in a failure case. In the menu system, the adjusted value is used for the representation in the fault case.

A plant STOP is provided for the DO 9475/2. The outputs can be switched off with the help of an external switch. This is shown in the display as a module message. For this, the module must be in data exchange.

9470 DIM16 + CF

The display for DIM in operating mode 2 is identical to that for a purely digital module. The menu has two further entries for the display of counter or frequency values. The reset and start bits are, in addition, displayed.

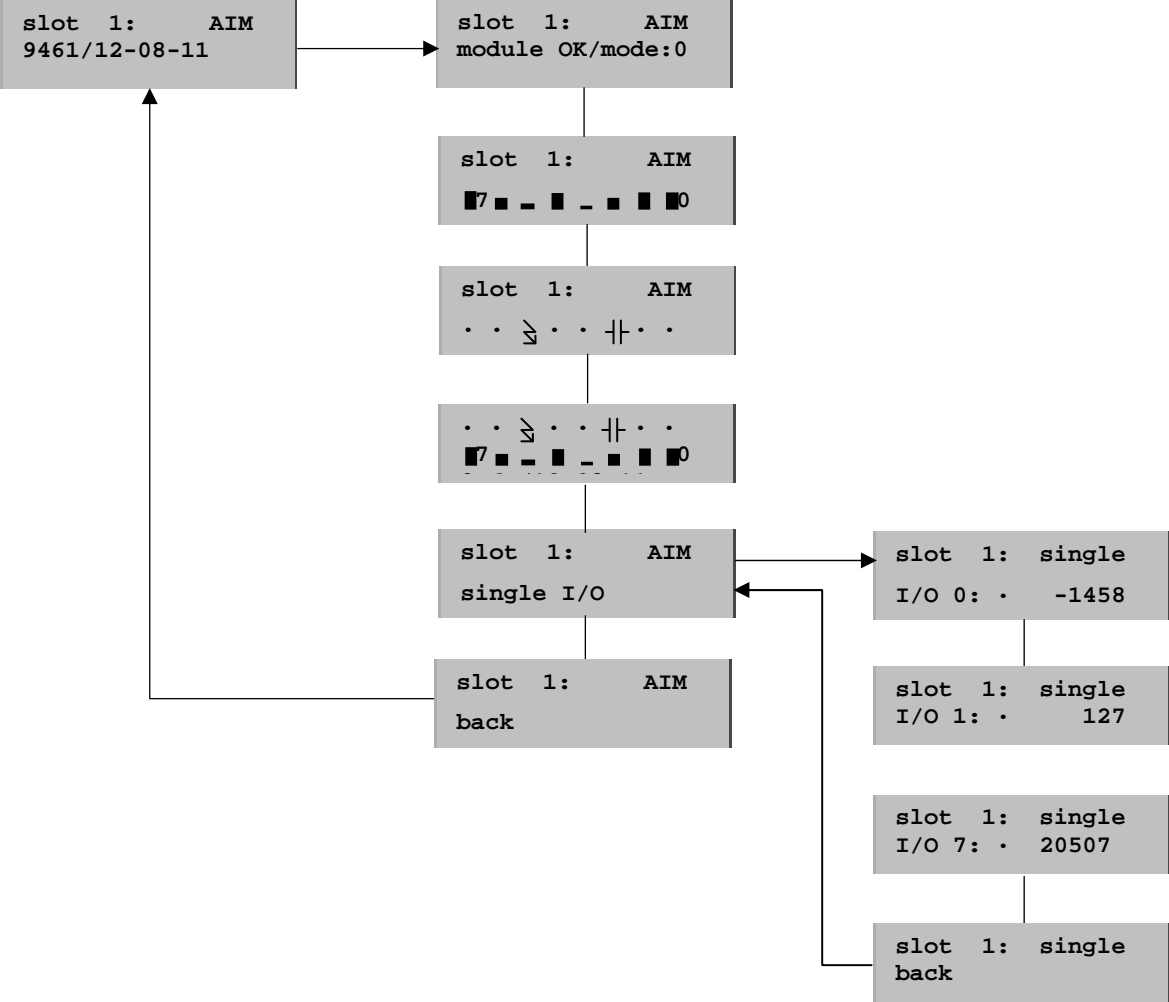
For the counter and frequency inputs, the value is shown as an unsigned decimal number.



If the DIM is parameterised as a pure DIM (operating mode 0) or as a DIM with status (operating mode 1), then the windows for the display of the counter/frequency values do not appear.

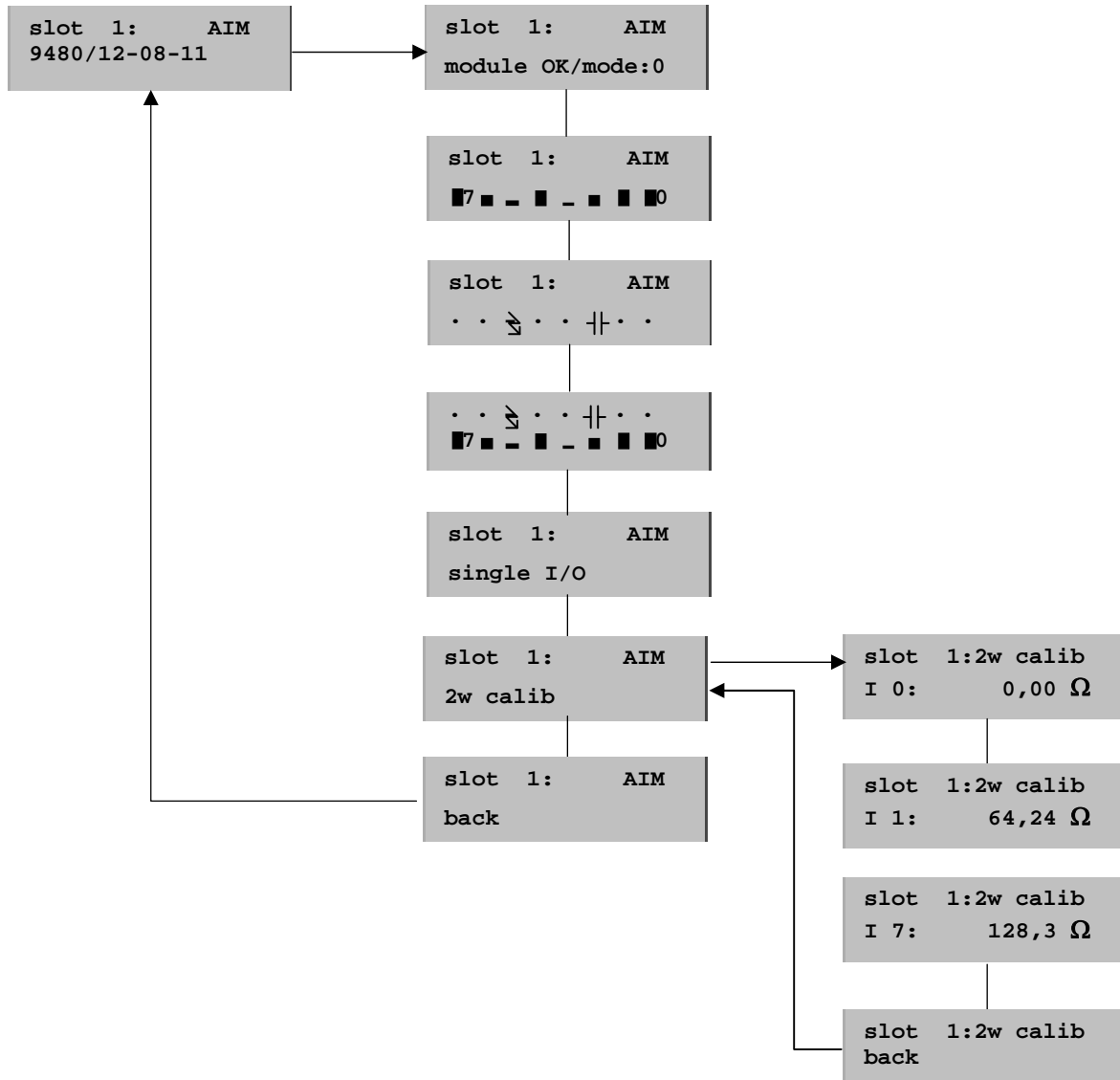
Analogue I/O modules

There are four menu items here, just as with the digital I/O modules. Additionally for the analogue modules, an individual input/output can be shown as a signed decimal value. This is additionally displayed because only rough estimates can be discerned from the bar graph increments. Each bar represents about 15% of the analogue signal.

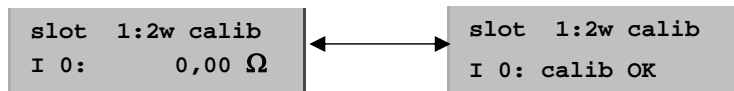


9480 Temperature module

With these modules, the item for the two-wire compensation is part of the menu. The two-wire compensation can also take place during running operation; it is checked in the module for plausibility.



After selecting the input to be calibrated, the calibration is started by pressing Enter.



A key press returns to the selection. The display of the currently stored conductor resistance in Ohm (Ω) allows a plausibility check of the compensation presently being viewed.

Text on the LCD	Meaning
I 7: calib OK	Calibration successful
I 0: module busy	Waiting for reply from module; telegram being processed
I 1: wrong value	Value read is out of range; is rejected by the module
I 3: no 2w mode	Input is not in two-wire operating mode
I 5: no implement	Command not available (old module)
I 4: wrong module	Wrong module in the slot
I 2: no response	Module does not reply to telegram; bus faulty or no module in slot

Module abbreviations

<i>Module description (13 chars.)</i>	<i>Module text</i>
9440 / .. - .. - ..	CPM

<i>Module description (13 chars.)</i>	<i>Module text</i>
9460 / .. - .. - ..	AIM
9461 / .. - .. - ..	AIM
9465 / .. - .. - ..	AOM
9466 / .. - .. - ..	AOM
9470 / .. - .. - ..	DIM
9471 / .. - .. - ..	DIM
9475 / .. - .. - ..	DOM
9477 / .. - .. - ..	DOM
9480 / .. - .. - ..	AIM
9481 / .. - .. - ..	AIM
Empty module	---

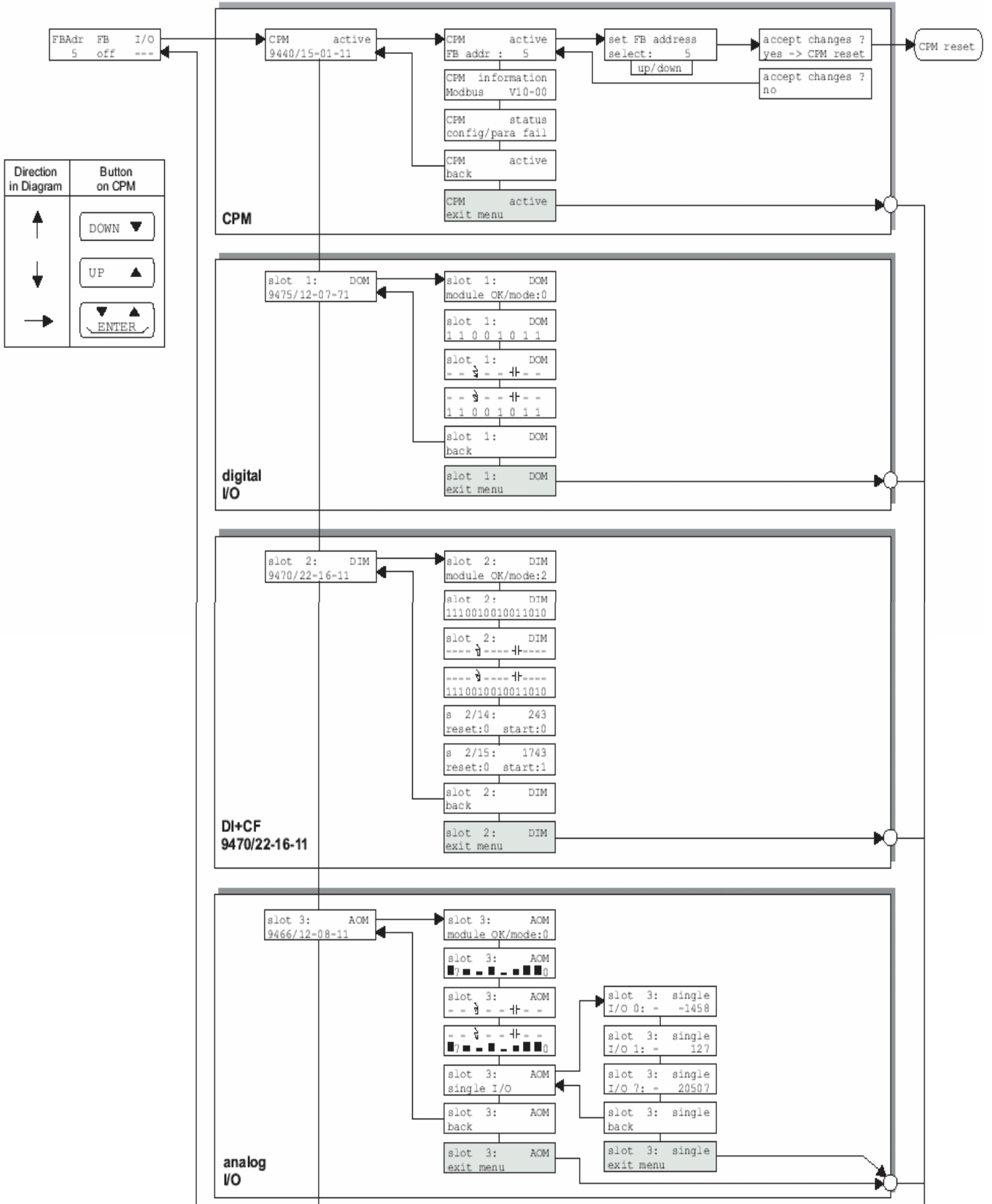
<i>"old" modules without hardware designation</i>	
9460/	AIM
9465/	AOM
9470/	DIM
9475/	DOM

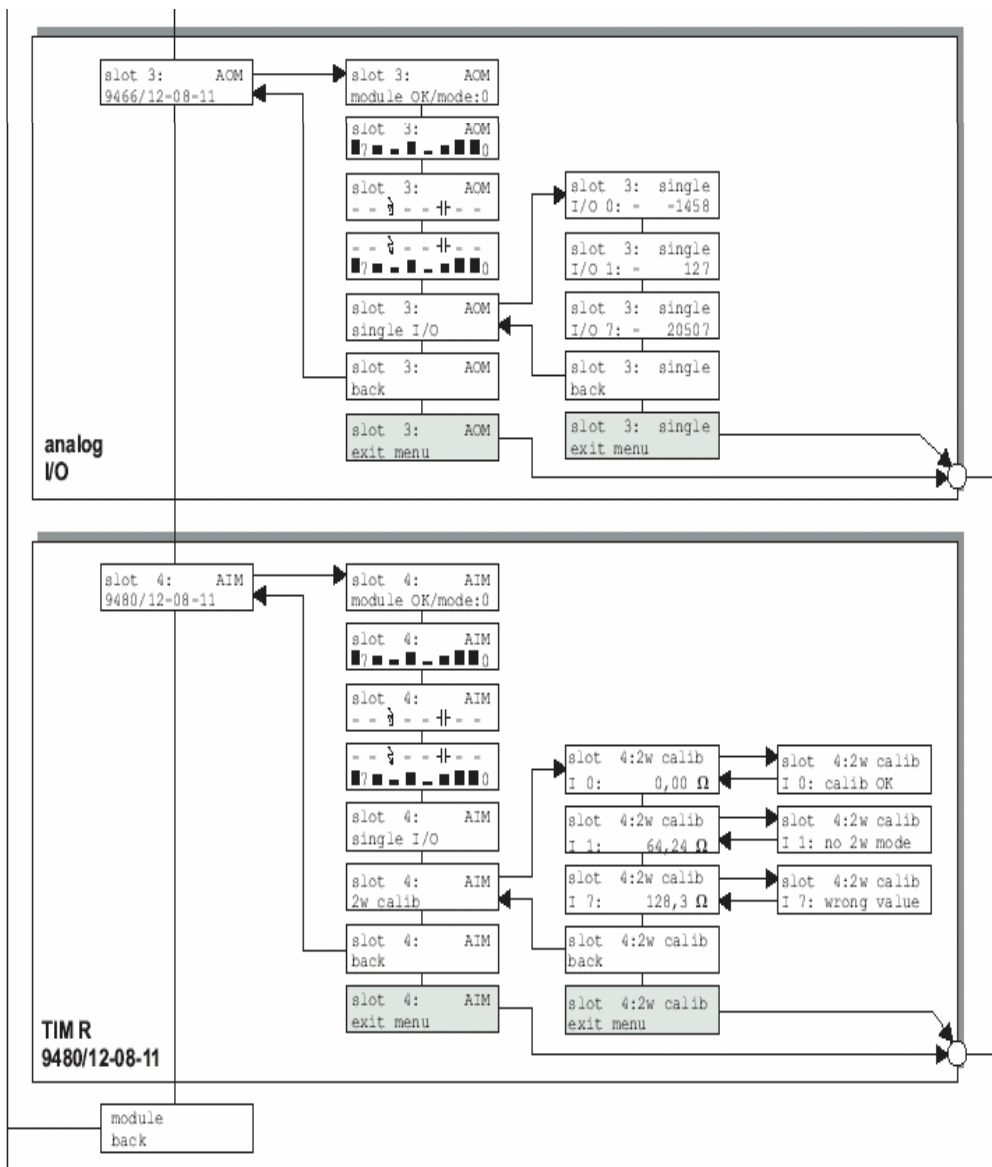
The detailed abbreviations contained in the Profibus description (e.g. AOM 8, DI+CF...) are not used.

Overall View of the Menu Structure - Stage 2



CPM - MENUE - SYSTEM





Display on Power-Up

There are two versions of the monitor program. The versions V02 and V03 are identical in terms of their function. The V03 has been adapted to the changed address recognition in the new CPMs. As from February 2003 onward, all new CPMs will be supplied with the new monitor program.

On power-up, the monitor program checks:

- Whether the hardware is functioning correctly
- Whether a demand for a firmware download is present
- On version V03, it is also checked whether the firmware version is compatible with the hardware

If one of the tests ends with a negative result, the monitor program remains in the so-called download mode. Further information on this is contained in the documentation "IS1 Firmware Download d.doc".

Monitor program V02	Monitor program V03	Meaning
+++ Start Up +++ > Prog : check	+++ CPM Test +++ > FW : check	Checking the program memory
	+++ CPM Test +++ >Monitor: V03-00	Display of the version of the monitor program
	The information is necessary for checking the compatibility. The second number ("00") indicates the hardware-compatible firmware	
	+++ CPM Test +++ > FW/HW : OK	Compatibility check was OK, correct FW loaded
+++ CPM Test +++ > Slot : prim 0	+++ CPM Test +++ > Slot : prim 0	Display of the slot of the CPM
Possible output values:	prim 0 red 1 prim 2 red 3	Primary / slot 0 Redundant / slot 1 Primary / slot 2 Redundant / slot 3
+++ CPM Test +++ > Supply: check	+++ CPM Test +++ > Supply: check	Power supply check
+++ CPM Test +++ > Supply: OK	+++ CPM Test +++ > Supply: OK	Power supply OK
+++ CPM Test +++ Modbus V11-03	+++ CPM Test +++ Modbus V11-03	Display of data link type and firmware version
FBAdr FB I/O vvv xx yyyy zzz	FBAdr FB I/O vvv xx yyyy zzz	CPM is ready for IS1 operation.

The following error messages can be output by the monitor program.

Monitor program V02	Monitor program V03	Meaning
	+++ CPM Test +++ > HW : fail	Error in the HW recognition of the CPM
	+++ CPM Test +++ > slot : fail	Error in reading the slot of the CPM
	## FDL Error ## >FW - HW : fail	Loaded firmware is not compatible with the existing Hardware
## FDL Error ## > Prog : wait	## FDL Error ## > FW : wait	CPM is waiting on download, previous download was broken off.
## FDL Error ## > Prog : fail		Error in programming a flash update
	## FDL Error ## > CPR : fail	Error in programming the CPR flash update
	## FDL Error ## > CPR : fail	Error in programming the IOP flash update
	## FDL Error ## >CPR/IOP: fail	Error in both flash updates
## FDL Error ## > CPR : erase	## FDL Error ## > CPR : erase	Error in erasing the CPR flash update
## FDL Error ## > IOP : erase	## FDL Error ## > IOP : erase	Error in erasing the IOP flash update
## FDL Error ## > Global : ----	## FDL Error ## > Global: ----	No particular state can be assigned to this error. Can occur at any position.
## FDL Error ## > Com : fail	## FDL Error ## > Com : fail	Interruption in data transfer or FDL broken off by user.