BA01643O/09/EN/02.23-00
71600966
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Valid as of version
ENU000A, V2.04.xx

Operating Instructions
ORSG45

Advanced Data Manager
Additional Instructions for PROFIBUS DP Slave

Table of contents

1 General information

1.1 Safety symbols

⚠ DANGER
This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.

⚠ WARNING
This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury.

⚠ CAUTION
This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or medium injury.

NOTICE
This symbol contains information on procedures and other facts which do not result in personal injury.

The functionality is only possible with a PROFIBUS module, Version V2.15 and higher.

1.2 Scope of delivery

NOTICE

This manual contains an additional description for a special software option.
These additional instructions do not replace the Operating Instructions provided with the delivery!

- ▶ Detailed information can be found in the Operating Instructions and the additional documentation.

The GSD file for the device can be found in the "GSD" folder on the CD-ROM supplied.

1.3 Firmware history

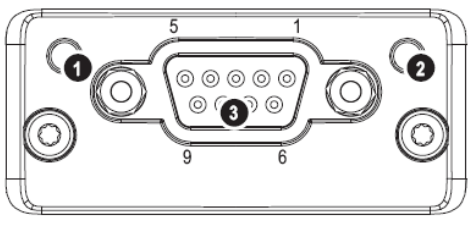
Overview of unit software history:

Unit software Version / date	Software modifications	Analysis software version	Version of OPC server	Operating Instructions
V02.01.04 / 06.2016	Original software	V1.3.0 and higher	V5.00.03 and higher	BA01643O/09/EN /01.16
V2.04.06 / 10.2022	Bug fixes	V1.06.03 and higher	V5.00.07 and higher	BA01643O/09/EN /02.22-00

1.4 Connections

View of the PROFIBUS DP connection on the device

1	Operating mode LED
2	Status LED
3	PROFIBUS connector DB9F



1.4.1 Operating mode LED

Functional description of the operating mode LED

Operating mode LED	Indicator for
Off	Not online/no voltage
Green	Online, data transfer active
Green, flashing	Online, data transfer stopped
Flashing red (one flash)	Parametrization error
Flashing red (two flashes)	PROFIBUS configuration error

1.4.2 Status LED

Functional description of the status LED

Status LED	Indicator for
Off	No voltage or not initialized
Green	Initialized
Red, flashing	Initialized, diagnostics available
Red	Exception error

1.4.3 PROFIBUS connector (DB9F)

Pin assignment of PROFIBUS connector

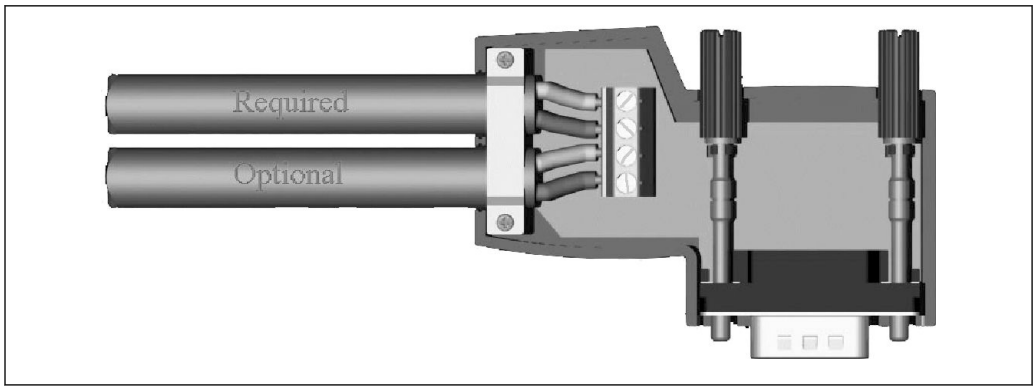
Pin	Signal	Description
1	-	-
2	-	-
3	B-wire	Positive RxD/TxD, RS485 Level
4	-	-
5	GND Bus	Reference potential
6	+5V Output [1)]	+5V voltage for termination
7	-	-
8	A-wire	Negative RxD/TxD, RS485 Level
9	-	-
Housing	Cable shielding	Internally connected to ground via the cable shield filter according to the PROFIBUS standard

1) Any current drawn from this pin will affect the total power consumption of the module.

1.5 Terminating resistors

The PROFIBUS module has no internal terminating resistors. However, pin 6 provides isolated 5V voltage for external termination.

To connect to the PROFIBUS, it is advisable to use the 9-pin D-sub plug with integrated bus terminating resistors, as recommended according to IEC 61158 / EN 50170:



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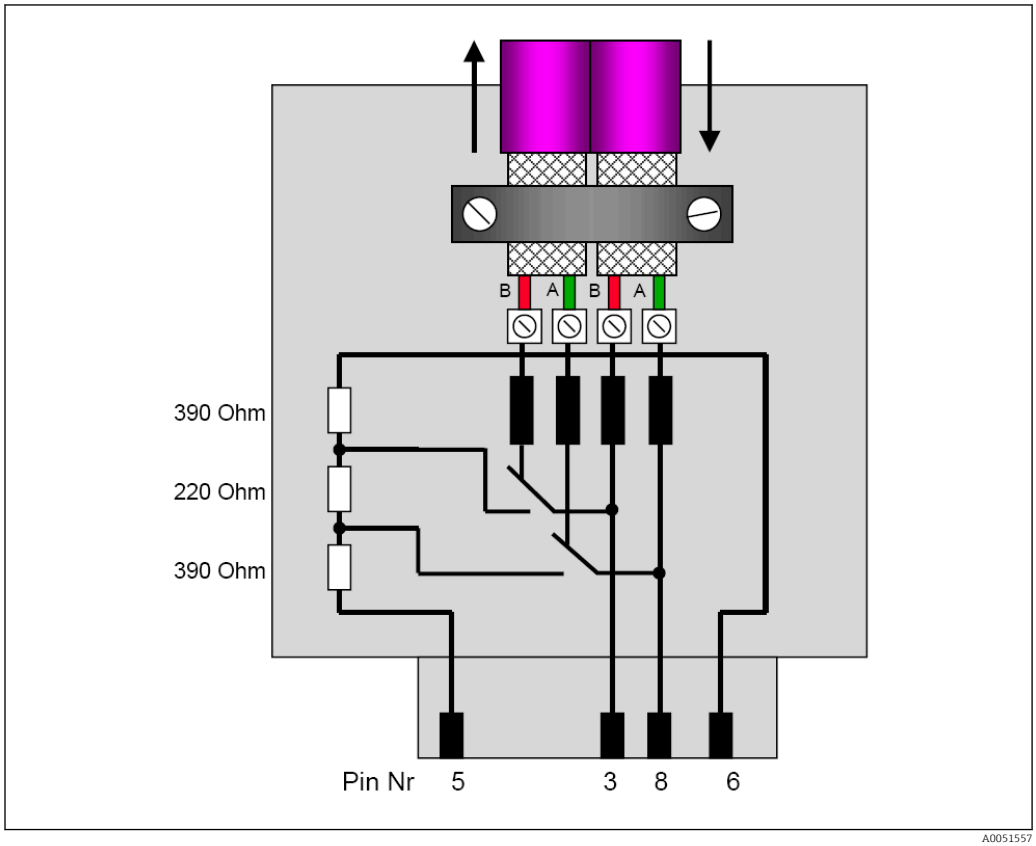
1 *PROFIBUS connector as per IEC 61158 / EN 50170*



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2 *Terminating resistors in the PROFIBUS connector*

PROFIBUS connector terminal assignment

Pin No.	Signal	Meaning
Housing	Shielding	Functional ground
3	B-wire	RxTx (+)
5	GND	Reference potential
6	+5V output	Power supply for terminating resistors
8	A-wire	RxTx (-)

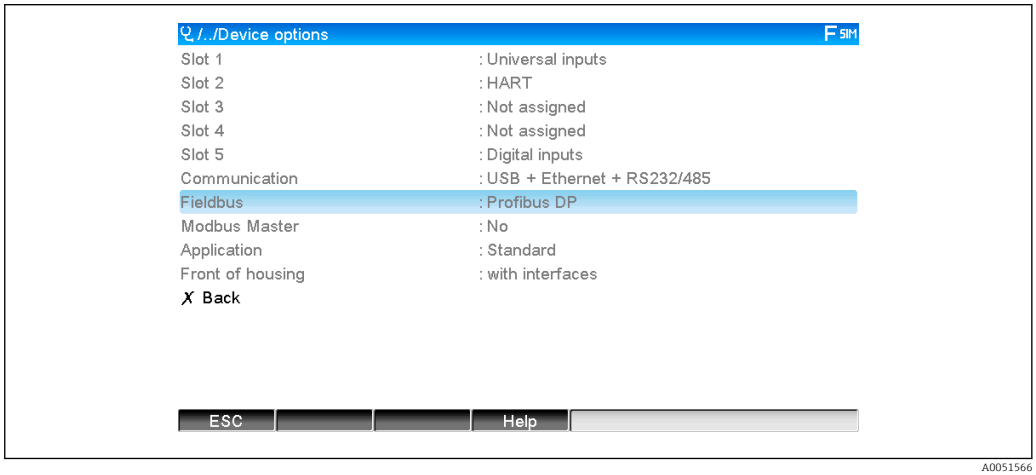
1.6 Functional description

The PROFIBUS module allows the device to be connected to PROFIBUS DP, with the functionality of a DP slave for cyclic data traffic.

Baud rates supported: 9.6k, 19.2k, 45.45k, 93.75k, 187.5k, 500k, 1.5M, 3M, 6M, 12MBaud

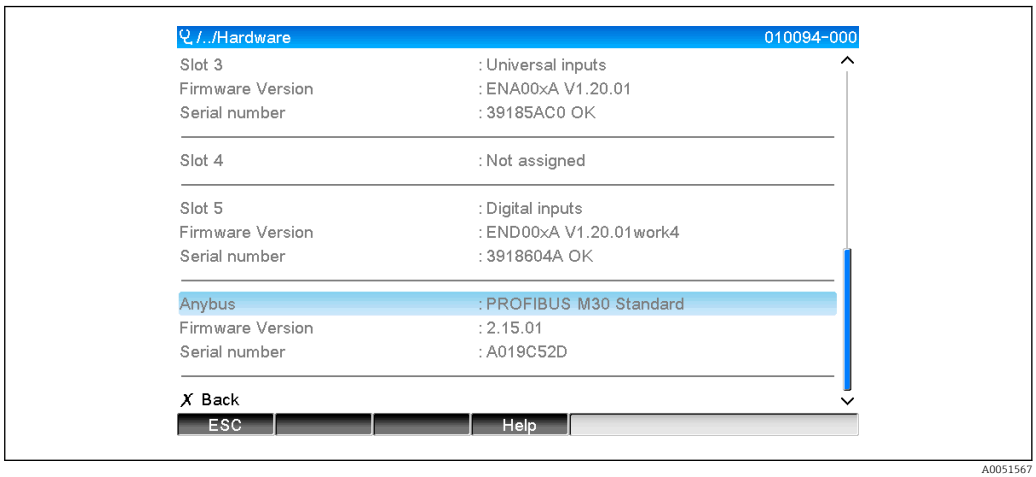
1.7 Checking for the presence of the PROFIBUS module

Check whether a PROFIBUS module is being used under **Main menu → Diagnostics → Device information → Device options**.



3 *Checking for the presence of the PROFIBUS module*

Additional information is available under **Main menu → Diagnostics → Device information → Hardware**.



4 *Additional information on the PROFIBUS module*

2 Data transmission

2.1 General information

The following parameters can be transmitted from the **PROFIBUS master to the device**:

- Analog values (instantaneous values)
- Digital status

The following parameters can be transmitted from the **device to the PROFIBUS master**:

- Analog values (instantaneous values)
- Integrated analog values
- Math channels (result: state, instantaneous value, operating time, totalizer)
- Integrated math channels
- Digital status
- Pulse counter (totalizer)
- Operating times
- Operating times with digital status

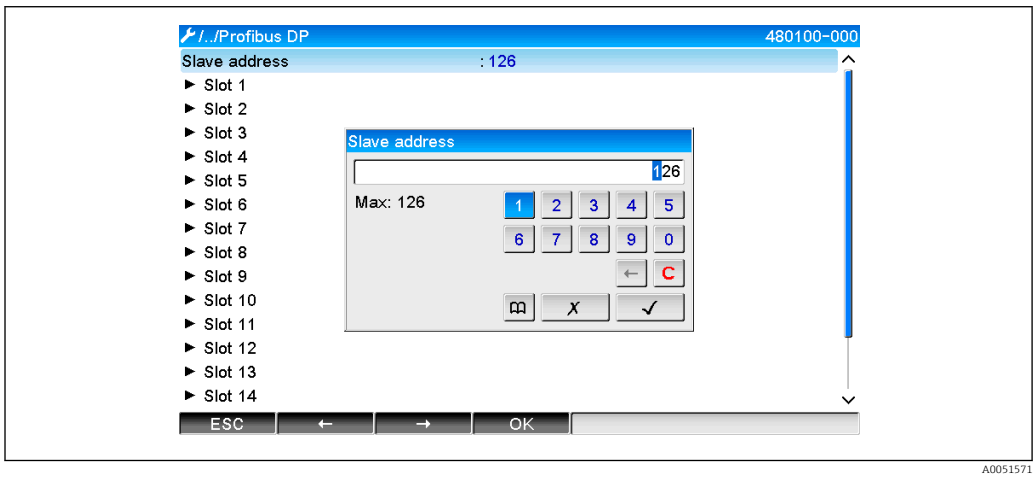
2.2 Settings in the setup

If a change is made to the setup (configuration) in the device that affects the transmission setup, the PROFIBUS module is reinitialized.

Result: The PROFIBUS module withdraws from the DP bus only to register again seconds later. This generates an "assembly rack failure" in the PLC. Taking the example of the Simatic S7, the PLC switches to the STOP mode and must be manually reset to the RUN mode. By transmitting the assembly rack failure OB 86 to the PLC, it is now possible to hold off the interruption. As a result, the PLC does not switch to the STOP mode, the red LED lights up only briefly, and the PLC continues to operate in the RUN mode.

The **slave address** is selected under **Setup → Advanced setup → Communication → PROFIBUS DP**. Please configure a slave address that is lower than **126** in order to assign a fixed address. If slave address **126** is configured, the address must be assigned by the PROFIBUS master. The address is then saved in the event list when the device is switched on and each time the slave address is changed by the PROFIBUS master.

The baud rate is determined automatically.



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5 *Entering the slave address*

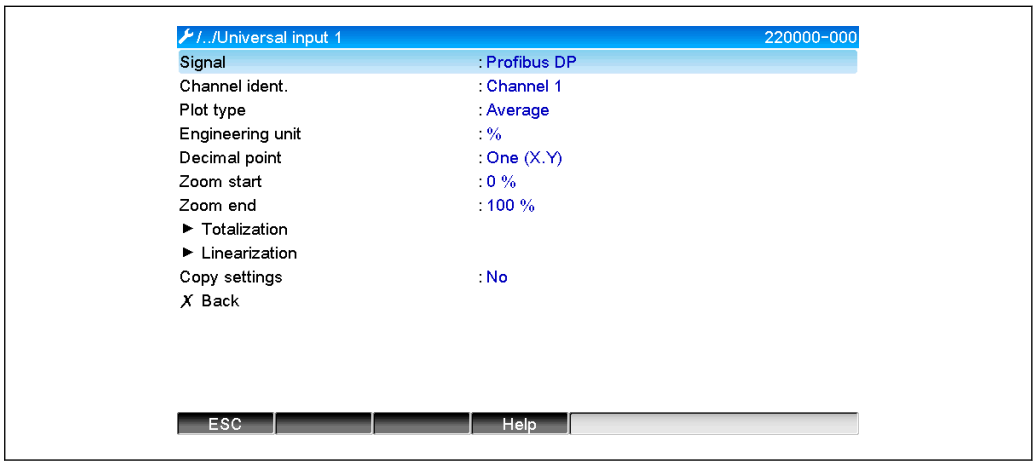
All universal inputs and digital inputs are enabled and can be used as PROFIBUS DP inputs even if they are not actually available as plug-in cards.

2.3 Analog channels

PROFIBUS master → device:

Under **Setup → Advanced setup → Inputs → Universal inputs → Universal input X**, the **Signal** parameter is set to **PROFIBUS DP**.

The analog channel configured in this way can be selected for cyclic data transfer (module x AO-PA), as described in section 2.6 → 10.



6 *Universal input x to "PROFIBUS DP" signal*

Device → PROFIBUS master:

To transmit an analog channel to the PROFIBUS master, the channel simply needs to be configured as described in section 2.6.1 → 12 (module x AI-PA).

2.4 Math channels

Device → PROFIBUS master:

Math channels are optionally available under **Setup → Advanced setup → Application → Math v Math x**.

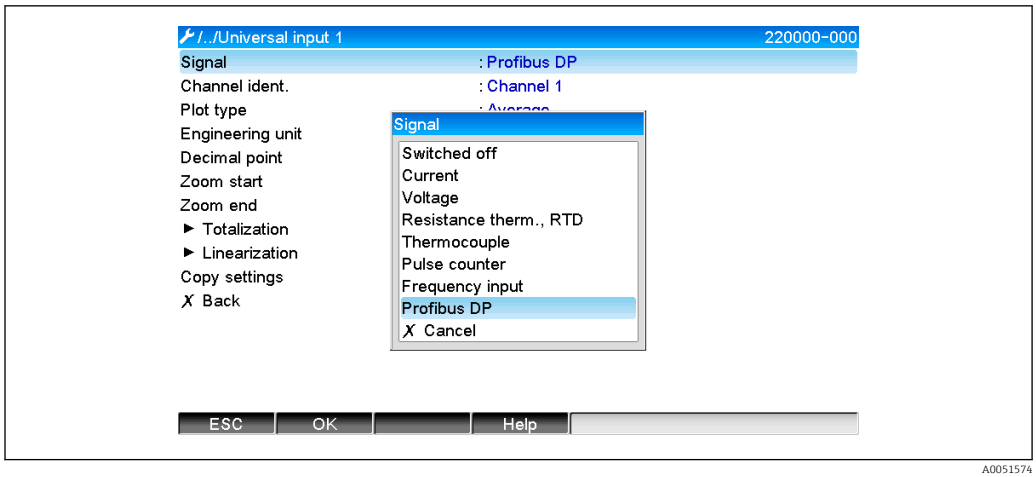
The results can be transmitted to the PROFIBUS master, as explained in section 2.6 → 10.

2.5 Digital channels

PROFIBUS master → Device:

Under **Setup → Advanced setup → Inputs → Digital inputs → Digital input X**, the **Function** parameter is set to **PROFIBUS DP**.

The digital channel configured in this way can be selected for cyclic data transfer (module 8 DO), as described in section 2.6 → 10.



7 *Setting digital channel x to the "PROFIBUS DP" function*

The digital status transmitted by the PROFIBUS master has the same function in the device as the status of a digital channel that is actually present.

Device → PROFIBUS master:

Functionality of control input or on/off event

The digital status of the digital channel configured in this way can be selected for cyclic data transfer (module 8 DI), as described in section 2.6.1 → 12.

Functionality of pulse counter or operating time

The totalizer or the total operating time of the digital channel configured in this way can be selected for cyclic data transfer (module x AI-PA).

Functionality of event + operating time

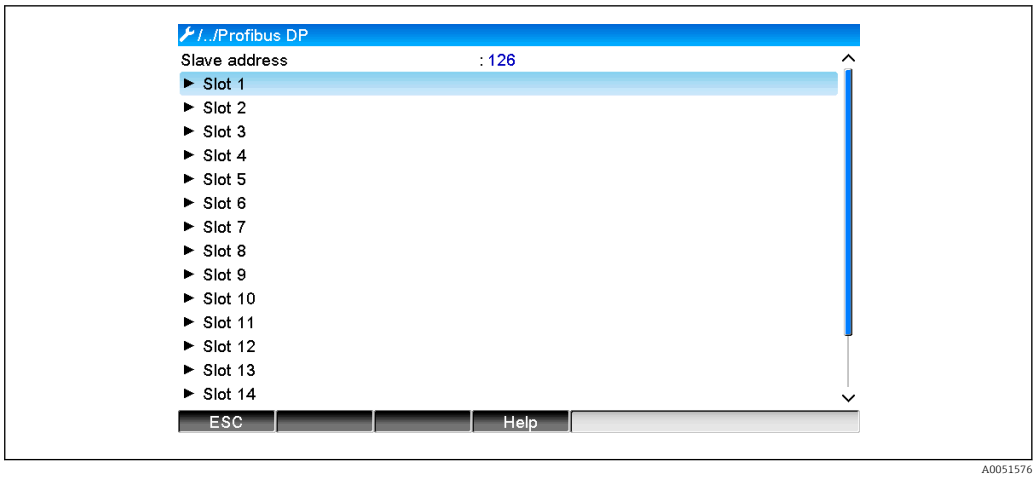
The digital status and the totalizer of the digital channel configured in this way can be selected for cyclic data transfer (module 8 DI and x AI-PA).

Functionality of quantity from time

The digital status and the totalizer of the digital channel configured in this way can be selected for cyclic data transfer (module 8 DI and x AI-PA).

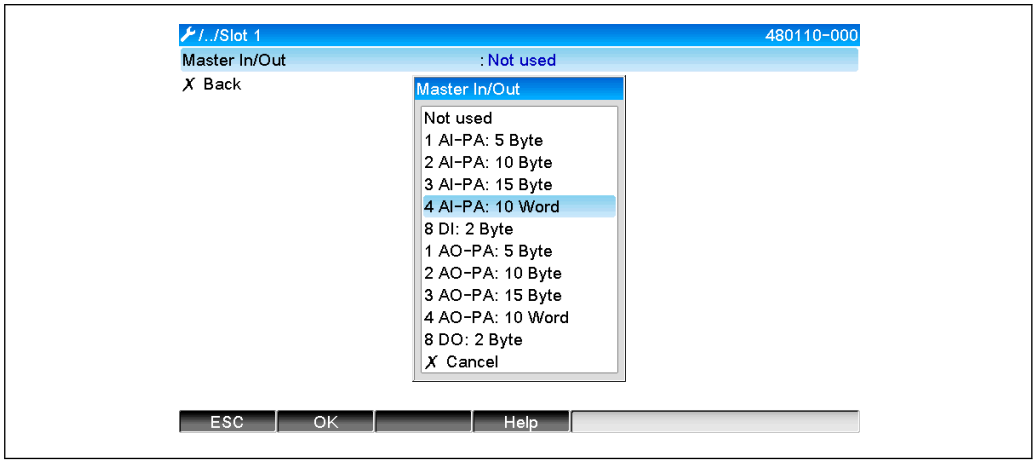
2.6 Structure of the data for cyclic data transfer

The structure of the data for cyclic transfer can be configured under **Setup → Advanced setup → Communication → PROFIBUS DP → Slot x**. 16 slots are available for selection, each of which can contain one module.



8 *Slot overview*

Modules can be selected depending on the data volume and content.



9 *Selecting modules*

The name refers to the read/write direction of the PROFIBUS master and is identical to the module names in the GSD file.

Description of module name:
- The number refers to the number of values to be transmitted.
- AI/DI: Master In (device → PROFIBUS master)
- AO/DO: Master Out (PROFIBUS master → device)
- AI/AO: Transmission of the floating point number + status
- DI/DO: Transmission of digital status
- The -PA suffix means that the data structure consists of 4 bytes for the floating point number (MSB first) and then 1 byte for the status of the measured value.
- The length of the module is given at the end

Description of the PROFIBUS modules

Modules	Use
AI-PA 5 Byte AI-PA 10 Byte AI-PA 15 Byte AI-PA 10 Word	Analog channel (instantaneous value, totalization) Math channel (result: instantaneous value, counter, operating time) Digital channel (control input, pulse counter, (event +) operating time, quantity from time)
DI 2 Byte	Math channel (result: status) Digital channel (on/off event, event (+operating time))

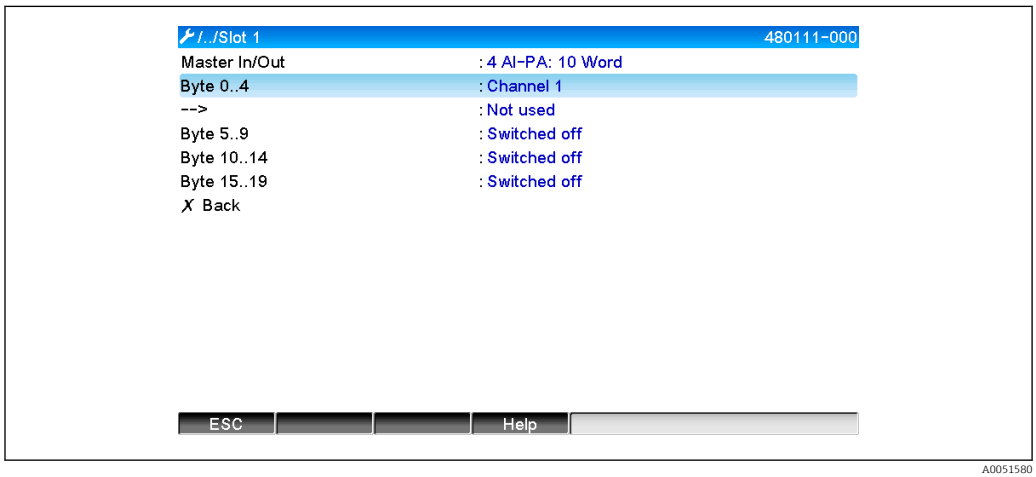
Modules	Use
AO-PA 5 Byte AO-PA 10 Byte AO-PA 15 Byte AO-PA 10 Word	Analog channel (instantaneous value)
DO 2 Byte	Digital channel (control input, on/off event, pulse counter, operating time, event + operating time, quantity from time)

2.6.1 Device → PROFIBUS master data transmission

Analog channel, totalizer or operating time

Under **Setup → Advanced setup → Communication → PROFIBUS DP → Slot x**, the **Master In/Out** parameter is set to one of the **AI-PA** modules, e.g. **4 AI-PA**.

Once the byte address has been selected within the module, the desired analog channel is selected. If totalization is activated in the universal input, the user can choose between the instantaneous value and the totalizer (totalization):

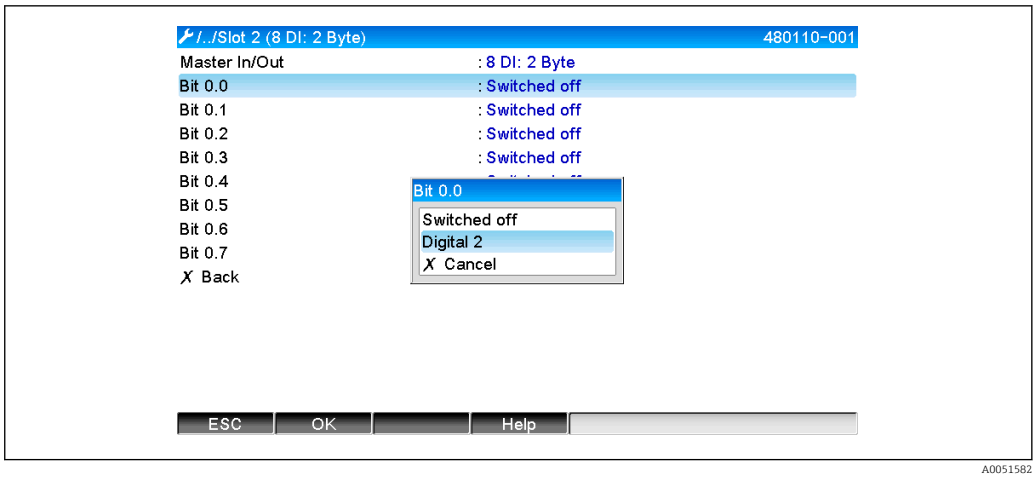


10 *Selecting the desired channel (device → PROFIBUS master)*

Digital channel

Under **Setup → Advanced setup → Communication → PROFIBUS DP → Slot x**, the **Master In/Out** parameter is set to the **8 DI** module.

Once the bit address has been selected within the module, the desired digital channel is selected:



11 *Selecting the desired module and digital channel (device → PROFIBUS master)*

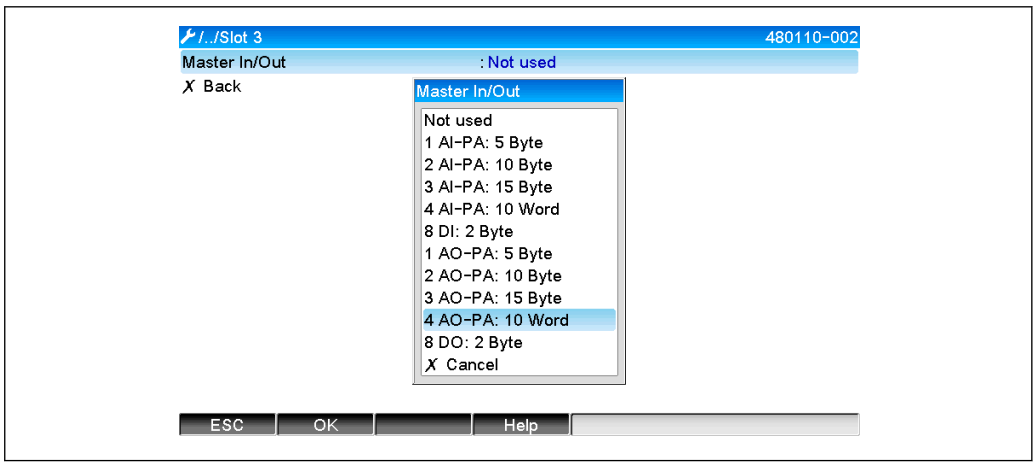
2.6.2 PROFIBUS master → device data transmission

Analog channel

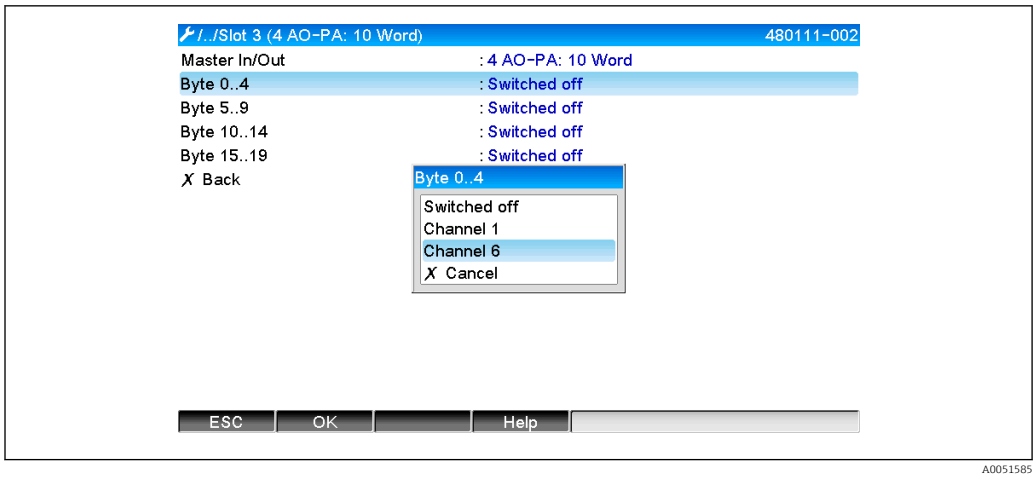
Under **Setup → Advanced setup → Communication → PROFIBUS DP → Slot x**, the **Master In/Out** parameter is set to one of the **AO-PA** modules, e.g. **4 AO-PA**.

Once the byte address has been selected within the module, the analog channel to be used is selected. The type (instantaneous value or totalizer (totalization)) is then selected.

Possible only with analog channels which have been assigned the PROFIBUS DP signal type (see section 2.3 → 9).



12 *Selecting the desired module (PROFIBUS master → device)*



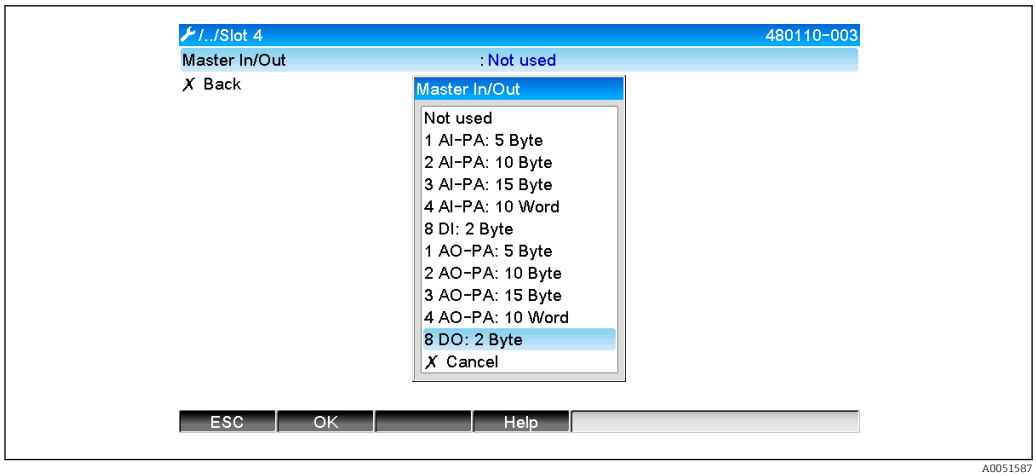
13 *Selecting the analog channel (PROFIBUS master → device)*

Digital channel

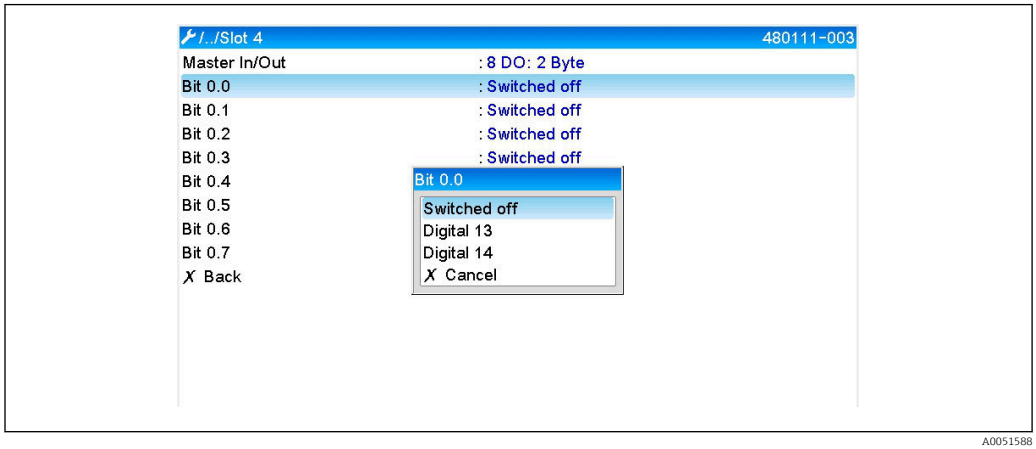
Under **Setup → Advanced setup → Communication → PROFIBUS DP → Slot x**, the **Master In/Out** parameter is set to the **8 DO** module.

Once the bit address has been selected within the module, the desired digital channel is selected.

Possible only with digital channels which have been assigned the PROFIBUS DP function type (see section 2.5 → 9).



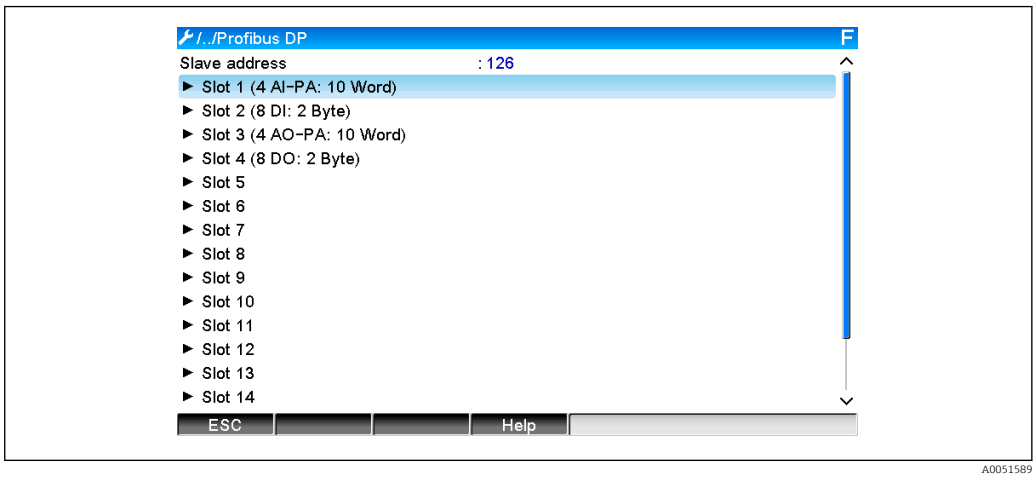
14 *Selecting the desired module (PROFIBUS master → device)*



15 *Selecting the digital channel (PROFIBUS master → device)*

2.6.3 Slot overview

For verification purposes, the module names are listed with information on how they are to be configured in the PROFIBUS master:



16 *Overview of slots after modification*

Empty slots are ignored and do not generate any configuration bytes.

2.6.4 Structure of the individual process values

Device → PROFIBUS master:

Structure of the individual measured values

Value	Interpretation	Bytes
Analog value 1-20	32-bit floating point number (IEEE-754) + status	5
Analog value 1-40 integrated	32-bit floating point number (IEEE-754) + status	5
Math channel 1-8 instantaneous value result, totalizer, operating time	32-bit floating point number (IEEE-754) + status	5
Math channel 1-8 integrated	32-bit floating point number (IEEE-754) + status	5
Digital pulse counter	32-bit floating point number (IEEE-754) + status	5
Digital operating time	32-bit floating point number (IEEE-754) + status	5
Digital status	8 bit + status	2
Math channel status result	8 bit + status	2

PROFIBUS master → device:

Structure of the individual measured values

Value	Interpretation	Bytes
Analog value 1-40	32-bit floating point number (IEEE-754) + status	5
Digital status	8 bit + status	2

32-bit floating point number (IEEE-754)

Octet	8	7	6	5	4	3	2	1
0	Sign	(E) 2^7	(E) 2^6					(E) 2^1
1	(E) 2^0	(M) 2^{-1}	(M) 2^{-2}					(M) 2^{-7}
2	(M) 2^{-8}							(M) 2^{-15}
3	(M) 2^{-16}							(M) 2^{-23}

Sign = 0: positive number

Sign = 1: negative number

$$Zahl = -1^{VZ} \cdot (1 + M) \cdot 2^{E-127}$$

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E = exponent, M = mantissa

Example: 40 F0 00 00 h = 0100 0000 1111 0000 0000 0000 0000 0000 b

Value = $-1^0 \times 2^{129-127} \times (1 + 2^{-1} + 2^{-2} + 2^{-3})$

= $1 \times 2^2 \times (1 + 0.5 + 0.25 + 0.125)$

= 1 x 4 x 1.875 = 7.5

Byte	0	1	2	3	4
	40	**F0**	**00**	**00**	**80**
	Floating point number				Status

Status of floating point number

Device → PROFIBUS master

10H = e.g. Cable open circuit, do not use value

11H = Value below the valid range

12H = Value above the valid range

18H = Value undefined, do not use

48H = Value uncertain or replacement value

49H = Value uncertain or replacement value, lower limit value or decreasing gradient

4AH = Value uncertain or replacement value, upper limit value or increasing gradient

4BH = Value uncertain or replacement value, upper and lower limit value or increasing/decreasing gradient

80H = Value OK

81H = Value OK, lower limit value or decreasing gradient

82H = Value OK, upper limit value or increasing gradient

83H = Value OK, upper and lower limit value or increasing/decreasing gradient

PROFIBUS master → device

80H...FFH: Value OK

40H .. 7FH: Value uncertain, value is used, but an error is displayed

00H...3FH: Do not use value (invalid)

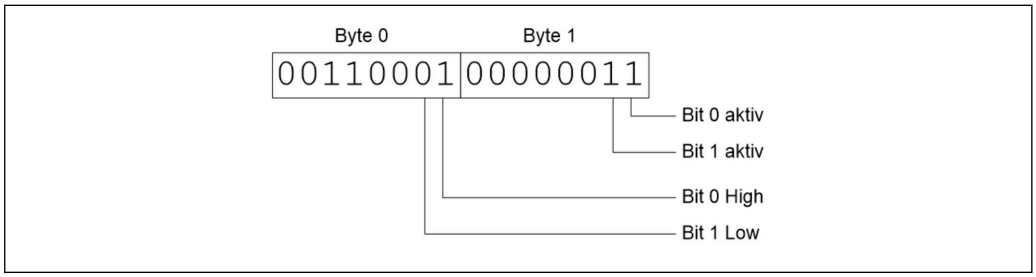
It is possible to display and check the status directly at the device.

Checking the measured value status (PROFIBUS master → device).

Digital status

A digital status is described by two bits in two bytes.

Byte 0 bit x = 0: **Low** status
= 1: **High** status
Byte 1 bit x = 0: Not active
= 1: Active
Example:



17 *Structure of the two bytes transmitted in the digital status*

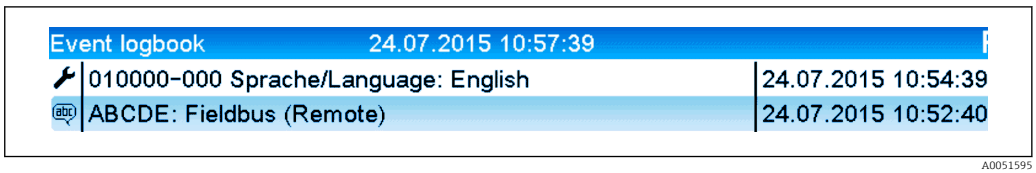
Only bit 0 and 1 are valid here (byte 1).

The statuses for this are bit 0 = high and bit 1 = low (byte 0).

2.7 Acyclic data transfer

2.7.1 Transferring texts

Texts can be saved in the device's event list. The maximum length is 40 characters. The texts must be written via **Slot 0 Index 0**, (see section 3.4 Acyclic access → 25).



18 *Text entered in the event list*

2.7.2 Batch data

Batches can be started and stopped. The batch name, batch identifier, batch number and preset counter for stopping the batch can also be set. The maximum length of the texts (ASCII) is 30 characters.

The functions and parameters must be written via **Slot 0 Index 1**, (see section 3.4 Acyclic access → 25).

Function	Description	Data
0x01	Start batch	Batch 1 to 4, ID, name
0x02	Stop batch	Batch 1 to 4, ID, name
0x03	Batch identifier	Batch 1 to 4, text (max. 30 characters)
0x04	Batch name	Batch 1 to 4, text (max. 30 characters)
0x05	Batch number	Batch 1 to 4, text (max. 30 characters)
0x06	Preset counter	Batch 1 to 4, text (max. 8 characters)

Starting a batch

If the user administration function is active, an ID (max. 8 characters) and a name (max. 20 characters) must be transmitted. The ID and name must be separated by ';'.

Example: Start batch 2

Byte	0	1
	func	no.
	1	2

The entry **Batch 2 started** is saved in the event list. This message also appears on the screen for a few seconds.

Ending a batch

If the user administration function is active, an ID (max. 8 characters) and a name (max. 20 characters) must be transmitted. The ID and name must be separated by ';'.

Example: Ending batch 2, user administration active (ID: "IDSPS", name "RemoteX")

Byte	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	func	**no.**	**49**	**44**	**53**	**50**	**53**	**3B**	**52**	**65**	**6D**	**6F**	**74**	**65**	**58**
	2	2	'I'	'D'	'S'	'P'	'S'	';'	'R'	'e'	'm'	'o'	't'	'e'	'X'

The message **Batch 2 ended** and **Remote (IDSPS)** is saved in the event list. This message also appears on the screen for a few seconds.

Setting the batch identifier

Can only be set if the batch has not yet been started. Does not need to be configured if this is not required by the device settings (Direct access 490005)

Example: "Identifier" batch designation for batch 2

Byte	0	1	2	3	4	5	6	7	8	9	10	11
	func	**no.**	**49**	**64**	**65**	**6E**	**74**	**69**	**66**	**69**	**65**	**72**
	3	2	'I'	'd'	'e'	'n'	't'	'i'	'f'	'i'	'e'	'r'

Setting the batch name

Can only be set if the batch has not yet been started. Does not need to be configured if this is not required by the device settings (Direct access 490006).

Example: "Name" batch name for batch 2

Byte	0	1	2	3	4	5
	func	**no.**	**4E**	**61**	**6D**	**65**
	4	2	'N'	'a'	'm'	'e'

Setting the batch number

Can only be set if the batch has not yet been started. Does not need to be configured if this is not required by the device settings (Direct access 490007).

Example: "Num" batch number for batch 2

Byte	0	1	2	3	4
	func	**no.**	**4E**	**75**	**6D**
	4	2	'N'	'u'	'm'

Setting the preset counter

Can only be set if the batch has not yet been started. Does not need to be configured if this is not required by the device settings (Direct access 490008).

- Maximum 8 characters (including '.')
- Exponential function permitted, e.g. "1.23E-2"
- Only positive numbers

Example: Preset counter to 12.345 for batch 2

Byte	0	1	2	3	4	5	6	7
	func	**no.**	**31**	**32**	**2E**	**33**	**34**	**35**
	6	2	‚1'	‚2'	‚.'	‚3'	‚4'	‚5'

Reading out the batch status

The status of every batch and the last communication status can be read out here. Slot 0 Index 1 6 Byte must be read out.

Example: Batch 2 started, communication status "OK"

Byte	0	1	2	3	4	5
		Comm. status	**Status batch 1**	**Status batch 2**	**Status batch 3**	**Status batch 4**
	0	0	0	1	0	0

If, for example, a batch number is set even though the batch is already running, byte 1 would have the value 0x03.

Communication status:

0: OK
1: Not all the required data have been transmitted (mandatory entries)
2: No responsible user is logged in
3: Batch already running
4: Batch not configured
5: Batch controlled by control input
7: Automatic batch number active
9: Error, text contained non-displayable characters, text too long, incorrect batch number
Function number outside the range

2.7.3 Setting relays

Relays can be set if they have been set to **Remote** in the device settings. Parameters must be written via **Slot 0 Index 2** (see section 3.4 Acyclic access → 🖹 25).

Setting relays

Example: Setting relay 6 to the active state

Byte	0	1
	RelNo.	Status
	6	1

Reading out the relay status

This reads out the status of every relay. Bit 0 corresponds to relay 1. **Slot 0 Index 2** 2 Byte must be read out.

Example: Relay 1 and relay 6 in active state

Byte	0	1
	Relays 12-9 (hex)	Relays 1-8 (hex)
	0	0x21

2.7.4 Changing limit values

Limit values can be changed. The functions and parameters must be written via **Slot 0 Index 3**, (see section 3.4 Acyclic access → 25).

Function	Description	Data
1	Initialization	
2	Accept limit values	
3	Change limit value	Limit value number, value [;dt] limit value number;value;time span for gradient;delay;value2
5	Provide reason	Reason text

The following procedure must be followed when changing limit values:

1. Initialize limit value change.
2. Change limit values.
3. Where applicable, give a reason for the change.
4. Accept limit values.

Any changes since the last initialization can be discarded when a subsequent limit value change is initialized.

Initializing limit value changes

This prepares the device for changes to the limit values.

Byte	0	1
	Func	Padding byte
	1	2A

Changing limit values

A limit value in the device is changed, but not yet accepted, with this function.

Examples:

Func	Limit value	Data	Meaning
3	1	5.22;;60	Limit value 1 to 5.22, no span, delay 60 s
3	2	5.34	Limit value 2 to 5.34
3	3	;;10	Limit value 3, delay to 10 seconds
3	4	20;;;50	Limit value 4, inband/outband lower limit value 20, upper limit value 50

Example: Changing limit value 1 (upper limit value for universal input) to 90.5

Byte	0	1	2	3	4	5
	Func	**Limit value**	**39**	**30**	**2E**	**35**
	3	1	‚9'	‚0'	‚.'	‚5'

Example: Changing limit value 3 (gradient for universal input) to 5.7 within 10 seconds

Byte	0	1	2	3	4	5	6	7
	Func	**Limit value**	**35**	**2E**	**37**	**3B**	**31**	**30**
	3	3	‚5'	‚.'	‚7'	‚;'	‚1'	‚0'

Specifying a reason for changing the limit values

Before you save the limit value change, you can enter a reason for the change, which is saved in the event list. If no reason is specified, the message **Limit values were changed** is entered in the event list.

Texts (according to ASCII table) can be transmitted. The maximum length of a text is 30 characters.

Byte	0	1	2..n
	Func	Padding byte	Text
	5	2A	

Accepting limit values

This function is used to accept the modified limit values in the device and save them in the device settings.

Byte	0	1
	Func	Padding byte
	2	2A

Reading out the communication status

The status of the last limit value function performed can be read out here. It must be read out via Slot 0 Index 3 1 Byte.

Example: Incorrect function addressed

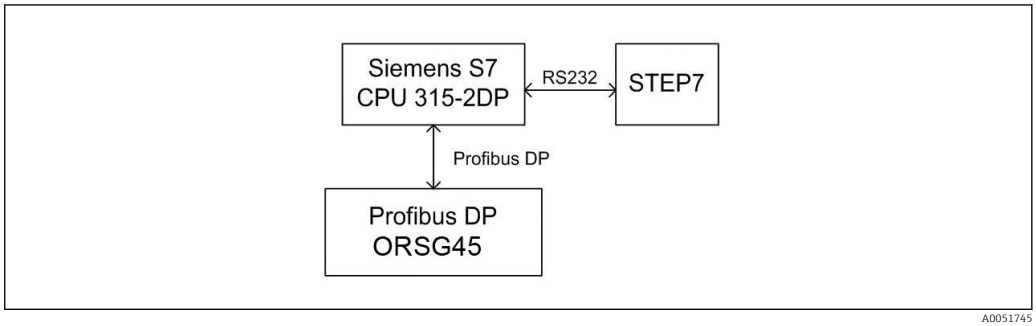
Byte	0
	Comm. status
	1

Communication status:

0: OK
1: Incorrect function number or limit value number
2: Data missing
3: Limit value not active
4: Gradient → two values
5: Function currently not possible
9: Error

3 Integration into Simatic S7

3.1 Network overview



3.2 Hardware planning

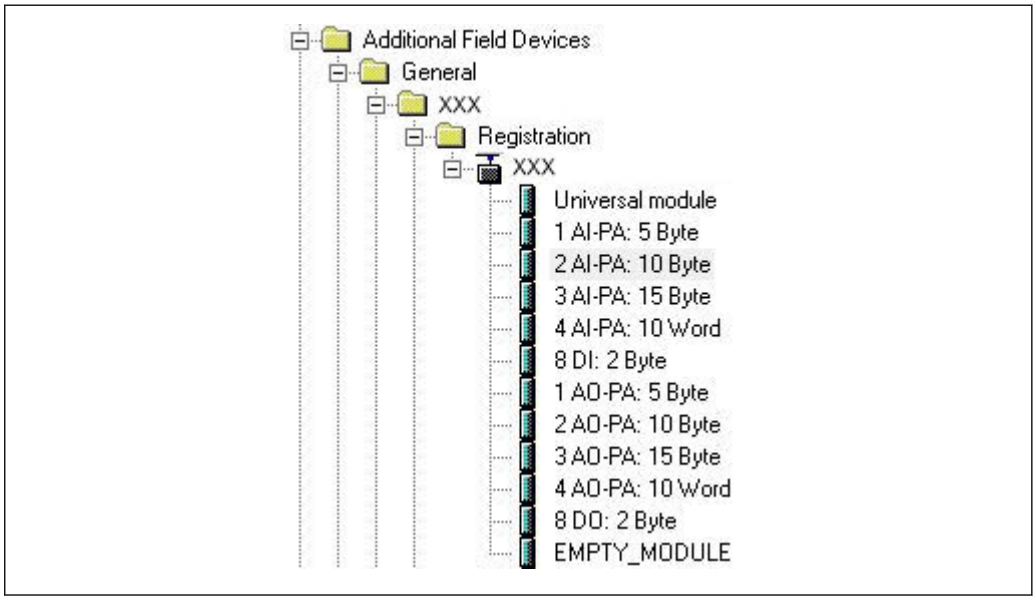
3.2.1 Installation and preparation

GSD file

In the hardware configuration:

Installation is performed either via **Options/Install GSD files** in HW config or by copying the GSD and BMP files to the STEP 7 software directory provided.

e.g.:
- c:\...\Siemens\Step7\S7data\GSD
- c:\...\ Siemens\Step7\S7data\NSBMP



19 *View of device in the hardware catalog*

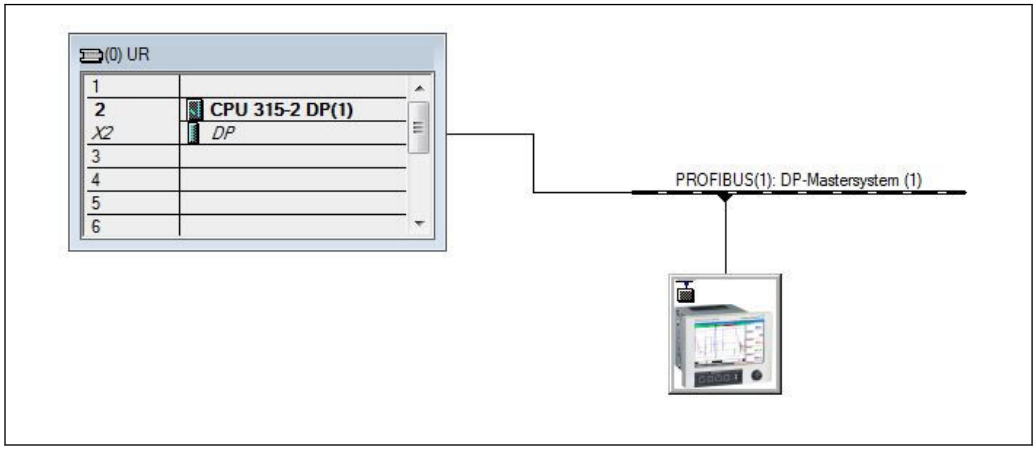
3.2.2 Configuring the device as a DP slave

In HW config:

1. Drag the device from the Hardware catalog → PROFIBUS DP → Additional field devices → General into the PROFIBUS DP network.

2. Assign the user address.

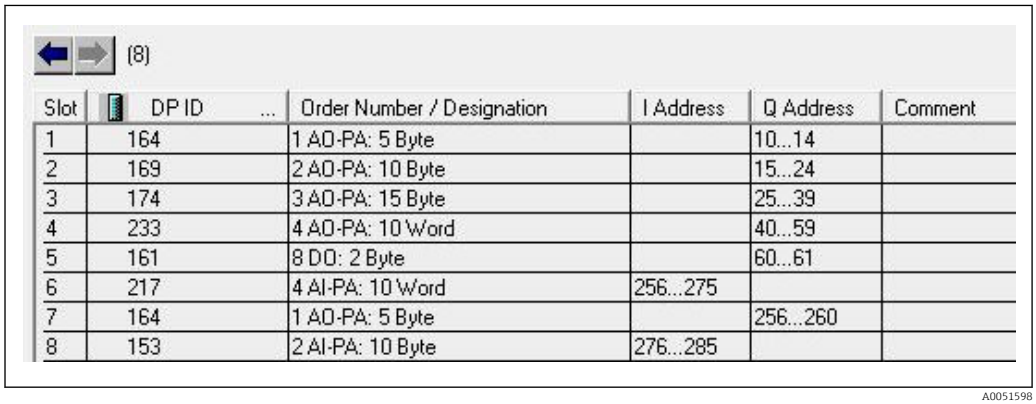
Result:



20 Device connected to the PROFIBUS DP network

The configured slave address must match the hardware address that is actually configured.

The module names and sequence must be assigned in accordance with the device parameters.



Slot	DP ID	...	Order Number / Designation	I Address	Q Address	Comment
1	164		1 AO-PA: 5 Byte		10...14	
2	169		2 AO-PA: 10 Byte		15...24	
3	174		3 AO-PA: 15 Byte		25...39	
4	233		4 AO-PA: 10 Word		40...59	
5	161		8 DO: 2 Byte		60...61	
6	217		4 AI-PA: 10 Word	256...275		
7	164		1 AO-PA: 5 Byte		256...260	
8	153		2 AI-PA: 10 Byte	276...285		

21 Slots populated with modules

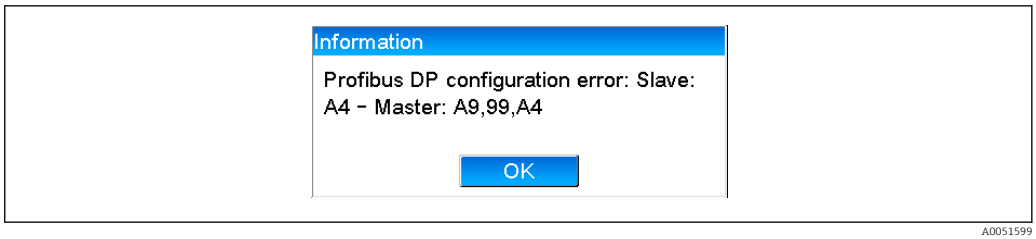
3.2.3 Transmitting the configuration

1. Save and compile the configuration.
2. Transmit the configuration to the control system via the **PLC → Upload** menu item.

If the information matches, a symbol appears in the top right-hand corner and alternates with the SD display.

If the **BUSF** LED of the PLC lights up after the transmission of the configuration, the configured network does not match the network that is physically present. Check the project for irregularities.

The following message is output if the configuration does not match:



22 *Message on device in the event of a configuration error*

This example shows that the first two modules have the same configuration bytes but that the master has defined one module less than required.

3.3 Sample program

The following shows the program lines that are needed to record and output the values. The SFC14 and SFC15 modules are used because the data are consistent.

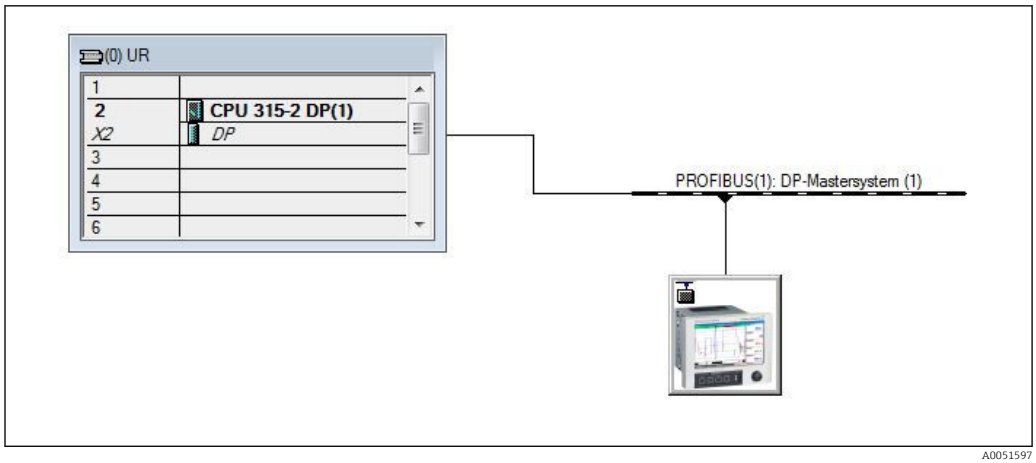
```
// Reading out four floating point numbers from module 4 AI-PA 10 Word

    CALL „DPRD_DAT"                  // SFC 14
     LADDR   :=W#16#107              // input address 263
     RECORD  :=P#M 22.0 BYTE 20      // read out 20 bytes
     RET_VAL :=MW20

// Writing a floating point number to module 1 AO-PA 5 byte

    CALL "DPWR_DAT"                  // SFC 15
     LADDR   :=W#16#100              // output address 256
     RECORD  :=P#M 44.0 BYTE 5       // write 5 bytes
     RET_VAL :=MW42

// Reading out digital statuses

      L     EB     261                 // digital statuses
      T     MB     0                   // transfer after flag 0
      L     EB     262                 // get validity of statuses
      T     MB     1                   // status after flag 1

// Writing digital statuses

      L     MB     2                   // digital statuses
      T     AB     261                 // transfer after output byte 261
      L     MB     3                   // get validity of statuses
      T     AB     262                 // transfer after output byte 262
```

A0051600

23 *Message on device in the event of a configuration error*

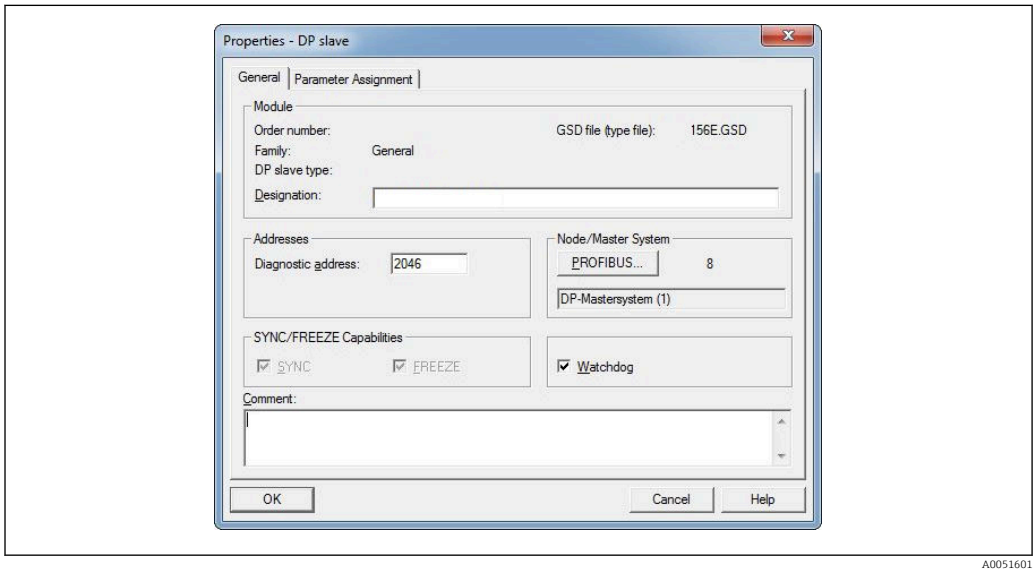
3.4 Acyclic access

Taking the example of a CPU315-2 DP (315-2AG10-0AB0), the text below describes the acyclic access to transmit a text via Slot 0, Index 0 (see 2.7.1 → 17) and the readout of the relay status via Slot 0, Index 2 (see 2.7.3→ 19).



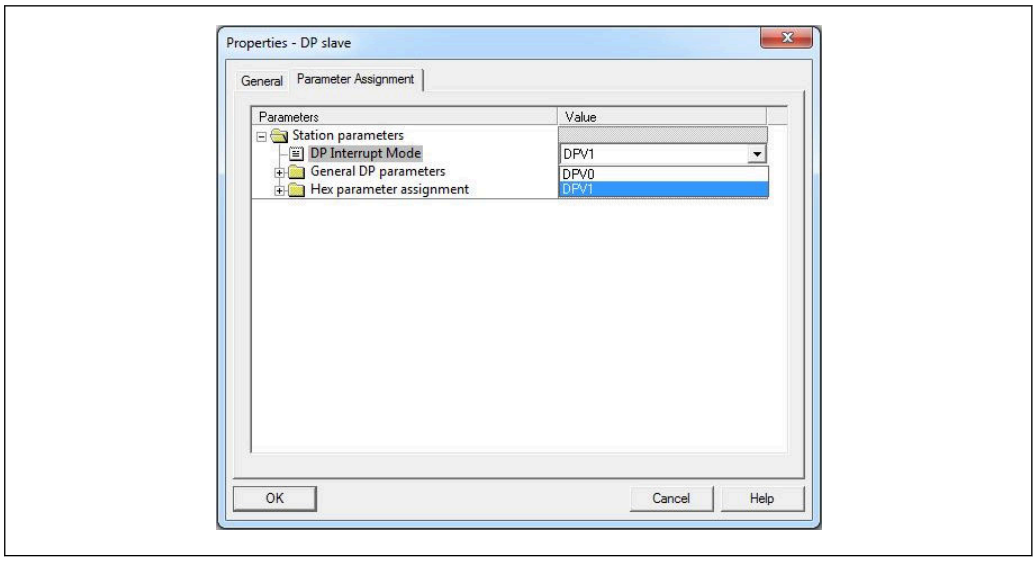
24 Integrating the device into the PROFIBUS network

The diagnostic address, here **2046** is determined under **Properties → General** of the DP slave:



25 Determining the diagnostic address

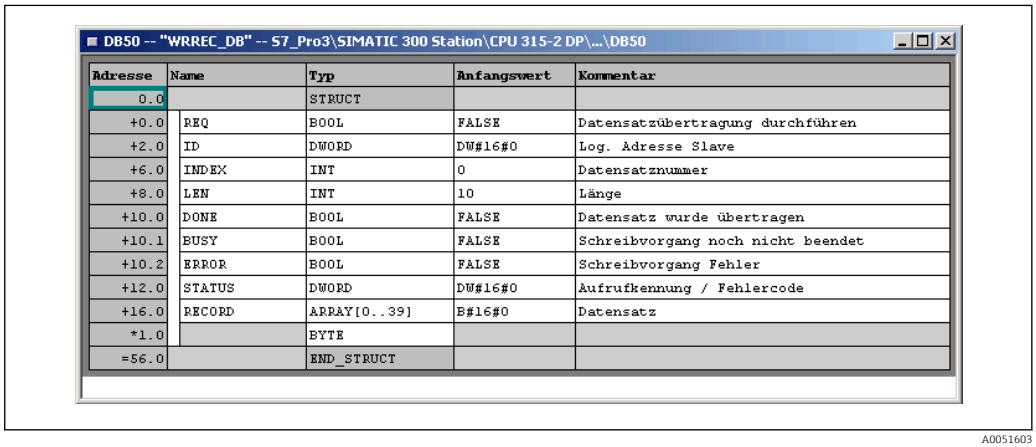
DPV1 is set under **Properties → Parameter assignment** of the DP slave:



26 *Settings for DPV1*

3.4.1 Transmitting a text via Slot 0, Index 0 (see 2.7.1→ 17)

A DB50 data module with a **WRREC_DB** structure is created:



Adresse	Name	Typ	Anfangswert	Kommentar
0.0		STRUCT		
+0.0	REQ	BOOL	FALSE	Datensatzübertragung durchführen
+2.0	ID	DWORD	DW#16#0	Log. Adresse Slave
+6.0	INDEX	INT	0	Datensatznummer
+8.0	LEN	INT	10	Länge
+10.0	DONE	BOOL	FALSE	Datensatz wurde übertragen
+10.1	BUSY	BOOL	FALSE	Schreibvorgang noch nicht beendet
+10.2	ERROR	BOOL	FALSE	Schreibvorgang Fehler
+12.0	STATUS	DWORD	DW#16#0	Aufrufkennung / Fehlercode
+16.0	RECORD	ARRAY[0..39]	B#16#0	Datensatz
*1.0		BYTE		
=56.0		END_STRUCT		

27 *DB50 data module*

The text to be transmitted can be entered online in the data block from RECORD[0]:

@DB50 -- "WRREC_DB" -- S7_Pro3\SIMATIC 300 Station\CPU 315-2 DP\...\DB50 ONLINE

Adresse	Name	Typ	Anfangswert	Aktualwert	Kommentar
0.0	REQ	BOOL	FALSE	FALSE	Datensatzübertragung durchführen
2.0	ID	DWORD	DW#16#0	DW#16#0000000	Log. Adresse Slave
6.0	INDEX	INT	0	0	Datensatznummer
8.0	LEN	INT	10	10	Länge
10.0	DONE	BOOL	FALSE	FALSE	Datensatz wurde übertragen
10.1	BUSY	BOOL	FALSE	FALSE	Schreibvorgang noch nicht beendet
10.2	ERROR	BOOL	FALSE	FALSE	Schreibvorgang Fehler
12.0	STATUS	DWORD	DW#16#0	DW#16#0070000	Aufrufkennung / Fehlercode
16.0	RECORD[0]	BYTE	B#16#0	B#16#30	Datensatz
17.0	RECORD[1]	BYTE	B#16#0	B#16#31	
18.0	RECORD[2]	BYTE	B#16#0	B#16#32	
19.0	RECORD[3]	BYTE	B#16#0	B#16#33	
20.0	RECORD[4]	BYTE	B#16#0	B#16#34	
21.0	RECORD[5]	BYTE	B#16#0	B#16#35	
22.0	RECORD[6]	BYTE	B#16#0	B#16#36	
23.0	RECORD[7]	BYTE	B#16#0	B#16#37	
24.0	RECORD[8]	BYTE	B#16#0	B#16#38	
25.0	RECORD[9]	BYTE	B#16#0	B#16#39	
26.0	RECORD[10]	BYTE	B#16#0	B#16#40	
27.0	RECORD[11]	BYTE	B#16#0	B#16#00	
28.0	RECORD[12]	BYTE	B#16#0	B#16#00	
29.0	RECORD[13]	BYTE	B#16#0	B#16#00	

A0051604

28 DB50 data module online

In OB1 the command for the SFB53 **WRREC** is implemented which can be used to write a data record to the module addressed.

```
U     M     11.0              // Trigger for writing record
UN    M     11.1              // helpflag
=     M     11.2              // edgeflag

U     M     11.0
=     M     11.1

CALL  "WRREC" , DB53
 REQ   :=M11.2                // Edgeflag
 ID    :=MD20                 // Diagnostic address of slave (2046)->Slot 0
 INDEX :=MW24                 // Index 0
 LEN   :="WRREC_DB".LEN
 DONE  :="WRREC_DB".DONE
 BUSY  :="WRREC_DB".BUSY
 ERROR :="WRREC_DB".ERROR
 STATUS:="WRREC_DB".STATUS
 RECORD:="WRREC_DB".RECORD
```

A0051605

This SFB command writes the data record ("WRREC_DB".RECORD DB50) with the length 10 ("WRREC_DB".LEN) to the slave with the diagnostic address 0x7FE (2046).

The following VAT is used to start communication:

VAT_1 -- S7_Pro3\SIMATIC 300 Station\CP...

		Operand	Symbol	Anzei	Statuswert	Steuerwert
1		//Start sending				
2		M 11.0		BOOL		true
3		MD 20		DEZ		L#2046
4		MW 24		DEZ		0

A0051606

29 Table of variables

To start transmission, M11.0 is set to **true**. Transmission begins. Before another transmission process can be started, M11.0 must first be reset to **false**.

SD2	2->5	SRD_LOW	DPV1_Write_Req	Req	51->51	14	5F 00 00 0A 30 31 32 33 34 35 36 37 38 39
SD2	2->5	SRD_LOW	DPV1_Poll	Req	51->51	0	
SD2	2->5	SRD_LOW	DPV1_Poll	Req	51->51	0	
SD2	2->5	SRD_LOW	DPV1_Poll	Req	51->51	0	
SD2	2->5	SRD_LOW	DPV1_Poll	Req	51->51	0	
SD2	2->5	SRD_LOW	DPV1_Poll	Req	51->51	0	
SD2	2->5	SRD_LOW	DPV1_Poll	Req	51->51	0	
SD1	2<-5	Passive		Res			
SD2	2->5	SRD_LOW	DPV1_Poll	Req	51->51	0	
SD2	2->5	SRD_LOW	DPV1_Poll	Req	51->51	0	
SD2	2->5	SRD_LOW	DPV1_Poll	Req	51->51	0	
SD2	2->5	SRD_LOW	DPV1_Poll	Req	51->51	0	
SD2	2->5	SRD_LOW	DPV1_Poll	Req	51->51	0	
SD2	2<-5	DL	DPV1_Write_Res	Res	51<-51	4	5F 00 00 0A

A0051607

30 *Communication cycle of the acyclic service*

3.4.2 Reading out the relay status via Slot 0, Index 2 (see 2.7.3 → 19)

To start the read-out process, M12.0 is set to **true**. Transmission begins. Before another read-out process can be started, M12.0 must first be reset to **false**.

```
U     M     12.0          // Trigger for reading data record
UN    M     12.1          // helpflag
=     M     12.2          // edgeflag

U     M     12.0
=     M     12.1

CALL  SFB   52 , DB52     // RDREC
 REQ   :=M12.2            // Edgeflag
 ID    :=DW#16#7FE        // Diagnosis address slave (2046)->Slot 0
 INDEX :=2                // Index 2
 MLEN  :=2                // Maximum length of the bytes to be read
 VALID :=M100.1           // VALID data record has been received and is valid
 BUSY  :=M100.2           // BUSY=1: The reading operation is not completed yet
 ERROR :=M100.3           // ERROR=1: An error has occurred while reading
 STATUS:=MD101            // STATUS
 LEN   :=MW110            // Length of data record information read
 RECORD:=MW120            // Target area for the data record read
```

A0051608

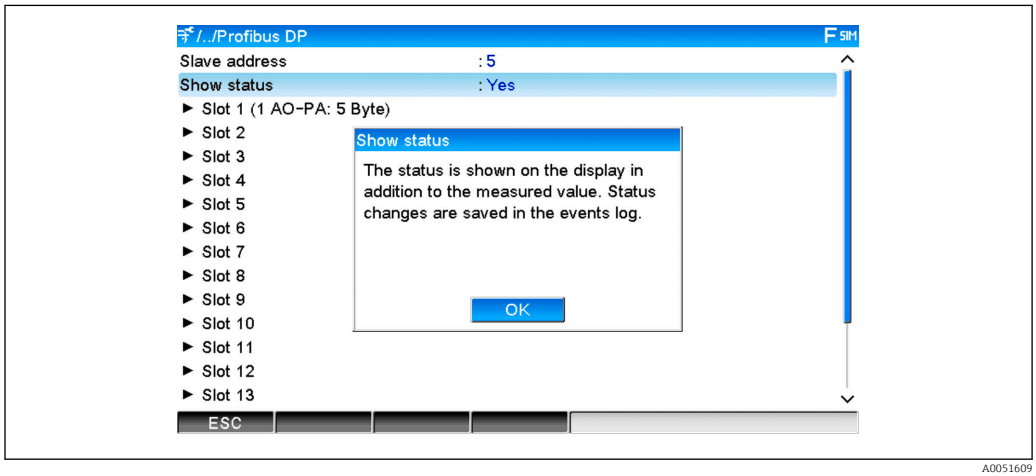
The target area must at least be large enough to accept the previously defined data (MLEN). In MW 120, W#16#0008 appears after the read-out operation, which means that relay 4 is active.

4 Troubleshooting

Problem	Cause	Remedy
The BUSF LED on the PLC is lit	Configuration of device and PROFIBUS master not identical	Check using the slot overview (see section 2.6.3 Slot overview → 🖹 15)
	Slave address not identical	Check the slave address, see: 2.2 Settings in the setup → 🖹 8 2.6.3 Slot overview → 🖹 15 3.2.2 Configuring the device as a DP slave → 🖹 24

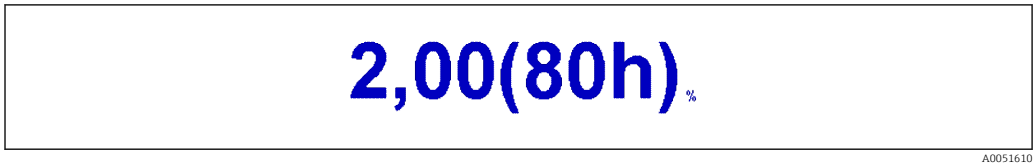
4.1 Checking the measured value status (PROFIBUS master → device)

Under **Expert → Communication → PROFIBUS DP** it is possible to activate the function for displaying and monitoring the measured value status. This function should be used for test purposes only since status changes are also saved in the event list in addition to the displayed value:



A0051609

The status is then displayed in hexadecimal format after the measured value:



A0051610

The status changes are saved in the event list (in English):

A0051611

5 PROFIBUS DP troubleshooting

Solutions to problems

Problem	Cause	Remedy
The BUSF LED on the PLC is lit	Configuration of device and PROFIBUS master not identical	Check using the slot overview (see section 2.6.3 Slot overview → 🖹 15)
	Slave address not identical	Check the slave address, see: 2.2 Settings in the setup → 🖹 8 2.6.3 Slot overview, web browser → 🖹 15 3.2.2 Configuring the device as a DP slave → 🖹 23

6 List of abbreviations/definition of terms

PROFIBUS module: The PROFIBUS DP slave plug-in module that is plugged into the front of the device.

PROFIBUS master: All instruments such as a PLC, PC plug-in cards etc. that perform a PROFIBUS DP master function.

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