Brief Operating Instructions
RID14

8-channel field indicator
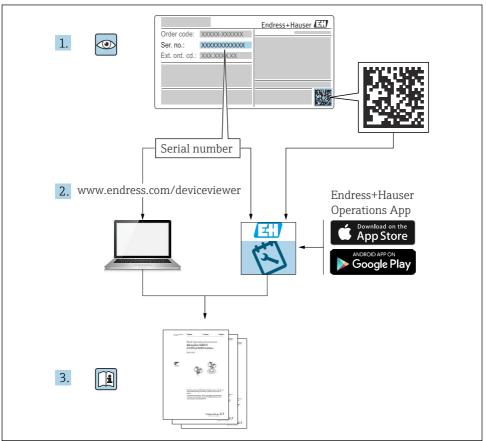with PROFIBUS® PA protocol

These Brief Operating Instructions are not a substitute for the Operating Instructions pertaining to the device.

Detailed information is provided in the Operating Instructions and other documentation.

Available for all device versions via:
- Internet: www.endress.com/deviceviewer
- Smartphone/tablet: Endress+Hauser Operations app

Endress+Hauser

People for Process Automation

1.

2. www.endress.com/deviceviewer

Serial number

Endress+Hauser
Operations App

3.

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1   About this document

1.1   Symbols

1.1.1   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.

1.1.2   Electrical symbols

Symbol	Meaning	Symbol	Meaning
⎓	Direct current	∿	Alternating current
⎓∿	Direct current and alternating current	⏚	**Ground connection** A grounded terminal which, as far as the operator is concerned, is grounded via a grounding system.

Symbol	Meaning
⏛	**Potential equalization connection (PE: protective earth)** Ground terminals that must be connected to ground prior to establishing any other connections. The ground terminals are located on the interior and exterior of the device: • Interior ground terminal: potential equalization is connected to the supply network. • Exterior ground terminal: device is connected to the plant grounding system.

1.1.3   Symbols for certain types of information

Symbol	Meaning	Symbol	Meaning
✅	**Permitted** Procedures, processes or actions that are permitted.	✅✅	**Preferred** Procedures, processes or actions that are preferred.
❌	**Forbidden** Procedures, processes or actions that are forbidden.	ℹ	**Tip** Indicates additional information.

Symbol	Meaning	Symbol	Meaning
📖	Reference to documentation	📄	Reference to page
🖼	Reference to graphic	1. , 2. , 3....	Series of steps
↳	Result of a step	👁	Visual inspection

1.1.4 Symbols in graphics

Symbol	Meaning	Symbol	Meaning
1, 2, 3,...	Item numbers	1. , 2. , 3....	Series of steps
A, B, C, ...	Views	A-A, B-B, C-C, ...	Sections
⚠EX	Hazardous area	⚠	Safe area (non-hazardous area)

2 Safety instructions

2.1 Requirements for the personnel

The personnel must fulfill the following requirements for its tasks:
▶ Trained, qualified specialists must have a relevant qualification for this specific function and task.
▶ Are authorized by the plant owner/operator.
▶ Are familiar with federal/national regulations.
▶ Before starting work, read and understand the instructions in the manual and supplementary documentation as well as the certificates (depending on the application).
▶ Follow instructions and comply with basic conditions.

2.2 Intended use

• The device is a field indicator for connection to a fieldbus.
• It is designed for mounting in the field.
• The manufacturer accepts no liability for damages resulting from improper or non-intended use.
• Safe operation is only guaranteed if the Operating Instructions are observed.
• Only operate the device in the permitted temperature range.

2.3 Workplace safety

When working on and with the device:
▶ Wear the required personal protective equipment as per national regulations.

2.4   Operational safety

Damage to the device!
▶ Operate the device in proper technical condition and fail-safe condition only.
▶ The operator is responsible for the interference-free operation of the device.

2.5   Product safety

This measuring device is designed in accordance with good engineering practice to meet state-of-the-art safety requirements, has been tested, and left the factory in a condition in which it is safe to operate.

It meets general safety standards and legal requirements. It also complies with the EU directives listed in the device-specific EU Declaration of Conformity. The manufacturer confirms this by affixing the CE mark to the device.

3   Incoming acceptance and product identification

3.1   Incoming acceptance

Proceed as follows on receipt of the device:

1. Check whether the packaging is intact.
2. If damage is discovered:
   Report all damage immediately to the manufacturer.
3. Do not install damaged components, as the manufacturer cannot otherwise guarantee the material resistance or compliance with the original safety requirements, and can also not be held responsible for the consequences that may result.
4. Compare the scope of delivery against the contents of your order.
5. Remove all the packaging material used for transportation.
6. Do the data on the nameplate match the ordering information on the delivery note?
7. Are the technical documentation and all other necessary documents provided, e.g. certificates?

If one of the conditions is not satisfied, contact your Sales Center.

3.2   Product identification

The following options are available for identification of the device:
• Nameplate specifications
• Enter the serial number from the nameplate in the *Device Viewer*
  (www.endress.com/deviceviewer): all the information about the device and an overview of
  the Technical Documentation supplied with the device are displayed.
• Enter the serial number on the nameplate into the *Endress+Hauser Operations App* or scan
  the 2-D matrix code (QR code) on the nameplate with the *Endress+Hauser Operations App*:
  all the information about the device and the technical documentation pertaining to the
  device is displayed.

3.2.1   Nameplate

The right device?

The nameplate provides you with the following information on the device:
• Manufacturer identification, device designation
• Order code
• Extended order code
• Serial number
• Tag name (TAG)
• Technical values: supply voltage, current consumption, ambient temperature,
  communication-specific data (optional)
• Degree of protection
• Approvals with symbols

▶ Compare the information on the nameplate with the order.

3.2.2   Name and address of manufacturer

Name of manufacturer:	Endress+Hauser Wetzer GmbH + Co. KG
Address of manufacturer:	Obere Wank 1, D-87484 Nesselwang or www.endress.com

3.3   Storage and transport

Storage temperature: –40 to +80 ℃ (–40 to +176 ℉)

Maximum relative humidity: < 95 % as per IEC 60068-2-30

Pack the device for storage and transportation in such a way that it is reliably protected
against impact and external influences. The original packaging offers the best protection.

Avoid the following environmental influences during storage:
• Direct sunlight
• Proximity to hot objects
• Mechanical vibration
• Aggressive media

3.4   Certificates and approvals

ℹ️ For certificates and approvals valid for the device: see the data on the nameplate

ℹ️ Approval-related data and documents: www.endress.com/deviceviewer → (enter the
serial number)

3.4.1   PROFIBUS

The field indicator has successfully passed the PROFIBUS PA physical layer test. As a "non-active" bus user, it doesn't interfere with the Profibus data traffic.

4   Mounting

4.1   Mounting requirements

The indicator is designed for use in the field.

Its orientation is determined by the readability of the display.

Operating temperature range: −40 to +80 ℃ (−40 to +176 ℉)

NOTICE

Reduced operating life of the display at high temperatures

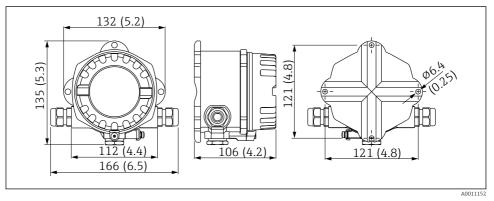▶ If possible, do not operate the device in the upper temperature limit range.

ℹ️ The display may react slowly at temperatures < −20 ℃ (−4 ℉).

Readability of the display can no longer be guaranteed at temperatures < −30 ℃ (−22 ℉).

Altitude	Up to 2 000 m (6 561.7 ft) above sea level
Overvoltage category	Overvoltage category II
Pollution degree	Pollution degree 2

4.1.1   Dimensions

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⊞ 1   *Dimensions of the field indicator; dimensions in mm (in)*

4.1.2   Mounting location

Information about the conditions (such as the ambient temperature, degree of protection, climate class etc.) that must be present at the installation location so that the device can be mounted correctly is provided in the "Technical data" section of the Operating Instructions.

4.2   Mounting the measuring device

The device can be mounted directly on the wall → ⧉ 10. A mounting bracket is available for pipe mounting → ⊞ 3, ⧉ 10.

The backlit display can be mounted in four different positions → ⧉ 9.

4.2.1   Turning the display

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⊞ 2   *Field indicator, 4 display positions, can be fitted in 90° steps*
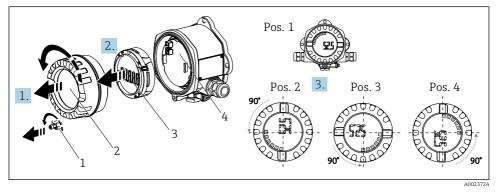
The display can be turned in 90˚ steps.

1. Remove the cover clamp (1) and the housing cover (2).

2. Remove the display (3) from the electronics unit (4).

3. Turn the display to the desired position and then attach it to the electronics unit.

4. Clean the thread in the housing cover and housing base and lubricate if necessary. (Recommended lubricant: Klüber Syntheso Glep 1)

5. Screw the housing cover (2) and O-ring together and fit the cover clamp (1) back on.

4.2.2   Direct wall mounting

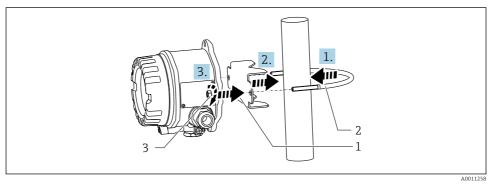Proceed as follows to mount the device directly on the wall:

1. Drill 2 holes

2. Fit the device on the wall with 2 screws (Ø 5 mm (0.2 in)).

4.2.3   Pipe mounting

The mounting bracket is suitable for pipes with a diameter between 1.5" and 3.3".

The additional mounting plate must be used for pipes with a diameter between 1.5" and 2.2". The mounting plate is not necessary for pipes with a diameter between 2.2" and 3.3".

Proceed as follows to mount the device on a pipe:

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⊞ *3   Mounting the field indicator on a pipe with a mounting bracket for pipe diameters 1.5" to 2.2"*

1   *Mounting plate*
2   *Mounting bracket*
3   *2 M6 nuts*

4.3   Post-mounting check

After installing the device, always perform the following checks:

Device condition and specifications	Notes
Is the measuring device damaged?	Visual inspection
Is the seal undamaged?	Visual inspection
Is the device securely fastened to the wall or the mounting plate?	-
Is the housing cover fixed tightly?	-
Does the device correspond to the measuring point specifications, e.g., ambient temperature etc.?	See 'Technical data' section

5   Electrical connection

5.1   Connecting requirements

> NOTICE

Destruction or malfunction of parts of the electronics
▶ ⚠ ESD - Electrostatic discharge. Protect the terminals from electrostatic discharge.

> ⚠ WARNING

Danger of explosion if the device is incorrectly connected in the hazardous area
▶ When connecting Ex-certified devices, please take special note of the instructions and connection schematics in the Ex-specific supplement to these Operating Instructions.

> NOTICE

The electronics can be destroyed if unit is connected incorrectly
▶ Switch off the power supply before installing or connecting the device. Failure to observe this may result in the destruction of parts of the electronics.
▶ The post connector is only used to connect the display. If other devices are connected, this can result in the destruction of parts of the electronics.

Devices can be connected to the PROFIBUS® PA in two ways:

• Via a conventional cable gland
• Via a fieldbus connector (optional, available as an accessory)

5.2   Connecting the measuring device

5.2.1   Connecting the cable to the field indicator

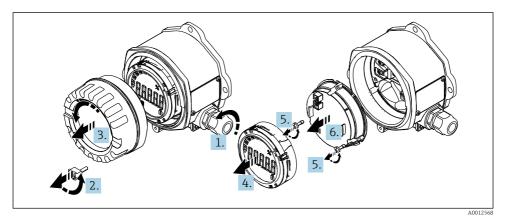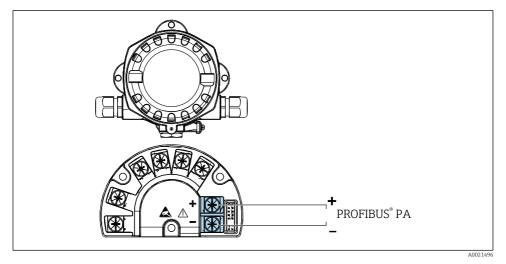Proceed as follows to wire the field indicator:

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🖻 4   *Opening the field indicator housing*

1.	Open the cable gland, or remove the cable gland to use a fieldbus connector (optional accessory).
2.	Remove the cover clamp.
3.	Remove the housing cover.
4.	Remove the display.
5.	Remove the screws from the electronics unit.
6.	Remove the electronics unit.
7.	Feed the cable through the cable entry, or screw the fieldbus connector into the housing.
8.	Connect the cable → 🖻 5, 🖺 13
9.	Assembly is in reverse order.

Quick wiring guide

⊞ *5   Terminal assignment*

Terminal	Terminal assignment
+	PROFIBUS® PA connection (+)
-	PROFIBUS® PA connection (-)

5.2.2   Connection to PROFIBUS® PA

Devices can be connected to the PROFIBUS® PA in two ways:
- Via a conventional cable gland
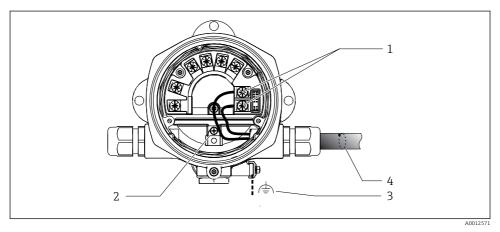- Via a fieldbus connector (optional, available as an accessory)

> **NOTICE**

The device and fieldbus cable can be damaged by electrical voltage
▶ Switch off the power supply before installing or connecting the device.
▶ It is recommended to ground the unit via one of the grounding screws.
▶ If the shielding of the fieldbus cable is grounded at more than one point in systems without additional potential equalization, mains frequency equalizing currents can occur that damage the cable or shield. In such cases, the shielding of the fieldbus cable is to be grounded on one side only, i.e. it must not be connected to the ground terminal of the housing. The shield that is not connected should be insulated!

🛈 We recommend that the fieldbus not be looped using conventional cable glands. If you replace even just one measuring device at a later date, the bus communication will have to be interrupted.

Cable gland or entry

ℹ️ Please also observe the general procedure → 🖹 11

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🖼 *6   Connection to the PROFIBUS® PA fieldbus cable*

1   Terminals - Fieldbus communication and power supply
2   Internal ground terminal
3   External ground terminal
4   Shielded fieldbus cable

• The terminals for the fieldbus connection (1+ and 2-) are independent of polarity.
• Conductor cross-section:
  Max. 2.5 mm² (14 AWG)
• Always use a shielded cable for the connection.

Fieldbus connector

As an option, a fieldbus connector can be screwed into the field housing instead of a cable gland. Fieldbus connectors can be ordered from Endress+Hauser as an accessory (see 'Accessories' section in the Operating Instructions).

The connection technology for PROFIBUS® PA enables measuring devices to be connected to the fieldbus via uniform mechanical connections such as T-boxes, junction boxes, etc.

This connection technology using prefabricated distribution modules and plug-in connectors offers substantial advantages over conventional wiring:
• Field devices can be removed, replaced or added at any time during normal operation. Communication is not interrupted.
• Installation and maintenance are significantly easier.
• Existing cable infrastructures can be used and expanded instantly, e.g. when constructing new star distributors using 4-channel or 8-channel distribution modules.
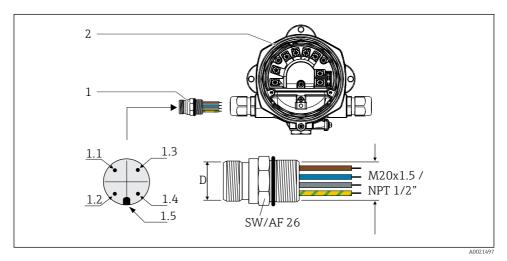
Supply line/T-box shielding

Always use cable glands with good EMC properties, where possible with wrapround cable shielding (Iris spring). This requires minimum differences in potential, and possibly potential equalization.

- The shielding of the PA cable may not be interrupted.
- The shielding connection must always be kept as short as possible.

Ideally, cable glands with Iris springs should be used to connect the shielding. The Iris spring, which is located inside the gland, connects the shield to the T-box housing. The shielding braid is located under the Iris spring.

When the armored thread is tightened, the Iris spring is pressed against the shielding, thereby creating a conductive connection between the shielding and the metal housing.

A junction box or a plug-in connection must be considered part of the shielding (Faraday shield). This applies, in particular, to remote boxes if such boxes are connected to a PROFIBUS® PA device via a plug-in cable. In such cases, you must use a metal connector where the cable shielding is connected to the connector housing (e.g. preterminated cables).

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⊞ *7*   *Connectors for connection to the PROFIBUS® PA fieldbus*

1	Fieldbus connector	Pin assignment/color codes			
2	Field indicator	D	7/8" connector	D	M12 connector
		1.1	Brown wire: PA+ (terminal 1)	1.1	Gray wire: shield
		1.2	Green-yellow wire: Grounding	1.2	Brown wire: PA+ (terminal 1)
		1.3	Blue wire: PA- (terminal 2)	1.3	Blue wire: PA- (terminal 2)
		1.4	Gray wire: shield	1.4	Green-yellow wire: Grounding
		1.5	Positioning key	1.5	Positioning key

Connector technical data:
- Degree of protection IP 67 (NEMA 4x)
- Ambient temperature: −40 to +105 ℃ (−40 to +221 ℉)

5.3 Ensuring the degree of protection

The devices fulfill the requirements for the IP 67 degree of protection. Compliance with the following points is mandatory to ensure IP 67 protection is guaranteed after installation or after service work:
- The housing seal must be clean and undamaged when inserted into the groove. The seal should be cleaned, dried or replaced.
- The connecting cables must be of the specified outer diameter (e.g., M16 x 1.5, cable diameter 5 to 10 mm (0.2 to 0.39 in)).
- Replace all unused cable entries with dummy plugs.
- The cable entry seal may not be removed from the cable entry.
- The housing cover and cable entry/entries must be closed securely.
- Install the device in such a way that the cable entries point downwards.

5.4 Post-connection check

After completing the device's electrical installation, carry out the following checks:

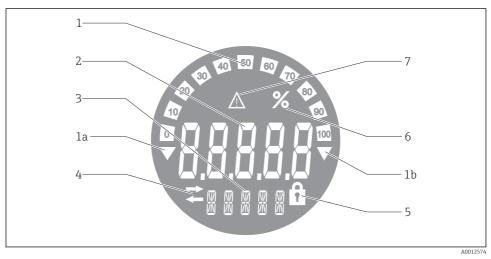| Device condition and specifications	Notes
Are cables or the device damaged (visual inspection)?	-

Electrical connection	Notes
Does the supply voltage match the specifications on the nameplate?	9 to 32 V_{DC}
Do the cables used meet the required specifications?	Fieldbus cable, see Operating Instructions
Do the cables have adequate strain relief?	-
Are the power supply and signal cables correctly connected?	→ 🖺 13
Are all the screw terminals well tightened and have the connections of the spring terminals been checked?	-
Are all the cable entries installed, tightened and sealed? Cable run with "water trap"?	-
Are all housing covers installed and firmly tightened?	-
Are all the connecting components (T-boxes, junction boxes, connectors, etc.) connected with each other correctly?	-
Has each fieldbus segment been terminated at both ends with a bus terminator?	-
Has the max. length of the fieldbus cable been observed in accordance with the fieldbus specifications?	See cable specifications in the Operating Instructions
Has the max. length of the spurs been observed in accordance with the fieldbus specifications?	
Is the fieldbus cable fully shielded (90%) and correctly grounded?	

6   Operation options

6.1   Overview of operation options

6.1.1   Display

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🔲 *8   LC display of the field indicator*

1   Bar graph display in increments of 10% with indicators for underranging (item 1a) and overranging (item 1b)
2   Measured value display, status indication "Bad measured value status"
3   14-segment display for units and messages
4   "Communication" symbol
5   "Parameters cannot be modified" symbol
6   Unit "%"
7   "Uncertain measured value status" symbol

The backlit LCD display contains a bar graph (0-100) and arrows to indicate measured values above or below the measuring range. Analog process values, digital status and failure codes are displayed in the 7-segment area. Here up to 8 values can be displayed with an alternating time of between 2 and 20 seconds. Plain text can be displayed in the 14-segment area (text is limited to 16 characters and is scrolled if needed).

The indicator also displays the quality of the measured value. If the status of the displayed value is 'good' (value equal to or above 0x80), no symbol is lit and the indicator remains in the normal operational state. If the status of the displayed value is 'uncertain' (value between 0x40 and 0x7F), the 'Uncertain measured value status' symbol is lit. If the status is 'bad' (value below 0x40), within the 7-segment area the display will show "BAD" and the channel number where the bad value is published. The channel number is also displayed in the 14-segment area.

6.1.2   Operation options

Two options are available to the operator for configuring and commissioning the device:
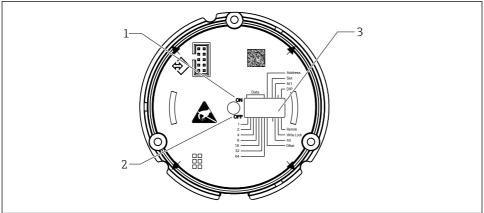
1. Configuration programs

Device-specific parameters are configured via the service interface (CDI). A special device driver (DTM) for an FDT operating program (e.g., DeviceCare, FieldCare) is available for this purpose → 🗐 19.

The DTM file is available for download: www.endress.com/download → Select device driver → Type → Select product root.

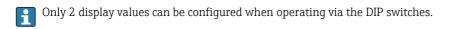### 2. Miniature switches (DIP switches) for various hardware settings

You can make the following hardware settings for the fieldbus interface using miniature switches (DIP switches) on the electronics module → 🗐 19:

• Setting to specify whether operation is possible via DIP switches or remotely via the DTM
• Setting for the address of the bus users whose values are to be displayed
• Configuring an offset

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🔲 9   *Hardware configuration via DIP switches*

1   ON switch position
2   OFF switch position
3   Write protection

ℹ️   Only 2 display values can be configured when operating via the DIP switches.

Listener mode

The field indicator acts solely as a listener, i.e. it does not appear in the bus as an active user with its own address and it does not increase the traffic in the bus.

The field indicator analyzes the devices active on the bus. Via their addresses, these devices can be assigned to up to 8 channels if DTM operation is used, or 2 channels in the case of operation with DIP switches.

ℹ️ Operation via the PROFIBUS protocol is not possible given the sole listener function of the indicator!

6.2 Access to the operating menu via the operating tool

NOTICE

Loss of explosion protection when housing is open

▶ The device must be configured outside the hazardous area.

To configure the device using the FieldCare Device Setup software, connect the device to your PC. To do so, you require a special interface adapter, the Commubox FXA291 (see the "Accessories" section in the Operating Instructions).

Insert the four-pin connector of the interface cable into the corresponding socket in the device, insert the USB connector on the PC into a free USB slot.

You will find additional information on configuration via the PC configuration software in the Operating Instructions.

ℹ️ No power should be supplied via the bus if configuring the PROFIBUS PA indicator with the DTM via the CDI interface!

To ensure a connection to the device can be established, operation must be set to "Remote" at the DIP switches. Furthermore, write protection, which can be enabled and disabled via the DIP switches, must be disabled so that the parameters of the field indicator can be modified via the DTM.

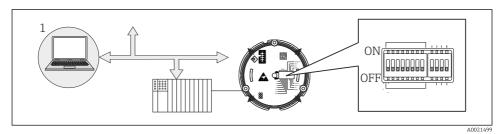The DIP switches are described in the "Hardware settings" section → 🖻 19.

6.3 Hardware settings

Hardware write protection can be switched on and off via DIP switches inside the field indicator. If write protection is enabled, no parameters can be changed.

The current write protection status is displayed in the "Locking status" parameter.

Proceed as follows to set the DIP switch:

1. Remove the housing cover and remove the display → 🖾 4, 🖻 12
2. Configure the DIP switch as required. Switch on ON = function switched on, switch on OFF = function switched off.
3. Attach the display to the electronics.
4. Close the housing cover and secure it.

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⊠ *10   Hardware configuration of the field indicator*

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⊠ *11   Assignment of the DIP switches*

6.3.1   Switching write protection on/off

Write protection is switched on or off via the "WRITE LOCK" DIP switch. When write protection is active, ("WRITE LOCK" is "ON"), parameters cannot be modified. The current write protection status is displayed in the "Locking status" parameter. When write protection is active ("WRITE LOCK" is "ON"), a padlock symbol is lit on the display.

6.3.2   Choosing between operation via DIP switches and remote operation

When the device is operated via the DIP switches, only 2 values are displayed even if more display values were configured previously in the configuration software.

The bar graph is not displayed when the device is operated via the DIP switches.

Via the "Remote/DIP" DIP switch, users can specify whether configuration is possible onsite via the DIP switches or remotely via the DTM and PC configuration software. If the switch is set to "OFF" (remote), all the switches apart from "WRITE LOCK" are disabled. If the switch is set to "ON", all the DIP switches work and operation via the DTM is not possible.

6.3.3   Setting the bus address

The DIP switches can be used to set the address of the Profibus PA measuring device whose values are to be displayed on the field indicator.

The bus address is configured as follows:

1. Use DIP switch "AI1/AI2" to select whether the configured address refers to analog input 1 (switch set to "ON") or analog input 2 (switch set to "OFF").

2. Set the DIP switch "Address/Offset" to "ON", the bus address of the measuring device whose values are to be displayed can be set using DIP switches 1 to 64. Valid address range: 0 to 125

3. Set DIP switch "Set" from "OFF" to "ON" in order to accept the address setting in the device. The settings are only accepted if the "Set" switch is changed from "OFF" to "ON". Power-on of the device with the "Set" switch "ON" position has no effect, nor does a change of the "Set" switch from "OFF" to "ON" when write lock is enabled.

ⓘ   If all the DIP switches are set for the address, address 127 can be configured. This deletes the settings for the channel. A channel that was previously configured can be disabled again in this way.

Address 126 is not valid for the necessary data exchange telegram. The device displays a configuration error with this address.

6.3.4   Configuring an offset

Using the DIP switch, it is possible to set the index (offset) of the first byte of the value to be displayed in relation to the set bus address of the data source.

The setting is made as follows:

1. Use DIP switch "AI1/AI2" to select whether the configured offset refers to analog input 1 (switch set to "ON") or analog input 2 (switch set to "OFF").

2. Set DIP switch "Address/Offset" to "OFF" in order to configure an index (offset) for analog input 1 or analog input 2. Set this index (offset) via DIP switches 1 to 64. Valid address range: 0 to 127.

3. Set DIP switch "Set" from "OFF" to "ON" in order to accept the offset setting in the device. The settings are only accepted if the "Set" switch is changed from "OFF" to "ON". Power-on of the device with the "Set" switch "ON" position has no effect, nor does a change of the "Set" switch from "OFF" to "ON" when write lock is enabled.

6.4   Device configuration

Detailed information on the device configuration can be found in the Operating Instructions.

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www.addresses.endress.com

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