

Operating Instructions

RID14

Fieldbus indicator
with PROFIBUS® PA protocol



Table of contents

1	About this document	3	10	Maintenance	28
1.1	Symbols	3	10.1	Cleaning	28
1.2	Documentation	4	11	Repair	28
2	Safety instructions	5	11.1	General information	28
2.1	Requirements for the personnel	5	11.2	Spare parts	29
2.2	Intended use	5	11.3	Return	30
2.3	Workplace safety	5	11.4	Disposal	30
2.4	Operational safety	5	12	Accessories	30
2.5	Product safety	6	12.1	Device-specific accessories	30
2.6	IT security	6	12.2	Communication-specific accessories	31
3	Incoming acceptance and product identification	6	13	Technical data	31
3.1	Incoming acceptance	6	13.1	Communication	31
3.2	Product identification	7	13.2	Power supply	32
3.3	Storage and transport	7	13.3	Installation	33
3.4	Certificates and approvals	7	13.4	Environment	33
4	Mounting	8	13.5	Mechanical construction	34
4.1	Mounting requirements	8	13.6	Operability	35
4.2	Mounting the measuring device	8	13.7	Certificates and approvals	35
4.3	Post-mounting check	10	13.8	Supplementary documentation	36
5	Electrical connection	10	14	Appendix	36
5.1	Connecting requirements	10	14.1	DTM operating parameters	36
5.2	Connecting the measuring device	10	Index		45
5.3	Ensuring the degree of protection	16			
5.4	Post-connection check	16			
6	Operation options	17			
6.1	Overview of operation options	17			
6.2	Access to the operating menu via the operating tool	19			
6.3	Hardware settings	20			
7	System integration	22			
7.1	PROFIBUS® technology	22			
8	Commissioning	24			
8.1	Post-installation check	24			
8.2	Switching on the field indicator	25			
8.3	Commissioning	25			
9	Diagnostics and troubleshooting	25			
9.1	Troubleshooting instructions	25			
9.2	Status messages	27			
9.3	Firmware history	28			

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
	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.
	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: <ul style="list-style-type: none"> ■ 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
	Permitted Procedures, processes or actions that are permitted.
	Preferred Procedures, processes or actions that are preferred.
	Forbidden Procedures, processes or actions that are forbidden.
	Tip Indicates additional information.
	Reference to documentation
	Reference to page

Symbol	Meaning
	Reference to graphic
	Notice or individual step to be observed
	Series of steps
	Result of a step
	Help in the event of a problem
	Visual inspection

1.1.4 Symbols in graphics

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

1.2 Documentation


 For an overview of the scope of the associated Technical Documentation, refer to the following:

- *Device Viewer* (www.endress.com/deviceviewer): Enter the serial number from the nameplate
- *Endress+Hauser Operations app*: Enter serial number from nameplate or scan matrix code on nameplate.

1.2.1 Document function

The following documentation may be available depending on the version ordered:

Document type	Purpose and content of the document
Technical Information (TI)	Planning aid for your device The document contains all the technical data on the device and provides an overview of the accessories and other products that can be ordered for the device.
Brief Operating Instructions (KA)	Guide that takes you quickly to the 1st measured value The Brief Operating Instructions contain all the essential information from incoming acceptance to initial commissioning.
Operating Instructions (BA)	Your reference document The Operating Instructions contain all the information that is required in the various phases of the life cycle of the device: from product identification, incoming acceptance and storage, to mounting, connection, operation and commissioning through to troubleshooting, maintenance and disposal.
Description of Device Parameters (GP)	Reference for your parameters The document provides a detailed explanation of each individual parameter. The description is aimed at those who work with the device over the entire life cycle and perform specific configurations.

Document type	Purpose and content of the document
Safety Instructions (XA)	<p>Depending on the approval, safety instructions for electrical equipment in hazardous areas are also supplied with the device. The Safety Instructions are an integral part of the Operating Instructions.</p> <p> Information on the Safety Instructions (XA) relevant to the device is provided on the nameplate.</p>
Supplementary device-dependent documentation (SD/FY)	<p>Always comply strictly with the instructions in the relevant supplementary documentation. The supplementary documentation is an integral part of the device documentation.</p>

2 Safety instructions

2.1 Requirements for the personnel

The personnel for installation, commissioning, diagnostics and maintenance must fulfill the following requirements:

- ▶ 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.

The operating personnel must fulfill the following requirements:

- ▶ Are instructed and authorized according to the requirements of the task by the facility's owner-operator.
- ▶ Follow the instructions in this manual.

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.

Modifications to the device

Unauthorized modifications to the device are not permitted and can lead to unforeseeable dangers!

- ▶ If modifications are nevertheless required, consult with the manufacturer.

Repair

To ensure continued operational safety and reliability:

- ▶ Carry out repairs on the device only if they are expressly permitted.
- ▶ Observe federal/national regulations pertaining to the repair of an electrical device.
- ▶ Use only original spare parts and accessories.

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.

2.6 IT security

Our warranty is valid only if the product is installed and used as described in the Operating Instructions. The product is equipped with security mechanisms to protect it against any inadvertent changes to the settings.

IT security measures, which provide additional protection for the product and associated data transfer, must be implemented by the operators themselves in line with their security standards.

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 °C (-40 to +176 °F)


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

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

-  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

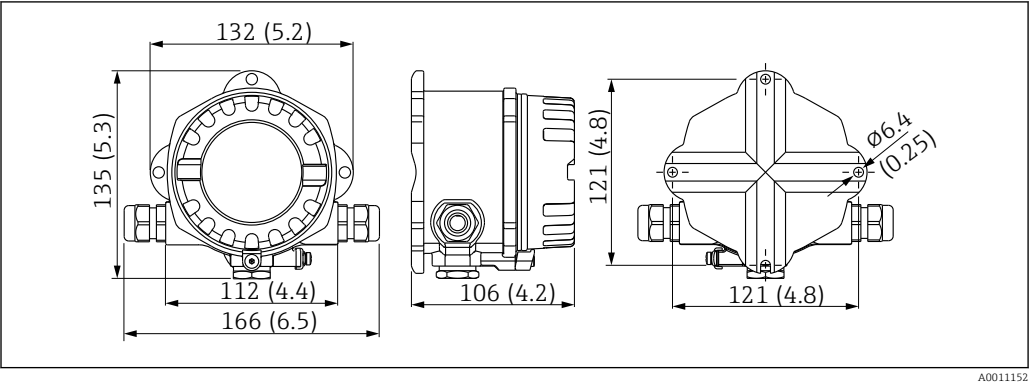
The indicator is designed for use in the field.
Its orientation is determined by the readability of the display.
Operating temperature range: -40 to +80 °C (-40 to +176 °F)

NOTICE

- Reduced operating life of the display at high temperatures**
- If possible, do not operate the device in the upper temperature limit range.
- i** The display may react slowly at temperatures < -20 °C (-4 °F).
Readability of the display can no longer be guaranteed at temperatures < -30 °C (-22 °F).

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



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

4.1.2 Mounting location

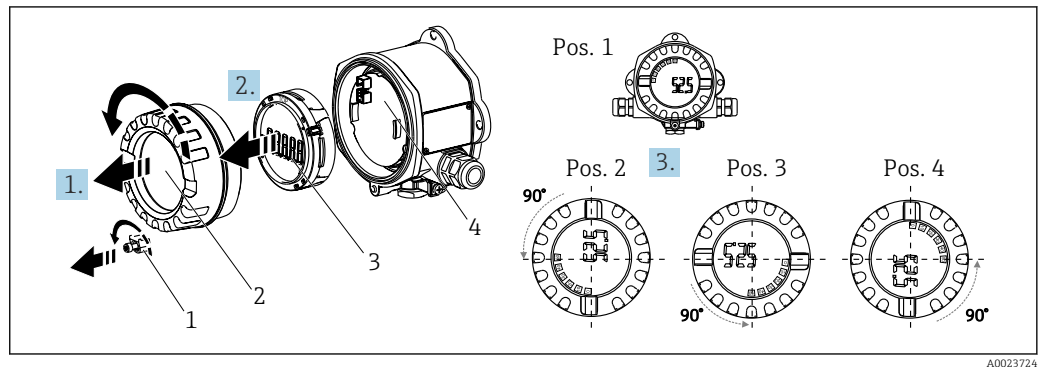
Information about the conditions (such as the ambient temperature, degree of protection, climate class, etc.) that must be present at the installation location so that the device can be mounted correctly is provided in the "Technical data" section.

4.2 Mounting the measuring device

The device can be mounted directly on the wall → 9. A mounting bracket is available for pipe mounting → 3, 9.

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

4.2.1 Turning the display



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 Synthesso 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:

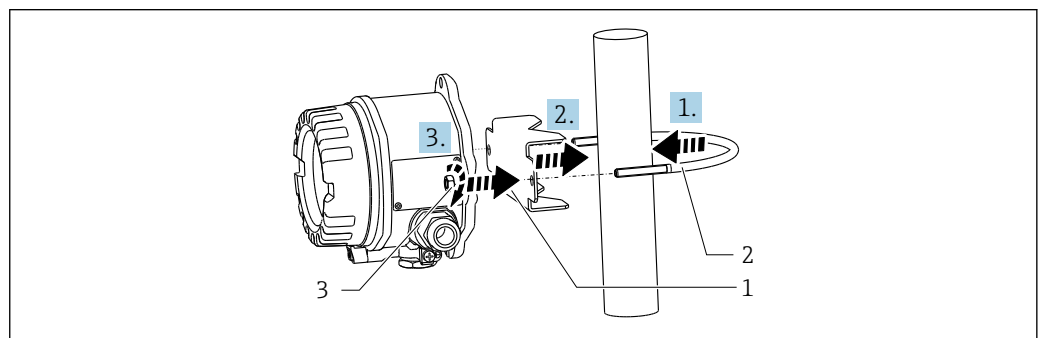
1. Drill 2 holes
2. Fit the device on the wall with 2 screws (Ø 5 mm (0.2 in)).

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:



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

 For information on the connection data, see the "Technical data" section.

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.

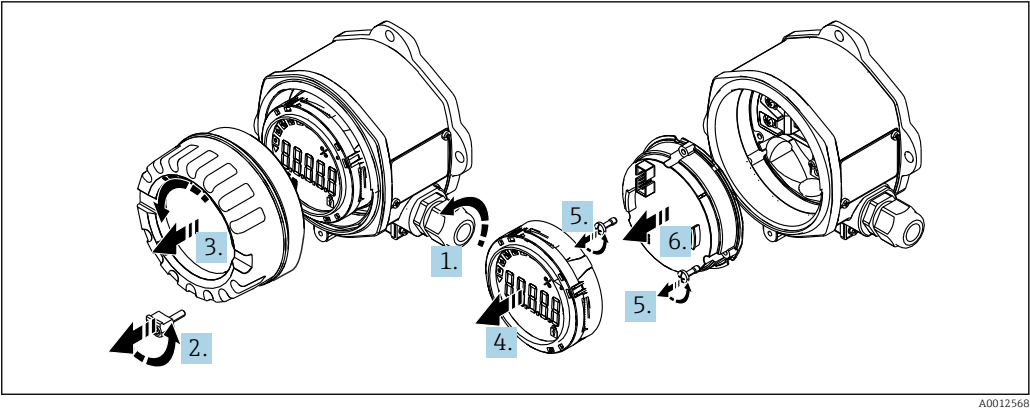
Devices can be connected to the PROFIBUS® PA in two ways:

- 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:

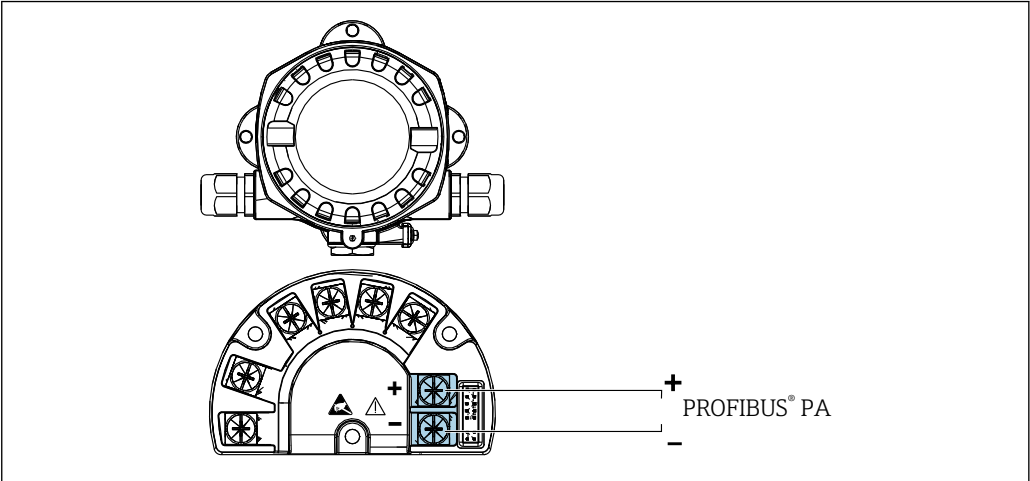


A0012568

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, 11
9. Assembly is in reverse order.

Quick wiring guide



A0021496

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

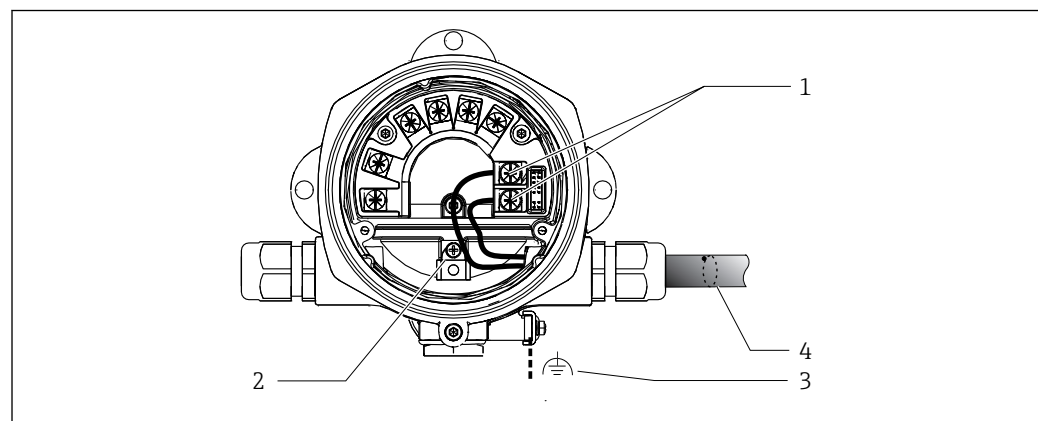
The device and fieldbus cable can be damaged by electrical voltage

- ▶ 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!

i 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

i Please also observe the general procedure → 10



A0012571

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).

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

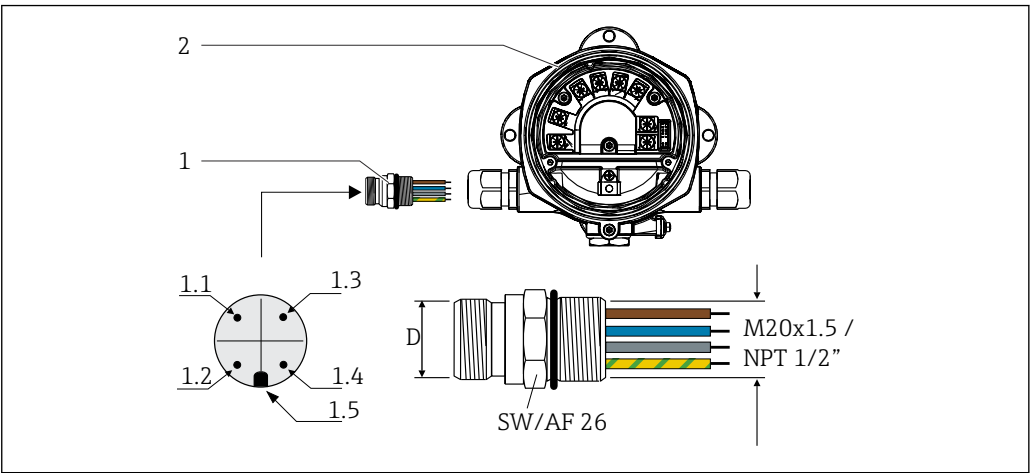
Always use cable glands with good EMC properties, where possible with wraparound cable shielding (Iris spring). This requires minimum differences in potential, and possibly potential equalization.

- 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).



7 Connectors for connection to the PROFIBUS® PA fieldbus

	Pin assignment/color codes	
	D 7/8" connector	D M12 connector
1 Fieldbus connector	1.1 Brown wire: PA+ (terminal 1)	1.1 Gray wire: shield
2 Field indicator	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 °C (-40 to +221 °F)

5.2.3 PROFIBUS® PA cable specification

Cable type

Twin-core cables are generally advisable for connecting the device to the fieldbus. Following IEC 61158-2 (MBP), four different cable types (A, B, C, D) can be used with the fieldbus, only two of which (cable types A and B) are shielded.

- Cable types A or B are particularly preferable for new installations. Only these types have cable shielding that guarantees adequate protection from electromagnetic interference and thus the most reliable data transfer. In the case of cable type B, several fieldbuses (same degree of protection) may be operated in one cable. No other circuits are permissible in the same cable.
- Practical experience has shown that cable types C and D should not be used due to the lack of shielding, since the freedom from interference generally does not meet the requirements described in the standard.

The electrical data of the fieldbus cable have not been specified but determine important characteristics of the design of the fieldbus, such as distances bridged, number of users, electromagnetic compatibility, etc.

	Type A	Type B
Cable structure	Twisted pair, shielded	One or more twisted pairs, fully shielded
Wire cross-section	0.8 mm ² (18 in ²)	0.32 mm ² (22 in ²)
Loop-resistance (direct current)	44 Ω/km	112 Ω/km
Characteristic impedance at 31.25 kHz	100 Ω ±20 %	100 Ω ±30 %
Wave attenuation at 39 kHz	3 dB/km	5 dB/km
Capacitive asymmetry	2 nF/km	2 nF/km
Envelope delay distortion (7.9 to 39 kHz)	1.7 ms/km	*)
Shield coverage	90 %	*)
Max. cable length (incl. spurs > 1 m)	1900 m (6233 ft)	1200 m (3937 ft)
*) Not specified		

Suitable fieldbus cables (type A) from various manufacturers for non-hazardous areas are listed below:

- Siemens: 6XV1 830-5BH10
- Belden: 3076F
- Kerpen: CeL-PE/OSCR/PVC/FRLA FB-02YS(ST)YFL

Maximum overall cable length

The maximum network expansion depends on the type of protection and the cable specifications. The overall cable length combines the length of the main cable and the length of all spurs (>1 m/3.28 ft). Please note the following:

- The maximum permissible overall cable length depends on the cable type used.
- If repeaters are used, the maximum permissible cable length is doubled! A maximum of three repeaters are permitted between the user and the master.

Maximum spur length

The line between the distribution box and field device is described as a spur. In the case of non-Ex applications, the max. length of a spur depends on the number of spurs (> 1 m (3.28 ft)):

Number of spurs	1 to 12	13 to 14	15 to 18	19 to 24	25 to 32
Max. length per spur	120 m (393 ft)	90 m (295 ft)	60 m (196 ft)	30 m (98 ft)	1 m (3.28 ft)

Number of field devices

In systems that meet FISCO with Ex ia type of protection, the line length is limited to max. 1 000 m (3 280 ft). A maximum of 32 users per segment in non-Ex areas or a maximum of 10 users in an Ex-area (Ex ia IIC) is possible. The actual number of users must be determined during the planning stage.

Shielding and grounding

NOTICE

Equalizing currents can damage the bus cable or bus shield

- ▶ If the shielding of the cable is grounded at more than one point in systems without potential matching, mains frequency equalizing currents can occur that damage the bus cable or the bus shield or have a serious effect on signal transmission. 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!

Optimum electromagnetic compatibility (EMC) of the fieldbus system can only be guaranteed if the system components and, in particular, the lines are shielded and the shield forms as complete a cover as possible. A shield coverage of 90% is ideal.

- To ensure an optimum EMC protective effect, connect the shield as often as possible to the reference ground.
- For reasons of explosion protection, you should refrain from grounding however.

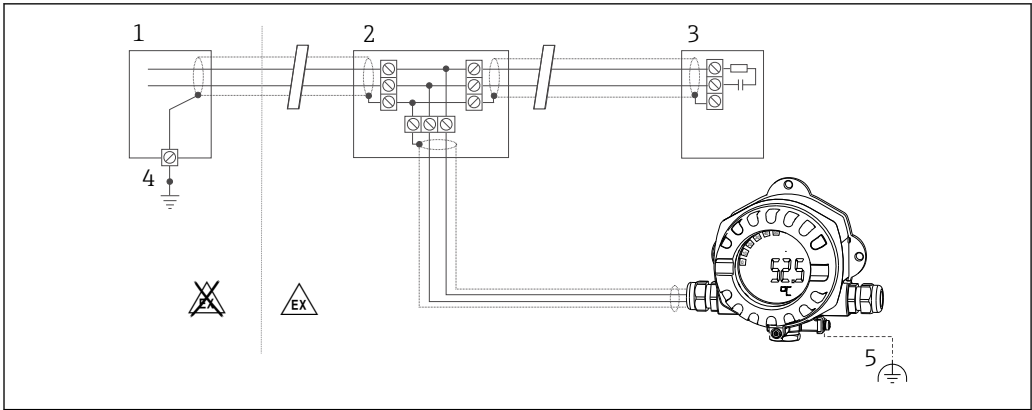
To meet both requirements, the FOUNDATION Fieldbus™ allows three different types of shielding:

- Shielding at both ends
- Shielding at one end on the feed side with capacitance termination at the field device
- Shielding at one end on the feed side

Experience shows that the best results with regard to EMC are achieved in most cases in installations with shielding at one end. Appropriate measures with regard to input wiring must be taken to allow unrestricted operation when EMC interference is present. These measures have been taken into account for this device. Operation in the event of disturbance variables as per NAMUR NE21 is possible with shielding at one end.

Where applicable, national installation regulations and guidelines must be observed during the installation!

Where there are large differences in potential between the individual grounding points, only one point of the shielding is connected directly with the reference ground. In systems without potential equalization, therefore, cable shielding of fieldbus systems should only be grounded on one side, for example at the fieldbus supply unit or at safety barriers.



8 Shielding and grounding of the fieldbus cable shield at one end

- 1 Supply unit
- 2 Distribution box (T-box)
- 3 Bus terminator
- 4 Grounding point for fieldbus cable shield
- 5 Optional grounding of the field device, isolated from cable shielding

Bus termination

The start and end of each fieldbus segment must always be terminated by a bus terminator. With various junction boxes (non-Ex), the bus termination can be activated via a switch. If this is not the case, a separate bus terminator must be installed. Please also note the following:

- In the case of a branched bus segment, the measuring device furthest from the segment coupler represents the end of the bus.
- If the fieldbus is extended with a repeater, then the extension must also be terminated at both ends.

Further information

General information and further details about the wiring can be found in the Operating Instructions "Guidelines for planning and commissioning, PROFIBUS® DP/PA, Field communication". Source: www.endress.com → Search for "BA00034S"

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:

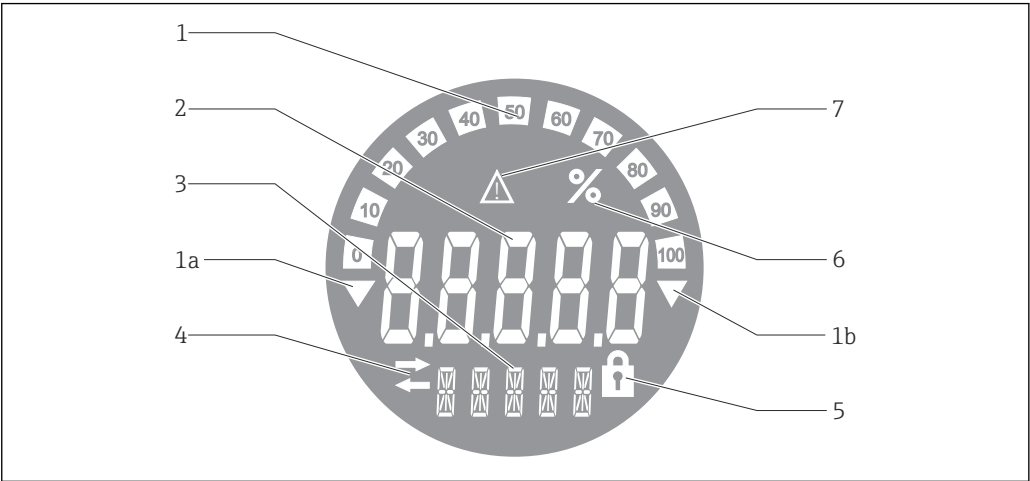
Device condition and specifications	Notes
Are cables or the device damaged (visual inspection)?	-

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 specification
Do the cables have adequate strain relief?	-
Are the power supply and signal cables correctly connected?	→ 11
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 → 14
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



9 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

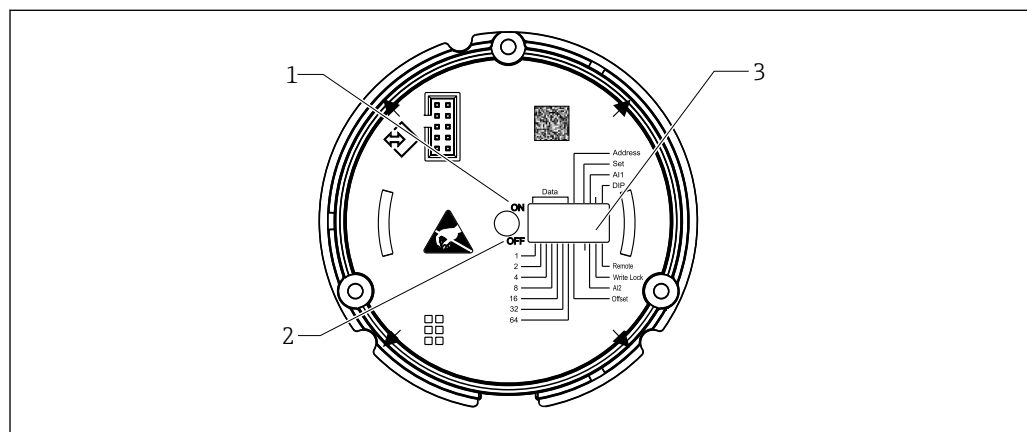
Device-specific parameters are configured via the service interface (CDI). A special device driver (DTM) for an FDT operating program (e.g., DeviceCare, FieldCare) is available for this purpose →  19.

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 →  20:


- 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



A0021500

 10 Hardware configuration via DIP switches

- 1 ON switch position
- 2 OFF switch position
- 3 Write protection

 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.



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

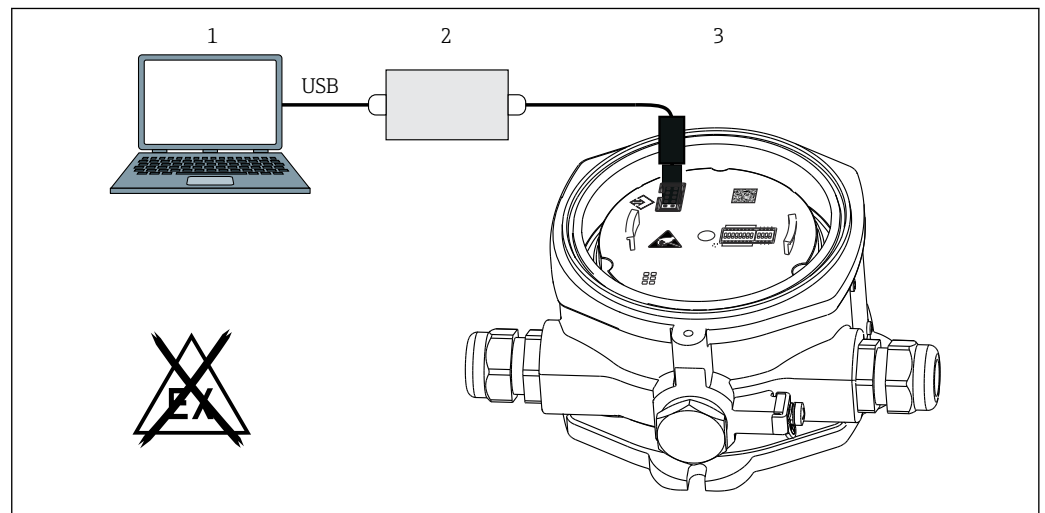
Loss of explosion protection when housing is open

- 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. You need a special interface adapter for this purpose, the Commubox FXA291 (see "Accessories" section).

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.

Establishing a connection



A0051897

11 Configuring the field indicator using an interface adapter

- 1 PC configuration software
- 2 Configuration kit USB box
- 3 Field indicator

When you connect the device, the device DTM (Device Type Manager) is not automatically loaded in FieldCare, so you need to add the device manually.

1. First, add the "CDI communication FXA291" communication DTM to an empty project.
2. In the Comm DTM settings, set the baud rate to 9600 baud and select the COM port used.
3. Add the "RID14/16/Vx.xx.xx" device DTM to the project using the "Add device..." function.

- 4. Continue with device configuration in accordance with these Operating Instructions. All of the parameters listed in these Operating Instructions can also be found in FieldCare Device Setup. The DTM operating parameters can be found in the appendix → 36.

i 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 → 20.

6.2.1 DTM file for FieldCare Device Setup

The DTM file can be purchased via the Internet: www.endress.com/download → Select device driver → Type → Select product root.

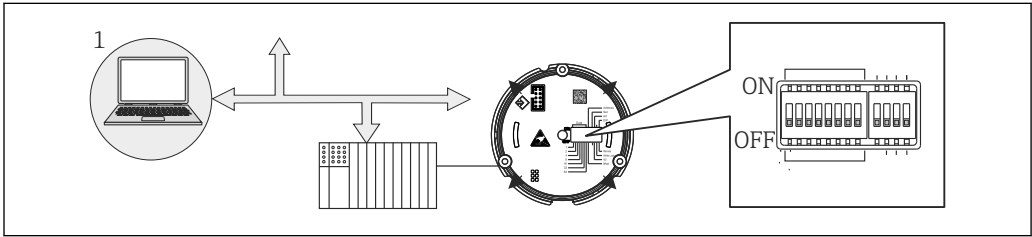
6.3 Hardware settings

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.

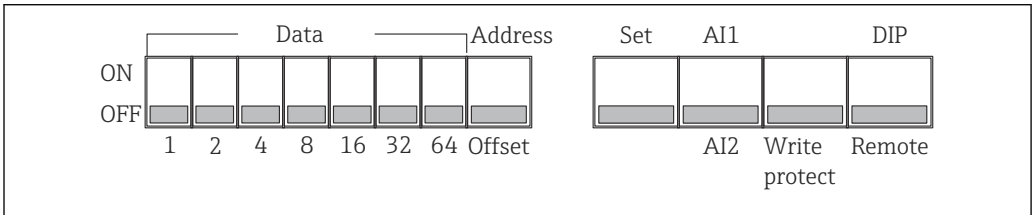
The current write protection status is displayed in the "Locking status" parameter → 42.

Proceed as follows to set the DIP switch:

- 1. Remove the housing cover and remove the display → 4, 11
- 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.



12 Hardware configuration of the field indicator




13 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.

6.3.5 Determining the offset

The device can be used to display certain analog values of a field device which are transmitted via the PROFIBUS PA protocol. If the analog value is not at the first position in the data telegram, the position can be selected via the setting for the offset. The structure of the data telegram with the position of the analog value to be displayed must be taken from the documentation of the field device or can be obtained from the system integrator responsible for the communication interface.

Example:

Fieldbus data telegram from the slave to the PLC:

Two analog values and a digital value are transmitted via the protocol. The analog value 2 should be displayed at the device.

Data telegram 12 bytes											
Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Analog 1					Digital 1		Analog 2				
							OFFSET				

Description:

A total of 12 bytes (0-11) are transmitted:

- Bytes 0 - 4: analog 1 + status (5 Bytes)
- Bytes 5 - 6: digital 1 + status (2 Bytes)
- Bytes 7 - 11: analog 2 + status (5 Bytes)

Analog value 2 (bytes 7 - 11) should be displayed in the device. The following settings are therefore required for the corresponding channel:

- Data type: Analog
- Data direction: From the device
- Offset source: 7 (= Byte 7 from the received payload data)

7 System integration

7.1 PROFIBUS® technology

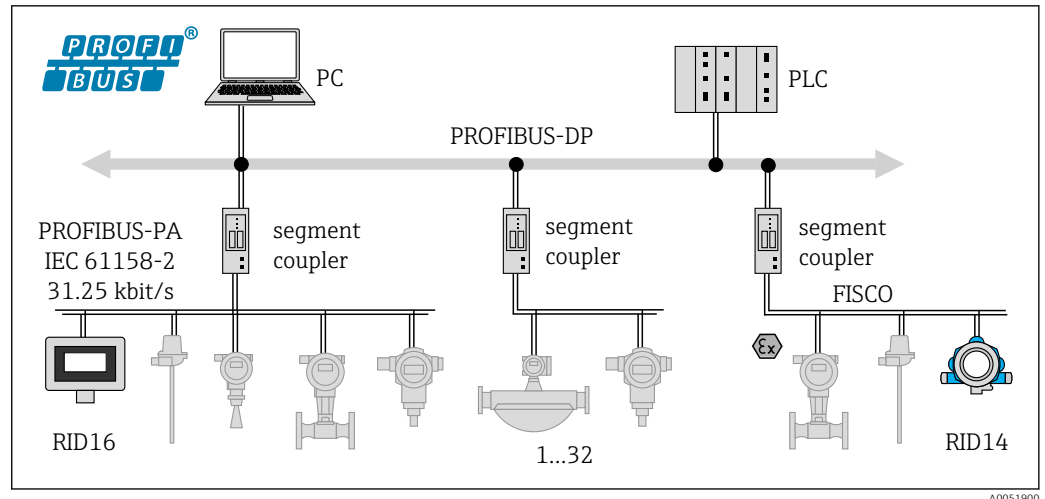
PROFIBUS is the standardized, open digital communication system in production and process automation for all application areas. PROFIBUS communication is incorporated into the international standards EN 50170 and IEC 61158. It replaces analog 4 to 20 mA transmission technology on a broad basis.

PROFIBUS has been in existence for over a decade and has been consistently developing as global market leader since. With different protocol versions, interfaces and profiles, the modular PROFIBUS communication system can be applied universally and, with PROFIBUS versions geared towards specific industries, covers the wide range of requirements of factory and process automation in equal measure.

Fieldbus configuration information can be found in the Operating Instructions "Guidelines for planning and commissioning, PROFIBUS® DP/PA, field communication". Source: www.endress.com → Search for "BA00034S".

7.1.1 System architecture

The following diagram shows an example of a PROFIBUS® network with associated components.



14 System integration via PROFIBUS® PA

PC Visualization and monitoring, e.g. P View, FieldCare and diagnostic software
 1-32 Up to 32 devices per segment

PROFIBUS PA is always used in conjunction with a superior PROFIBUS DP control system. Since the transmission media and baud rates of PROFIBUS DP and PROFIBUS PA are different, the PROFIBUS® PA segment is integrated into the PROFIBUS DP system via a segment coupler.

A segment coupler consists of a signal coupler and a bus power supply unit. Depending on the model, one or more transmission rates are supported on the PROFIBUS DP side. The transmission rate for PROFIBUS PA is fixed at 31.25 kBit/s.

PROFIBUS PA has been specially designed for the needs of process engineering. There are three distinct features compared to a PROFIBUS DP system:

- PROFIBUS PA supports use in hazardous areas without special requirements.
- The devices are supplied with power via the bus line (two-wire devices)
- The data are transmitted via a physical layer in accordance with IEC 61158-2 (MBP), which enables considerable flexibility in selecting the topology. In PROFIBUS PA, the topology can be linear, tree or a combination of both. The fieldbus cable can be looped via individual field devices but it is more practical to connect the devices via a T-connection with a short spur.

Configuration of the field devices is possible during operation with PROFIBUS PA. The number of connected fieldbus devices depends on various factors, such as use in hazardous areas, the length of the spur, cable types, current consumption of the field devices, etc.

A bus terminator is required at each end of the bus segment.

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

7.1.2 Bus access method and data transmission

PROFIBUS PA uses the central master/slave principle as the bus access method. The PI (process interface, e.g. PLC), a Class 1 master, is located on the PROFIBUS DP system. The field devices are configured via a Class 2 PROFIBUS DP master, e.g., FieldCare. The field devices on the PROFIBUS PA segment are the slaves.

Segment coupler

From the point of view of the PROFIBUS DP master, segment couplers are transparent and are therefore not configured in the PLC, i.e. they only convert the signals and power the PROFIBUS PA segment.

They do not require any settings and they are not assigned an address.

Each field device on the PA segment is assigned a PROFIBUS DP address and acts like a DP slave. Every slave is only assigned to one Class 1 master. The masters communicate directly with the slaves:


- A Class 1 master, such as a PLC, retrieves the field device data with the cyclic service.
- A Class 2 master, e.g. FieldCare, sends and retrieves data from the field devices with the acyclic service.

A link is recognized by the master and is a user of the PROFIBUS DP system. It is assigned a DP address and is therefore no longer transparent for cyclic data exchange of the master with the field devices. Instead it retains the device data in a data buffer which can be read cyclically by a Class 1 master. Therefore a link must be configured.

The link acts like a PA master on the PROFIBUS PA side. It retrieves the data cyclically from the field devices and stores the data in a data buffer. Each field device is assigned to a PA address which may only occur once in the individual link. It can be present in another link segment however.


For acyclic data exchange with a Class 2 master, the link is virtually transparent.

Once the link address (DP address) and the device address (PA address) have been specified, any field device can be addressed.

 Since the field indicator is only a listener, it does not appear as an active user on the bus and does not require its own bus address. Therefore the indicator can also not be addressed directly by the master. The indicator listens to the cyclic data traffic on the bus and presents the corresponding values on the display.

7.1.3 Device ID, addressing



Users must be addressed correctly for communication on the bus to function correctly. Each device on the PROFIBUS PA segment is given a unique bus address between 0 and 125. Addressing depends on the type of DP/PA interface (segment coupler or link).

 Since the indicator is only a listener and is not an active bus user, it does not require its own bus address. The bus address of the device whose values are to be shown on the indicator must be configured on the field indicator.

8 Commissioning

8.1 Post-installation check

Make sure that all final checks have been carried out before putting your devices into operation:


- Checklist for "Post-mounting check" →  10
- Checklist for "Post-connection check" →  16

 The functional data of the PROFIBUS® PA interface as per IEC 61158-2 (MBP) must be observed.

A normal multimeter can be used to check that the bus voltage is between 9 to 32 V and that current consumption is approx. 11 mA on the device.

8.2 Switching on the field indicator


Once the final checks have been successfully completed, it is time to switch on the supply voltage. The field indicator performs a number of internal test functions after power-up. As this procedure progresses, the following sequence of messages appears on the display:

Step	Display
1	All segments on
2	All segments off
3	Manufacturer name
4	Device name
5	Firmware version
6	Device revision
7a	A published value
7b	The current status message If the switch-on procedure fails, the appropriate status message is displayed, depending on the cause. A detailed list of status messages and the corresponding troubleshooting instructions can be found in the "Troubleshooting" section →  25.

Normal indicating mode commences as soon as the switch-on procedure is completed. Various measured values and/or status values appear on the display.

8.3 Commissioning



Note the following points:

- The files required for commissioning and network configuration can be obtained via download →  20.
- The field indicator acts solely as a listener. This means that the device listens on the bus for values that should be displayed. The device does not have an address of its own and is not an active bus user.

A corresponding address of a sensor connected to the PROFIBUS PA network can be selected for each of the 8 channels of the indicator. The first published value of the selected address is listed in the next step. The selected value is then displayed by the device. The first published value of the selected address is listed in the next step. The selected value is then displayed by the device. If an address publishes more than one value, further values can be selected manually. This address generates a configuration error in the indicator following a reconfiguration of the bus or the removal of a publishing device. If only the displayed value of the device is no longer available, the indicator automatically switches to the next value published at this address.

9 Diagnostics and troubleshooting



9.1 Troubleshooting instructions


 In the event of a critical error, it might be necessary to return the indicator to the manufacturer for repair. Follow the instructions in →  30 before returning the indicator.

Always start troubleshooting with the checklists below if faults occur after commissioning or during operation. The checklists take you directly (via various queries) to the cause of the problem and the appropriate remedial measures.


Checking the display	
No display visible - No connection to the fieldbus host system	<ul style="list-style-type: none"> ■ For fault elimination, see below "Faulty connection to the fieldbus host system" ■ Other possible sources of error: <ul style="list-style-type: none"> ■ Electronics module defective → Test with spare module → Order spare part ■ Housing (internal electronics) defective → Test with spare housing → Order spare part ■ Field indicator defective → Replace field indicator
No display visible - however, connection established to the fieldbus system	<ul style="list-style-type: none"> ■ Check whether the display module is correctly connected to the electronics module ■ Display defective → Test with spare display → Order spare part ■ Electronics module defective → Test with spare module → Order spare part



Faulty connection to the fieldbus host system	
A connection cannot be established between the fieldbus system and the indicator. Check the following points:	
Fieldbus connection	Check the data cable
Fieldbus connector (optional)	Check pin assignment/wiring →  12
Fieldbus voltage	Check whether a minimum bus voltage of 9 V _{DC} is present at the +/- terminals. Permitted range: 9 to 32 V _{DC}
Network structure	Check the permitted fieldbus cable length and number of spurs →  14
Basic current	Is there a minimum basic current of 11 mA?
Terminating resistors	Has the PROFIBUS PA segment been terminated correctly? Each bus segment must always be terminated with a bus terminator at both ends (start and finish). Otherwise there may be interference in data transmission.
Current consumption Permitted feed current	Check the current consumption of the bus segment: The current consumption of the bus segment in question (= total of basic currents of all bus users) must not exceed the max. permitted feed current of the bus power supply unit.

Error messages in the PROFIBUS® PA configuration system
See "Status messages" section →  27



Other errors (application errors without messages)	
Some other error has occurred.	For possible causes and remedial measures see the "Status messages" section →  27

9.2 Status messages

The device displays warnings or alarms as status messages. If errors occur during commissioning, these errors are displayed immediately. A distinction is made here between the following 4 status categories:

Status category	Description	Error category
F	Fault detected ('Failure')	ALARM
C	Device is in the service mode ('Check')	WARNING
S	Specifications not observed ('Out of specification')	
M	Maintenance required ('Maintenance')	

ALARM error category:


In the event of an error, the display alternates every second between the error message (= letter "F" plus the defined error number, e.g. "F283") and the word "BAD" and the channel number. In this case, the bar graph and the alarm signals are disabled.

Other channels that are correctly configured continue to be displayed in alternation with the correct bar graph. Once the faulty channel is reached again, the display again shows Fxxx) once and the word "BAD" and the channel number.

WARNING error category:

The display alternates between the displayed values and the error message (= relevant letter plus the defined error number, e.g. "C501"). If more than one value is displayed, the display alternates between the values and the error message as follows:

- e.g. channel 1, channel 2 and channel 3 are configured for value display
- Value of channel 1 => error message => value of channel 2 => error message => value of channel 3 => error message => value of channel 1 => ...
- If no value should be displayed and an error occurs, the display switches between "- - - -" and the error message.

 As long as the error message is active the alternating time is set to 2 seconds. Once the error has been rectified the alternating time returns to the normal value entered in the "DISP_ALTERNATING_TIME" parameter.

7-segment display	14-segment display	Description	Cause of error/remedy
C501		Device reset	A reset has been performed. This status only becomes visible in the last status message and also on the display shortly before the reset.
M561	CHAN followed by channel info 1-8	Display overrun	Value is too large to be displayed with the number of decimal places currently configured. The measured value is represented by 5 dashes "-----".
F437	CHAN followed by channel info 1-8	Configuration error	An address has been selected that is currently not on the bus or does not transmit a value over the bus.
F283		Content of memory	Int. RAM, ext. RAM or EEPROM error <ul style="list-style-type: none"> ■ Perform a reset ■ Replace the electronics module
F261		Electronics board defective	Replace the electronics module

9.3 Firmware history

Revision history

The version number on the nameplate and in the Operating Instructions indicates the device release: XX.YY.ZZ (example 01.02.01).

XX	Change to main version. No longer compatible. The device and Operating Instructions change.
YY	Change to functions and operation. Compatible. The Operating Instructions change.
ZZ	Fixes and internal changes. No changes to the Operating Instructions.

Date	Software version	Software modification	Documentation
10/2013	1.00.zz	Original software	BA01267K/09/EN/01.13
			BA01267K/09/EN/02.15
			BA01267K/09/EN/03.16
01/2023	1.00.zz	-	BA01267K/09/EN/04.23

10 Maintenance

No special maintenance work is required for the device.

10.1 Cleaning

A clean, dry cloth can be used to clean the device.

11 Repair

11.1 General information

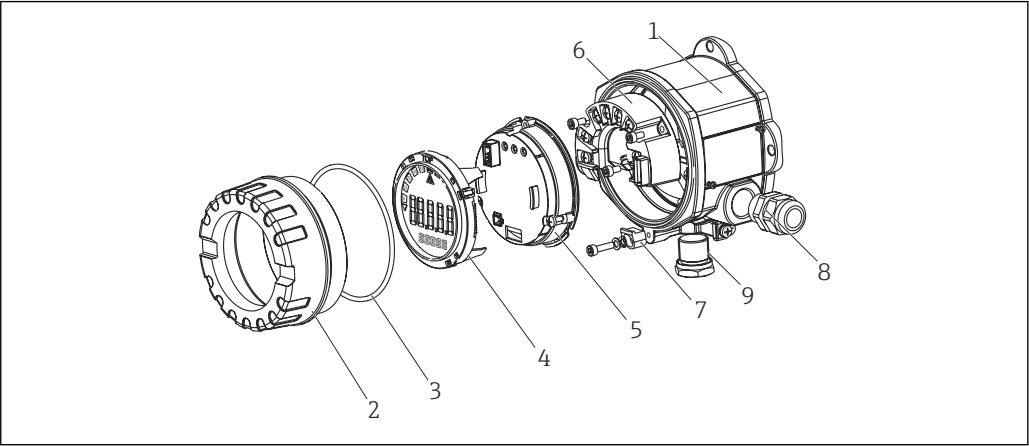
In accordance with the Endress+Hauser repair principle, the devices have a modular design and repairs can be carried out by the customer. For more information on service and spare parts, please contact your supplier.

11.1.1 Repairs to Ex-approved devices

- Only specialist personnel or the manufacturer may undertake repairs on Ex-approved devices.
- Comply with the prevailing standards, national Ex-area regulations, Safety Instructions (XA) and certificates.
- Only use original spare parts from the manufacturer.
- When ordering spare parts, check the device designation on the nameplate. Parts may only be replaced by identical parts.
- Carry out repairs according to the instructions. On completion of the repair, carry out the routine test specified for the device.
- A certified device may only be converted to another certified device version by the manufacturer only.
- Document all repairs and modifications.

11.2 Spare parts

Spare parts currently available for the device can be found online at: http://www.products.endress.com/spareparts_consumables. Always quote the serial number of the device when ordering spare parts!



A0013204

15 Spare parts for field indicator

Item No.				
1	RID14 housing			
				Certificates: A Non-hazardous area + Ex nA B Ex d Material: A Aluminum B Stainless steel 316L Cable entry: 1 3x thread NPT 1/2, w/o terminal block 2 3x M20x1.5, w/o terminal block 3 3x thread G1/2, w/o terminal block Version: A Standard
	RIA141G-			← complete order code for RID14 housing

Item No.	Type	Order number
2	Housing cover cpl. display, aluminum Ex d + seal	RIA141X-HK
	Housing cover cpl. display, aluminum + seal	RIA141X-HL
	Housing cover cpl. display, 316L, Ex d, FM XP, CSA XP, with seal	TMT142X-HC
	Housing cover cpl. display, 316L with seal	TMT142X-HD
4	Field housing display fitting kit	51004454
	Display + fitting kit + twist protection	RIA141X-DA
	Display fitting kit + twist protection	RIA141X-DC
5	Electronics	RID14X-EB

Item No.	Type	Order number
6	Terminal strip	RID14X-KA
7	Cover clamp spare part set for field housing: screw, disk, spring washer	51004948
8	Cable gland M20x1.5	51004949
9	Plug (dummy) M20x1.5 EEx-d/XP	51004489
	Plug (dummy) NPT 1/2" ALU	51004490
	Plug (dummy) G1/2" EEx-d/XP	51004916
	Plug (dummy) NPT 1/2" V4A	51006888
None	Mounting bracket for pipe 1.5-3" stainless steel 316L	51007995

11.3 Return

The requirements for safe device return can vary depending on the device type and national legislation.

1. Refer to the web page for information:
<http://www.endress.com/support/return-material>
↳ Select the region.
2. Return the device if repairs or a factory calibration are required, or if the wrong device was ordered or delivered.

11.4 Disposal



If required by the Directive 2012/19/EU on waste electrical and electronic equipment (WEEE), the product is marked with the depicted symbol in order to minimize the disposal of WEEE as unsorted municipal waste. Do not dispose of products bearing this marking as unsorted municipal waste. Instead, return them to the manufacturer for disposal under the applicable conditions.

12 Accessories

Various accessories are available for the device, and can be ordered with the device or at a later stage from Endress+Hauser. Detailed information on the specific order code is available from your local Endress+Hauser sales organization or on the product page of the Endress+Hauser website: www.endress.com.

12.1 Device-specific accessories

12.1.1 Cable glands and adapters

Cable gland

2x cable gland M20	RK01-AB
--------------------	---------

Plug (dummy)

1/2"NPT 1.0718	51004490
M20x1.5 EEx-d/XP	51004489
G1/2" EEx-d/XP	51004916
1/2"NPT V4A	51006888

12.1.2 Housing**Pipe mounting set**

Mounting bracket, pipe 2", 316L	RK01-AI
---------------------------------	---------

12.2 Communication-specific accessories*Fieldbus connector*

Connector, fieldbus PA 1/2"NPT; 7/8" L300	71133313
Connector, fieldbus devices PA M20;7/8" L150	71089147
Connector, fieldbus PA M20;M12; L150	71090687
Connector, fieldbus PA 1/2"NPT;M12 L150	71005802

13 Technical data**13.1 Communication****13.1.1 Failure information**

Status message as per the fieldbus specification.

13.1.2 Switch-on delay

8 s

13.1.3 PROFIBUS® PA

- PROFIBUS® PA in accordance with EN 50170 Volume 2, IEC 61158-2 (MBP)
- FDE (Fault Disconnection Electronic) = 0 mA
- Data transmission rate, supported baudrate: 31.25 kBit/s
- Signal encoding = Manchester II
- Connection values in accordance with IEC 60079-11 FISCO, Entity

13.1.4 Protocol-specific data

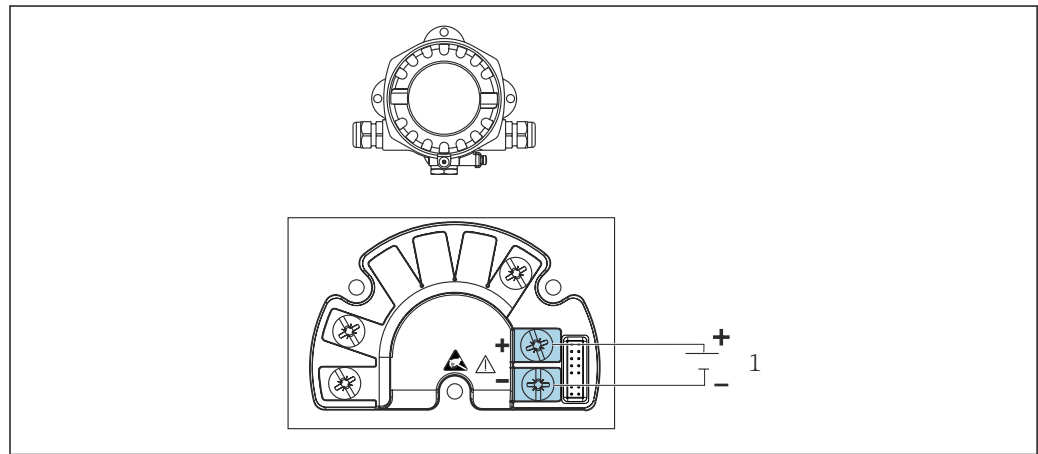
PROFIBUS® PA

Basic data

Indicator for PROFIBUS PA, for use in conjunction with PROFIL 2 and PROFIL 3 (3.0, 3.01 and 3.02) devices	
Device drivers	Where to obtain the device drivers: FieldCare/DTM: www.endress.com/download → product root RID14 or RID16 → search area "Software" → "Drivers"
Write protection	Write protection activated by hardware setting (DIP switch)

13.2 Power supply

13.2.1 Terminal assignment



16 Terminal assignment of the field indicator

1 Fieldbus connection

13.2.2 Supply voltage

The power is supplied via the fieldbus.

$U = 9 \text{ to } 32 \text{ V}_{\text{DC}}$, polarity-independent (max. voltage $U_b = 35 \text{ V}$).

13.2.3 Mains voltage filter

50/60 Hz

13.2.4 Current consumption

$\leq 11 \text{ mA}$

13.2.5 Cable entry

The following cable entries are available:

- NPT1/2 thread
- M20 thread
- G1/2 thread

13.3 Installation

13.3.1 Orientation

No restrictions, the orientation depends on the readability of the display.

13.3.2 Mounting location

Wall or pipe mounting (see "Accessories")

13.4 Environment

13.4.1 Ambient temperature range

−40 to +80 °C (−40 to +176 °F)



The display may react slowly at temperatures < −20 °C (−4 °F).

At temperatures < −30 °C (−22 °F) the readability of the display can no longer be guaranteed.

13.4.2 Storage temperature

−40 to +80 °C (−40 to +176 °F)

13.4.3 Altitude

Up to 2 000 m (6 561.7 ft) above sea level

13.4.4 Climate class

As per IEC 60654-1, Class C

13.4.5 Humidity

- Condensation permitted as per IEC 60 068-2-33
- Max. rel. humidity: 95% as per IEC 60068-2-30

13.4.6 Degree of protection

IP67. NEMA 4X.

13.4.7 Shock and vibration resistance

10 to 2 000 Hz at 5g as per IEC 60 068-2-6

13.4.8 Electromagnetic compatibility (EMC)

CE conformity

Electromagnetic compatibility in accordance with all the relevant requirements of the IEC/EN 61326 series and NAMUR Recommendation EMC (NE21). For details refer to the EU Declaration of Conformity.

Interference immunity as per IEC/EN 61326 series, industrial requirements.

Interference emission as per IEC/EN 61326 series, Class B equipment.

13.4.9 Measuring category

Measuring category II as per IEC 61010-1. The measuring category is provided for measuring on power circuits that are directly connected electrically with the low-voltage network.

13.4.10 Overvoltage category

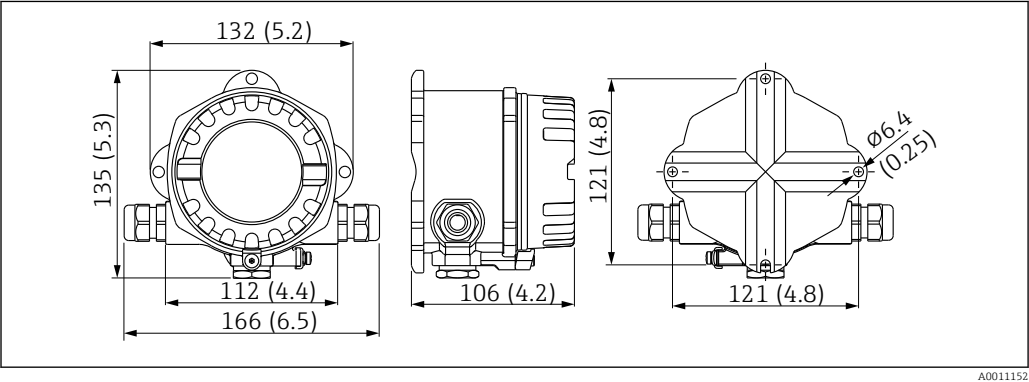
Overvoltage category II

13.4.11 Pollution degree

Pollution degree 2

13.5 Mechanical construction

13.5.1 Design, dimensions



17 Dimensions of the field indicator in mm (in)

- Die-cast aluminum housing for general applications, or optional stainless steel housing
- Electronics compartment and connection compartment in single-chamber housing
- Display attachable in 90° stages

13.5.2 Weight

- Aluminum housing
Approx. 1.6 kg (3.5 lb)
- Stainless steel housing
Approx. 4.2 kg (9.3 lb)

13.5.3 Materials

Housing	Nameplate
Die-cast aluminum AlSi10Mg/AlSi12Mg with powder coating on polyester base	Aluminum AlMgI, anodized in black
Stainless steel CF3M (316L)	Stainless steel 1.4404 (AiSi 316L)

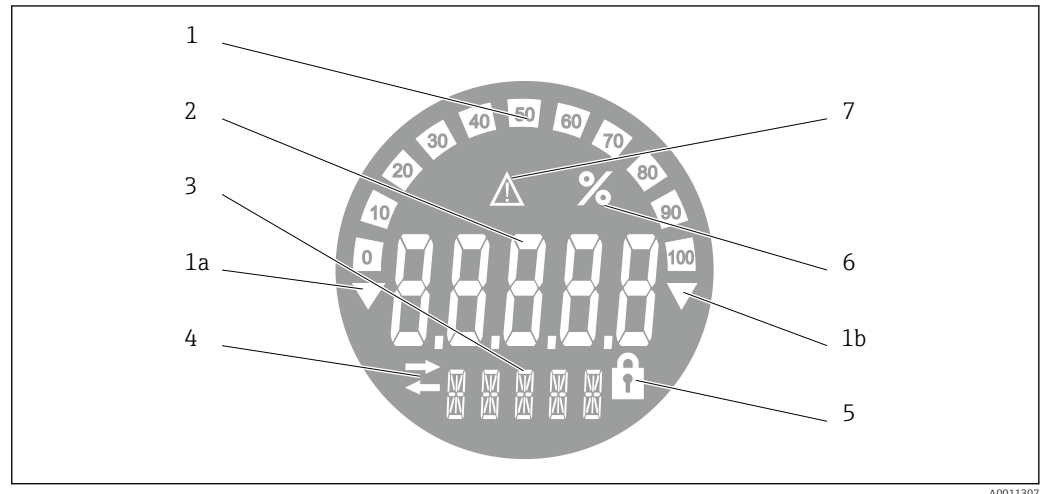
13.5.4 Terminals

Screw terminals for cables up to 2.5 mm² (14 AWG) max. plus ferrule

13.6 Operability

13.6.1 Local operation

Display elements



18 LC display of the field indicator (backlit, can be plugged in 90° stages)

- 1 Bar graph display in increments of 10% with indicators for underranging (item 1a) and overranging (item 1b)
- 2 Measured value display, digit height 20.5 mm (0.8 in), status indication "Bad measured value status"
- 3 14-segment display for units and messages
- 4 'Communication' symbol
- 5 "Configuration locked" symbol
- 6 Unit "%"
- 7 "Uncertain measured value status" symbol

Display range
-9999 to +99999

DIP switch

PROFIBUS® PA: Configuration of the bus address of the values displayed (max. 2 if configuring via DIP switches) and the hardware write protection

13.6.2 Remote operation

PROFIBUS® PA



The parameters can be configured either remotely via the DTM and configuration software or onsite via DIP switches.

13.7 Certificates and approvals

Current certificates and approvals for the product are available at www.endress.com on the relevant product page:


1. Select the product using the filters and search field.
2. Open the product page.
3. Select **Downloads**.

13.7.1

-  For certificates and approvals valid for the device: see the data on the nameplate
-  Approval-related data and documents: www.endress.com/deviceviewer → (enter the serial number)

13.8 Supplementary documentation


The following types of documentation are available on the product pages and in the Download Area of the Endress+Hauser website (www.endress.com/downloads) (depending on the selected device version):





Document	Purpose and content of the document
Technical Information (TI)	Planning aid for your device The document contains all the technical data on the device and provides an overview of the accessories and other products that can be ordered for the device.
Brief Operating Instructions (KA)	Guide that takes you quickly to the 1st measured value The Brief Operating Instructions contain all the essential information from incoming acceptance to initial commissioning.
Operating Instructions (BA)	Your reference document The Operating Instructions contain all the information that is required in various phases of the life cycle of the device: from product identification, incoming acceptance and storage, to mounting, connection, operation and commissioning through to troubleshooting, maintenance and disposal.
Description of Device Parameters (GP)	Reference for your parameters The document provides a detailed explanation of each individual parameter. The description is aimed at those who work with the device over the entire life cycle and perform specific configurations.
Safety Instructions (XA)	Depending on the approval, Safety Instructions (XA) are supplied with the device. The Safety Instructions are an integral part of the Operating Instructions.  Information on the Safety Instructions (XA) that are relevant for the device is provided on the nameplate.
Supplementary device-dependent documentation (SD/FY)	Always comply strictly with the instructions in the relevant supplementary documentation. The supplementary documentation is an integral part of the device documentation.

14 Appendix

14.1 DTM operating parameters


14.1.1 Operation menu

Display duration	
Navigation	 Operation → Alternating time
Description	Use this function to set the length of time the measured values are displayed if the values alternate on the local display. This type of change is only generated automatically if several measured values are specified.
User entry	Time in seconds (2-20)


Factory setting	5
Additional information	<ul style="list-style-type: none"> ■ The Value 1 display - Value 8 display parameters are used to specify which measured values are shown on the local display. ■ The display format of the displayed measured values is specified using the Format display parameter. ■ Visible offline: Yes ■ Writable offline: Yes
<hr/>	
"Display value X" submenu	
<hr/>	
Navigation	 Operation → Display value X
Description	Settings to display the measured values received via PROFIBUS.
<hr/>	
Data source address	
<hr/>	
Navigation	 Operation → "Display value X" submenu → Source address
Description	Allows users to select the bus address of the device whose values are to be displayed.
User entry	Bus address [0-125]
Factory setting	0
Additional information	<ul style="list-style-type: none"> ■ Visible offline: Yes ■ Writable offline: Yes
<hr/>	
Offset source	
<hr/>	
Navigation	 Operation → "Display value X" submenu → Offset source
Description	Indicates the index (offset) of the first byte of the value to be displayed from the payload data received.
User entry	Offset [0-244]
Factory setting	0
Additional information	<ul style="list-style-type: none"> ■ Visible offline: Yes ■ Writable offline: Yes
<hr/>	
Description	
<hr/>	
Navigation	 Operation → "Display value X" submenu → Description
Description	Possibility to enter a user-defined text with a maximum of 16 characters. This text is shown below the value on the display. If the text is longer than 5 characters, it is displayed as marquee text.
User entry	User-defined text
Factory setting	
Additional information	<ul style="list-style-type: none"> ■ Visible offline: Yes ■ Writable offline: Yes
<hr/>	
Enable % symbol	
<hr/>	
Navigation	 Operation → "Display value X" submenu → Enable % symbol

Description	Use this function to switch on the % symbol of the display.
Options	<ul style="list-style-type: none"> ▪ On ▪ Off
Factory setting	Off
Additional information	<ul style="list-style-type: none"> ▪ Visible offline: Yes ▪ Writable offline: Yes


Bar graph 0%

Navigation	 Operation → "Display value X" submenu → Bar graph 0%
Description	Use this function to enter the minimum value (0%) for the bar graph. Only visible if data type = analog and bar graph on/off = on (Expert menu).
User entry	Numerical value
Factory setting	0
Additional information	<ul style="list-style-type: none"> ▪ Visible offline: Yes ▪ Writable offline: Yes

Bar graph 100%

Navigation	 Operation → "Display value X" submenu → Bar graph 100%
Description	Use this function to enter the maximum value (100%) for the bar graph. Only visible if data type = analog and bar graph on/off = on (Expert menu).
User entry	Numerical value
Factory setting	100
Additional information	<ul style="list-style-type: none"> ▪ Visible offline: Yes ▪ Writable offline: Yes

Decimal places

Navigation	 Operation → "Display value X" submenu → Decimal places
Description	Use this function to select the number of decimal places for the display value. This setting does not affect the accuracy of the device when measuring or calculating. Only visible if data type = analog.
Options	<ul style="list-style-type: none"> ▪ Automatic ▪ xxxxx ▪ xxxx.x ▪ xxx.xx ▪ xx.xxx ▪ x.xxxx
Factory setting	Automatic
Additional information	<ul style="list-style-type: none"> ▪ Visible offline: Yes ▪ Writable offline: Yes


14.1.2 Diagnostics menu

Current diagnostics


Navigation	 Diagnostics → Current diagnostics
-------------------	---

Description	Use this function to display the current diagnostic message. If two or more messages occur simultaneously, the message with the highest priority is shown on the display. This parameter is the input parameter for the NE 107 module. The category and the channel are encoded in the value.
Options	<ul style="list-style-type: none"> ■ GOOD ■ Display overflow ch x ■ Preset ■ Electronic ■ Memory ■ Configuration ch x
Additional information	<ul style="list-style-type: none"> ■ Visible offline: No ■ Writable offline: No


Last diagnostics

Navigation	 Diagnostics → → Last diagnostics
Description	Use this function to display the last diagnostic message with the highest priority.
Additional information	<ul style="list-style-type: none"> ■ Visible offline: Yes ■ Writable offline: No


Actual diagnostics count

Navigation	 Diagnostics → Actual diagnostics count
Description	Use this function to display the number of diagnostic messages currently pending in the device.
Additional information	<ul style="list-style-type: none"> ■ Visible offline: No ■ Writable offline: No


Locking status

Navigation	 Diagnostics → Locking status
Description	Use this function to display the device locking status. The DIP switch for hardware locking is provided on the electronics module. Write access to the parameters is locked if write protection is enabled.
Only read access	<ul style="list-style-type: none"> ■ Not locked ■ Hardware locked
Factory setting	Not locked
Additional information	<ul style="list-style-type: none"> ■ Visible offline: No ■ Writable offline: No

"Device information" submenu

Navigation	 Diagnostics → Device information
Description	Use this function to display general device information.

Device name

Navigation	 Diagnostics → Device information → Device name
-------------------	--


Description	Use this function to display the device name. Only read access.
Factory setting	RID14
Additional information	<ul style="list-style-type: none"> Visible offline: Yes Writable offline: No

Device tag

Navigation	 Diagnostics → Device information → Device tag
-------------------	---

Description	Text for the tag name
User entry	User-defined text
Factory setting	Serial number of the device
Additional information	<ul style="list-style-type: none"> Visible offline: Yes Writable offline: Yes

Serial number

Navigation	 Diagnostics → Device information → Serial number
-------------------	--

Description	Serial number of the device, text, max. 11 characters
Additional information	<ul style="list-style-type: none"> Visible offline: Yes Writable offline: No

Order code

Navigation	 Diagnostics → Device information → Order code
-------------------	---


Description	<p>Use this function to display the order code of the device. It can also be found on the nameplate. The order code is generated from the extended order code through a process of reversible transformation, which defines all the device features of the product structure. In contrast, the device features cannot be read directly from the order code.</p> <p>Useful applications of the order code</p> <ul style="list-style-type: none"> To order an identical spare device. To identify the device quickly and easily, e.g. when contacting the manufacturer.
Additional information	<ul style="list-style-type: none"> Visible offline: Yes Writable offline: No

"Device reset" submenu

Navigation	 Diagnostics → Device information → Device reset
-------------------	---

Description	Use these functions to reset the device to factory settings.
--------------------	--

Device reset

Navigation	 Diagnostics → Device information → Device reset → Device reset
-------------------	--


Description	<p>Use this function to reset the device configuration - either entirely or in part - to a defined state.</p> <p>If set to "To factory defaults", the device reboots.</p>
Options	<ul style="list-style-type: none"> Not active To factory defaults

Factory setting	Not active
Additional information	<ul style="list-style-type: none"> Visible offline: No Writable offline: No


14.1.3 Expert menu

The Expert menu contains all the parameters in the Operation and Diagnostics menus as well as the parameters listed below.


Enter access code

Navigation	 Expert → Enter access code
Description	Use this function to disable the parameter write protection with the user-specific access code.
User entry	4-digit number
Factory setting	0
Additional information	<ul style="list-style-type: none"> Visible offline: Yes Writable offline: No


Access status tooling

Navigation	 Expert → Access status tooling
Description	Use this function to display access rights to the parameters
Options	<ul style="list-style-type: none"> Operator Service Production
Factory setting	Operator
Additional information	<ul style="list-style-type: none"> Visible offline: Yes Writable offline: No

"System" submenu








Navigation	 Expert → System
Description	This submenu contains system settings.

Locking status

Navigation	 Expert → System → Locking status
Description	Use this function to display the device locking status. The DIP switch for hardware locking is provided on the display module. Write access to the parameters is locked if write protection is enabled.
Only read access	<ul style="list-style-type: none"> Not locked Hardware locked
Factory setting	Not locked
Additional information	<ul style="list-style-type: none"> Visible offline: No Writable offline: No


"Display" submenu

Navigation	 Expert → Display
-------------------	--


Description		This submenu contains display settings.
<hr/>		
Display duration		
<hr/>		
Navigation		Expert → Display → Display duration
Description		See Operation menu →  36
<hr/>		
"Display value X" submenu		
<hr/>		
Navigation		Expert → Display → Display value X
Description		Settings to display the measured values received via PROFIBUS. This submenu contains the following parameters in addition to those described in Operation → Display value X →  37.
<hr/>		
Data type		
<hr/>		
Navigation		Expert → Display → Display value X → Data type
Description		Use this function to select the data type (analog/digital) whose values should be displayed.
Options		<ul style="list-style-type: none"> ▪ Analog ▪ Digital
Factory setting		Analog
Additional information		<ul style="list-style-type: none"> ▪ Visible offline: Yes ▪ Writable offline: Yes
<hr/>		
Data direction		
<hr/>		
Navigation		Expert → Display → Display value X → Data direction
Description		Use this function to select the direction of the data to be displayed. It is possible to display data that are sent from the device (slave) to the master or from the master to the field device.
Options		<ul style="list-style-type: none"> ▪ From device ▪ To device
Factory setting		From device
Additional information		<ul style="list-style-type: none"> ▪ Visible offline: Yes ▪ Writable offline: Yes
<hr/>		
Factor value		
<hr/>		
Navigation		Expert → Display → Display value X → Factor value

Description	Use this function to enter a factor by which the measured value should be multiplied. Only visible if data type = analog
Options	<ul style="list-style-type: none"> ■ 1E-06 ■ 1E-05 ■ 1E-04 ■ 1E-03 ■ 1E-02 ■ 1E-01 ■ 1E-00 ■ 1E+01 ■ 1E+02 ■ 1E+03 ■ 1E+04 ■ 1E+05 ■ 1E+06
Factory setting	1E-00
Additional information	<ul style="list-style-type: none"> ■ Visible offline: Yes ■ Writable offline: Yes



Offset value

Navigation	 Expert → Display → Display value X → Offset value
Description	Use this function to configure the offset for the measured value. The specified value is added to the measured value. Only visible if data type = analog
User entry	Numerical value [-99 999 to 99 999]
Factory setting	0
Additional information	<ul style="list-style-type: none"> ■ Visible offline: Yes ■ Writable offline: Yes


Digital representation

Navigation	 Expert → Display → Display value X → Digital representation
Description	Use this function to configure the offset for the measured value. The specified value is added to the measured value. Only visible if data type = digital
Options	<ul style="list-style-type: none"> ■ 1 = On; 0 = Off ■ 0 = On; 1 = Off ■ 1 = Open; 0 = Close ■ 0 = Open; 1 = Close ■ Display as decimal value
Factory setting	1 = Open; 0 = Close
Additional information	<ul style="list-style-type: none"> ■ Visible offline: Yes ■ Writable offline: Yes

Submenu "Diagnostics"

Navigation	 Expert → Diagnostics
Description	Settings to display the diagnostic information. This submenu contains the following parameters in addition to those described in the Diagnostics menu →  38.

"Device information" submenu

Navigation	 Expert → Diagnostics → Device information
-------------------	---

Description	Use this function to display general device information.
--------------------	--


Extended order code

Navigation	 Expert → Diagnostics → Device information → Extended order code
-------------------	---

Description	Use this function to display the extended order code. The extended order code indicates the attribute of all the features of the product structure for the device.
--------------------	--

Additional information	<ul style="list-style-type: none">▪ Visible offline: Yes▪ Writable offline: No
-------------------------------	---

Device revision

Navigation	 Expert → Diagnostics → Device information → Device revision
-------------------	---

Description	Use this function to display the device revision.
--------------------	---

Additional information	<ul style="list-style-type: none">▪ Visible offline: Yes▪ Writable offline: Yes
-------------------------------	--


Hardware version

Navigation	 Expert → Diagnostics → Device information → Hardware version
-------------------	--

Description	Use this function to display the hardware version and to identify the device. Only read access.
--------------------	---

Additional information	<ul style="list-style-type: none">▪ Visible offline: Yes▪ Writable offline: No
-------------------------------	---

Manufacturer name

Navigation	 Expert → Diagnostics → Device information → Manufacturer name
-------------------	---

Description	Use this function to display the manufacturer name. Only read access.
--------------------	---

Factory setting	Endress+Hauser
------------------------	----------------

Additional information	<ul style="list-style-type: none">▪ Visible offline: Yes▪ Writable offline: No
-------------------------------	---

Index

A

Addressing 24

B

Bus access method 23

Bus termination 16

C

Cable gland or entry 12

Cable specification 14

Cable type 14

CE mark 6

Certificates and approvals 7

Configuring an offset 21

Configuring the offset 21

D

Data transmission 23

Declaration of Conformity 6

Degree of protection 16

Determine offset 22

Determining the offset 22

Device ID 24

Dimensions 8

DIP/remote 21

Direct wall mounting 9

Display and operating elements 17

DTM file 20

F

Field devices, number 15

Fieldbus connector 12

FieldCare Device Setup 20

G

Grounding 15

L

Listener mode 18

M

Maximum overall cable length 14

Maximum spur length 14

Menu

 Diagnostics 38

 Expert 41

 Operation 36

Mounting

 Pipe 9

 Wall 9

Mounting location 8

N

Number of field devices 15

O

Operational safety 5

Overall cable length 14

P

Parameter

 Access status tooling 41

 Actual diagnostics count 39

 Bar graph 0% 38

 Bar graph 100% 38

 Current diagnostics 38

 Data direction 42

 Data source address 37

 Data type 42

 Decimal places 38

 Description 37

 Device name 39

 Device reset 40

 Device revision 44

 Device tag 40

 Digital representation 43

 Display duration 36

 Enable % symbol 37

 Enter access code 41

 Extended order code 44

 Factor value 42

 Hardware version 44

 Last diagnostics 39

 Locking status 39, 41

 Manufacturer name 44

 Offset source 37

 Offset value 43

 Order code 40

 Serial number 40

Pipe mounting 9

Post-connection check 16

Post-mounting check 10

Product safety 6

R

Remote/DIP 21

Requirements for personnel 5

Return 30

S

Selecting DIP/remote 21

Setting the bus address 21

Shielding 15

Spur length 14

Submenu

 Device information 39, 43

 Device reset 40

 Diagnostics 43

 Display 41

 Display value X 37, 42

 System 41

Supply line/T-box shielding 13

Switching write protection on/off 21

System architecture 22

T
Turning the display 9

W
Wall mounting 9
Workplace safety 5



71618403

www.addresses.endress.com
