BA00278R/09/EN/05.22-00
71615257
2022-11-21

Operating Instructions
RIA14

Loop-powered field indicator



Endress+Hauser
People for Process Automation

Table of contents

1 About this document 3
1.1 Symbols 3
1.2 Documentation 4

2 Basic safety instructions 5
2.1 Requirements for the personnel 5
2.2 Intended use 5
2.3 Workplace safety 5
2.4 Operational safety 5
2.5 Product safety 6
2.6 IT security 6

3 Incoming acceptance and product identification 6
3.1 Incoming acceptance 6
3.2 Product identification 7
3.3 Storage and transport 7
3.4 Certificates and approvals 7

4 Mounting 8
4.1 Mounting requirements 8
4.2 Mounting the measuring device 8
4.3 Post-installation check 10

5 Electrical connection 10
5.1 Connection requirements 10
5.2 Connecting the device 11
5.3 Ensuring the degree of protection 12
5.4 Post-connection check 12

6 Operation options 13
6.1 Overview of operation options 13
6.2 Access to the operating menu via operating keys 13
6.3 Structure and function of the operating menu 15
6.4 Access to the operating menu via the operating tool 16

7 Commissioning 17
7.1 Post-installation check 17
7.2 Switching on the device 18
7.3 Configuring the measuring device 18

8 Diagnosis and troubleshooting 22
8.1 General troubleshooting 22
8.2 Diagnostic list 22

9 Maintenance 23
9.1 Cleaning 23

10 Repair 23
10.1 General information 23
10.2 Spare parts 23
10.3 Return 25
10.4 Disposal 25

11 Accessories 25
11.1 Communication-specific accessories 25

12 Technical data 26
12.1 Input 26
12.2 Output 26
12.3 Power supply 27
12.4 Performance characteristics 28
12.5 Mounting 28
12.6 Environment 28
12.7 Mechanical construction 29
12.8 Human interface 30
12.9 Certificates and approvals 32
12.10 Documentation 32

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: ▪ 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
1., 2., 3...	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	1., 2., 3...	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)	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. Information on the Safety Instructions (XA) relevant to 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.

2 Basic 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 configurable field indicator with one sensor input.
- 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

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**.

3.4.1 UL approval

More information under UL Product iq™, search for keyword "E225237")

4 Mounting

4.1 Mounting requirements

The device is designed for use in the field.

The orientation is determined by the legibility of the display.

Operating temperature range:
- −40 to +80 °C (−40 to +176 °F)
- −20 to +80 °C (−4 to +176 °F) when using the open collector output

Operating the device in the upper temperature limit range decreases the operating life of the display.

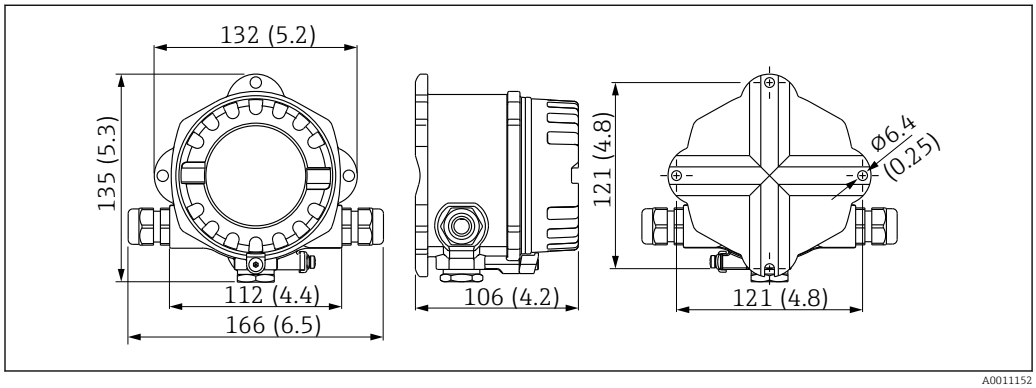
The display may react slowly at temperatures < −20 °C (−4 °F).

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

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

The dimensions of the device are provided in the "Technical data" section of the Operating Instructions.



1 Device dimensions; specified 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 mounting location so that the device can be mounted correctly is provided in the "Technical data" section.

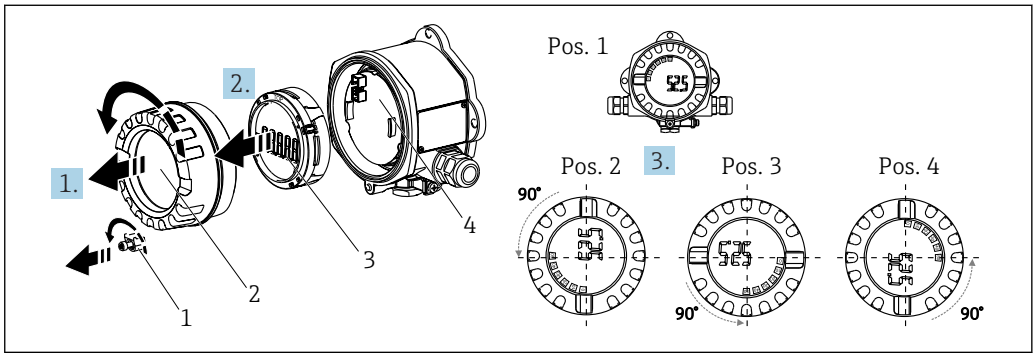
4.2 Mounting the measuring device

The device can either be mounted directly on the wall or mounted on a pipe using the optional mounting kit → 9.

The backlit display can be mounted in four different positions → 8.

It is essential that you clean and lubricate the thread prior to mounting.

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

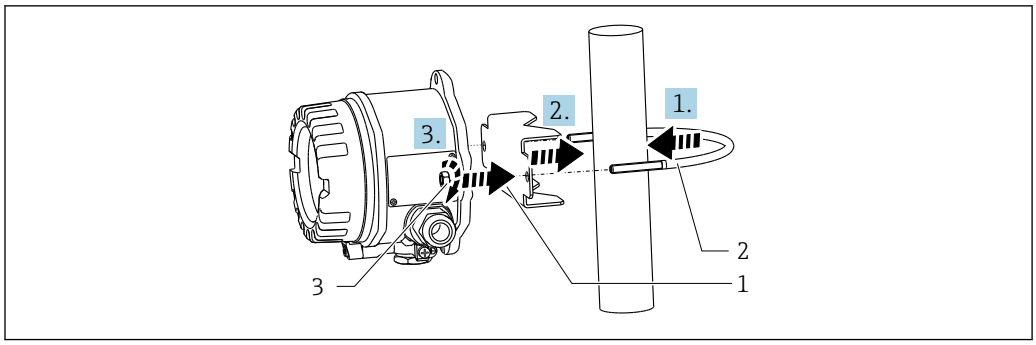
4.2.2 Direct wall mounting

Procedure for direct wall mounting of the device:

1. Drill 2 holes (see dimensions, → 1, 8)
2. Attach the device to the wall with 2 screws Ø5 mm (0.2 in).

4.2.3 Pipe mounting

The mounting bracket is suitable for pipes with a diameter of 38 to 84 mm (1.5 to 3.3 in).



3 *Pipe mounting of the device with mounting bracket*

1 Mounting plate
2 Mounting bracket
3 2 M6 nuts

1. Applies to pipes with a diameter of 38 to 56 mm (1.5 to 2.2 in).
   Attach the mounting bracket to the pipe.
2. Push the mounting plate onto the mounting bracket.
3. Fit the device on the mounting bracket with the two nuts (M6) supplied. The mounting plate is not necessary for pipes with a diameter of 56 to 84 mm (2.2 to 3.3 in).

4.3 Post-installation check

Perform the following checks after mounting the device:

Device condition and specifications	Notes
Is the measuring device damaged?	Visual inspection
Is the seal undamaged?	Visual inspection
Is the device fixed securely to the wall or mounting plate?	-
Is the housing cover firmly mounted?	-
Does the device match the measuring point specifications (ambient temperature, measuring range etc.)?	See "Technical data" section

5 Electrical connection

5.1 Connection 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.

CAUTION

Destruction of parts of the electronics

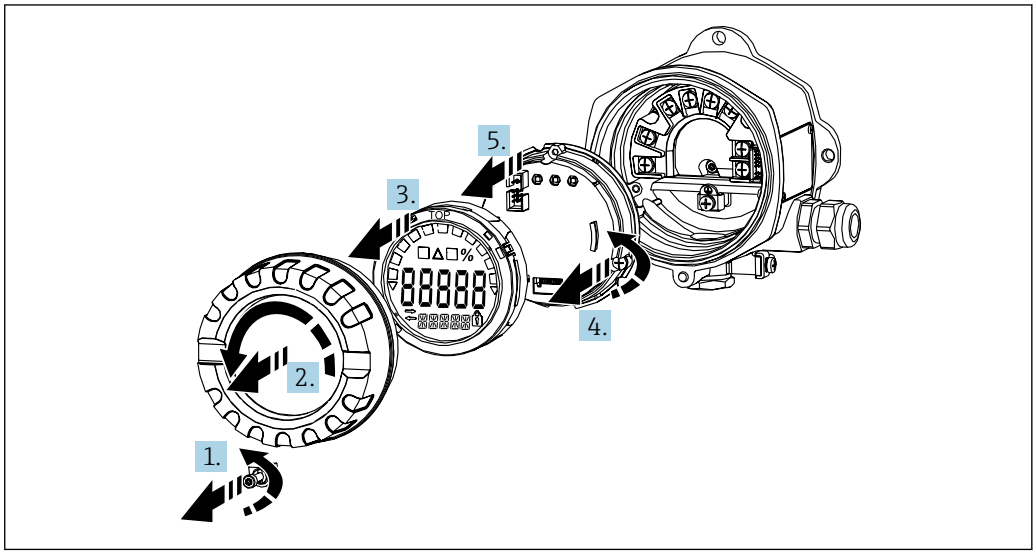
▶ Switch off the power supply before installing and connecting the device.

NOTICE

Loss of Ex approval if connected incorrectly

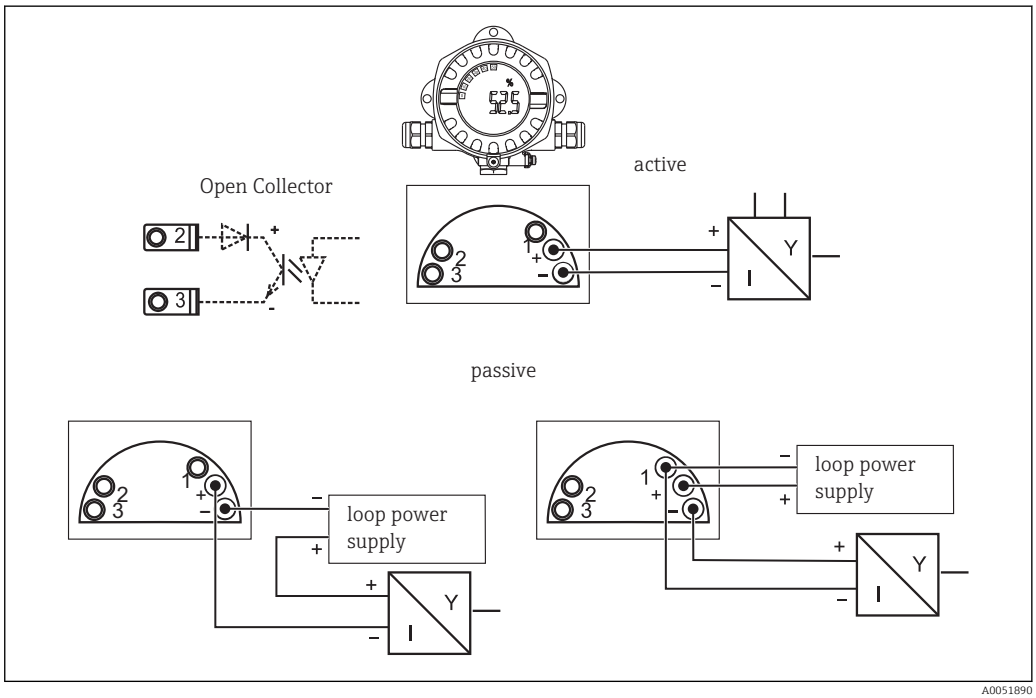
- When connecting Ex-certified devices, please take special note of the instructions and connection schematics in the Ex-specific supplement to these Operating Instructions.

First open the housing of the device.



4 *Open the housing of the field indicator*

5.2 Connecting the device



5 *Terminal assignment of the field indicator*

Terminal	Terminal assignment	Input and output
+	Measuring signal (+) 4 to 20 mA	Signal input
-	Measuring signal (-) 4 to 20 mA	Signal input

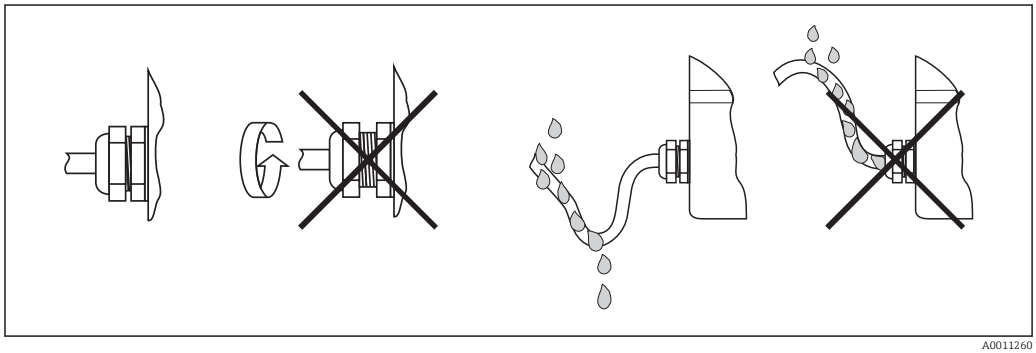
Terminal	Terminal assignment	Input and output
1	Terminal for further instruments	Support terminal
2	Digital limit switch (collector)	Switch output
3	Digital limit switch (emitter)	Switch output

Both the terminal assignment and the connection values of the device correspond to those of the Ex-version. The device is only designed for operation in a 4 to 20 mA measuring circuit. There must be potential equalization along the circuits (within and outside the hazardous area).

5.3 Ensuring the degree of protection

The devices meet all the requirements of IP67. It is absolutely essential to comply with the following points to ensure this protection is guaranteed after mounting or servicing the device:

- The housing seal must be clean and undamaged when inserted into the groove. The seal must be cleaned, dried or replaced if necessary.
- The cables used for connection must have the specified outer diameter (e.g., M20 x 1.5, cable diameter 8 to 12 mm (0.3 to 0.47 in)).
- Route the cable in a loop before cable entry (→ 6, 12). This means that any moisture that may form cannot enter the gland. Mount the measuring device so that the cable entries are not facing upwards.
- Replace unused cable entries with dummy plugs.
- Do not remove the grommet used from the cable entry.
- The housing cover and the cable entry must be firmly tightened.



A0011260

6 Connection tips to retain IP67 protection

5.4 Post-connection check

Perform the following checks after electrical installation:

Device condition and specifications	Note
Are cables or the device damaged?	Visual inspection

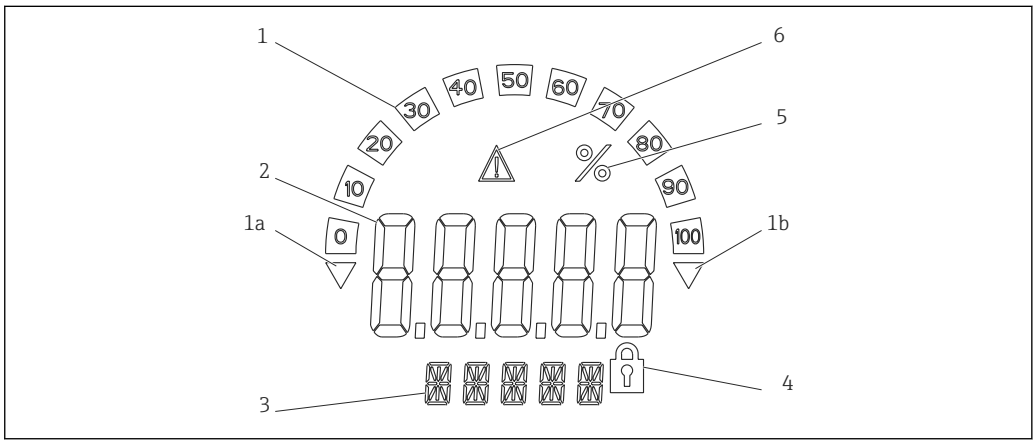
Electrical connection	Note
Is the cable type route completely isolated? No loops and cross-overs?	-
Are the mounted cables strain-relieved?	-
Is the terminal assignment correct? Compare the connection diagram of terminal block.	→ 5, 11
Are all the screws firmly tightened?	Visual inspection

Electrical connection	Note
Is the cable gland sealed tight?	Visual inspection
Is the housing cover firmly tightened?	Visual inspection

6 Operation options

6.1 Overview of operation options

6.1.1 Display



7 *LC display of the field indicator (backlit, fitted in steps of 90 °)*

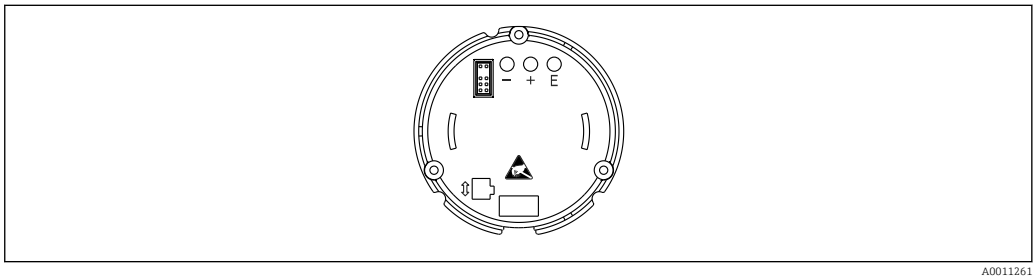
1 Bar graph display
1a Mark for underranging
1b Mark for overranging
2 Measured value display, digit height 20.5 mm (0.8 in)
3 14-segment display for units and messages
4 "Programming locked" symbol
5 Unit "%"
6 "Fault" warning icon

6.2 Access to the operating menu via operating keys

NOTICE

Loss of explosion protection when housing is open

▶ Parameter configuration must take place outside of the hazardous area.



8 *Operating keys of the field indicator ("-", "+", "E")*

The display must remain connected to the electronics unit during configuration.

1. Remove the housing cover
2. Remove the display
3. The operating keys on the device are accessible.
4. Configure the device via the operating keys.
5. Position the display at the desired angle.

6.2.1 Navigation

The operating panels are divided into 2 levels.

Menu: Various menu items can be selected in the menu level. The individual menu items are a summary of the associated operating functions.

Operating function: An operating function can be viewed as a summary of operating parameters. The operating functions perform the actual operation or configuration of the device.

Operating keys:

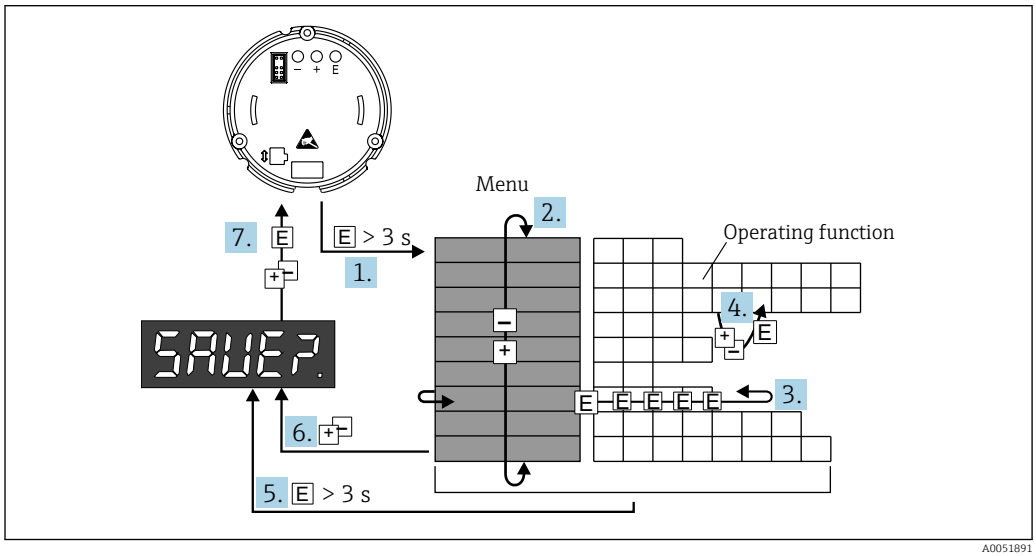
"E" key: Enter the programming menu if the "E" key is pressed for longer than 3 seconds.
- Select operating functions.
- Apply values.
- If the "E" key is pressed for longer than 3 seconds, the display returns directly to the Home position. You are first asked if the data entered until now should be saved.
- Save data entered.

"+ / -" selection keys:
- Select the menus.
- Configure parameters and numerical values.
- Once the operating function has been selected, the "+" or "-" keys are used to enter the value or change the setting.

If the keys are pressed for longer, the numbers change with increasing speed.

For the "program name" and "program version" operating items, the display is scrolled horizontally when the "+" or "-" keys are pressed as these items (7-digit) cannot be shown completely in the 14-segment display.

6.2.2 Programming in the operating menu



9 *Programming the field indicator*

1. Enter the operating menu

2. Select the menu with "+" or "-"
3. Select the operating function
4. Enter parameters in editing mode (enter/select data with "+" or "-" and apply with "E")
5. Jump to the home position directly. You are first asked if the data entered until now should be saved.
6. Exit the menu using "+ / - ". You are asked whether the data entered should be saved.
7. Confirm whether data should be saved. Select yes/no with the "+" or "-" operating key and confirm with "E".

6.3 Structure and function of the operating menu

Menu	Operating function		Operating function		Operating function	
	Parameter	**Default/ selection**	**Parameter**	**Default/ selection**	**Parameter**	**Default/ selection**
Analog input INPUT	**Curve** CURV		**Signal damping** DAMP		**Decimal point for measured value** DI DP	
	Linear	LINAR	0 to 99 s	0	99.999	3 DEC
	Squared	SQRT			999.99	2 DEC
					9 999.9	1 DEC
					99 999	0 DEC
	Measured value scaling4 mA DI LO		**Measured value scaling20 mA** DI HI		**Measured value offset** OFFST	
	– 19 999 to 99 999	0.0	– 19 999 to 99 999	100.0	– 19 999 to 99 999	0.0
Display DISPL	**Dimension** DIM		**Dimension** [1] DTEXT			
	None % Any	NO % TEXT	XXXXX			
Limit LIMIT	**Measuring mode** MODE		**Threshold** SETP			
	Off	OFF	– 19 999 to 99 999	0.0		
	Min. safety with alarm	MIN				
	Max. safety with alarm	MAX				
	Alarm	ALARM				
	Hysteresis HYST		**Delay** DELY			
	– 19 999 to 99 999	0.0	0 to 99 s	0.0		
Operating parameters PARAM	**Operator code** CODE		**Program name** PNAME		**Firmware version** FWVER	
	0 to 9 999	0				
	NAMUR NAMUR		**NAMUR 3.6** [2] N_360		**NAMUR 3.80** [2] N_380	

Menu	Operating function		Operating function		Operating function	
	Parameter	Default/ selection	Parameter	Default/ selection	Parameter	Default/ selection
	Standard	dEF	0 to NAMUR 20.5	3.60	NAMUR 3.6 to NAMUR 20.5	3.80
	User entry	Edit				
	NAMUR 20.5 [2] N2050		**NAMUR 21.0** [2] N2100		**Test** TEST	
	NAMUR 3.80 to NAMUR 21.0	20.5	20.5 to 25 mA	21.0	Off	OFF
					Open collect.	OUT
					Display	DISP
Service SERV	Service code SCODE		**Parameter reset** [3] PRSET			
		----	Yes	YES		
			No	NO		

1) Only if DIM = TEXT
2) Only if NAMUR = Edit
3) Can only be performed by service staff

6.4 Access to the operating menu via the operating tool

6.4.1 Configuration via interface & PC configuration software FieldCare Device Setup

⚠ WARNING

Loss of explosion protection when housing is open

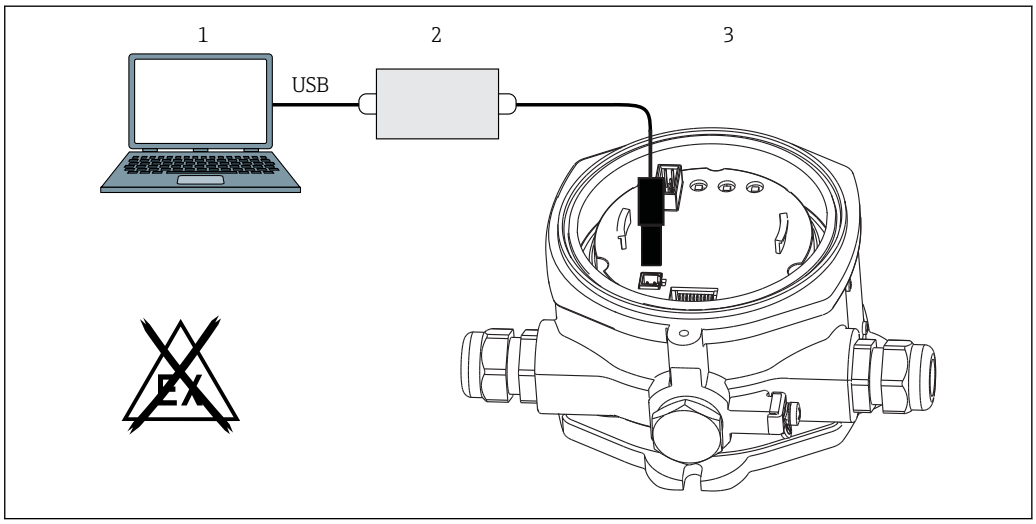
▶ The device must be configured outside the hazardous area.

During configuration with FieldCare, the device may assume undefined statuses! This may result in the undefined switching of outputs and relays.

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.

The 4-pin connector of the interface cable must be plugged into the corresponding socket in the device and the USB connector must be plugged into a free USB port on the PC.

Connecting the device



10 *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.

Online configuration of parameters is not possible for the RIA14/16.

1. First add the Comm-DTM "PCP (Readwin) TXU10/FXA291" to an empty project.
2. In the Comm-DTM settings, set the baud rate to 2400 baud and select the COM port used.
3. Add the device DTM "RIA14/16/Vx.xx.xx" to the project using the "Add device..." function.
4. Continue with device configuration in accordance with these Operating Instructions. The complete Setup menu, i.e. all of the parameters listed in these Operating Instructions, can also be found in the FieldCareDevice Setup.

In general, it is possible to overwrite parameters with the FieldCare PC software and the appropriate device DTM even if access protection is active. If access protection by means of a code should be extended to the software, this function should be activated in the extended device setup.

7 Commissioning

7.1 Post-installation check

Make sure that all installation and connection checks have been carried out before putting the device into operation.

NOTICE

- Before commissioning the device, make sure that the supply voltage matches the voltage specifications on the nameplate. Failure to perform these checks may result in damage to the device caused by the incorrect supply voltage.

7.2 Switching on the device

Switch on the supply voltage. During device initialization, all segments in the display are displayed for approx. 1 second.

7.3 Configuring the measuring device

Description of the operating functions

The following table shows the menus available for the field indicator. These are explained in detail in the sections that follow.

Function	As shown on the display
Data processing	INPUT
Display	DISPL
Limit values	LIMIT
Other settings	PARAM
Service level	SERV

7.3.1 Data processing (INPUT)

Input range

INPUT → CURVE → Options: Linear (LINAR) or square root (SQRT)

The input range is a 4 to 20 mA signal. Select the type of input signal here (linear or square).

Damping

INPUT → DAMP → Options: 0-99 (0 = no damping).

- Measured value damping can be set between 0 to 99 s .
- Only whole numbers can be entered.
- The factory setting is 0 (no damping).

Measured value scaling

Designation	Description
Measured value decimal point 'DI DP'	Indicates the number of decimal places (places after the decimal point) for the numerical display of the measuring range ▪ Selection range 0-3 decimal places ▪ Default: 1 decimal place If the number of decimal places is increased, the value for all the dependent operating parameters must be recalculated based on the formula New value = Old value * $10^{(DPnew-DPold)}$. If the value of one of the dependent operating parameters is < -19999 or > 99999, the number of decimal places cannot be increased and error message C561 is shown on the display.
Measured value 0 % 'DI LO'	Indicates the display value for the 4 mA value. ▪ Value range −19 999 to 99 999 ▪ Default: 0.0

Designation	Description
Measured value 100 % 'DI HI'	Indicates the display value for the 20 mA value. ▪ Value range –19 999 to 99 999 ▪ Default: 100.0
Measured value offset 'OFFST'	Used to correct the display measured value. The offset is added to the measured value. ▪ Value range –19 999 to 99 999 ▪ Default: 0.0

Measured value 0 % and 100 % should not be identical. However, the 0 % measured value can be larger than the 100 % measured value (invert).

7.3.2 Display (DISPL)

Dimension

DIM → Options: NO, °C, K, °F, % or TEXT

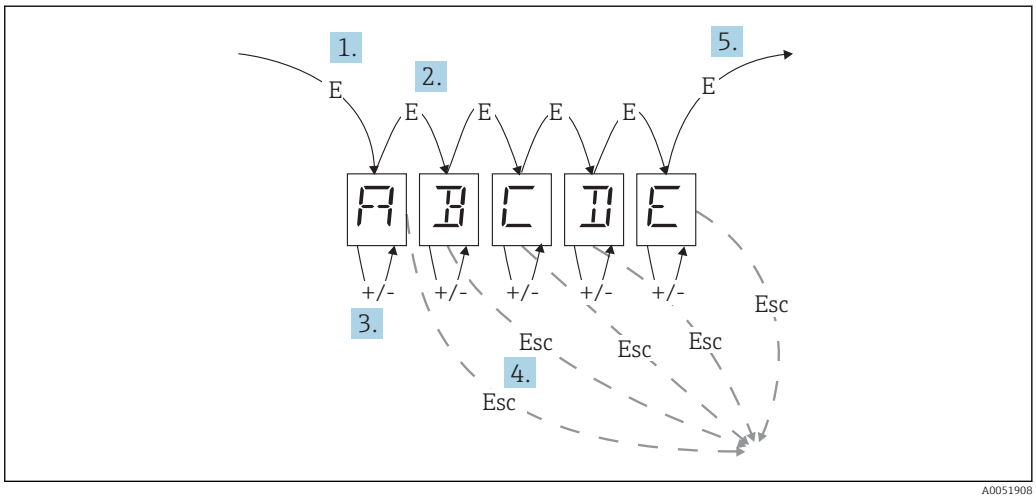
You can choose one of the measurement units permanently stored in the display (°C, K, °F, %). Alternatively, you can configure a unit of your choice on the 14-segment display (TEXT).

The character set consists of the following characters: Characters A-Z, abcdhijlmnoruvwy, the digits 0-9 and the special characters: - + * / ( ).

Configuring the editable unit (DTEXT)

DIM → DTEXT → Enter a unit that can be edited as required

To configure the editable unit, all 5 points on the 14-segment display must be configured. Press the E key to edit the next letter. Accept the set unit with "E".



A0051908

Configuring the editable unit

1. Press the E key to select the desired operating function.
2. Press the E key to select the next point of the 5-digit 14-segment display.
3. Press the + or - key to select the next/previous character for the point selected.
4. If you press the +/- keys simultaneously, data entry is aborted and the operating function is displayed.
5. When you confirm the fifth position of the display with E, the entry is accepted and you switch to the operating function.

7.3.3 Limit values (LIMIT)

In the event of a limit value violation and a fault, the OC output is de-energized in accordance with the closed circuit current principle.

If a limit value violation MIN (lower limit) occurs, 'LIMIN' is displayed in the 14-segment display. If a limit value violation MAX (upper limit) occurs, 'LIMAX' is displayed.

Operating mode

LIMIT → MODE → Options OFF, MIN, MAX, ALARM

Use this function to select limit value and fault monitoring.

Options for selection: MIN, MAX, ALARM or OFF
- MIN = lower limit value
- MAX = upper limit value
- ALARM = in the event of a device fault
- Default: OFF = no limit value or fault monitoring

Switching threshold

LIMIT → SETP → Options –19 999 to 99 999

Measured value at which a change in the switching status occurs

- Value range: –19 999 to 99 999
- Default 0

Hysteresis

LIMIT → HYST → Options –19 999 to 99 999

Use this function to enter the hysteresis for the switching threshold at minimum/ maximum safety.

- Value range: –19 999 to 99 999
- Default 0

Delay

LIMIT → DELY → Options 0 to 99 s

Setting of the response delay (in seconds) of the limit value event after reaching the switching threshold.

- Value range: 0 to 99 s
- Default 0

7.3.4 Other settings (PARAM)

User code - Locking

PARAM → CODE → User code entry

The device can be locked to protect the processes against unauthorized and undesired interference. The device parameters are protected by a 4-digit user code and cannot be altered without entering the code.

User code: Once assigned, a user code can only be altered if the old code is entered to enable the device. The new code can then be set.

- Value range: 0 to 9 999
- Default 0

Program information

Designation	Description
Program name 'PNAME'	Displays the name of the software loaded in the device (7-digit) Display cannot be edited.
Firmware version 'FWVER'	Displays the name of the firmware loaded in the device (8-digit) Display cannot be edited.

Press the + or - key to scroll horizontally through the 7 or 8-digit display values.

Alarm limits (NAMUR)

PARAM → NAMUR

The alarm limits are set to NAMUR values at the factory. These values can be used as default values (DEF) or edited freely (EDIT).

You can change the following operating items if the 'Edit' operating item has been selected:

Designation	Description
NAMUR 3.6	Value range: 0 mA... < Namur 3.8 Default: 3.60
NAMUR 3.8	Value range: Namur 3.6 < x < Namur 20.5 Default: 3.80
NAMUR 20.5	Value range: Namur 3.8 < x < Namur 21.0 Default: 20.50
NAMUR 21.0	Value range: Namur 20.5 < x < Namur 25 mA Default: 21.00

The Namur limits are listed in ascending order.

Test (TEST)

PARAM → TEST → Options OFF, OUT, DISP

Certain device functions can be tested automatically.

- off: OFF (default)
- Open Collector: OUT
- Display: DISP

7.3.5 Service level (SERV)

This level can only be selected after entering the service code (only available for service personnel).

Resetting the settings (PRSET)

PRSET - Perform a reset

Service personnel can reset the settings to the default values.

Reset: After YES is selected, the operating parameters are set to the factory default values.

- Options: YES or NO
- Default: NO

If the default values are set, the option selected is automatically reset to NO.

8 Diagnosis and troubleshooting

8.1 General troubleshooting

⚠ WARNING

Danger! Electric voltage

▶ Do not operate the device in an open condition for device troubleshooting.

8.2 Diagnostic list

Errors that occur during the self-test or during operation are immediately shown on the display. Error messages that can be acknowledged are deleted after a key is pressed. A fault has occurred if the hardware for writing and reading data (EEPROM) is defective or if data cannot be read correctly from the EEPROM.

The errors are defined as:

Error code	Meaning
C561	Display overrun
F041	Sensor error (0 mA < input ≤ 2 mA). "Failure" warning symbol is displayed.
F045	Sensor error (2 mA < input ≤ 3.6 mA or input ≥ 21 mA). "Failure" warning symbol is displayed.
F101	Range undershoot (input between 3.6 mA and 3.8 mA). "Failure" warning symbol is displayed.
F102	Range overshoot (input between 20.5 mA and 21.0 mA). "Failure" warning symbol is displayed.
F261	Error: EEPROM "Failure" warning symbol is displayed.
F282	The parameter data could not be saved. "Failure" warning symbol is displayed.
F283	Incorrect parameter data "Failure" warning symbol is displayed.
F431	Incorrect reference values "Failure" warning symbol is displayed.

8.2.1 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
08/2009	01.00.00	Original software	BA278R/09/en/08.09
09/2010	01.00.zz	No change to functions and operation	BA278R/09/en/13.10
12/2011	01.00.zz	No change to functions and operation	BA00278R/09/en/01.11
11/2012	01.00.zz	No change to functions and operation	BA00278R/09/EN/02.12

Date	Software version	Software modification	Documentation
04/2013	01.00.zz	No change to functions and operation	BA00278R/09/EN/03.13
07/2015	01.00.zz	No change to functions and operation	BA00278R/09/EN/04.15

9 Maintenance

No special maintenance work is required for the device.

9.1 Cleaning

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

10 Repair

10.1 General information

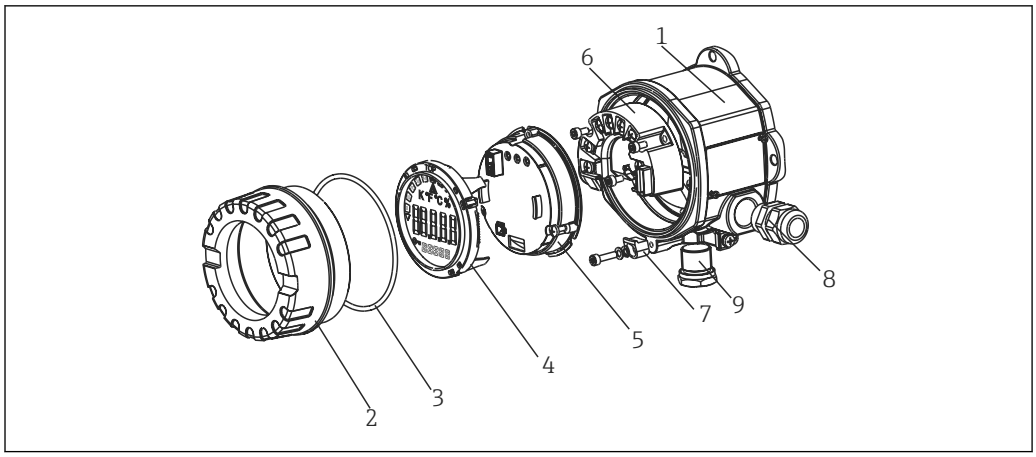
The device has a modular design and repairs can be carried out by the customer's electrotechnical personnel. For more information on service and spare parts, contact the supplier.

10.1.1 Repair of Ex-certified devices

- Only specialist personnel or the manufacturer may undertake repairs on Ex-certified devices.
- The prevailing standards, national hazardous area regulations, safety instructions and certificates must be observed.
- 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.

10.2 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!



11 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 NPT1/2 thread, w/o terminal block	
				2	3x M20x1.5, w/o terminal block	
				3	3x G1/2 thread, w/o terminal block	
					Version:	
					A	Standard
	RIA141G-					← Complete order code for RIA14 housing

Item no.	Type	Order number
2	Housing cover cpl. display, 316L, Ex d, FM XP, CSA XP, with seal	TMT142X-HC
	Housing cover cpl. display, 316L with seal	TMT142X-HD
	Housing cover cpl. display, aluminum Ex d + seal	RIA141X-HK
	Housing cover cpl. display, aluminum + seal	RIA141X-HL
3	O-Ring 88x3 NBR70 PTFE anti-friction coating//O-Ring 88x3 EPDM70 PTFE anti-friction coating	71158816
4	Display + fitting kit + twist protection	XPR0010-DA
	Display fitting kit + twist protection	RIA141X-DC
	Field housing display fitting kit	51004454
5	Electronics	XPR0010-EA
6	Terminal block	RIA141X-KA
7	Cover clamp spare part set for field housing: screw, disk, spring washer	51004948

Item no.	Type	Order number
8	2x M20 cable gland	RK01-AB
9	Plug (dummy) M20x1.5 EEx-d/XP	51004489
	Plug (dummy) NPT1/2" ALU	51004490
	Plug (dummy) G1/2" EEx-d/XP	51004916
	Plug (dummy) NPT1/2"V4A	51006888

10.3 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.

10.4 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.

11 Accessories

Accessories currently available for the product can be selected via the Product Configurator at www.endress.com:

1. Select the product using the filters and search field.
2. Open the product page.
3. Select **Spare parts & Accessories**.

11.1 Communication-specific accessories

Designation	
Interface cable	Commubox TXU10 incl. FieldCare Device Setup and DTM Library
	Commubox FXA291 incl. FieldCare Device Setup and DTM Library

12 Technical data

12.1 Input

12.1.1 Measured variable

Current

12.1.2 Measuring range

4 to 20 mA Reverse polarity protection

12.1.3 Input signal

- Voltage drop < 4 V at 3 to 22 mA
- Max. voltage drop < 6 V at max. short-circuit current 200 mA

12.2 Output

12.2.1 Output signal

Digital limit switch

Passive, open collector:

I_{max}	200 mA

U_{max}	35 V

$U_{low/max}$	< 2 V at 200 mA

Max. reaction time to limit value	250 ms

Temperature range	–20 to +80 °C (–4 to +176 °F)

12.2.2 Signal on alarm

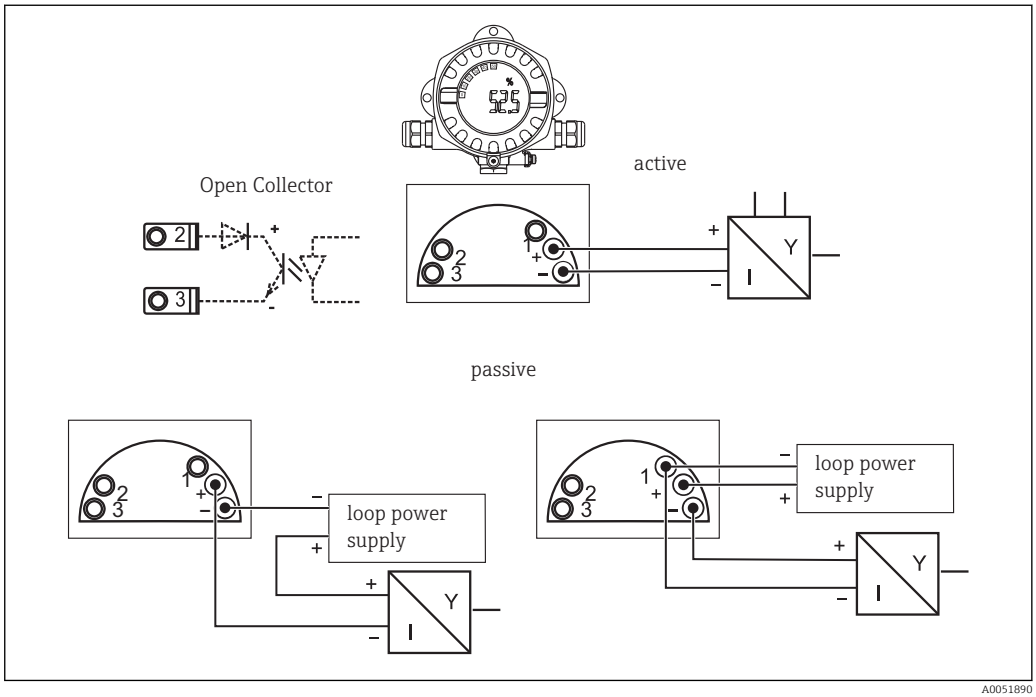
- No measured value visible in the LC display, no background illumination.
- Open collector inactive.

12.2.3 Transmission behavior

The indicator allows the HART® transmission protocol to pass unimpeded.

12.3 Power supply

12.3.1 Terminal assignment



12 *Terminal assignment of the field indicator*

Terminal	Terminal assignment	Input and output
+	Measuring signal (+) 4 to 20 mA	Signal input
-	Measuring signal (-) 4 to 20 mA	Signal input
1a, 1b	Terminal for further instruments	Support terminal
2	Digital limit switch (collector)	Switch output
3	Digital limit switch (emitter)	Switch output

12.3.2 Supply voltage

Power is supplied via the 4 to 20 mA current loop.

The device may only be powered by a power unit with an energy-limited circuit in accordance with UL/EN/IEC 61010-1, Section 9.4 and the requirements of Table 18.

12.3.3 Voltage drop

Voltage drop	< 3.6 V at 3 to 22 mA
Max. voltage drop	< 6 V at max. short-circuit current 200 mA

12.3.4 Terminals

Cables up to 2.5 mm^2 (14 AWG) max. plus ferrule

12.3.5 Cable entries

The following cable entries are available:
- NPT 1/2 thread
- M20 thread
- G1/2 thread
- 2x NPT1/2 gland + 1x dummy plug
- 2x M20 gland + 1x dummy plug

12.4 Performance characteristics

12.4.1 Reference conditions

T	25 °C (77 °F)

12.4.2 Maximum measured error

< 0.1 % of scaled display range

12.4.3 Influence of ambient temperature

Impact on accuracy when ambient temperature changes by 1 K (1.8 °F): 0.01 %

12.5 Mounting

12.5.1 Mounting location

Wall or pipe mounting (see "Accessories")

12.5.2 Orientation

No restrictions.

The orientation is determined by the legibility of the display.

12.5.3 Altitude

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

12.6 Environment

12.6.1 Ambient temperature range

–40 to +80 °C (–40 to +176 °F)

–20 to +80 °C (–4 to +176 °F) when using the open collector output

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.

12.6.2 Storage temperature

–40 to 80 °C (–40 to 176 °F)

12.6.3 Electrical safety

As per IEC 61010-1,

UL 61010-1,

CSA C22.2 No. 1010.1-92

12.6.4 Climate class

As per IEC 60654-1, Class C

12.6.5 Degree of protection

IP 66/IP67, Type 4X (not assessed by UL)

12.6.6 Vibration resistance

3g at 2 to 150 Hz as per IEC 60068-2-6

12.6.7 Condensation

Permitted

12.6.8 Installation category

1 as per IEC 61010

12.6.9 Pollution degree

2

12.6.10 Overvoltage category

II

12.6.11 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 Declaration of Conformity.

Maximum measured error <1% of measuring range.

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

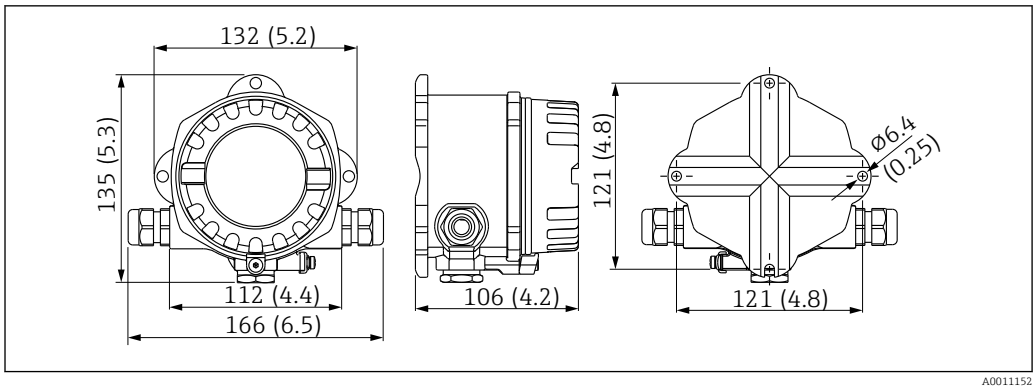
Interference emission as per IEC/EN 61326 series, Class B equipment

Connection of the functional grounding may be needed for functional purposes. Compliance with the electrical codes of individual countries is mandatory.

12.7 Mechanical construction

12.7.1 Design, dimensions

Die-cast aluminum housing for general applications, or optional stainless steel housing



13 Dimensions in mm (in)

- Aluminum housing for general applications or, optional stainless steel housing
- Electronics compartment and connection compartment in single-chamber housing
- Display can be fitted in steps of 90 °

12.7.2 Weight

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

12.7.3 Materials

Housing	Nameplate
Die-cast aluminum AlSi10Mg/ALSi12Mg with powder coating on polyester base	Aluminum AIMgl, anodized in black
Stainless steel CF3M (316L)	Stainless steel 1.4404 (AiSi 316L)

12.7.4 Terminals

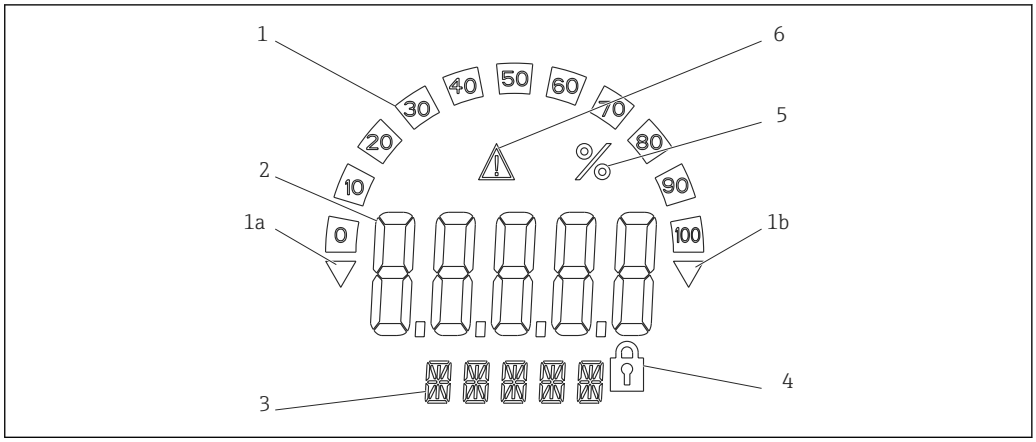
Cables up to 2.5 mm^2 (14 AWG) max. plus ferrule

12.8 Human interface

12.8.1 Operation concept

3-key operation (-/+/E) integrated in the device, access when housing is open

12.8.2 Local operation



A0011157

14 *LC display of the field indicator (backlit, fitted in steps of 90 °)*

1 Bar graph display
1a Mark for underranging
1b Mark for overranging
2 Measured value display, digit height 20.5 mm (0.8 in)
3 14-segment display for units and messages
4 "Programming locked" symbol
5 Unit "%"
6 "Fault" warning icon

- Display area
  −19 999 to +99 999
- Offset
  −19 999 to +99 999
- Signalization
  Overranging/underranging
- Limit value over/under cut
  Limit value overranging/underranging

12.8.3 Remote operation

Configuration

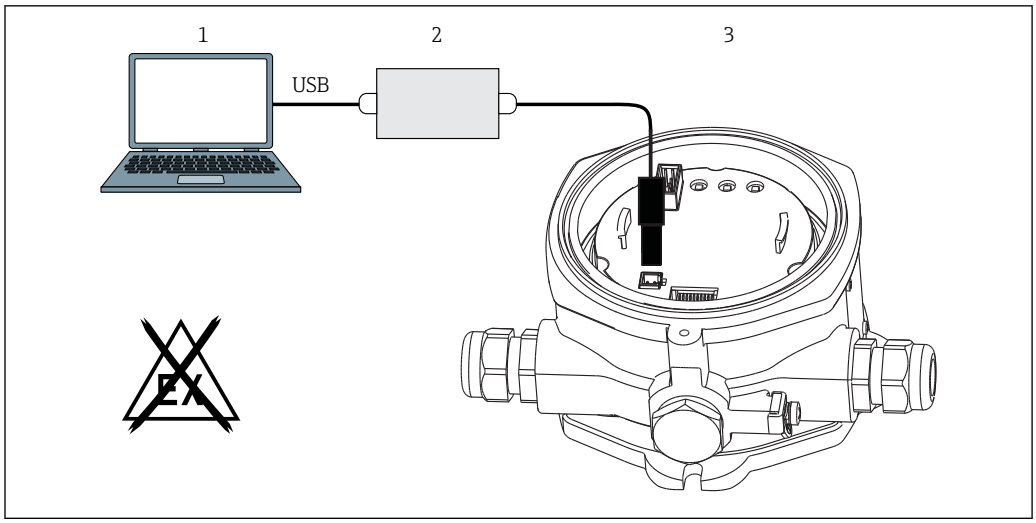
The device can be configured with the FieldCare PC software. FieldCare Device Setup is included in the scope of delivery of the Commubox FXA291 and TXU10-AC (see 'Accessories') or can be downloaded free of charge via www.endress.com.

Interface

Configuration interface at device; connection to PC via interface cable (see 'Accessories').

Configurable device parameters (selection)

Measuring dimension, measuring ranges (linear/quadratic), setup lock via operator code, failsafe mode, digital filter (damping), offset, limit value (min/max/alarm), alarm limit values can be configured by the user



15 *Configuration via PC configuration software*

1 *PC configuration software*
2 *USB box configuration kit*
3 *Field indicator*

12.9 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**.

12.9.1 UL approval

More information under UL Product iq™, search for keyword "E225237")

12.10 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.

12.10.1 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.

Document type	Purpose and content of the document
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.
Safety Instructions (XA)	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. Information on the Safety Instructions (XA) relevant to 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.



www.addresses.endress.com

Endress+Hauser

People for Process Automation