

Operating Instructions

RIA16

Loop-powered field indicator



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1 About this document

1.1 Symbols

1.1.1 Safety symbols

DANGER

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

WARNING

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

CAUTION

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

NOTICE

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

1.1.2 Electrical symbols

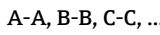
Symbol	Meaning
	Direct current
	Alternating current
	Direct current and alternating current
	Ground connection A grounded terminal which, as far as the operator is concerned, is grounded via a grounding system.
	Potential equalization connection (PE: protective earth) Ground terminals that must be connected 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
	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
	Item numbers		Series of steps
	Views		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.
Its orientation is determined by the readability of the display.

- Operating temperature range:
- -40 to +80 °C (-40 to +176 °F)
 - -20 to +80 °C (-4 to +176 °F) when the Open Collector output is used

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

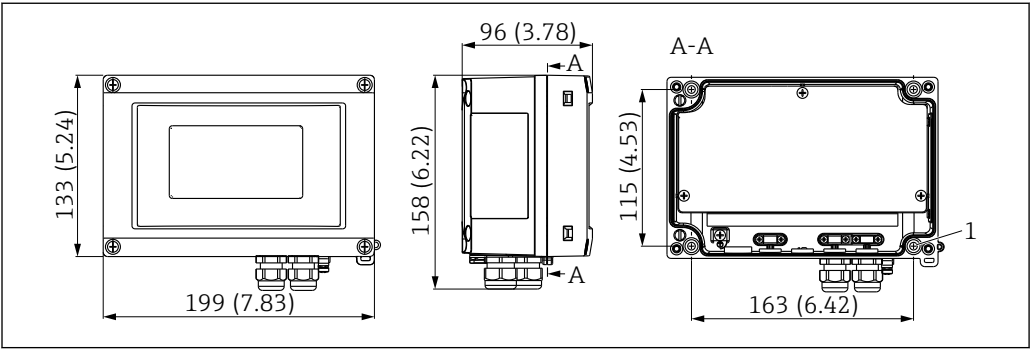
The display may respond slowly at temperatures < -20 °C (-4 °F).

Readability of the display can no longer be guaranteed at temperatures < -30 °C (-22 °F).

Operating 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 Dimensions of the field indicator; dimension in mm (in)
1 Bore hole for mounting directly to wall or optional mounting plate with 4 screws Ø 5 mm (0.2 in)

4.1.2 Mounting location

For information on the conditions that must be present at the mounting location before the device can be mounted correctly (such as ambient temperature, type of protection, climate class etc.), see the "Technical data" section.

4.2 Mounting the measuring device

The device can either be mounted directly to the wall or mounted to the pipe or wall using the optional mounting kit.

4.2.1 Direct wall mounting

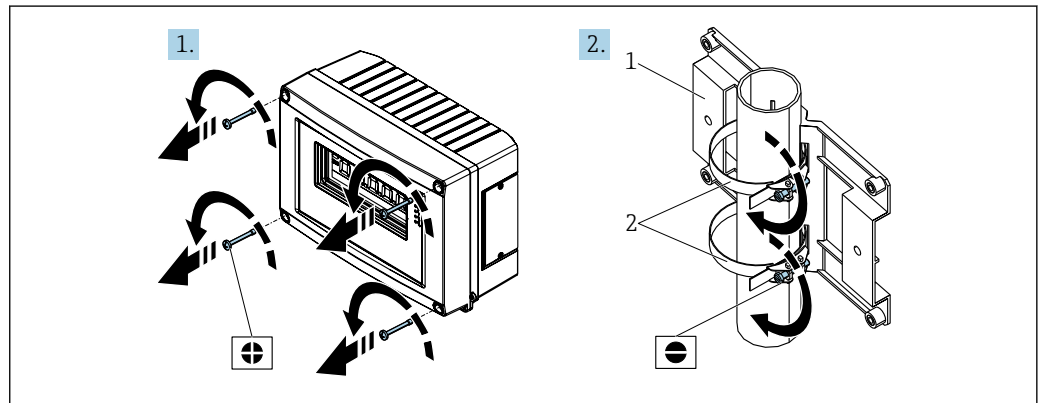
To mount the indicator directly on the wall:

1. Drill 4 holes (see dimensions, →  1,  8)
2. Attach the device to the wall using 4 screws $\varnothing 5$ mm (0.2 in).

4.2.2 Pipe mounting

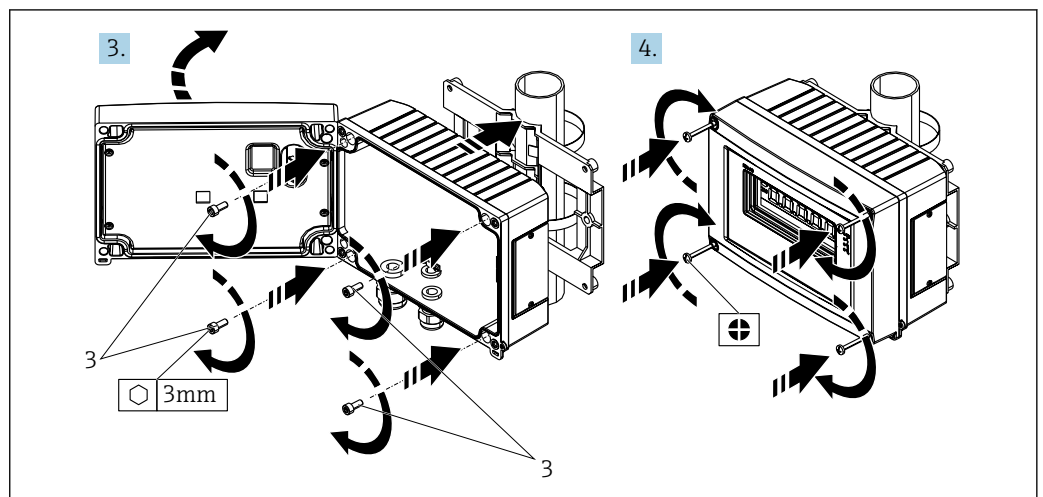
The mounting bracket is suitable for pipes with a diameter of 25 to 125 mm (1 to 5 in). The mounting kit comprises a mounting plate (item 1), 2 metal strips (item 2) and 4 screws (item 3), →  2,  9.

To mount the indicator on a pipe:



 2 Preparing for mounting

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 3 Attaching the indicator to the mounting plate

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4.3 Post-mounting checks

Perform the following checks after mounting the device:

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

5 Electrical connection

i 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

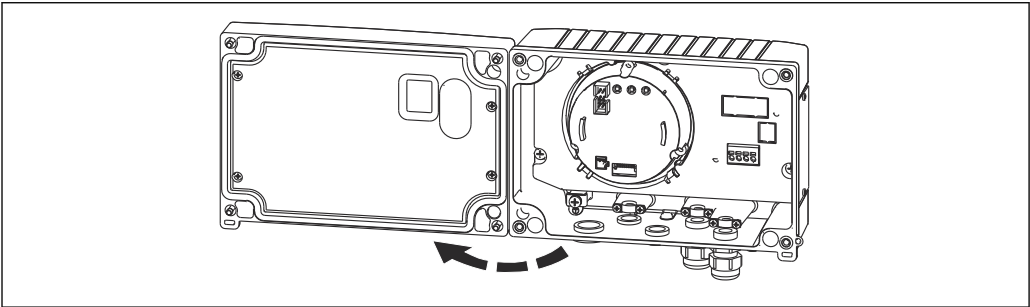
- ▶ Switch off the power supply before installing and connecting the device.

NOTICE

Loss of Ex approval in case of improper connection.

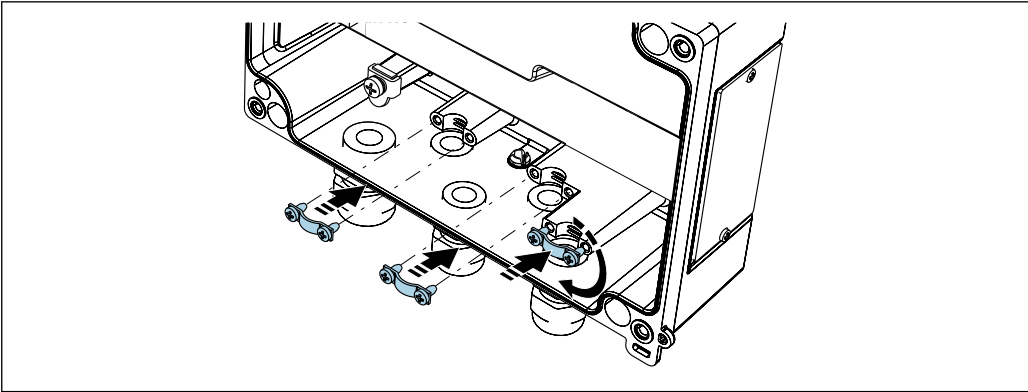
- ▶ When connecting devices certified for use in hazardous areas, ensure compliance with all relevant instructions and connection schematics in the Ex-specific supplement to these Operating Instructions.

First open the device housing.



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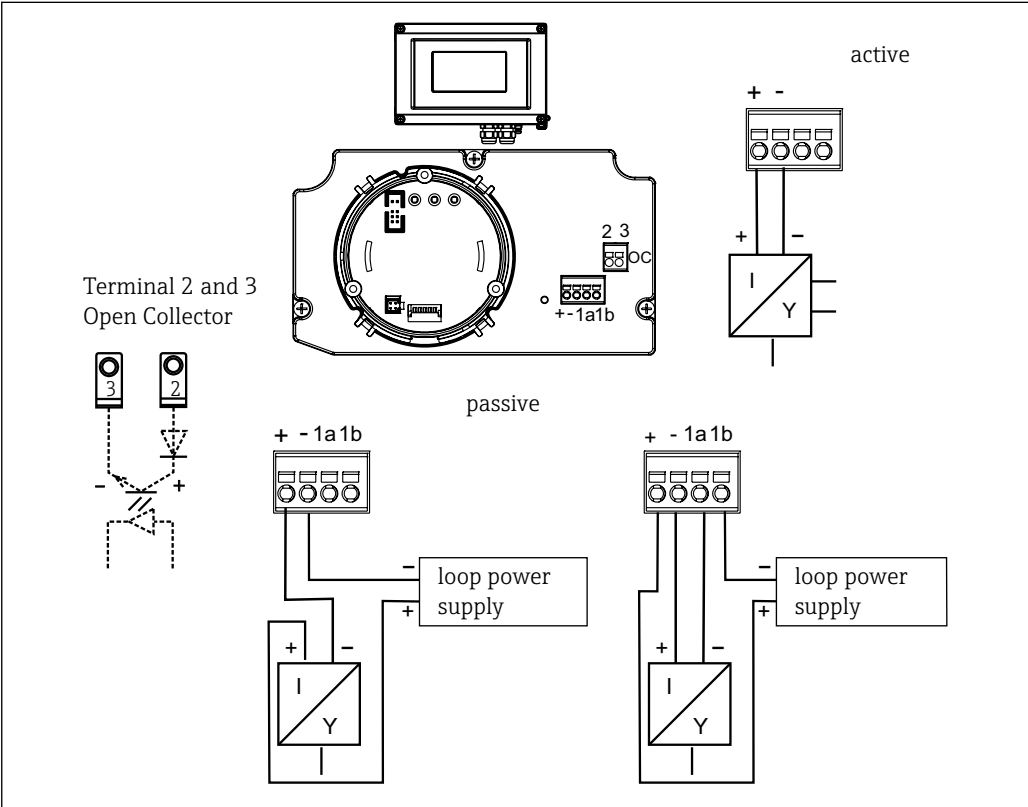
 4 Opening the field indicator housing



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5 Installing the cable shield ground clamps (aluminum housing only)

5.1 Connecting the device



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6 Field indicator terminal assignment

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

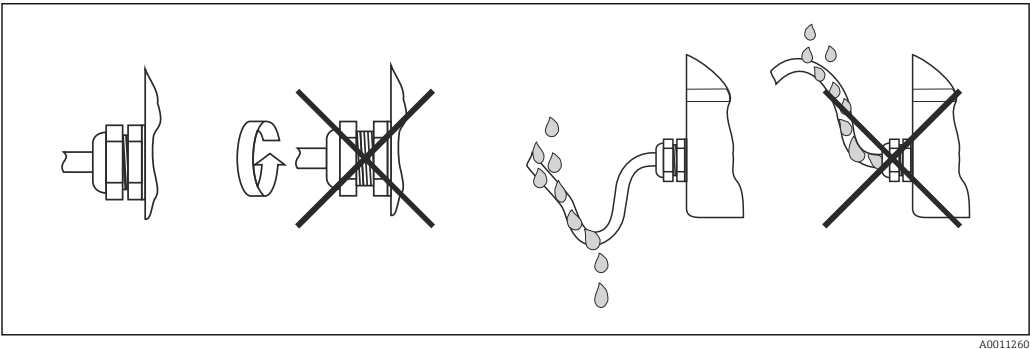
Both the terminal assignment and the connection values of the field indicator correspond to those of the hazardous area version. The device is only designed for operation in a

4 to 20 mA measuring circuit. There must be potential equalization along the measuring circuits (inside and outside the hazardous area).

5.2 Ensuring the degree of protection

The devices meet all the requirements of IP67. In order to guarantee this after mounting or after a service case the following points must be observed.

- 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)). If possible, mount the measuring device so that the cable entries point downwards.
- Replace unused cable entries with dummy plugs.
- Do not remove the grommet from the cable entry.
- The housing cover and cable entry must be firmly tightened.



7 Connection tips to retain IP67 protection

5.3 Post-connection check

Carry out the following checks once the electrical installation is complete:

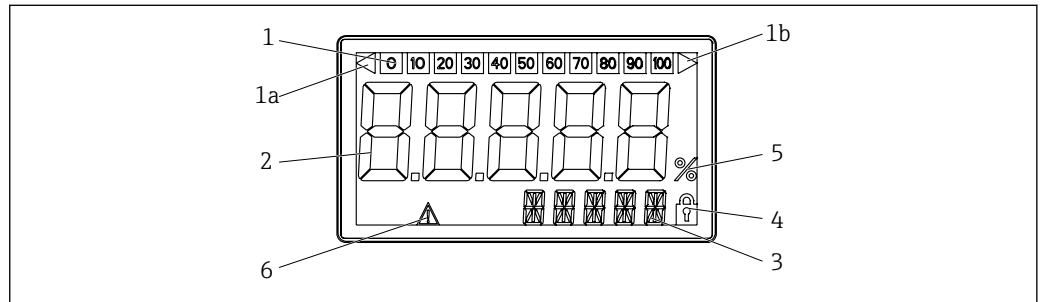
Device condition and specifications	Note
Are cables or the device damaged?	Visual inspection

Electrical connection	Note
Is the cable type route completely isolated? Without loops and crossovers?	-
Are the mounted cables strain-relieved?	-
Is the terminal assignment correct? Compare with the connection diagram of the terminal block.	→ 11
Are all terminal screws tightened?	Visual inspection
Is the cable gland leak-tight?	Visual inspection
Is the housing cover securely tightened?	Visual inspection

6 Operation options

6.1 Overview of operation options

6.1.1 Display



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8 LC display of the field indicator

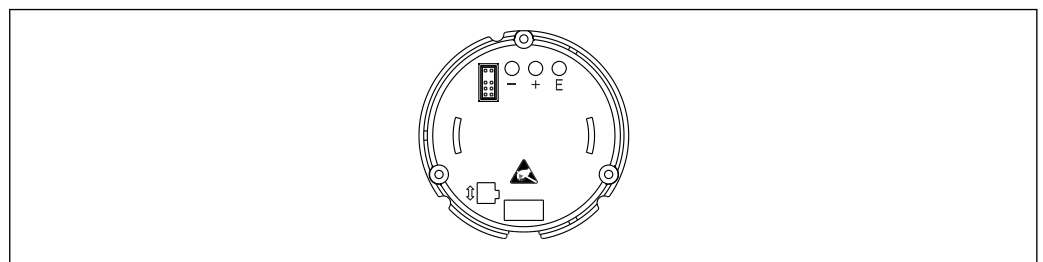
1	Bargraph display	3	14-segment display for units and messages
1a	Indicator for measuring range undershoot	4	'Programming disabled' symbol
1b	Indicator for measuring range overshoot	5	Unit '%'
2	Measured value display Digit height 26 mm (1.02 in)	6	'Failure' warning symbol

6.2 Access to the operating menu via the operating keys

NOTICE

Loss of explosion protection when housing is open

- The device must be configured outside the hazardous area.



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

i During configuration, the display must remain connected to the electronics unit.

1. Open the housing cover.
2. The operating keys on the device are accessible.

6.2.1 Navigation

The operating panels are split into 2 levels.

Menu: In the Menu level, different menu items can be selected. The individual menu items provide an aggregate of related operating functions.

Operating function: An operating function can be viewed as an aggregate of operating parameters. The operating functions are used to operate and configure the device.

Operating keys:

"E" Enter key: Press and hold down the E key for longer than 3 seconds to access the programming menu.

- Select operating functions.
- Accept values.
- Hold down the E key for longer than 3 seconds to jump to the Home position. A prompt appears beforehand asking whether you want to save the data entered up to this point.
- Save data entered.

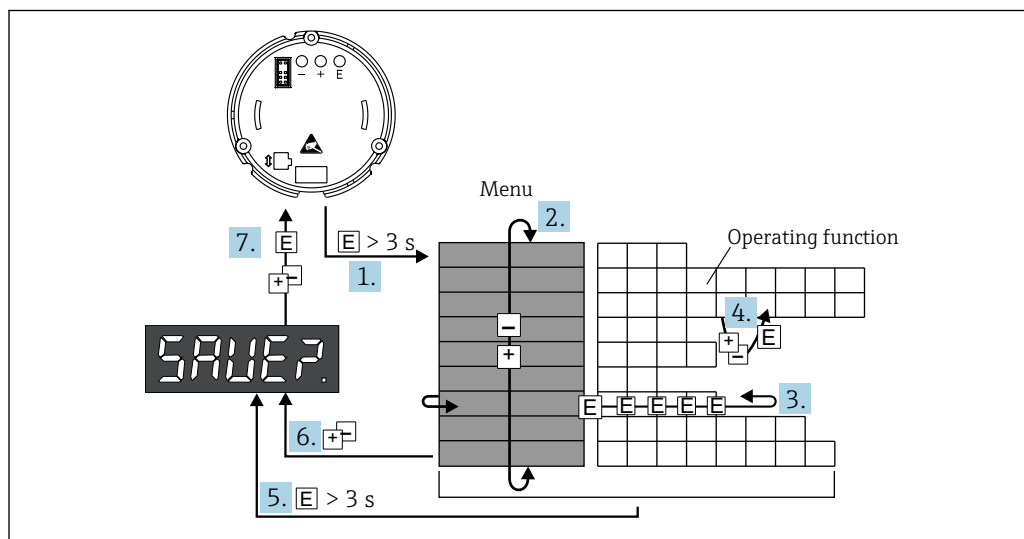
Selection keys '+/-':

- Select menus.
- Configure parameters and numerical values.
- After you select the operating function, press the + or - keys to enter the value or change the setting.

i Holding down the keys for an extended period accelerates the speed at which the digits change.

If you press the + or - keys in the "Program Name" and "Program Version" operating positions, the display scrolls horizontally because these positions (7-digit) cannot be displayed completely in the 14-segment display.

6.2.2 Programming in the operating menu



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10 Programming the field indicator

1. Go to the operating menu.
2. Select the menu using the "+" or "-" key.
3. Select the operating function.
4. Enter parameters in edit mode (enter/select data with "+" or "-" and accept with "E").
5. Go directly to the Home position. A prompt appears beforehand asking whether you want to save the data entered up to this point.
6. Exit the menu with "+/-". A prompt appears, asking whether you want to save the data entered up to this point.
7. Confirm the prompt asking whether you want to save the data: Select YES/NO with the "+" or "-" 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	Characteristic curve CURV		Signal damping DAMP		Decimal point of 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	Mode of operation 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		Response delay DELY			
– 19 999 to 99 999	0.0	0 to 99 s	0.0			
Operating parameters PARAM	User code CODE		Program name PNAME		Firmware version FWVER	
	0 to 9 999	0				
	NAMUR NAMUR		NAMUR 3.6 ²⁾ N_360		NAMUR 3.80 N_380	
	Default	dEF	0 to NAMUR 20.5	3.60	NAMUR 3.6 to NAMUR 20.5	3.80
	User entry	Edit				
	NAMUR 20.5 N2050		NAMUR 21.0 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		Reset parameter ³⁾ PRSET			

Menu	Operating function		Operating function		Operating function	
	Parameter	Default/Selection	Parameter	Default/Selection	Parameter	Default/Selection
		----	Yes	YES		
			No	NO		

- 1) Only if DIM = TEXT
- 2) Only if NAMUR = Edit
- 3) Only available for service personnel

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

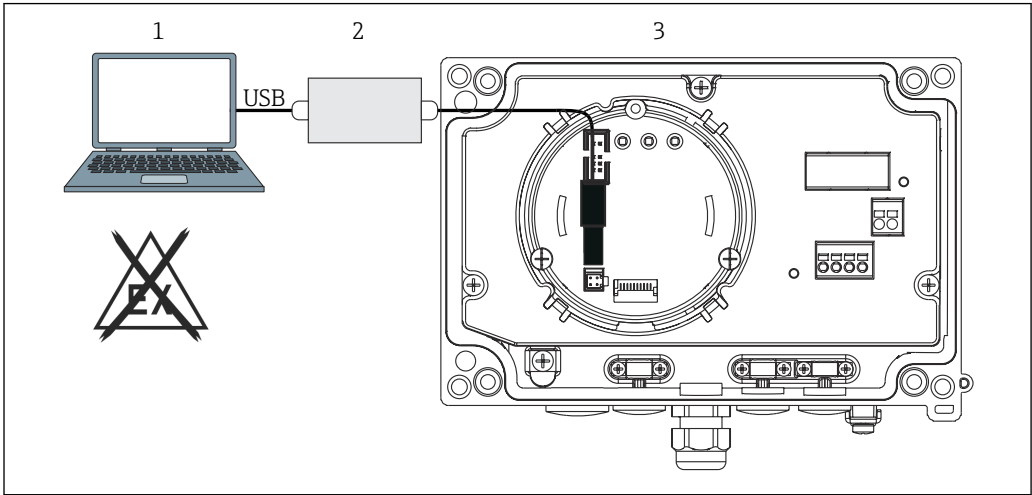
- The device must be configured outside the hazardous area.

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



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.

i 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 $\text{New value} = \text{Old value} \cdot 10^{(\text{DP}_{\text{new}} - \text{DP}_{\text{old}})}$. 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 -19999 to 99999 ■ Default: 0.0
Measured value 100 % 'DI HI'	Indicates the display value for the 20 mA value. ■ Value range -19999 to 99999 ■ Default: 100.0
Measured value offset 'OFFST'	Used to correct the display measured value. The offset is added to the measured value. ■ Value range -19999 to 99999 ■ 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

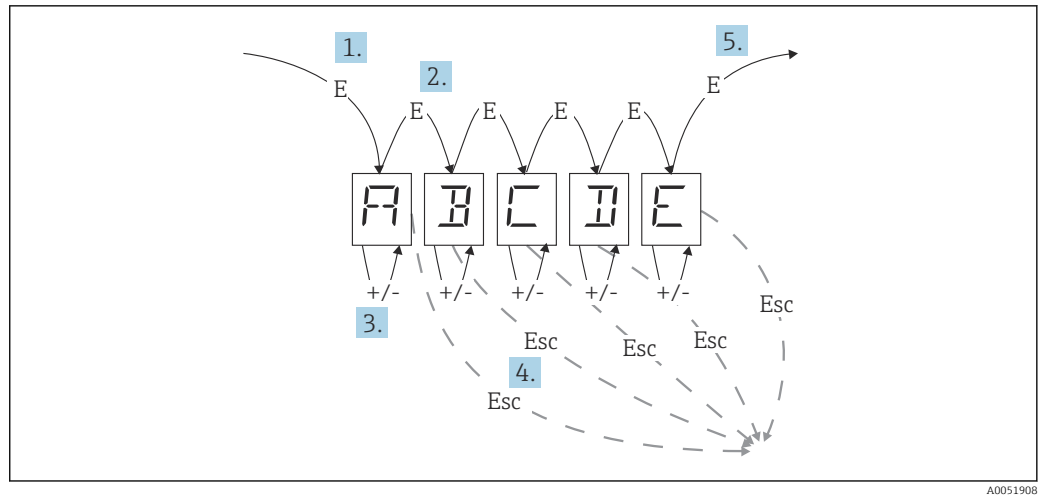
You can choose one of the measurement units permanently stored in the display (°C, K, °F, %). Alternatively, you can configure a unit of your choice on the 14-segment display (TEXT).

The character set consists of the following characters: Characters A-Z, abcdhijlmnoruvw, 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.

Error code	Meaning
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	BA280R/09/en/08.09
05/2010	01.00.zz	No change to functions and operation	BA280R/09/en/05.10
09/2010	01.00.zz	No change to functions and operation	BA280R/09/en/13.10
12/2011	01.00.zz	No change to functions and operation	BA00280R/09/en/01.11
11/2012	01.00.zz	No change to functions and operation	BA00280R/09/EN/02.12
04/2013	01.00.zz	No change to functions and operation	BA00280R/09/EN/03.13
09/2013	01.00.zz	No change to functions and operation	BA00280R/09/EN/04.13
04/2014	01.00.zz	No change to functions and operation	BA00280R/09/EN/05.14

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

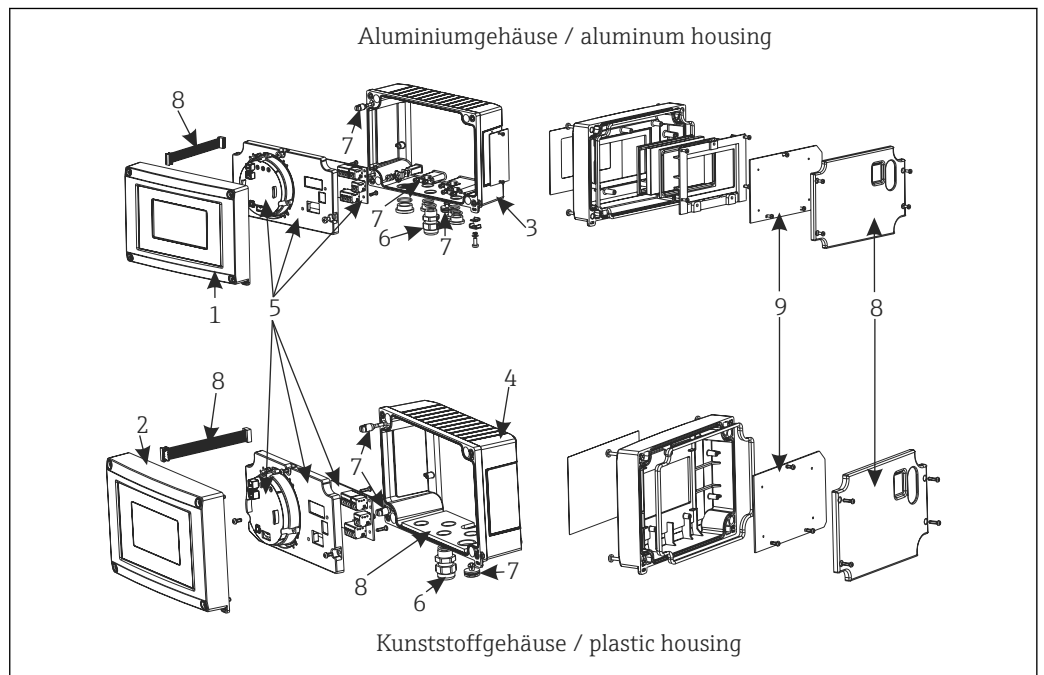
The device has a modular design and repairs can be carried out by the customer's electrotechnical personnel. For more information on service and spare parts, contact the supplier.

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!



A0012119

12 Spare parts for field indicator

Item No.	Type	Order number
1	Metal front, incl. front foil + glass (with seals and mounting frame)	RIA16X-GB
2	Front, plastic, incl. foil	RIA16X-GA
3	Metal lower part (metric thread)	RIA16X-GD
	Metal lower part (NPT1/2 thread)	RIA16X-GE
4	Plastic lower part (lasered)	RIA16X-GC
5, 9	Complete electronics module (Ex + nonEx) incl. terminal card + cover	RIA16X-EA
	LC display incl. display board	RIA16X-DA

Item No.	Type	Order number
6	Cable gland M16x1.5 PA RAL7035	51004048
	Cable gland NPT 1/2 D4-8.5, IP68	51006845
	Adapter M16x1.5 NPT1/2	71085029
7	Set of small parts: Gore-Tex filter, 2 x hinge pins, cable shield grounding clamp (metal kit = 5 brackets + screws/washers)	RIA16X-GG
8	Cover + connecting parts spare parts set (includes cover plate for front, mounting plate (plastic housing) + main board -> display board connecting cable	RIA16X-GF

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



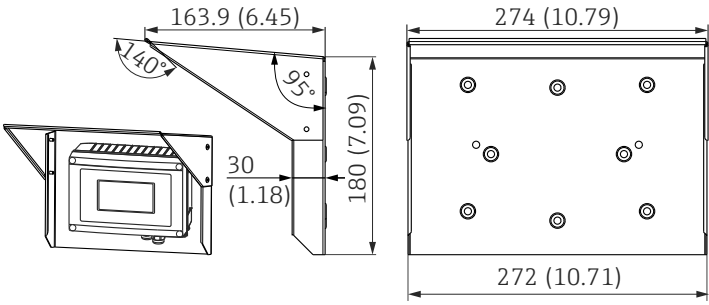
If required by the Directive 2012/19/EU on waste electrical and electronic equipment (WEEE), the product is marked with the depicted symbol in order to minimize the disposal of WEEE as unsorted municipal waste. Do not dispose of products bearing this marking as unsorted municipal waste. Instead, return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

Designation	Description
Wall/pipe mounting kit	For pipes Ø1-5" , different variants for plastic and aluminum housings
Weather protection cover	 13 Dimensions in mm (in) A0021548

11.2 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

- Line voltage drop < 4 V at 3 to 22 mA
- Maximum line voltage drop < 6 V at maximum short-circuit current 200 mA

12.2 Output

12.2.1 Output signal

Switching output

Digital limit switch

Passive, open collector:

- $I_{\max} = 200 \text{ mA}$
- $U_{\max} = 35 \text{ V}$
- $U_{\text{low/max}} \leq 2 \text{ V}$ at 200 mA
- Maximum reaction time to limit value = 250 ms
- Temperature range: -20 to $+80 \text{ }^{\circ}\text{C}$ (-4 to $+176 \text{ }^{\circ}\text{F}$)

12.2.2 Signal on alarm

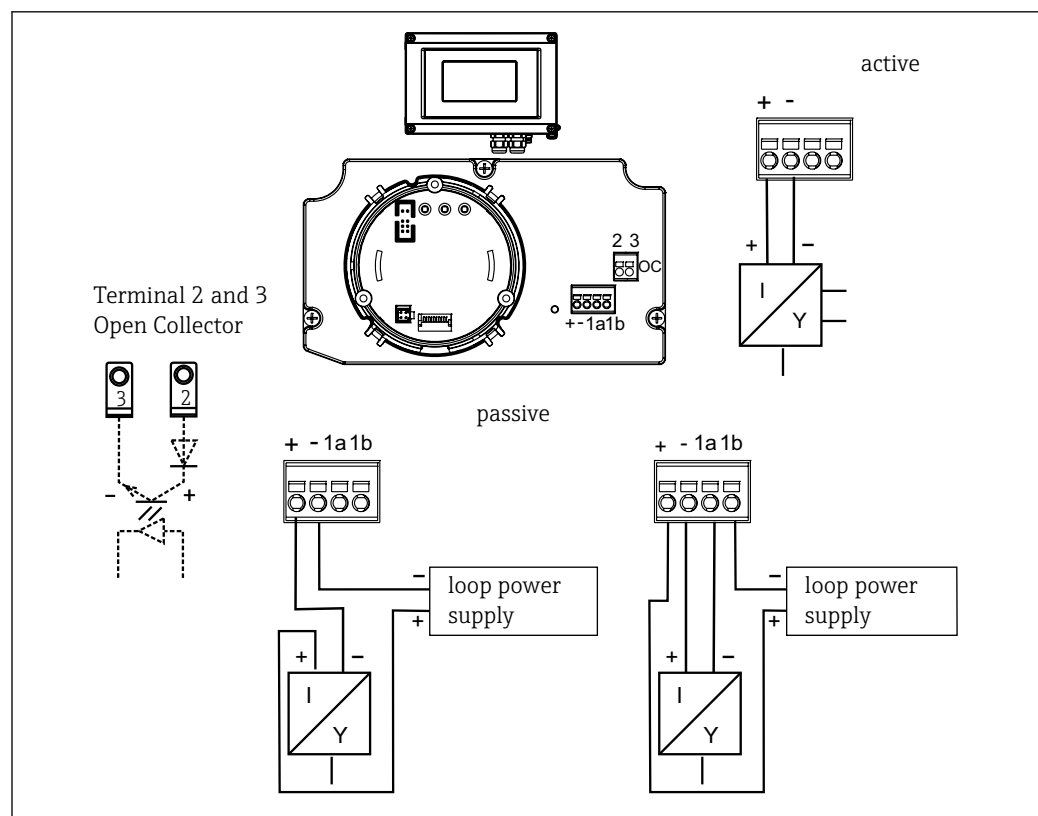
- No measured value visible on the LC display, no background illumination.
- Open Collector inactive.

12.2.3 Transmission behavior

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

12.3 Power supply

12.3.1 Terminal assignment



14 Field indicator terminal assignment

A0051980

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 instrumentation	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.

12.3.3 Cable entries

The following cable entries are available:

- 2x thread NPT1/2
- 2x thread M16

 The plastic housing includes up to 5 cable entries. In the housing as supplied to the customer, 3 of these remain closed. If necessary, you can open these using a suitable tool.

The aluminum housing also includes 5 cable entries, 3 of which are closed with blind plugs.

12.4 Performance characteristics

12.4.1 Reference operating 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 (temperature drift)

Effect on the 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 device orientation is determined by the readability of the display.

12.5.3 Operating 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 the Open Collector output is used

 The display can react slowly for temperatures < −20 °C (−4 °F).
Readability of the display cannot be guaranteed at temperatures < −30 °C (−22 °F).

12.6.2 Storage temperature

-40 to +80 °C (-40 to +176 °F)

12.6.3 Electrical safety

As per IEC 61010-1,

UL61010-1,

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 67, NEMA 4X (not UL rated)

12.6.6 Shock resistance

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

12.6.7 Condensation

Permitted

12.6.8 Installation category

1 according to 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

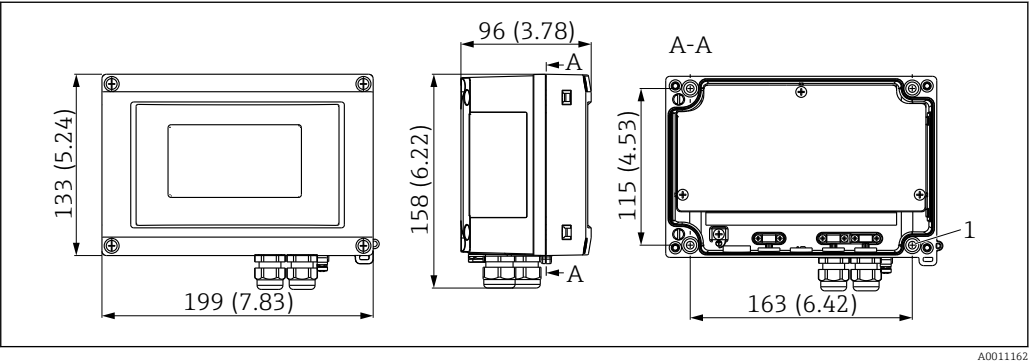
Interference emission as per IEC/EN 61326 series, Class B equipment



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



15 Dimensions in mm (in)

1 Bore hole for mounting directly to wall or optional mounting plate with 4 screws Ø 5 mm (0.2 in)

12.7.2 Weight

- Plastic housing: approximately 500 g (1.1 lb)
- Aluminum housing: approximately 1.7 kg (3.75 lb)

12.7.3 Materials

Housing	Nameplate
Fiber-glass reinforced plastic PBT-GF30	Laser marking
Optional: Aluminum (AlSi12, AC-44100 or AlSi10Mg(Fe), AC-43400)	Laser-writable foil, polyester

12.7.4 Terminals

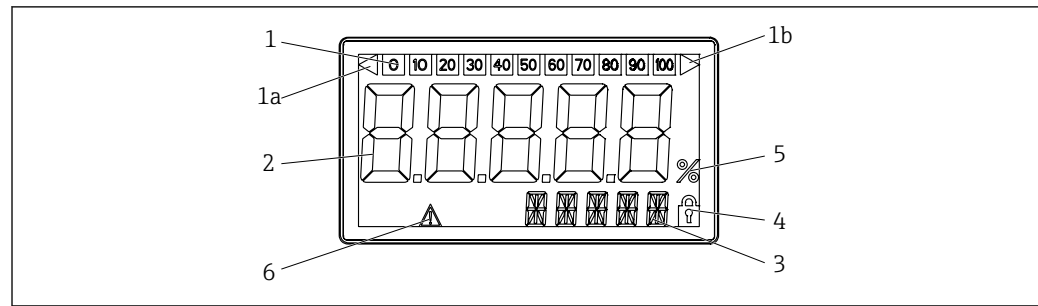
Cables / wires up to 2.5 mm² (14 AWG) plus ferrule

12.8 Human interface

12.8.1 Operating concept

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

12.8.2 On-site operation



A0011163

16 LC display of the field indicator

- 1 Bar graph display in increments of 10% with indicators for measurement range undershoot (item 1a) and overshoot (item 1b)
- 2 Measured value display, digit height 26 mm (1.02 in)
- 3 14-segment display for units and messages
- 4 "Programming disabled" symbol
- 5 Unit "%"
- 6 "Failure" warning symbol

- Display range
-19999 to 99999
- Offset
-19999 to 99999
- Signalization
Measuring range overshoot/undershoot
- Limit value violation
Limit value overshoot/undershoot

12.8.3 Remote operation

Parameter configuration

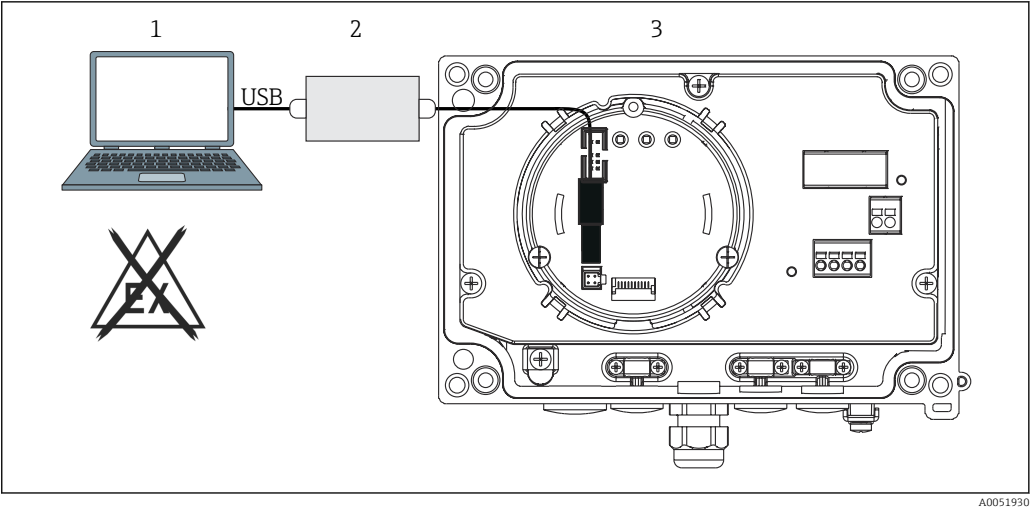
The device can be configured with the FieldCare PC software. FieldCare Device Setup is included in the Commubox FXA291 and TXU10-AC scope of delivery (see 'Accessories') or can be downloaded free of charge at www.endress.com.

Interface

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

Configurable device parameters (selection)

Measuring dimension, measuring ranges (linear/squared), setup lock with user code, failure mode, digital filter (damping), offset, limit value (min/max/alarm), user-configurable alarm limit values



17 Configuring the field indicator using an interface adapter

- 1 PC configuration software
- 2 Configuration kit USB box
- 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

i 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.



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