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ISU00XA (Standard): 01.06.xx

Operating Instructions
RIA15

Process indicator
Loop-powered 4 to 20 mA process indicator

Endress+Hauser
People for Process Automation

Table of contents

1 About this document

1.1 Document conventions

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

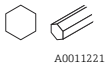
Symbol	Meaning
✓	**Permitted** Procedures, processes or actions that are permitted.
✓✓	**Preferred** Procedures, processes or actions that are preferred.
✗	**Forbidden** Procedures, processes or actions that are forbidden.
ℹ	**Tip** Indicates additional information.
📖	Reference to documentation
📄	Reference 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
EX	Hazardous area	EX	Safe area (non-hazardous area)

1.1.5 Tool symbols

Symbol	Meaning
 A0011220	Flat-blade screwdriver
 A0011221	Allen key
 A0011222	Open-ended wrench
 A0013442	Torx screwdriver

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.
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 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 process indicator displays analog process variables on its screen.

The device is powered via the 4 to 20 mA current loop and does not require an additional power supply.

- The manufacturer accepts no liability for damages resulting from improper or non-intended use. The device must not be converted or modified in any way.
- Panel-mounted device:
  The device is designed for installation in a panel and must only be operated in an installed state.
- Field device:
  The device is designed for mounting in the field.
- The device may be operated only under the permitted ambient conditions→ 27.

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 on the device and an overview of the Technical Documentation provided is 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 Certificates and approvals

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

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

3.4 Storage and transport

Note the following:
The permitted storage temperature is −40 to 85 °C (−40 to 185 °F); it is possible to store the device at borderline temperatures for a limited period (48 hours maximum).

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 and transport:
- Direct sunlight
- Vibration
- Aggressive media

4 Mounting

4.1 Installation conditions

Permitted ambient temperature: −40 to 60 °C (−40 to 140 °F)

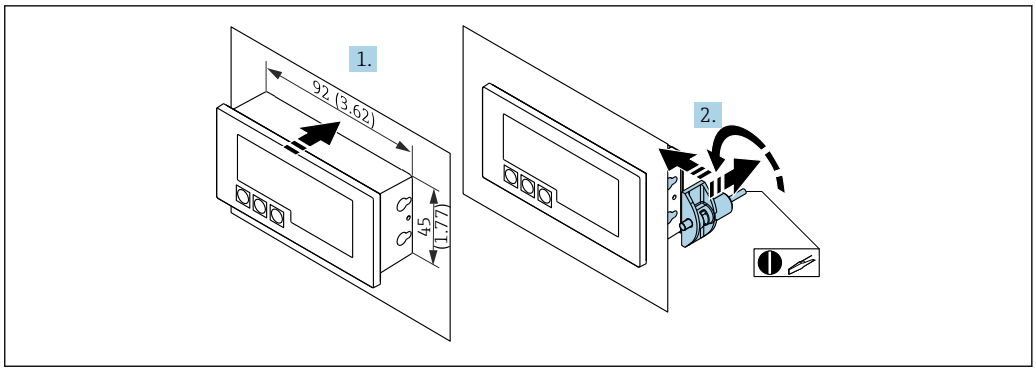
At temperatures below −25 °C (−13 °F) the readability of the display can no longer be guaranteed.

4.2 Installation Instructions

For device dimensions, see "Technical data".

4.2.1 Panel housing

- Degree of protection: IP65 front, IP20 rear (not evaluated by UL)
- Mounting position: horizontal



1 *Installation instructions for the panel housing*

Installation in a panel with a panel cutout 92x45 mm (3.62x1.77 in), max. panel thickness 13 mm (0.51 in)

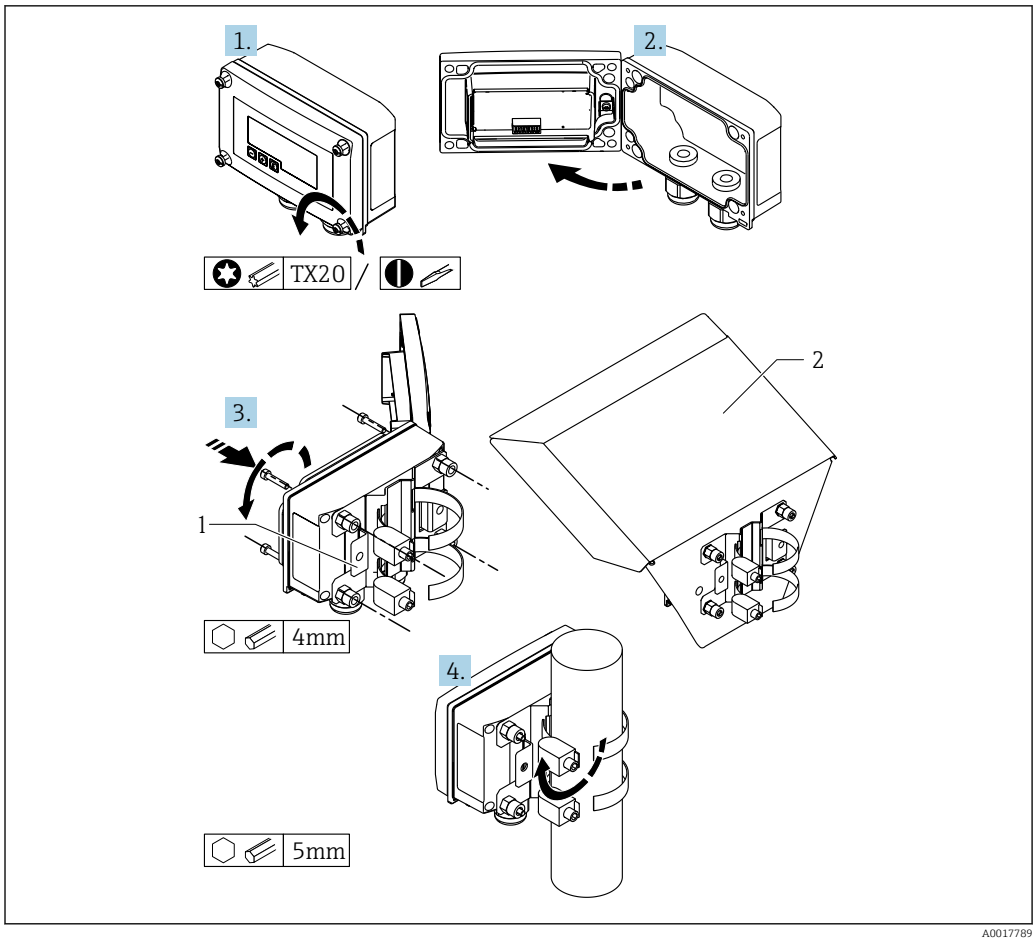
1. Slot the device into the panel cutout from the front.
2. Fit the mounting clips on the side of the housing and tighten the threaded rods (tightening torque: 0.4 to 0.6 Nm).

4.2.2 Field housing

- Degree of protection for aluminum housing: IP66/67, NEMA 4X (not evaluated by UL)
- Degree of protection for plastic housing: IP66/67 (not evaluated by UL)

Pipe mounting (with optional mounting kit)

The device can be mounted on a pipe with a diameter of up to 50.8 mm (2 in) with the mounting kit (optionally available).



2 *Mounting the process indicator on a pipe*

1 Mounting plate for pipe/wall mounting
2 Weather protection cover (optional)

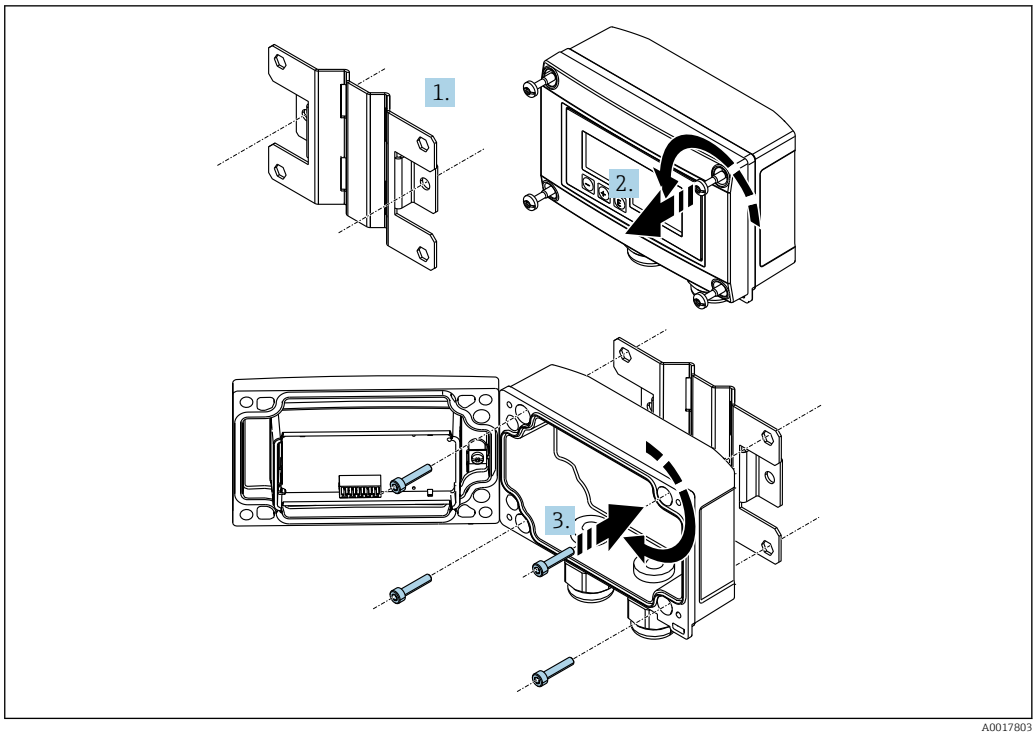
1. Release the 4 housing screws.
2. Open the housing.
3. Secure the mounting plate to the rear of the device with 4 screws supplied. The optional weather protection cover can be secured between the device and the mounting plate.
4. Guide the two gripper clamps through the mounting plate, fit them around the pipe and tighten.

Wall mounting

Wall mounting without a mounting kit

1. Open the housing.
2. Use the device as a stencil for 4 6 mm (0.24 in) bore holes, 99 mm (3.9 in) apart on the horizontal plane, 66 mm (2.6 in) apart on the vertical plane.
3. Secure the indicator on the wall with 4 screws.
4. Close the cover and tighten the housing screws.

Wall mounting with mounting kit (optionally available)



3 *Mounting the process indicator on a wall*

1. Use the mounting plate as a stencil for 2 6 mm (0.24 in) bore holes, 82 mm (3.23 in) apart, and secure the plate on the wall with 2 screws (not supplied).
2. Open the housing.
3. Secure the indicator on the mounting plate with the 4 screws supplied.
4. Close the cover and tighten the screws.

4.3 Post-installation check

4.3.1 Display unit in the panel-mount housing

- Is the seal undamaged?
- Are the mounting clips securely fastened on the housing of the device?
- Are the threaded rods properly tightened?
- Is the device located in the center of the panel cutout?

4.3.2 Display unit in the field housing

- Is the seal undamaged?
- Is the housing firmly screwed to the mounting plate?
- Is the mounting bracket firmly secured on the wall/pipe?
- Are the housing screws firmly tightened?

5 Wiring

⚠ WARNING

Danger! Electric voltage

▶ The entire connection of the device must take place while the device is de-energized.

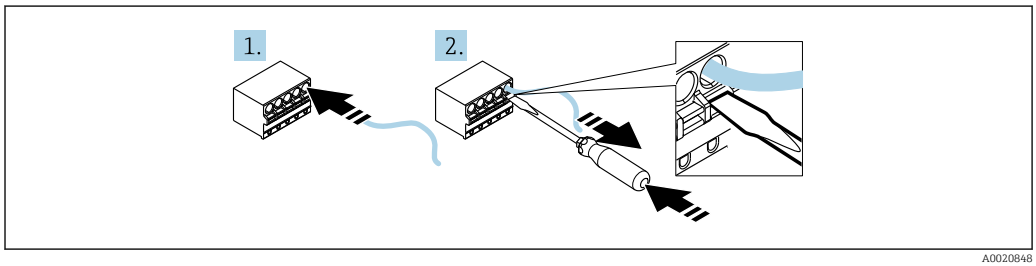
Only certified devices (optionally available) may be connected in the hazardous area
- ▶ Observe the corresponding notes and wiring diagrams in the Ex-specific supplement to these Operating Instructions.

NOTICE

Device destroyed if current too high
- ▶ The device must be powered only by a power unit with an energy-limited circuit in accordance with UL/EN/IEC 61010-1, Section 9.4 and the requirements in Table 18.
- ▶ Do not operate the device at a voltage source without a current limiter. Instead, operate the device only in the current loop with a transmitter.

- **Panel housing:**
  The terminals are located on the rear of the housing.
- **Field housing:**
  The terminals are located inside the housing. The device has two M16 cable entries. The housing must be opened for wiring purposes.

Operation of the spring terminals

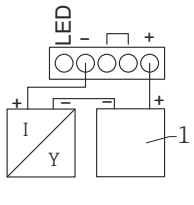
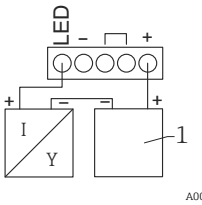
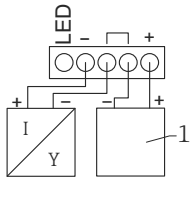
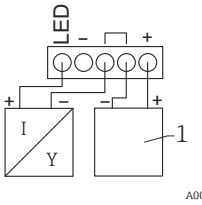
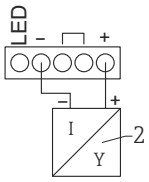
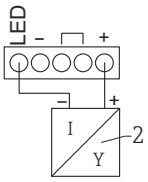


4 *Operation of the spring terminals*

1. If using rigid cables or flexible cables with a ferrule, insert only the cable into the terminal to connect. No tools required. If using flexible cables without ferrules, the spring mechanism must be activated as shown in step 2.
2. In order to loosen the cable, push the spring mechanism in completely using a screwdriver or other suitable tool and pull out the cable.

5.1 Quick wiring guide

Terminal	Description
+	Positive connection, current measurement
-	Negative connection, current measurement (without backlighting)
LED	Negative connection, current measurement (with backlighting)
⊓	Auxiliary terminals (electrically connected internally)
⏚	Functional grounding: ▪ Panel-mounted device: Terminal on the rear of the housing ▪ Field device: Terminal in the housing

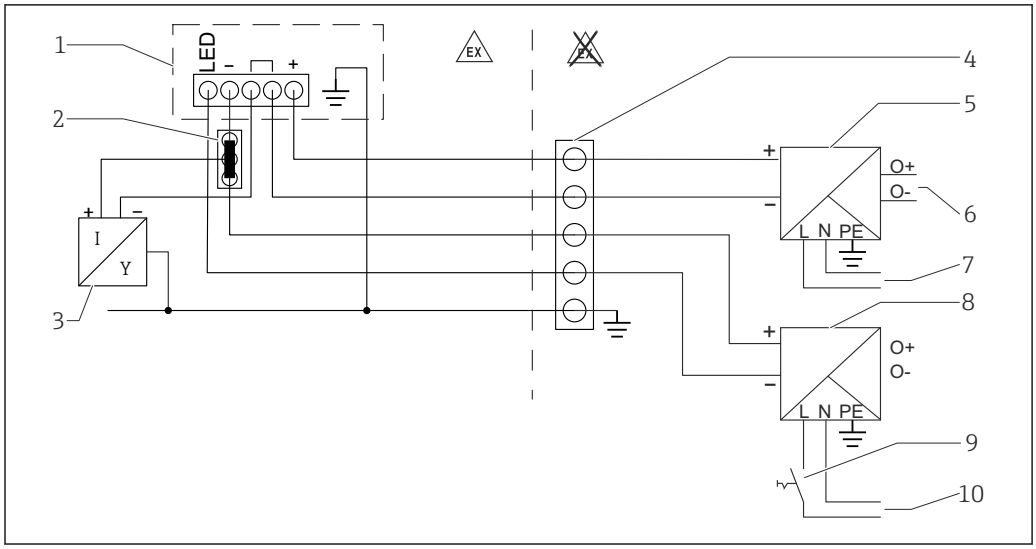
	Connection without backlighting	Connection with backlighting
Connection with transmitter power supply and transmitter	 A0017704 *1 Transmitter power supply*	 A0017705 *1 Transmitter power supply*
Connection with transmitter power supply and transmitter using the auxiliary terminal	 A0017706 *1 Transmitter power supply*	 A0017707 *1 Transmitter power supply*
Connection without transmitter power supply directly in the 4 to 20 mA circuit	 A0017708 *2 4 to 20 mA power source*	 A0017709 *2 4 to 20 mA power source*

5.2 Wiring with switchable backlighting

An additional current-limited power source (e.g. active barrier from the Endress+Hauser RN product family) is required to implement switchable backlighting. This power source is used to supply the LED backlighting of up to seven RIA15 process indicators without generating an additional voltage drop in the measuring loop. The backlighting can be switched on and off using an external switch.

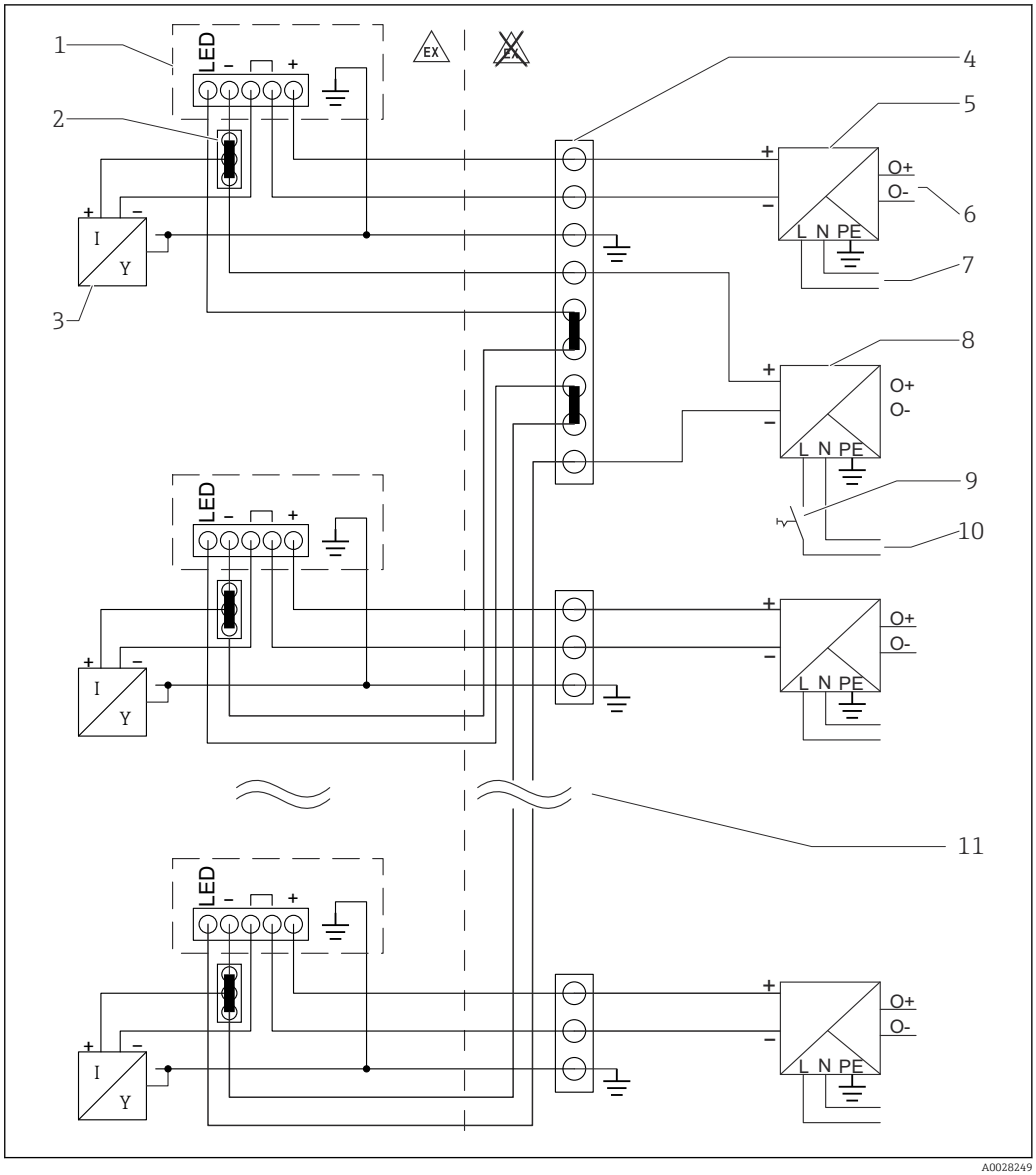
The following shows connection examples for the hazardous area. Wiring is similar for the non-hazardous area; however, it is not necessary to use Ex-certified devices.

5.2.1 Connection diagram for a process indicator



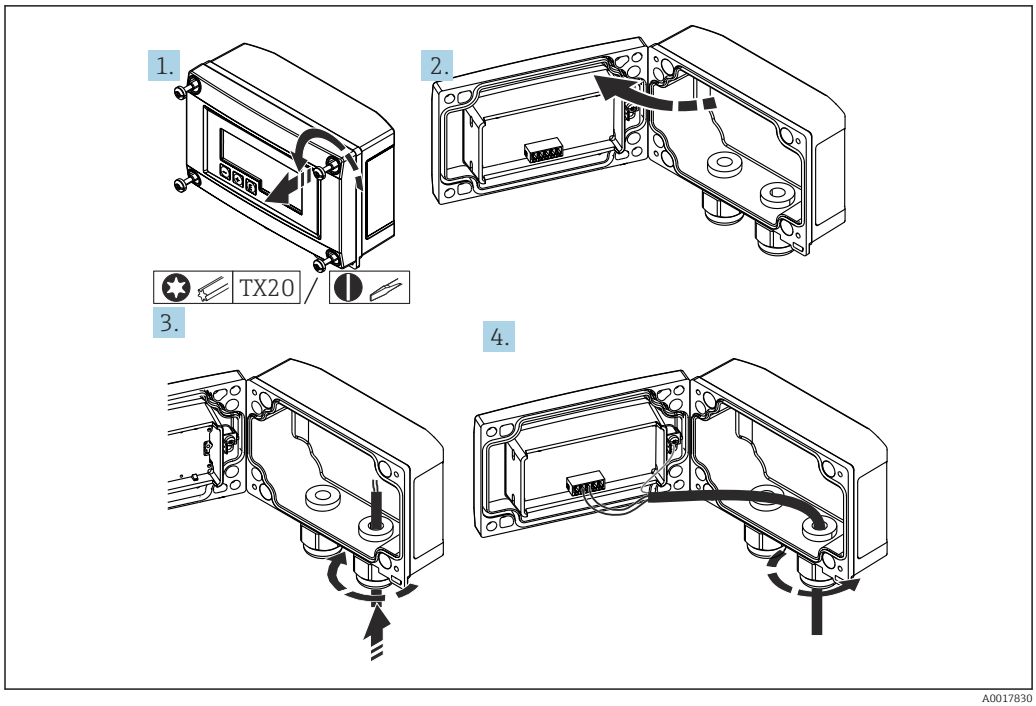
1 Process indicator RIA15
2 3-wire connector, e.g. WAGO 221 series
3 2-wire sensor
4 Terminal block on DIN rail
5 Active barrier (e.g. RN product family from Endress+Hauser)
6 4 to 20 mA output to the control unit
7 Power supply
8 Power source (e.g. RN product family from Endress+Hauser)
9 Switch to activate backlighting
10 Power supply

5.2.2 Connection diagram for multiple process indicators



1 Process indicator RIA15
2 3-wire connector, e.g. WAGO 221 series
3 2-wire sensor
4 Terminal block on DIN rail
5 Active barrier (e.g. RN product family from Endress+Hauser)
6 4 to 20 mA output to the control unit
7 Power supply
8 Power source (e.g. RN product family from Endress+Hauser)
9 Switch to activate backlighting
10 Power supply
11 Can be extended to 7 devices

5.3 Inserting the cable, field housing



5 *Inserting the cable, field housing*

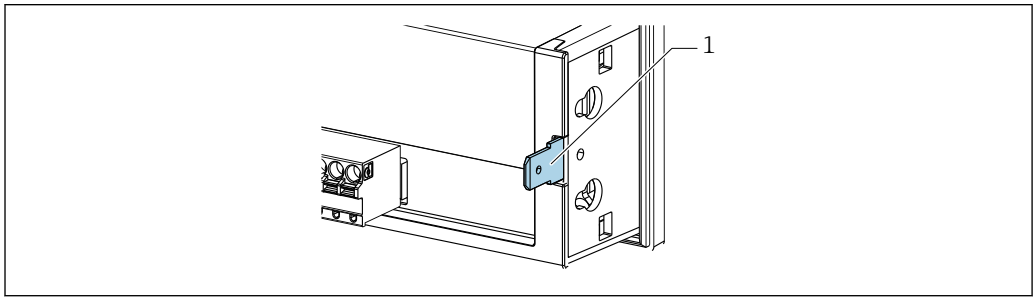
Inserting the cable, field housing, connection without transmitter power supply (example)

1. Release the housing screws.
2. Open the housing.
3. Open the cable gland (M16) and insert the cable.
4. Connect the cable including the functional grounding and close the cable gland.

5.4 Connecting to functional grounding

5.4.1 Panel-mounted device

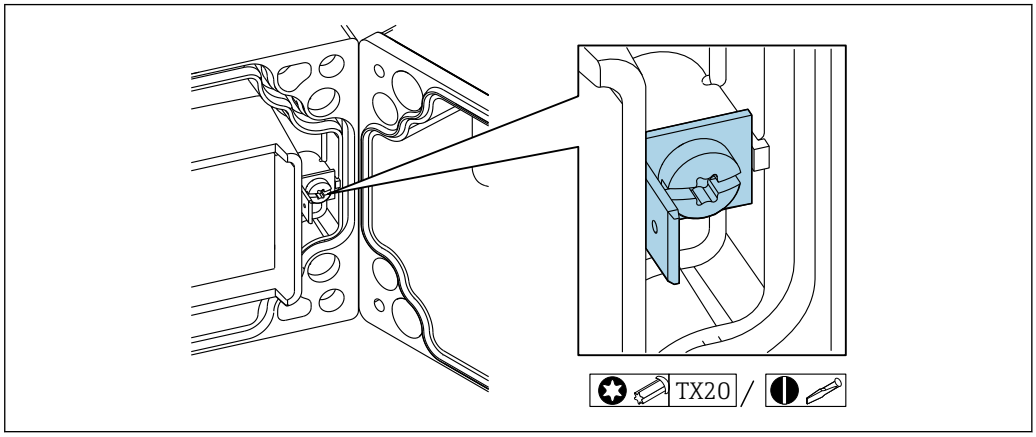
For EMC reasons, the functional grounding should always be connected. When the device is used in the hazardous area (with optional Ex approval) the connection is obligatory.



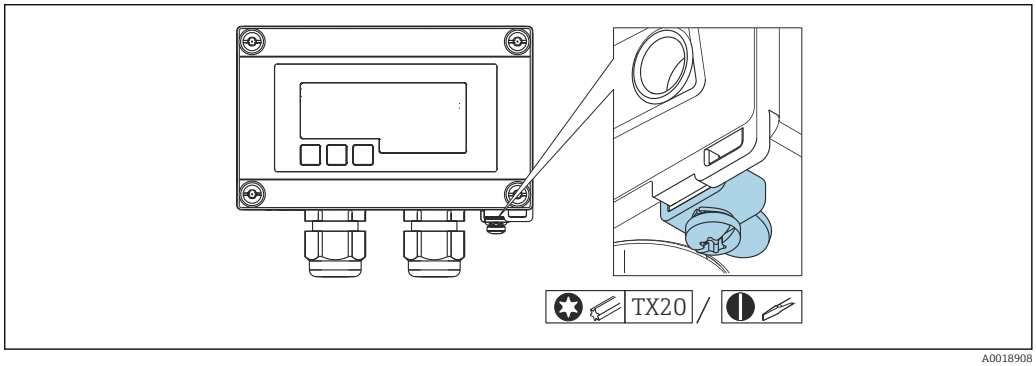
6 *Functional grounding terminal on panel-mounted device*

5.4.2 Field device

For EMC reasons, the functional grounding should always be connected. When used in the hazardous area (with optional Ex approval), the connection is obligatory and the field housing must be grounded via a grounding screw fitted on the outside of the housing.



7 *Functional grounding terminal in field housing*



8 *Ground terminal on field housing*

5.5 Ensuring the degree of protection

5.5.1 Field housing

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 be of the specified outside diameter (e.g. M16 x 1.5, cable diameter 5 to 10 mm (0.2 to 0.39 in)).
- Mount the measuring device in such a way that the cable entries point downwards.
- Replace unused cable entries with dummy plugs.
- The housing cover and the cable entries must be firmly tightened.

5.5.2 Panel housing

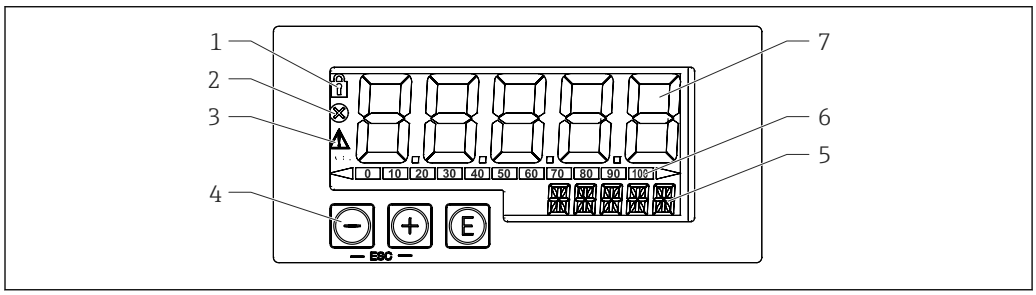
The front of the device meets the requirements of IP65. It is absolutely essential to comply with the following points to ensure this protection is guaranteed after mounting or servicing the device:

- The seal between the front of the housing and the panel must be clean and undamaged. The seal must be cleaned, dried or replaced if necessary.
- The threaded rods of the panel mounting clips must be firmly tightened (tightening torque: 0.4 to 0.6 Nm).

5.6 Post-connection check

Device condition and specifications	**Notes**
Are cables or the device damaged?	Visual inspection
Electrical connection	**Notes**
Does the supply current match the specifications on the nameplate?	-
Are the cables, incl. functional grounding, connected correctly and strain-relieved?	-
Field housing: Are the cable glands securely closed?	-

6 Operation



9 Display and operating elements of the process indicator

1 Symbol: operating menu disabled
2 Symbol: error
3 Symbol: warning
4 Operating keys "-", "+", "E"
5 14-segment display for unit/TAG
6 Bar graph with indicators for under range and over range
7 5-digit 7-segment display for measured value, digit height 17 mm (0.67 in)

The device is operated using three operating keys on the front of the housing. The device setup can be disabled with a 4-digit user code. If the setup is disabled, a padlock symbol appears on the display when an operating parameter is selected.

 A0017716	Enter key; for calling up the operating menu, confirming the selection/configuration of parameters in the operating menu
 A0017714	Selecting and setting/changing values in the operating menu; pressing the '-' and '+' keys simultaneously takes the user back up a menu level. The configured value is not saved
 A0017715	

6.1 Operating functions

The operating functions of the process indicator are divided into the following menus. The individual parameters and settings are described in the "Commissioning" section.

If the operating menu is disabled by means of a user code, the individual menus and parameters can be displayed but not changed. To change a parameter, the user code must be entered. As the display unit can only display digits in the 7-segment display and not alphanumeric characters, the procedure for number parameters is different to that for text parameters.

If the operating position contains only numbers as parameters, the operating position is displayed in the 14-segment display and the configured parameter is displayed in the 7-segment display. To edit, press the 'E'-button followed by the user code.

If the operating position contains text parameters, only the operating position is initially displayed in the 14-segment display. If the 'E' button is pressed again, the configured parameter is displayed in the 14-segment display. To edit, press the '+' button followed by the user code.

Setup (SETUP)	Basic device settings → 20
Diagnostics (DIAG)	Device information, display of error messages → 20
Expert (EXPRT)	Expert settings for the device setup → 20 The Expert menu is protected from editing by an access code (default 0000).

7 Commissioning

7.1 Post-installation check and switching on the device

Perform the final checks before commissioning the device:
- Checklist for "post-installation check" → 11.
- Checklist for "post-connection check" → 18.

The device starts after being connected to the 4 to 20 mA circuit. The firmware version appears on the display during the start-up phase.

When the device is being commissioned for the first time, program the setup in accordance with the descriptions in the Operating Instructions.

If you are commissioning a device that is already configured or preset, the device immediately starts measuring the current as defined in the settings.

Remove the protective film from the display as this would otherwise affect the readability of the display.

7.2 Operating matrix

Setup menu (SETUP)			
Parameter	**Values (default in bold)**	**Displayed when**	**Description**
DECIM	0 DEC **1 DEC** 2 DEC 3 DEC 4 DEC		Number of decimal places for the 4 to 20 mA display mode.
SC__4	Numerical value −19 999 to 99 999 Default: **0.0**		5-digit value (number of decimal places as configured under DECIM) for scaling the measured value at 4 mA Example: SC__4 = 0.0 → 0.0 displayed at measuring current 4 mA The unit selected under UNIT is used to display the value.
SC_20	Numerical value −19 999 to 99 999 Default: **100.0**		5-digit value (number of decimal places as configured under DECIM) for scaling the measured value at 20 mA Example: SC_20 = 100.0 → 100.0 displayed at measuring current 20 mA The unit selected under UNIT is used to display the value.
UNIT	% °C °F K USER		Use this function to select the unit for displaying the value. If "USER" is selected, a user-defined unit can be entered in the TEXT parameter.
TEXT	Customized text, 5-digit		User-defined unit, only visible if the "USER" option has been selected under UNIT.

Diagnostics menu (DIAG)		
Parameter	**Values**	**Description**
AERR	Read only	The current diagnostic message appears on the display. If several messages occur simultaneously, the message with the highest priority is shown on the display.
LERR	Read only	The last diagnostic message with the highest priority appears on the display.
FWVER	Read only	The firmware version appears on the display.

Expert menu (EXPRT); a code must be entered			
In addition to all the parameters in the Setup menu, the Expert menu also contains the parameters described in this table. If you call up the Expert menu, you will be asked to enter the user code (UCODE, default: 0000).			
Parameter	**Values (default in bold)**	**Displayed when**	**Description**
SYSTM			
UCODE	Numerical value 0000 to 9999 Default: **0000**		4-digit user code With the user code it is possible to protect the device setup from unauthorized modifications. If the setup is disabled, a padlock symbol appears on the display when an operating parameter is selected. The user code is not active with the default setting "0000". This means that setup parameters can be changed without entering the code. The code must always be entered for the Expert menu, even for the default setting.
FRSET	**NO** YES		Resets the device setup. The values are reset to the preset values for preconfigured devices, and to the default values for all other devices. Select "YES" and press "E" by way of confirmation to reset the device.
INPUT			The following parameters are available in addition to the parameters from the Setup menu.

Expert menu (EXPRT); a code must be entered				
In addition to all the parameters in the Setup menu, the Expert menu also contains the parameters described in this table. If you call up the Expert menu, you will be asked to enter the user code (UCODE, default: 0000).				
Parameter		**Values (default in bold)**	**Displayed when**	**Description**
	CURV	**LINAR** SQRT		**Use this to select the calculation function for the process value** **LINAR** (scaling with SC__4 and SC_20): Process value = (mA value - 4)/16 * (SC_20 - SC__4) + SC__4 + OFFST **SQRT** (square root extraction and scaling): Process value = Square root((mA value - 4)/16) * (SC_20 - SC__4) + SC__4 + OFFST Negative values when calculating the square root are set to 0. **Example for SQRT:** ▪ mA value = 8.0 ▪ SC__4 = 0.0 ▪ SC_20 = 100.0 ▪ OFFST = 0.0 Display value = 50.0
	NAMUR	NO **YES**		Used for determining the maximum permissible errors in accordance with standard NAMUR NE 43 → 🖹 21
	RNGLO	Numerical value	NAMUR = NO	Lower range limit. An error message is displayed if the measured current falls below this limit.
	RNGHI	Numerical value	NAMUR = NO	Upper range limit. An error message is displayed if the measured current exceeds this limit.
	OFFST	Numerical value −19 999 to 99 999		Use this function to enter an offset value to display the measured value.

8 Troubleshooting

8.1 Error limits as per NAMUR NE 43

The device can be set to error limits as per NAMUR NE 43 → 🖹 20.

The device displays an error message if a value is outside these limits.

Current value	Error	Diagnostic code
≤ 3.6 mA	Under range	F100
3.6 mA < x ≤ 3.8 mA	Unpermitted measured value	S901
20.5 mA ≤ x < 21.0 mA	Unpermitted measured value	S902
> 21.0 mA	Over range	F100

8.2 Diagnostic messages

If several errors are pending simultaneously, the device always displays the error with the highest priority.

1 = Highest priority

Diagnostic number	Short text	Remedial action	Status signal	Diagnostic behavior	Priority
Diagnostics for the sensor					
F100	Sensor error	▪ Check electrical wiring ▪ Check the sensor ▪ Check sensor settings	F	Alarm	6

Diagnostic number	Short text	Remedial action	Status signal	Diagnostic behavior	Priority
S901	Input signal too small	▪ Check transmitter output for defect and conformity error ▪ Check transmitter for incorrect configuration	S	Warning	4
S902	Input signal too large		S	Warning	5
Diagnostics for the electronics					
F261	Electronics module	Replace electronics	F	Alarm	1
F283	Memory content	▪ Restart device ▪ Reset device ▪ Replace electronics	F	Alarm	2
F431	Factory calibration	Replace electronics	F	Alarm	3
Diagnostics for the configuration					
M561	Display overshoot	Check scaling	M	Warning	7

8.3 Firmware history

Release

The firmware version on the nameplate and in the Operating Instructions indicates the device release: XX.YY.ZZ (example 1.02.01).

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	Firmware version	Software changes	Documentation
11/2012	ISU00XA: 1.00.01	Original software	BA01073K/09/EN/02.13
03/2013	ISU00XA: 1.01.00	HART® option, only relevant for HART® version	BA01073K/09/EN/03.13
07/2013	ISU00XA: 1.02.00	HART® level measurement, only relevant for HART® version	BA01073K/09/EN/04.13
11/2014	ISU00XA: 1.03.00	New EXP1-EXP4 parameter for HART® option, only relevant for HART® version	BA01073K/09/EN/05.14
05/2016	ISU00XA: 1.04.00	New menus and parameters in "FMR20 basic commissioning", relevant only to HART® version	BA01073K/09/EN/06.15
07/2019	ISU00XA: 1.06.xx	Display of the mA value in 4-20 mA mode via + or - key held down	BA01073K/09/EN/07.23

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

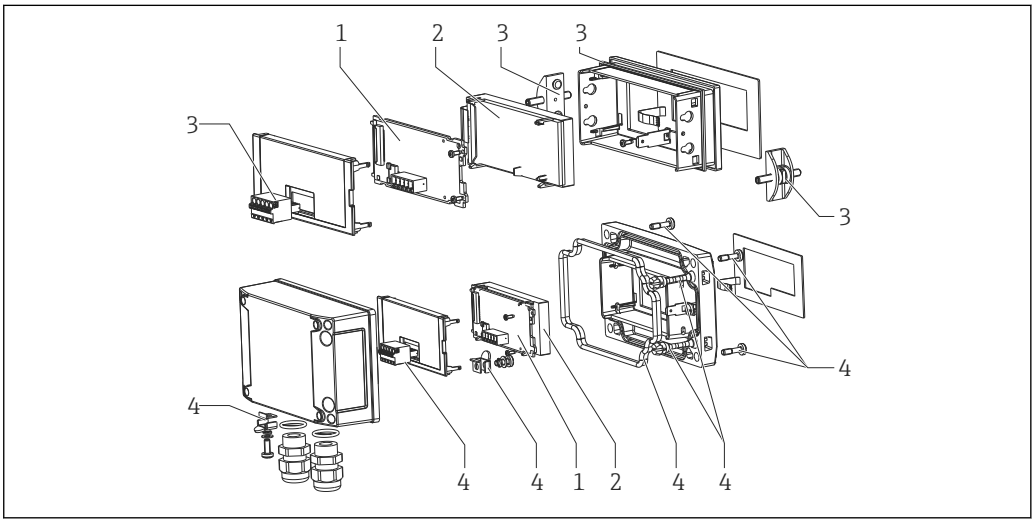
The device has a modular design and repairs can be carried out by the customer's electrotechnical personnel. For more information on service and spare parts, contact the supplier.

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!



10 *Spare parts of the process indicator*

Item no.	Name	Order number
1	Mainboard 4 to 20 mA	XPR0005-AAA
2	LCD module	XPR0006-A1
3	Small parts set for panel-mount housing (5-pin plug-in terminal, seal on front frame, 2x fastening clip)	XPR0006-A2
4	Small parts set for field housing (5-pin plug-in terminal, seal on cover, 2x cover hinge, grounding connection on bottom, cover screws, grounding lug)	XPR0006-A3
4	Cable gland with integrated pressure compensation membrane (for FMX21)	RK01-BD
	Plastic field housing W18 RAL5012, conductive	XPR0006-A4

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.

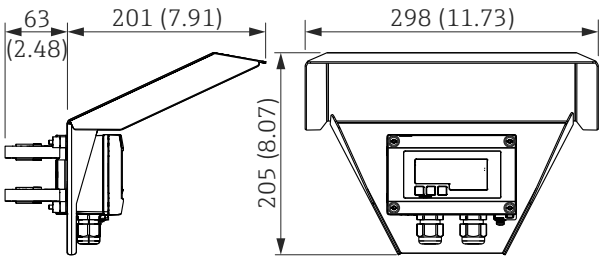
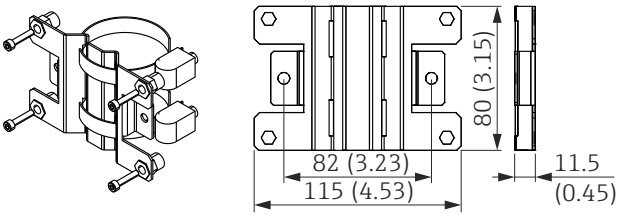
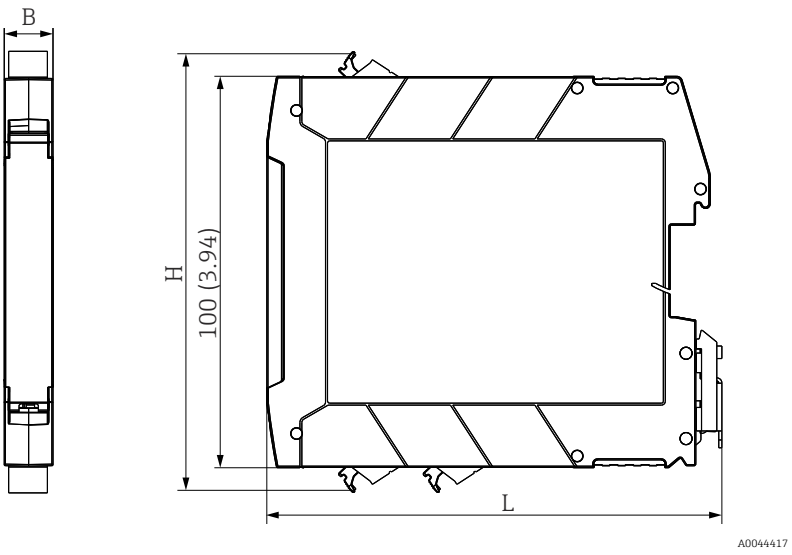
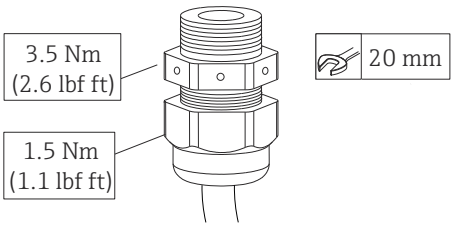
10.4 Disposal

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

Various accessories, which can be ordered with the device or subsequently from Endress +Hauser, are available for the device. Detailed information on the order code in question is available from your local Endress+Hauser sales center or on the product page of the Endress+Hauser website: www.endress.com.

11.1 Device-specific accessories

Weather protection cover	 *11 Dimensions of protective cover, engineering unit mm (in)*
Mounting kit for wall/ pipe mounting	 *12 Dimensions of mounting bracket, engineering unit mm (in)*
Active barrier from the Endress+Hauser RN product family	 *13 Dimensions of active barrier for DIN rail mounting, unit mm (in)*
M16 cable gland with integrated pressure compensation membrane	

12 Technical data

12.1 Input

Voltage drop	
Standard device with 4 to 20 mA communication	≤ 1.0 V
Display lighting	Additional 2.9 V

Measured variable

The 4 to 20 mA current signal is the input variable.

HART® signals are not affected.

Measuring range

4 to 20 mA (scalable, reverse polarity protection)

Max. input current 200 mA

12.2 Power supply

Supply voltage

NOTICE

SELV/Class 2 device

- The device may be powered only by a power unit with an energy-limited circuit in accordance with UL/EN/IEC 61010-1 Paragraph 9.4 or Class 2 as per UL 1310: 'SELV or Class 2 circuit'.

The process indicator is loop-powered and does not require any external power supply. The voltage drop is1 V in the standard version with 4 to 20 mA communication and an additional 2.9 V if display lighting is used.

12.3 Performance characteristics

Reference operating conditions

Reference temperature 25 °C ±5 °C (77 °F ±9 °F)

Humidity 20 to 60 % relative humidity

Maximum measured error

Input	Range	Measured error of measuring range
Current	4 to 20 mA Over range up to 22 mA	±0.1 %

Resolution

Signal resolution > 13 bit

Influence of ambient temperature

< 0.02 %/K (0.01 %/°F) of measuring range

Warm-up period

10 minutes

12.4 Installation

Mounting location

Panel housing

The device is designed for use in a panel.

Required panel cutout 45x92 mm (1.77x3.62 in)

Field housing

The field housing version is designed for use in the field. The unit is mounted directly on a wall, or on a pipe with a diameter of up to 2 " with the aid of an optional mounting bracket. An optional weather protection cover protects the device from the effects of weather conditions.

Orientation

Panel housing

The orientation is horizontal.

Field housing

The device must be mounted in such a way that the cable entries point downwards.

12.5 Environment

Ambient temperature range

−40 to 60 °C (−40 to 140 °F)

At temperatures below −25 °C (−13 °F) the readability of the display can no longer be guaranteed.

Storage temperature

−40 to 85 °C (−40 to 185 °F)

Climate class

IEC 60654-1, Class B2

Operating altitude

Up to 5 000 m (16 400 ft) above MSL in accordance with IEC61010-1

Degree of protection

Panel housing

IP65 at front, IP20 at rear

Field housing

Aluminum housing: degree of protection IP66/67, NEMA 4x

Plastic housing: degree of protection IP66/67

Electromagnetic compatibility

- Interference immunity:
  As per IEC61326 (Industrial Environments) / NAMUR NE 21
  Maximum measured error < 1 % o. MR
- Interference emission:
  As per IEC61326, Class B

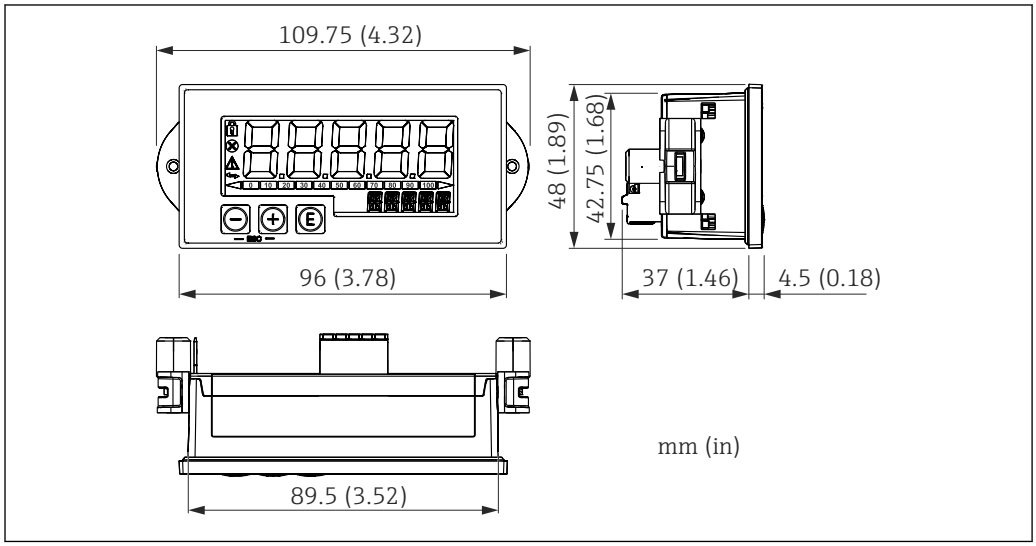
Electrical safety

Class III, overvoltage protection category II, pollution degree 2

12.6 Mechanical construction

Design, dimensions

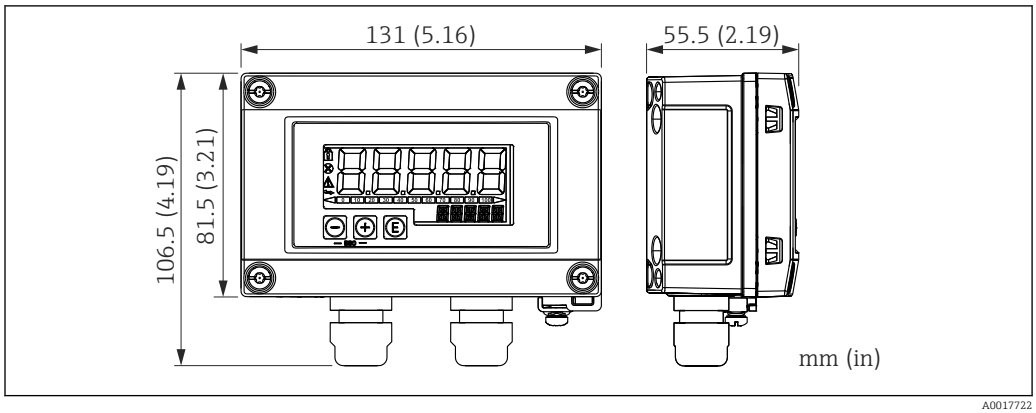
Panel-mount housing



14 *Dimensions of the panel housing*

Required panel cutout 45x92 mm (1.77x3.62 in), max. panel thickness 13 mm (0.51 in).

Field housing



15 *Dimensions of the field housing incl. cable entries (M16)*

Weight

Panel-mount housing

115 g (0.25 lb.)

Field housing

- Aluminum: 520 g (1.15 lb)
- Plastic: 300 g (0.66 lb)

Materials

Panel-mount housing

Front: aluminum

Rear panel: polycarbonate PC

Field housing

Aluminum or plastic (PBT with steel fibers, antistatic)

12.7 Operability

Local operation

The device is operated with the 3 operating keys on the front of the housing. The device setup can be disabled with a 4-digit user code. If the setup is disabled, a padlock symbol appears on the display when an operating parameter is selected.

 A0017716	Enter key; calling up the operating menu, confirming the option/setting parameters in the operating menu
 A0017714	Selecting and setting values in the operating menu; pressing the - and + keys simultaneously takes the user back up a menu level. The configured value is not saved (ESC)
 A0017715	

12.8 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**.

Functional safety

A SIL version of the device is optionally available. It can be used in safety equipment in accordance with IEC 61508 up to SIL 2. Refer to Safety Manual FY01098K for the use of the device in safety instrumented systems according to IEC 61508.

Marine approval

Marine approval (optional)

UL approval

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

Other standards and guidelines

The manufacturer confirms compliance with all the relevant external standards and guidelines.

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