Products   Solutions   Services

Operating Instructions
RIA15

Process display unit
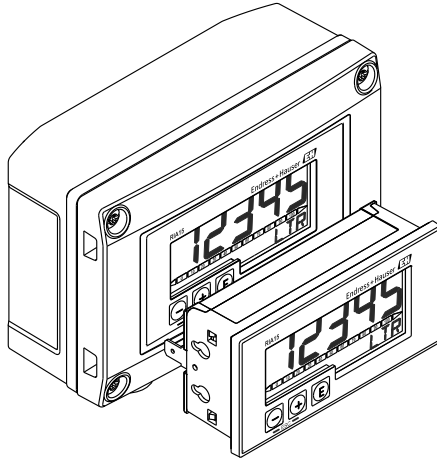Loop-powered 4 to 20 mA process display unit

Endress+Hauser [EH]

People for Process Automation

Table of contents

1   Document information

1.1   Document function

These Operating Instructions contain all the information that is required in various phases of the life cycle of the device: from product identification, incoming acceptance and storage, to mounting, connection, operation and commissioning through to troubleshooting, maintenance and disposal.

1.2   Document conventions

1.2.1   Safety symbols

Symbol	Meaning
⚠ DANGER	**DANGER!** This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.
⚠ WARNING	**WARNING!** This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury.
⚠ CAUTION	**CAUTION!** This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or medium injury.
NOTICE	**NOTE!** This symbol contains information on procedures and other facts which do not result in personal injury.

1.2.2   Electrical symbols

Symbol	Meaning
A0011197	**Direct current** A terminal to which DC voltage is applied or through which direct current flows.
A0011198	**Alternating current** A terminal to which alternating voltage is applied or through which alternating current flows.
A0017381	**Direct current and alternating current** • A terminal to which alternating voltage or DC voltage is applied. • A terminal through which alternating current or direct current flows.
A0011200	**Ground connection** A grounded terminal which, as far as the operator is concerned, is grounded via a grounding system.
A0011199	**Protective ground connection** A terminal which must be connected to ground prior to establishing any other connections.

Symbol	Meaning
A0011201	**Equipotential connection** A connection that has to be connected to the plant grounding system: This may be a potential equalization line or a star grounding system depending on national or company codes of practice.
A0012751	**ESD - Electrostatic discharge** Protect the terminals against electrostatic discharge. Failure to comply with this instruction can result in the destruction of parts or malffunction of the electronics.

1.2.3   Symbols for certain types of information
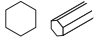
Symbol	Meaning
	Permitted Procedures, processes or actions that are permitted.
	Preferred Procedures, processes or actions that are preferred.
	Forbidden Procedures, processes or actions that are forbidden.
	Tip Indicates additional information.
	Reference to documentation
	Reference to page
	Reference to graphic
1. , 2. , 3. ...	Series of steps
	Result of a step
	Help in the event of a problem
	Visual inspection

1.2.4   Symbols in graphics

Symbol	Meaning
1, 2, 3,...	Item numbers
1. , 2. , 3. ...	Series of steps
A, B, C, ...	Views
A-A, B-B, C-C, ...	Sections

Symbol	Meaning
A0013441	Flow direction
A0011187	**Hazardous area** Indicates a hazardous area.
A0011188	**Safe area (non-hazardous area)** Indicates a non-hazardous area.

1.2.5   Tool symbols

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

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 beginning work, the specialist staff must have read and understood the instructions in the Operating Instructions and supplementary documentation as well as in the certificates (depending on the application)
▸ Following instructions and basic conditions

The operating personnel must fulfill the following requirements:
▸ Being instructed and authorized according to the requirements of the task by the facility's owner-operator
▸ Following the instructions in these Operating Instructions

2.2   Designated use

The process display unit 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 incorrect use or use other than that designated. It is not permitted to convert or modify the device 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 installation in the field.
• The device may only be operated under the permitted ambient conditions → 🖹 32.

2.3   Workplace safety

For work on and with the device:
▶ Wear the required personal protective equipment according to federal/national regulations.

2.4   Operational safety

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

Conversions to the device

Unauthorized modifications to the device are not permitted and can lead to unforeseeable dangers.
▶ If, despite this, modifications are required, consult with Endress+Hauser.

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 repair of an electrical device.
▶ Use original spare parts and accessories from Endress+Hauser only.

Environmental requirements

If a plastic transmitter housing is permanently exposed to certain steam and air mixtures, this can damage the housing.
▶ If you are unsure, please contact your Endress+Hauser Sales Center for clarification.
▶ If used in an approval-related area, observe the information on the nameplate.

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 EC directives listed in the device-specific EC Declaration of Conformity. Endress+Hauser confirms this by affixing the CE mark to the device.

3 Identification

3.1 Nameplate

The nameplate is located on the right-hand side of the housing in the case of the field device, and on the rear of the housing in the case of the panel-mounted device.
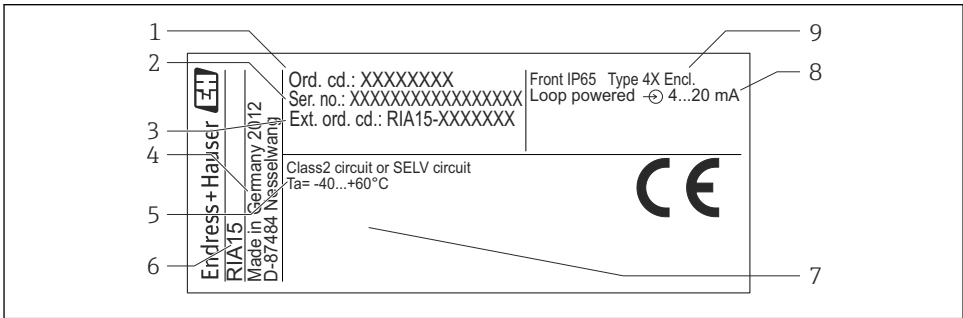
A0019608

⊠ 1 Nameplate of the process display unit (example)

1	Order code of the device	6	Device designation
2	Serial number of the device	7	Approvals (optional)
3	Extended order code of the device	8	Input signal
4	Manufacturer's address	9	Housing degree of protection
5	Ambient temperature range		

3.2 Scope of delivery

The scope of delivery of the device comprises:
- Panel-mounted device
  - Process display unit
  - Operating Instructions
  - Ex Safety Instructions (optional)
  - Fastening fixtures
- Field device
  - Process display unit
  - Operating Instructions
  - Ex Safety Instructions (optional)
  - Fastening fixtures for wall/pipe mounting (optional)
  - Weather protection cover (optional)

3.3   Certificates and approvals

An overview of all available approvals is provided in the "Technical data" section. → 🖹 34.

3.3.1   CE mark

The measuring system meets the legal requirements of the applicable EC guidelines. These are listed in the corresponding EC Declaration of Conformity together with the standards applied. Endress+Hauser confirms successful testing of the device by affixing to it the CE mark.

3.3.2   EAC mark

The product meets the legal requirements of the EEU guidelines. The manufacturer confirms the successful testing of the product by affixing the EAC mark.

4   Installation

4.1   Incoming acceptance, transport, storage

Compliance with the permitted environmental and storage conditions is mandatory. Precise specifications for this are provided in the "Technical data" .

4.1.1   Incoming acceptance

On receipt of the goods, check the following points:
• Is the packaging or the content damaged?
• Is the delivery complete? Compare the scope of delivery against the information on your order form.

4.1.2   Transport and storage

Please note the following:
• Pack the device so that is protected against impact for storage and transport. The original packaging provides optimum protection.
• 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).

4.2   Installation conditions

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

4.2.1   Display unit in the panel-mount housing

Permitted ambient temperature range −40 to 60 °C (−40 to 140 °F), horizontal orientation. IP65 protection at front, IP20 at rear

See "Technical data" section .

4.2.2   Display unit in the field housing

Permitted ambient temperature range −40 to 60 ℃ (−40 to 140 ℉). IP67 protection, NEMA 4x (aluminum housing).

See "Technical data" section .

4.3   Installation instructions

For the dimensions of the device, see "Technical data" → 🗒 33.

4.3.1   Panel housing
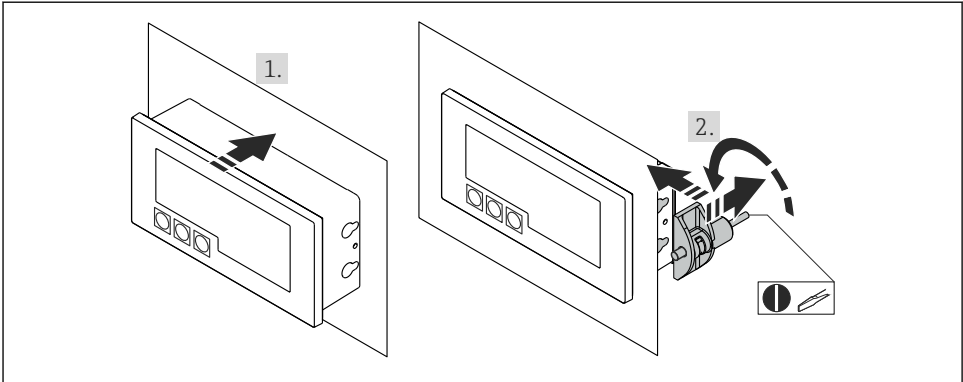
🔲 *2   Installation instructions for the panel housing*

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.

4.3.2   Field housing

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).
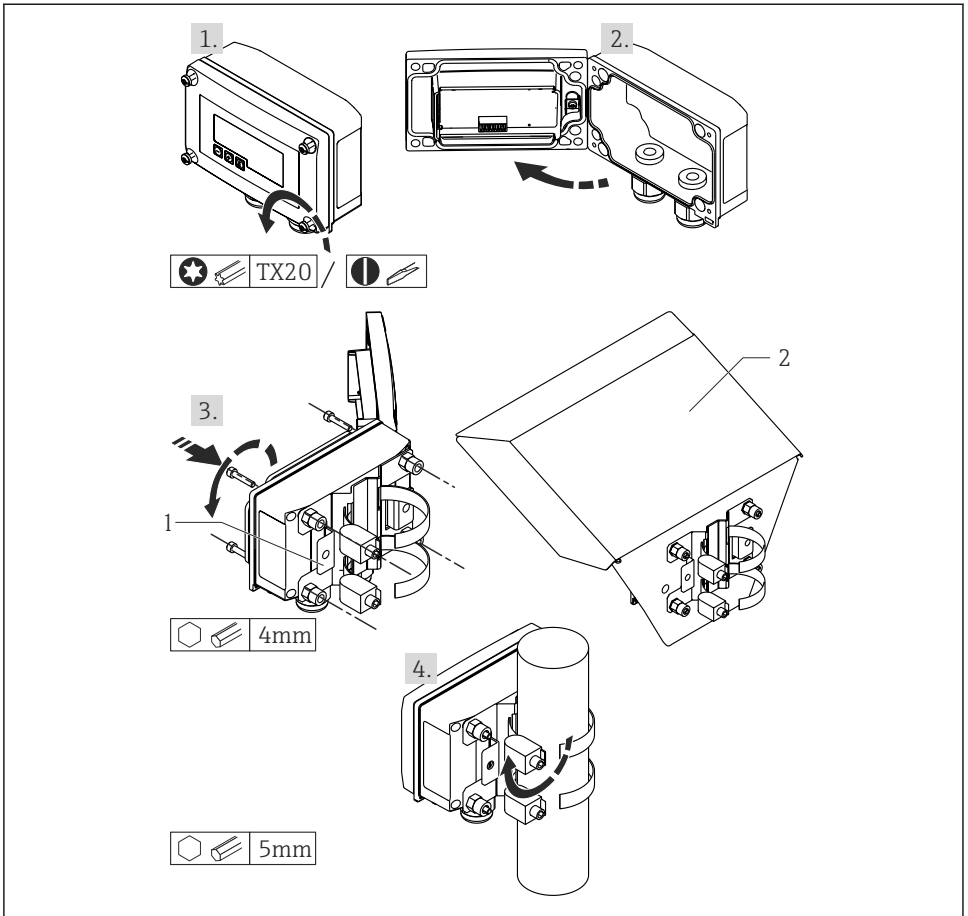
A0017789

🖻 *3   Mounting the process display unit 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

With optionally available mounting kit.
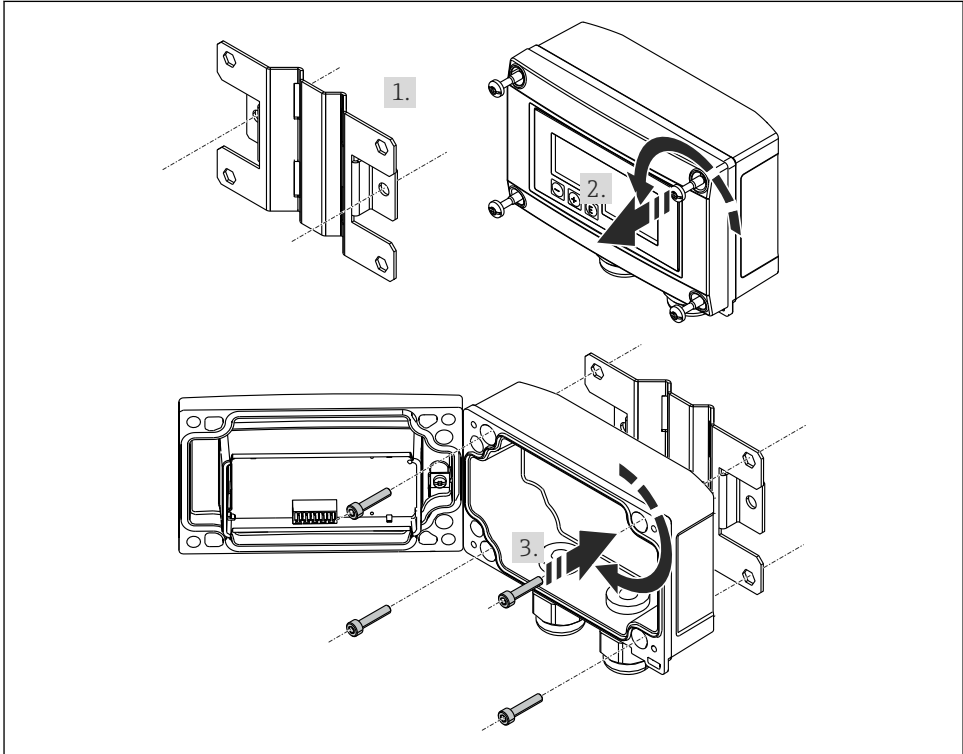
A0017803

⊞ 4   *Mounting the process display unit 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 display unit on the mounting plate with the 4 screws supplied.

4. Close the cover and tighten the screws.

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 display unit on the wall with 4 screws.

4. Close the cover and tighten the housing screws.

4.4   Post-installation check

4.4.1   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?

4.4.2   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 corresponding notes and wiring diagrams in the Ex-specific supplement to these Operating Instructions. If you have any questions, please do not hesitate to contact your E+H representative.

NOTICE

SELV/Class 2 device
▸ The device may only be powered by a power unit with an energy-limited circuit in accordance with IEC 61010-1: 'SELV or Class 2 circuit'.

Device destroyed if current too high
▸ 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
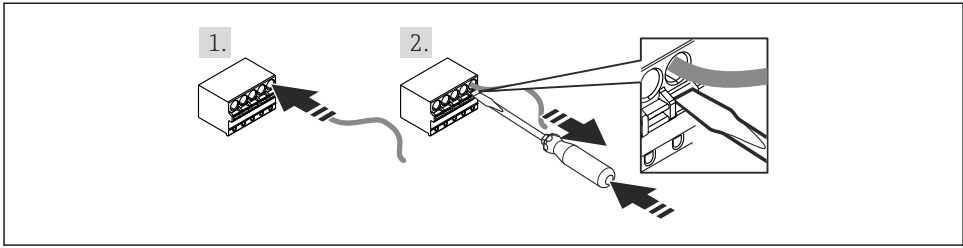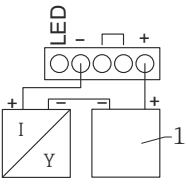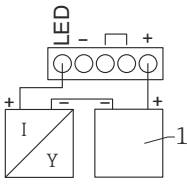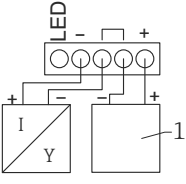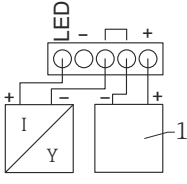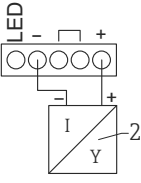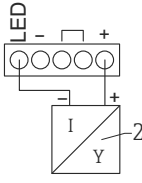
A0020848

⊡ 5   *Operation of the spring terminals*

1. When using rigid cables with a ferrule, just plug the cable into the terminal. No tools required. With flexible wires the spring mechanism of the terminal must be operated 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 current source is required to implement switchable backlighting, e.g. active barrier RN221N. This current source is used to supply the LED backlighting of up to 7 RIA15 process display units without causing an additional voltage drop in the measurement 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 one process display unit
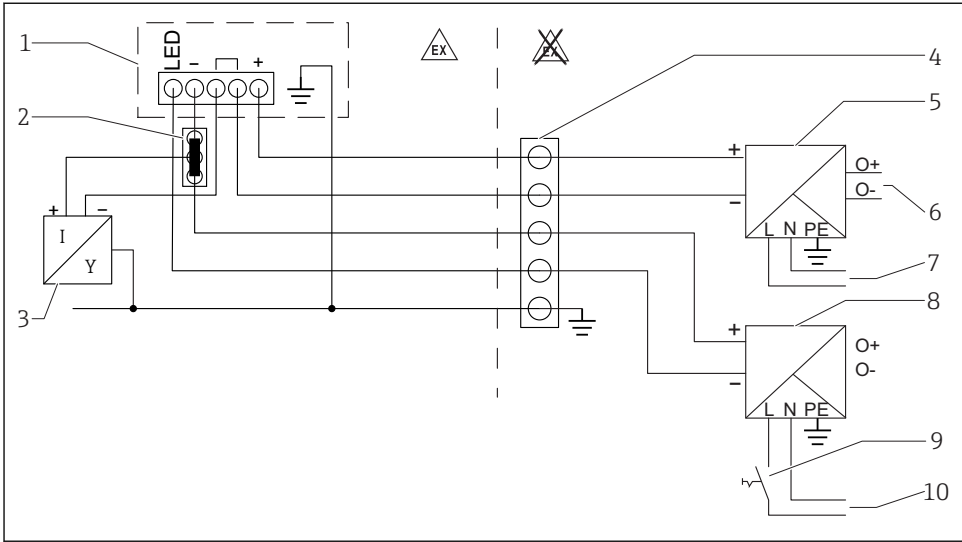
A0028248

1   Process display unit RIA15
2   3-wire connector, e.g. WAGO 221 series
3   2-wire sensor
4   Terminal block on top-hat rail
5   Active barrier, e.g. RN221N
6   4 to 20 mA output to the control unit
7   Power supply
8   Current source, e.g. RN221N
9   Switch to activate backlighting
10   Power supply

5.2.2   Connection diagram for multiple process display units
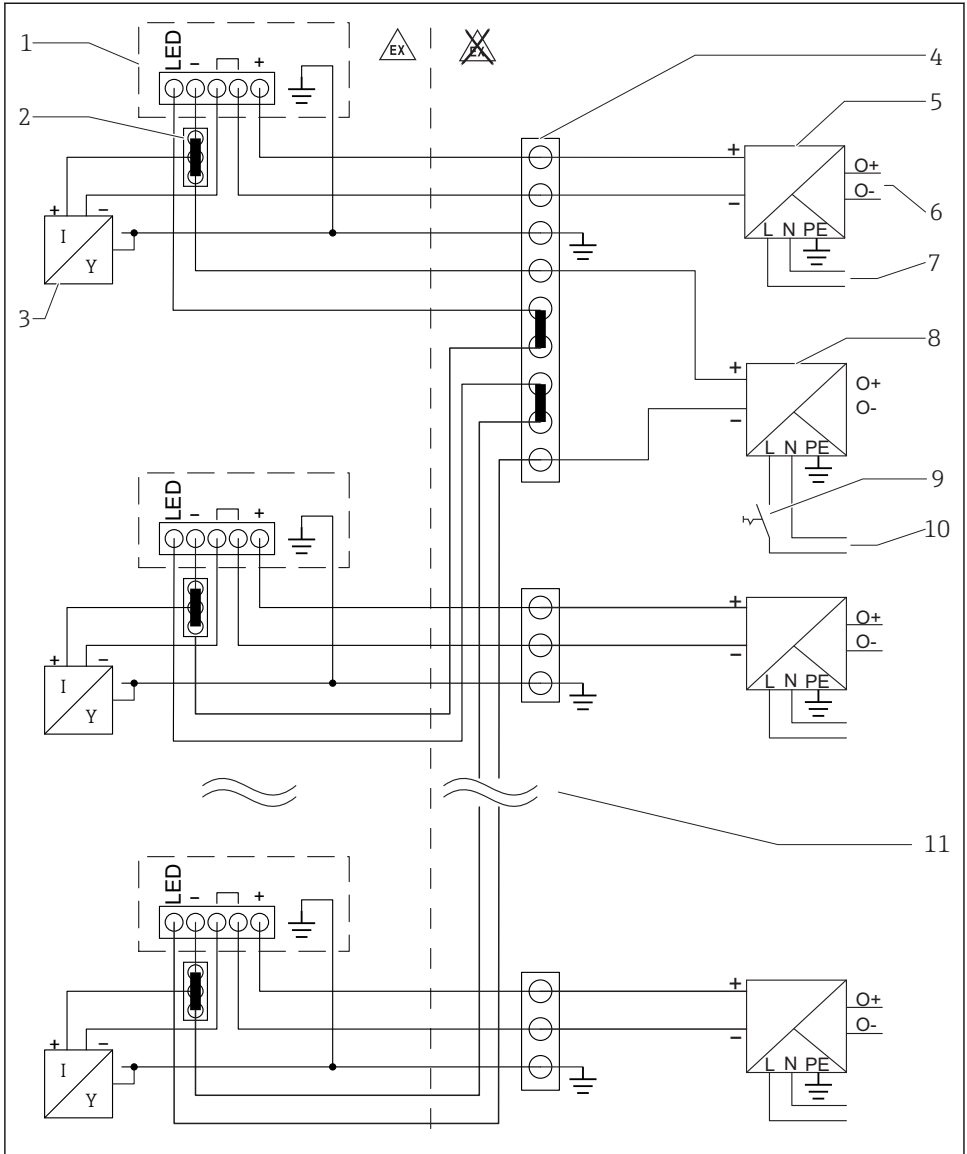
A0028249

1   Process display unit RIA15
2   3-wire connector, e.g. WAGO 221 series
3   2-wire sensor
4   Terminal block on top-hat rail
5   Active barrier, e.g. RN221N

6 4 to 20 mA output to the control unit
7 Power supply
8 Current source, e.g. RN221N
9 Switch to activate backlighting
10 Power supply
11 Can be extended to 7 devices

5.3 Inserting the cable, field housing
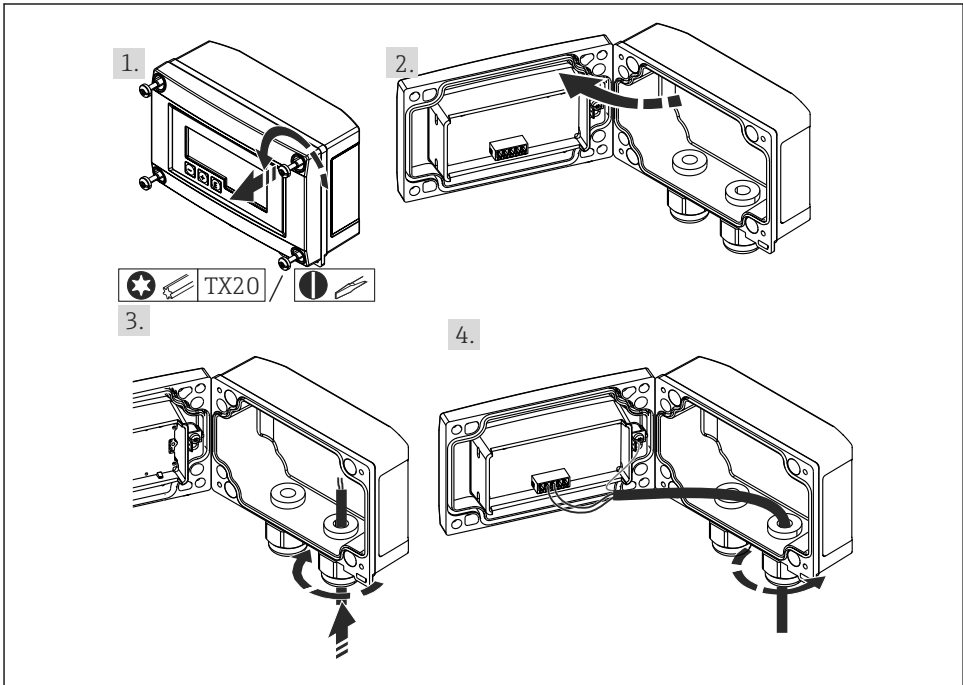
A0017830

⊞ *6 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 incl. 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.
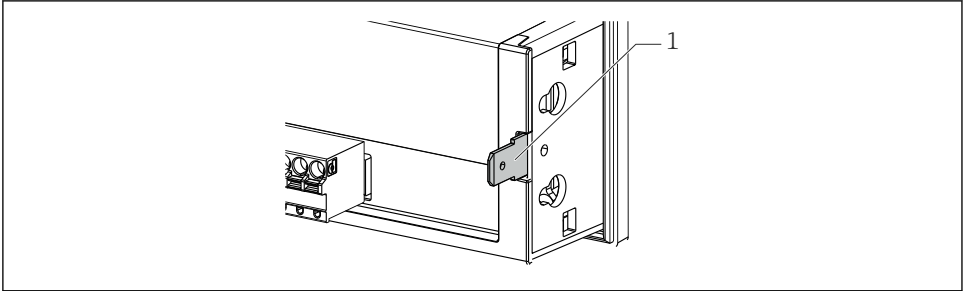
⊡ 7   Functional grounding terminal on panel-mounted device

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.
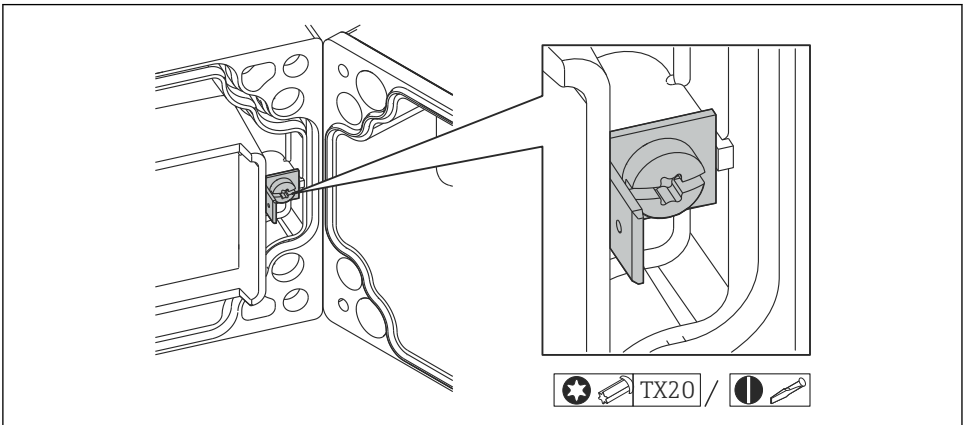
⊡ 8   Functional grounding terminal in field housing
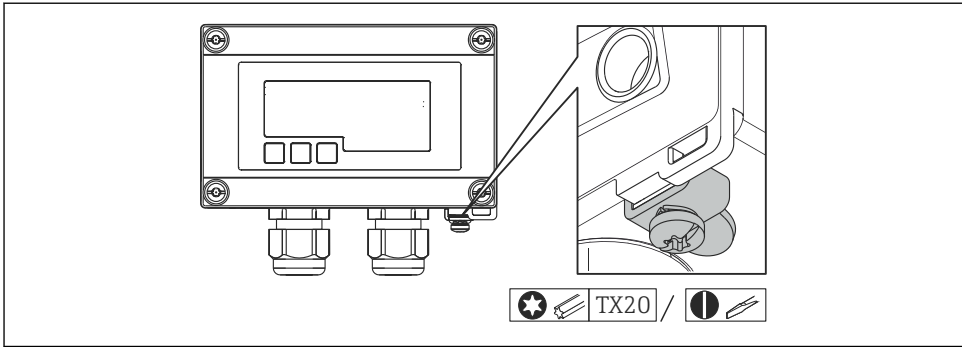
A0018908

⊞ *9*   *Ground terminal on field housing*

5.5   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.

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
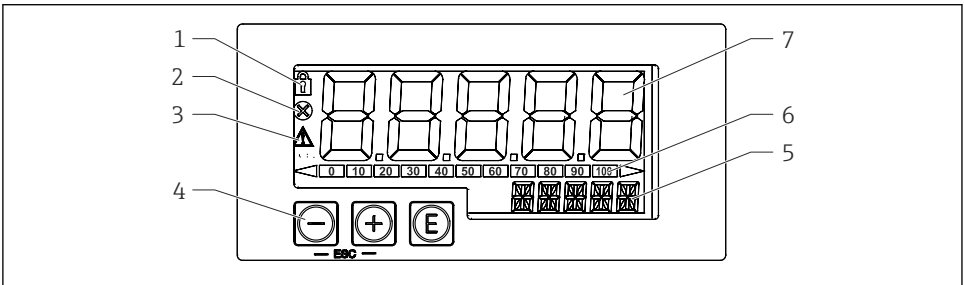
A0017989

🖎 *10   Display and operating elements of the process display unit*

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; calling up the operating menu, confirming the option/setting 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 display unit are divided into the following menus. The individual parameters and settings are described in the "Commissioning" section.

ℹ️ 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
Diagnostics (DIAG)	Device information, display of error messages
Expert (EXPRT)	Expert settings for the device setup → 🔖 24 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" → 🔖 13.
- Checklist for "post-connection check" → 🔖 20.

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.

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

7.2　　　Operating matrix

Setup menu (SETUP)			
Parameters	Values	visible at	Description
DECIM	0 DEC **1 DEC** 2 DEC 3 DEC 4 DEC		Number of decimal places for display
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 4 mA measuring current 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 20 mA measuring current The unit selected under UNIT is used to display the value.
UNIT	% ℃ ℉ 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)		
Parameters	Values	Description
AERR	Read only	The current diagnostic message appears on the display. If two or more 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).				
Parameters		**Values**	**visible at**	**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.
	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**		Use this function to define the error limits in accordance with standard NAMUR NE 43 → 🖺 25
	RNGLO	Numerical value	NAMUR = NO	Lower range limit. An error message is displayed if the measured current falls below this limit.

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).				
Parameters		**Values**	**visible at**	**Description**
	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 configured for error limits as per NAMUR NE 43 → 🕮 24.

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

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

1 = Highest priority

Diagnostic number	Short text	Corrective measure	Status signal	Diagnostic behavior	Priority
Diagnostics for the sensor					
F100	Sensor error	• Check electrical wiring • Check sensor • Check sensor settings	F	Alarm	6
S901	Input signal too small	• Check transmitter output for defect and	S	Warning	4

Diagnostic number	Short text	Corrective measure	Status signal	Diagnostic behavior	Priority
S902	Input signal too large	conformity error • Check transmitter for incorrect configuration	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   Spare parts
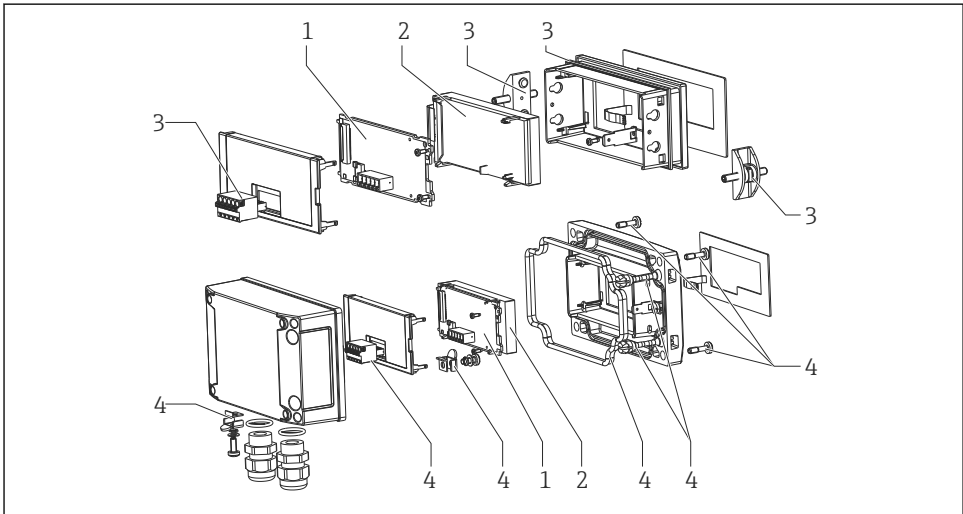
 11   Spare parts of the process display unit

A0018882

Item No.	Description	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

8.4   Software history and overview of compatibility

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	1.00.01	Original software	Analog: BA01073K/09/EN/02.13
03/2013	1.01.00	HART® option, only relevant for HART® version	Analog: BA01073K/09/EN/03.13 HART: BA01170K/09/EN/02.13
07/2013	1.02.00	HART® level measurement, only relevant for HART® version	Analog: BA01073K/09/EN/04.13 HART: BA01170K/09/EN/03.13
11/2014	1.03.00	New EXP1-EXP4 parameter for HART® option, only relevant for HART® version	Analog: BA01073K/09/EN/05.14 HART: BA01170K/09/EN/04.14
05/2016	1.04.00	New menus and parameters for "FMR20 basic configuration", only relevant for HART® version	Analog: BA01073K/09/EN/06.15 HART: BA01170K/09/EN/05.15

9   Maintenance

No special maintenance work is required on the device.

10   Return

The measuring device must be returned if it is need of repair or a factory calibration, or if the wrong measuring device has been delivered or ordered. Legal specifications require Endress +Hauser, as an ISO-certified company, to follow certain procedures when handling products that are in contact with the medium.

To ensure safe, swift and professional device returns, please refer to the procedure and conditions for returning devices provided on the Endress+Hauser website at http://www.endress.com/support/return-material
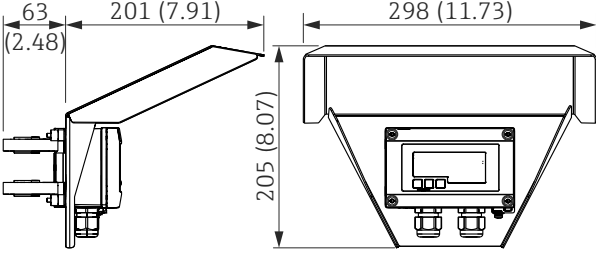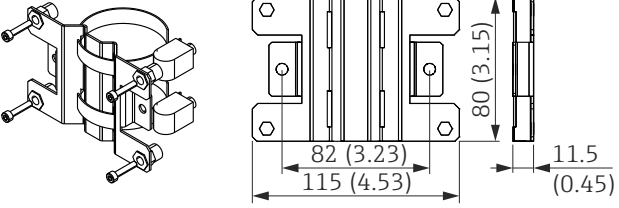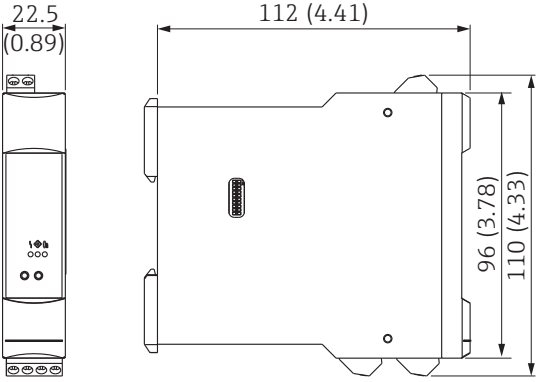
11   Disposal

The device contains electronic components and must therefore be disposed of as electronic waste. Comply with local disposal regulations.

12   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.

12.1   Device-specific accessories

| Protective cover |
12   Dimensions of protective cover, engineering unit mm (in) |
| Mounting kit for wall/ pipe mounting |
13   Dimensions of mounting bracket, engineering unit mm (in) |
| Active barrier RN221N |
14   Dimensions of active barrier, engineering unit mm (in)

For further information, see TI00073R/09/ |

12.2   Service-specific accessories

Accessories	Description
Applicator	Software for selecting and sizing Endress+Hauser measuring devices: • Calculation of all the necessary data for identifying the optimum measuring device: e.g. pressure loss, accuracy or process connections. • Graphic illustration of the calculation results Administration, documentation and access to all project-related data and parameters over the entire life cycle of a project. Applicator is available: • Via the Internet: https://wapps.endress.com/applicator • On CD-ROM for local PC installation.
W@M	Life cycle management for your plant W@M supports you with a wide range of software applications over the entire process: from planning and procurement, to the installation, commissioning and operation of the measuring devices. All the relevant device information, such as the device status, spare parts and device-specific documentation, is available for every device over the entire life cycle. The application already contains the data of your Endress+Hauser device. Endress+Hauser also takes care of maintaining and updating the data records. W@M is available: • Via the Internet: www.endress.com/lifecyclemanagement • On CD-ROM for local PC installation.

13   Technical data

13.1   Input

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

13.1.1   Measured variable

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

HART® signals are not affected.

13.1.2   Measuring range

4 to 20 mA (scalable, reverse polarity protection)

Max. input current 200 mA

13.2   Power supply

13.2.1   Supply voltage

The display unit is loop-powered and does not require any external power supply. The voltage drop is ≤1 V in the standard version with 4 to 20 mA communication and an additional 2.9 V if display lighting is used.

13.3   Performance characteristics

13.3.1   Reference operating conditions

Reference temperature 25 ℃ ±5 ℃ (77 ℉ ±9 ℉)

Humidity 20 to 60 % relative humidity

13.3.2   Maximum measured error

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

13.3.3   Resolution

Signal resolution > 13 bit

13.3.4   Influence of ambient temperature

< 0.02 %/K (0.01 %/℉) of measuring range

13.3.5   Warm-up period

10 minutes

13.4   Installation

13.4.1   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.

13.4.2   Orientation

Panel housing

The orientation is horizontal.

Field housing

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

13.5 Environment

13.5.1 Ambient temperature range

−40 to 60 ℃ (−40 to 140 ℉)

ℹ️ At temperatures below −25 ℃ (−13 ℉) the readability of the display can no longer be guaranteed.

13.5.2 Storage temperature

−40 to 85 ℃ (−40 to 185 ℉)

13.5.3 Climate class

IEC 60654-1, Class B2

13.5.4 Altitude

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

13.5.5 Degree of protection

Panel housing

IP65 at front, IP20 at rear

Field housing

IP67, NEMA4x (aluminum housing)

13.5.6 Electromagnetic compatibility

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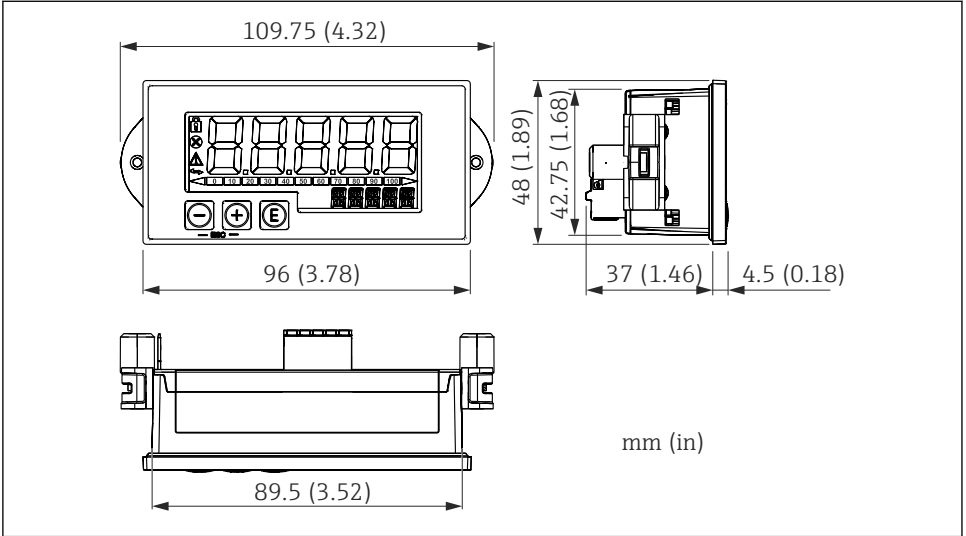 As per IEC61326, Class B

13.5.7 Electrical safety

Class III, overvoltage protection category II, pollution degree 2

13.6   Mechanical construction

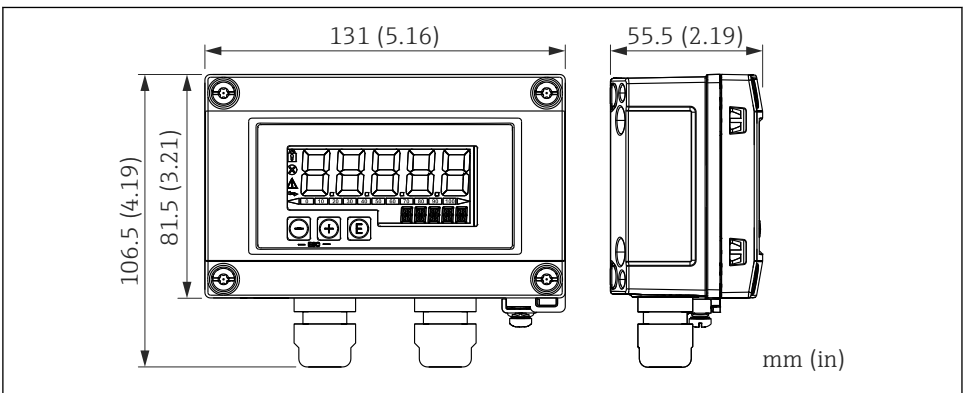### 13.6.1   Design, dimensions

Panel-mount housing

⊞ *15   Dimensions of the panel housing*

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

Field housing

⊞ *16   Dimensions of the field housing incl. cable glands (M16)*

13.6.2   Weight

Panel-mount housing

115 g (0.25 lb.)

Field housing

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

13.6.3   Materials

Panel-mount housing

Front: aluminum

Rear panel: polycarbonate PC

Field housing

Aluminum or plastic (PBT with steel fibers, antistatic)

13.7   Operability

13.7.1   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	

13.8   Certificates and approvals

13.8.1   CE mark

The measuring system meets the legal requirements of the applicable EC guidelines. These are listed in the corresponding EC Declaration of Conformity together with the standards applied. Endress+Hauser confirms successful testing of the device by affixing to it the CE mark.

13.8.2   EAC mark

The product meets the legal requirements of the EEU guidelines. The manufacturer confirms the successful testing of the product by affixing the EAC mark.

13.8.3   Ex approval

Information about currently available Ex versions (ATEX, FM, CSA, etc.) can be supplied by your E+H Sales Center on request. All explosion protection data are given in a separate documentation which is available upon request.

13.8.4   Functional safety

SIL interference freeness according to EN61508 (optional)

13.8.5   Marine approval

GL marine approval (optional)

13.8.6   Other standards and guidelines

- IEC 60529:
  Degrees of protection provided by enclosures (IP code)
- IEC 61010-1: 2010 cor 2011
  Safety requirements for electrical equipment for measurement, control and laboratory use
- NAMUR NE21, NE43
  Association for Standards for Control and Regulation in the Chemical Industry

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