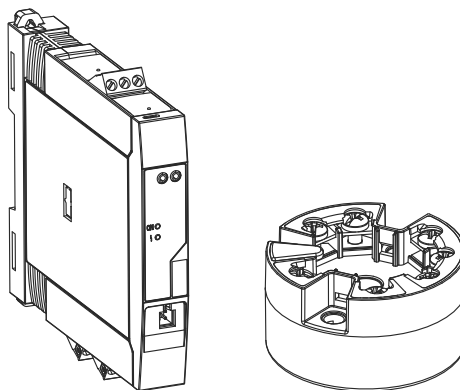


# Brief Operating Instructions

## Dual-input temperature transmitter

with HART®-protocol



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## 1 Important document information

### 1.1 Function of document and how to use

#### 1.1.1 Document function




These instructions contain all the essential information from incoming acceptance to initial commissioning.

1.1.2 Safety instructions





When using in hazardous areas, compliance with national regulations is mandatory. Separate Ex-specific documentation is provided for measuring systems that are used in hazardous areas. This documentation is an integral part of these Operating Instructions. The installation specifications, connection data and safety instructions it contains must be strictly observed! Make sure that you use the right Ex-specific documentation for the right device with approval for use in hazardous areas!

1.2 Symbols



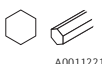


1.2.1 Safety symbols

Symbol	Meaning
 A0011189-EN	<b>DANGER!</b> This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.
 A0011191-EN	<b>CAUTION!</b> This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or medium injury.
 A0011192-EN	<b>NOTE!</b> This symbol contains information on procedures and other facts which do not result in personal injury.

1.2.2 Symbols and notation for certain types of information

Symbol	Meaning
 A0011193	<b>Tip</b> Indicates additional information.
 A0011194	<b>Reference to documentation</b> Refers to the corresponding device documentation.
 A0011195	<b>Reference to page</b> Refers to the corresponding page number.
 A0011196	<b>Reference to graphic</b> Refers to the corresponding graphic number and page number.
1., 2., 3.	<b>Series of steps</b>

### 1.3 Tool symbols

Symbol	Meaning
 A0011220	Flat blade screwdriver
 A0011219	Crosstip screwdriver
 A0011221	Allen key
 A0011222	Open-ended wrench
 A0013442	Torx screwdriver

### 1.4 Registered trademarks

HART®  
Registered trademark of the HART® FieldComm Group

## 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 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 device is a universal and user-configurable temperature transmitter with either one or two sensor inputs for a resistance thermometer (RTD), thermocouples (TC), resistance and voltage transmitters. The head transmitter version of the device is intended for mounting in a terminal head (flat face) as per DIN EN 50446. It is also possible to mount the device on a DIN rail using the optional DIN rail clip. The device is also optionally available in a version suitable for DIN rail mounting as per IEC 60715 (TH35).

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

The manufacturer is not liable for damage caused by improper or non-designated use.

## 2.3 Operational safety

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

### Hazardous area

To eliminate a danger for persons or for the facility when the device is used in the hazardous area (e.g. explosion protection or safety equipment):

- ▶ Based on the technical data on the nameplate, check whether the ordered device is permitted for the intended use in the hazardous area. The nameplate can be found on the side of the transmitter housing.
- ▶ Observe the specifications in the separate supplementary documentation that is an integral part of these Instructions.

### Electromagnetic compatibility

The measuring system complies with the general safety requirements as per EN 61010-1, the EMC requirements as per the IEC/EN 61326 series and the NAMUR recommendations NE 21.

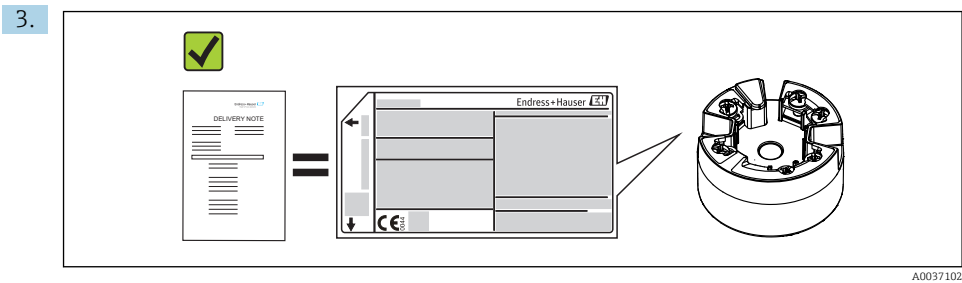
#### NOTICE

- ▶ The device must only be powered by a power unit that operates using an energy-limited electric circuit according to UL/EN/IEC 61010-1, chapter 9.4 and requirements of table 18.

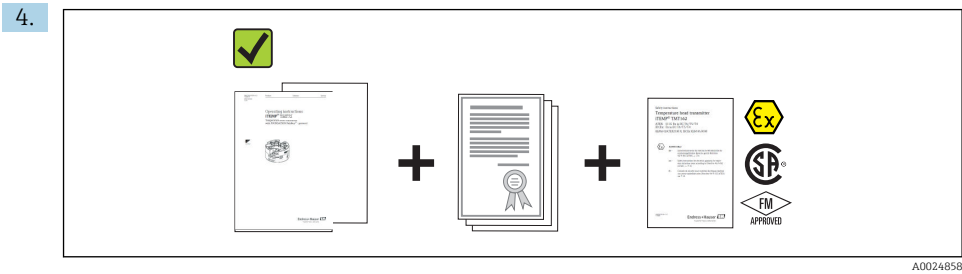
## 3 Incoming acceptance and product identification

### 3.1 Incoming acceptance

1. Unpack the temperature transmitter carefully. Is the packaging or content damaged?
  - ↳ Damaged components may not be installed as the manufacturer can otherwise not guarantee compliance with the original safety requirements or the material resistance, and can therefore not be held responsible for any resulting damage.
2. Is the delivery complete or is anything missing? Check the scope of delivery against your order.



Does the nameplate match the ordering information on the delivery note?

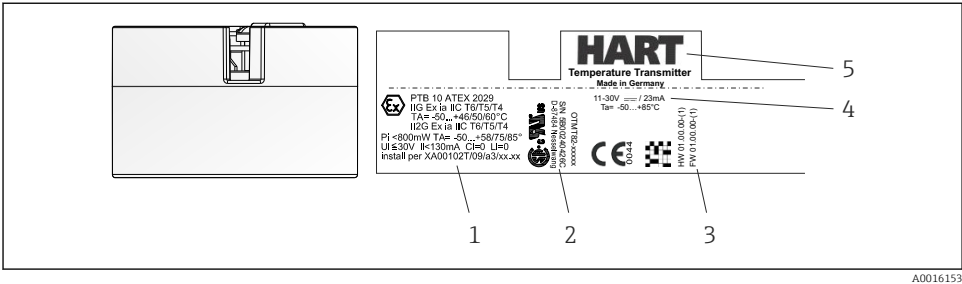


Are the technical documentation and all other necessary documents provided? If applicable: are the Safety Instructions (e.g. XA) for hazardous areas provided?

### 3.2 Nameplate

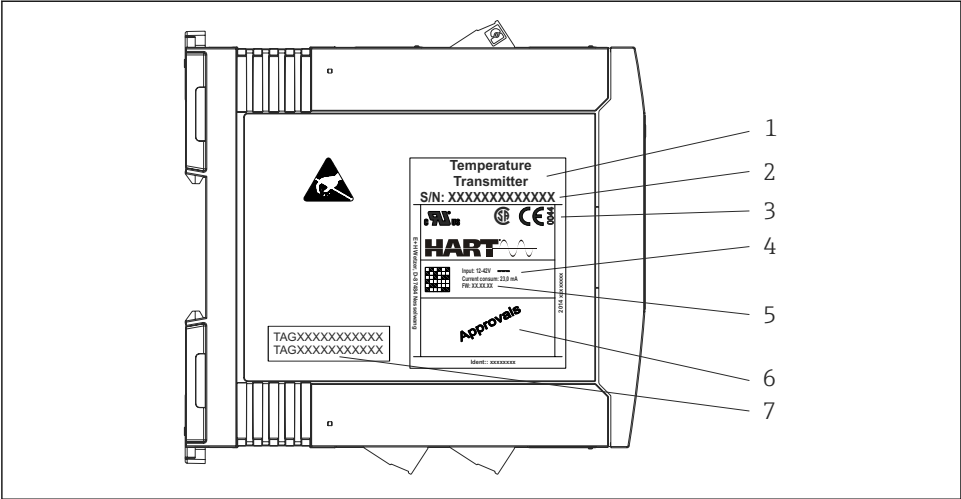
#### The right device?

Compare and check the data on the nameplate of the device against the requirements of the measuring point:



1 Nameplate of the head transmitter (example)

- 1 Approval in hazardous areas with technical data
- 2 Order code and serial number as well as approval logos
- 3 Firmware version and device revision
- 4 Power supply and current consumption
- 5 Product name and HART logo



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2 Nameplate of DIN rail transmitter (example)

- 1 Product designation
- 2 Serial number
- 3 Approval logos
- 4 Power supply and current consumption
- 5 Firmware version
- 6 Approval in hazardous areas
- 7 2 lines for the TAG name

3.2.1 Name and address of manufacturer

Name of manufacturer:	Endress+Hauser Wetzler GmbH + Co. KG
Address of manufacturer:	Obere Wank 1, D-87484 Nesselwang or <a href="http://www.endress.com">www.endress.com</a>

3.3 Scope of delivery

The scope of delivery of the device comprises:

- Temperature transmitter
- Mounting material (head transmitter)
- Operating Instructions
- Additional documentation for devices which are suitable for use in the hazardous area (ATEX, FM, CSA).

3.4 Certificates and approvals

The device left the factory in a safe operating condition. The device complies with the requirements of the standards EN 61 010-1 "Safety Requirements for Electrical Equipment for

Measurement, Control, and Laboratory Use" and with the EMC requirements as per the IEC/EN 61326 series.

### **3.4.1 CE/EAC mark, Declaration of Conformity**

The device meets the legal requirements of the EU/EEU guidelines. The manufacturer confirms that the device is compliant with the relevant guidelines by applying the CE/EAC mark.

### **3.4.2 Functional safety**

The two device versions (head transmitter/DIN rail device) are optionally available for use in safety systems as per IEC 61508.

- SIL 2: Hardware version
- SIL 3: Software version

## **3.5 Transport and storage**

Carefully remove all the packaging material and protective covers that are part of the transported package.

Storage temperature

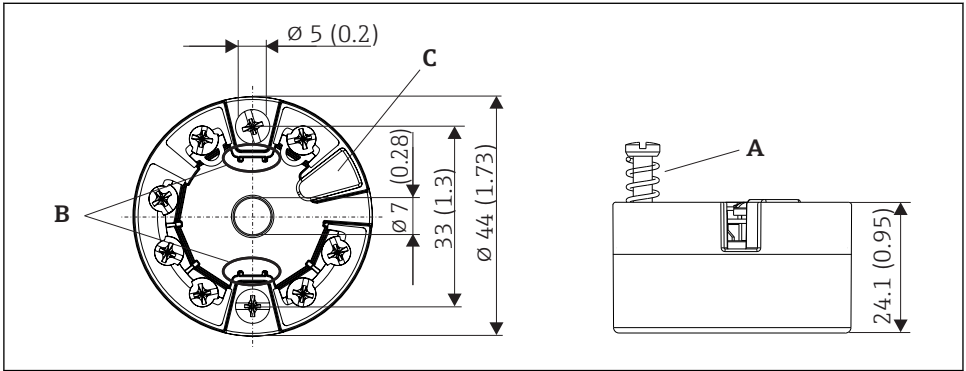
- Head transmitter: -50 to +100 °C (-58 to +212 °F)  
Option: -52 to +85 °C (-62 to +185 °F), Product Configurator, order code for "Test, Certificate, Declaration", option "JN"
- DIN rail device: -40 to +100 °C (-40 to +212 °F)



## 4 Mounting

### 4.1 Mounting requirements

#### 4.1.1 Dimensions

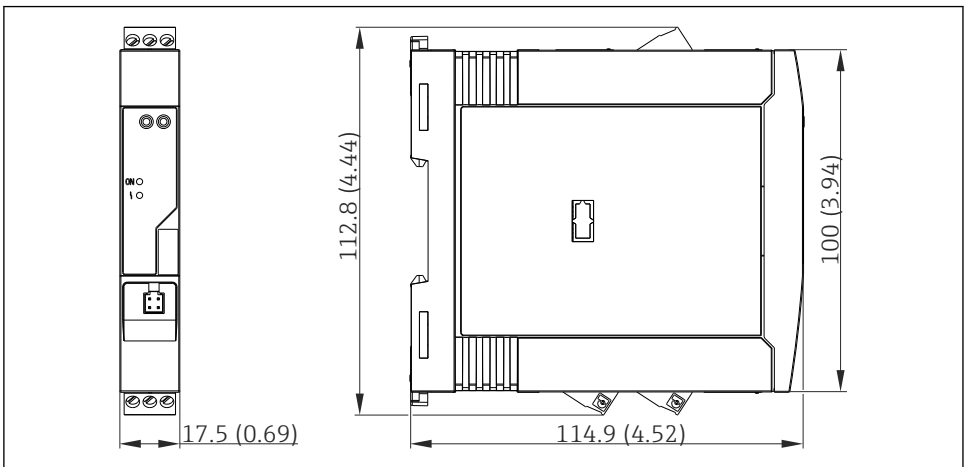


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**3** Head transmitter version with screw terminals. Dimensions in mm (in)

- A Spring travel  $L \geq 5$  mm (not for US - M4 securing screws)
- B Mounting elements for attachable measured value display
- C Interface for contacting measured value display

**i** The same dimensions apply to the version with spring terminals. Exception: Height of housing  $H = 30$  mm (1.18 in).



A0017808

**4** DIN rail transmitter version. Dimensions in mm (in)

### 4.1.2 Mounting location

- Head transmitter:
  - In the terminal head, flat face, as per DIN EN 50446, direct mounting on insert with cable entry (middle hole 7 mm)
  - In the field housing, separated from the process
  - With clip on DIN rail as per IEC 60715, TH35
- DIN rail transmitter:
  - In DIN rail housing on DIN rail as per IEC 60715, TH35

### 4.1.3 Important ambient conditions

- Ambient temperature:
  - -40 to +85 °C (-40 to +185 °F), for hazardous areas see Ex documentation
  - -50 to +85 °C (-58 to +185 °F), for hazardous areas see Ex documentation; Product Configurator order code for "Test, certificate, declaration", option "JM" <sup>1)</sup>
  - -52 to +85 °C (-62 to +185 °F), for hazardous areas see Ex documentation, Product Configurator order code for "Test, certificate, declaration", option "JN" <sup>1)</sup>
  - SIL Mode: -40 to +70 °C (-40 to +158 °F)
- Head transmitter in accordance with climate class C1, DIN rail transmitter in accordance with B2 as per EN 60654-1
- Condensation as per IEC 60068-2-33 permitted for head transmitter, not permitted for DIN rail transmitter
- Max. rel. humidity: 95% as per IEC 60068-2-30
- Degree of protection:
  - Head transmitter with screw terminals: IP 00, with spring terminals: IP 30. In installed state, depends on the terminal head or field housing used.
  - When installing in field housing TA30x: IP 66/68 (NEMA Type 4x encl.)
  - DIN rail device: IP 20

#### NOTICE

- When using in hazardous areas, the limit values of the certificates and approvals must be observed.

## 4.2 Mounting

A Phillips head screwdriver is required to mount the head transmitter.

#### NOTICE

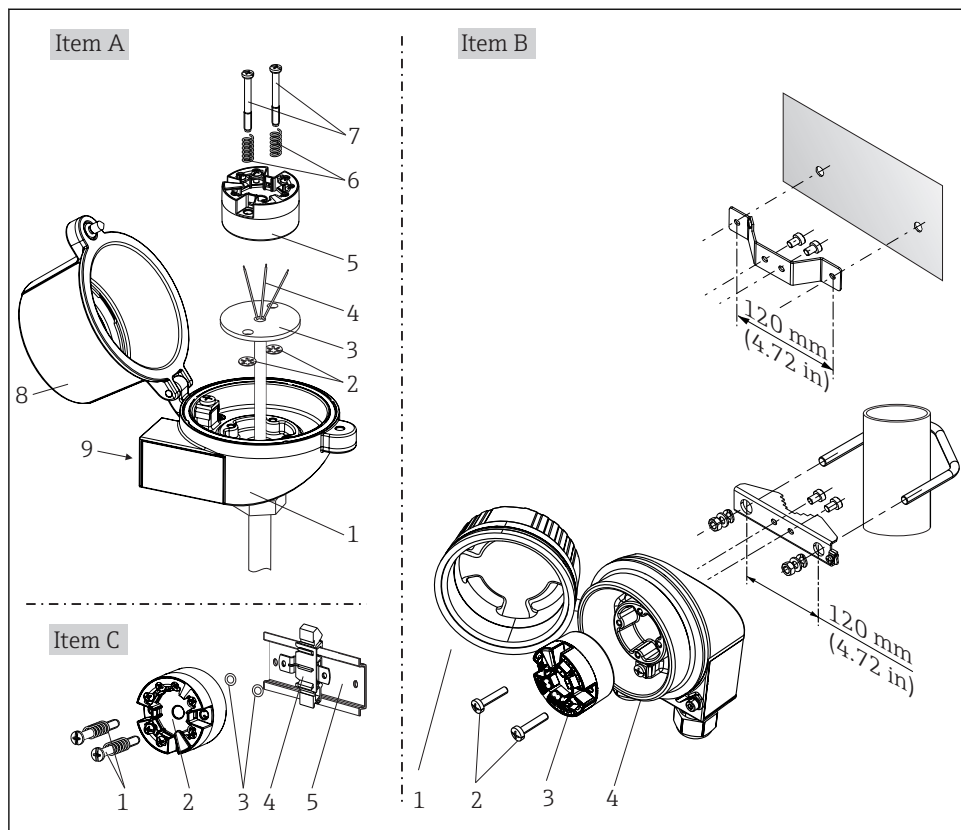
**Do not overtighten the mounting screws as this could damage the head transmitter.**

- Maximum torque = 1 Nm (¾ pound-feet).


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1) If the temperature is below -40 °C (-40 °F), increased failure rates are likely.


### 4.2.1 Mounting the head transmitter

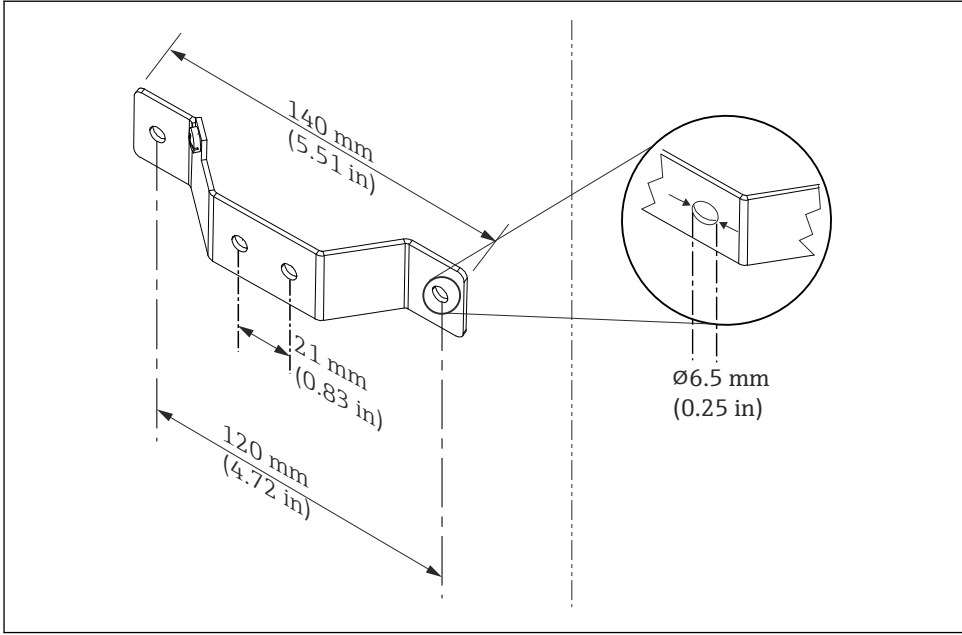


A0014269-EN


 5 Head transmitter mounting (three versions)

Procedure for mounting in a terminal head, pos. A:


1. Open the terminal head cover (8) on the terminal head.
2. Guide the connection wires (4) of the insert (3) through the center hole in the head transmitter (5).
3. Fit the mounting springs (6) on the mounting screws (7).
4. Guide the mounting screws (7) through the side boreholes of the head transmitter and the insert (3). Then fix both mounting screws with the snap rings (2).
5. Then tighten the head transmitter (5) along with the insert (3) in the terminal head.
6. After wiring, close the terminal head cover (8) tightly again. →  15



A0024604

 6 Dimensions of angle bracket for wall mount (complete wall mounting set available as accessory)

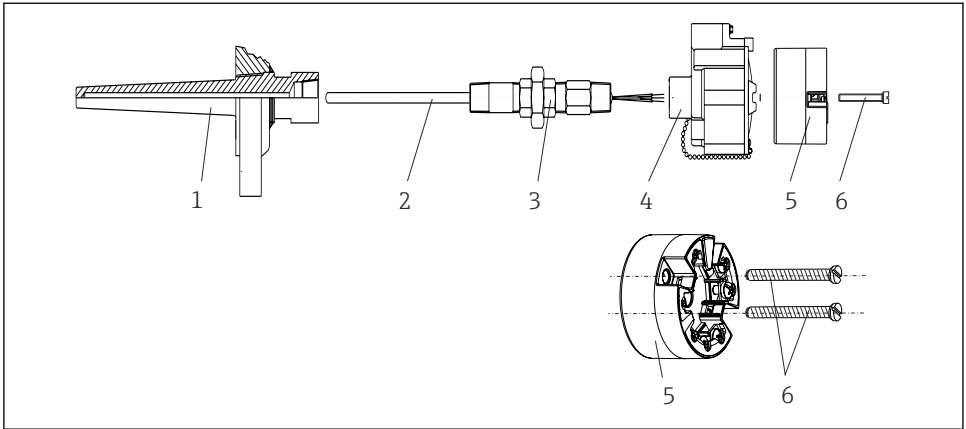
Procedure for mounting in a field housing, pos. B:

1. Open the cover (1) of the field housing (4).
2. Guide the mounting screws (2) through the lateral bores in the head transmitter (3).
3. Screw the head transmitter to the field housing.
4. After wiring, close the field housing cover (1) again. →  15


Procedure for mounting on a DIN rail, pos. C:

1. Press the DIN rail clip (4) onto the DIN rail (5) until it engages with a click.
2. Fit the mounting springs on the mounting screws (1) and guide the screws through the side boreholes of the head transmitter (2). Then fix both mounting screws with the snap rings (3).
3. Screw the head transmitter (2) onto the DIN rail clip (4).


## Mounting typical of North America



A0008520

 7 Head transmitter mounting

Thermometer design with thermocouples or RTD sensors and head transmitter:

1. Fit the thermowell (1) on the process pipe or the container wall. Secure the thermowell according to the instructions before the process pressure is applied.
2. Fit the necessary neck tube nipples and adapter (3) on the thermowell.
3. Make sure sealing rings are installed if such rings are needed for harsh environmental conditions or special regulations.
4. Guide the mounting screws (6) through the lateral bores of the head transmitter (5).
5. Position the head transmitter (5) in the terminal head (4) in such a way that the bus cable (terminals 1 and 2) point to the cable entry.
6. Using a screwdriver, screw down the head transmitter (5) in the terminal head (4).
7. Guide the connection wires of the insert (3) through the lower cable entry of the terminal head (4) and through the middle hole in the head transmitter (5). Wire the connection wires up to the transmitter. →  15
8. Screw the terminal head (4), with the integrated and wired head transmitter, onto the ready-mounted nipple and adapter (3).

### NOTICE

**The terminal head cover must be secured properly to meet the requirements for explosion protection.**

- After wiring, securely screw the terminal head cover back on.

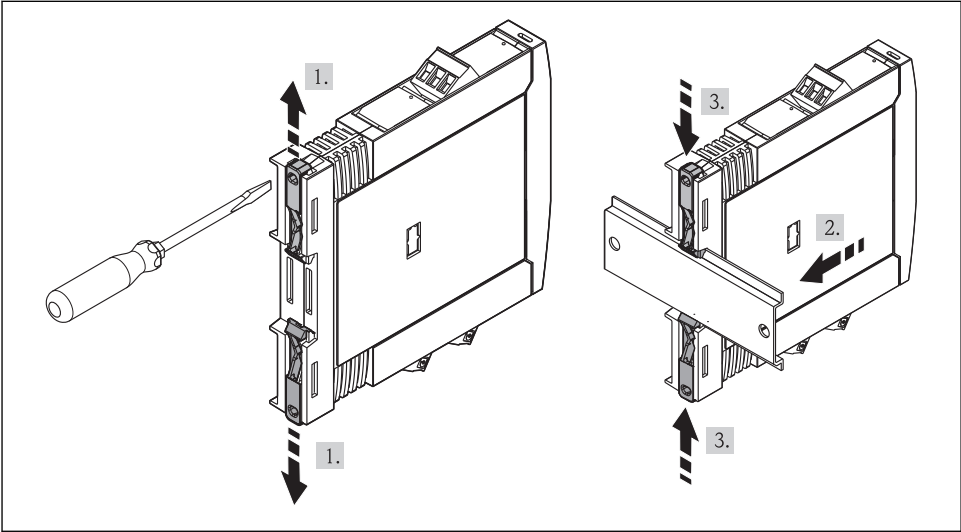
4.2.2 Mounting the DIN rail transmitter

NOTICE

Wrong orientation

Measurement deviates from the maximum accuracy rating when a thermocouple is connected and the internal reference junction is used.

- Mount the device vertically and ensure it is oriented correctly (sensor connection at bottom / power supply at top)!



A0017821

8 Mounting the DIN rail transmitter

1. Slide the upper DIN rail clip upwards and the lower clip downwards until they click into place.
2. Fit the device on the DIN rail from the front.
3. Slide the two DIN rail clips back together until they click into place.

4.3 Post-mounting check

After mounting the device, always run the following final checks:

Device condition and specifications	Notes
Is the device undamaged (visual inspection)?	-
Do the ambient conditions match the device specification (e.g. ambient temperature, measuring range, etc.)?	→ 10

## 5 Electrical connection



### ⚠ CAUTION

- ▶ Switch off the power supply before installing or connecting the device. Not conforming with this can lead to the destruction of electronic components.
- ▶ Do not occupy the display connection. An incorrect connection can destroy the electronics.

### 5.1 Connection conditions

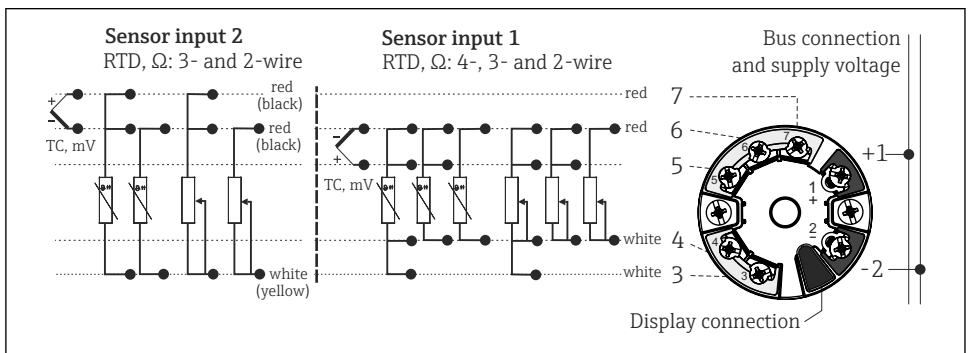
A Phillips head screwdriver is required to wire the head transmitter with screw terminals. Use a flat blade screwdriver for the DIN rail housing version with screw terminals. The push-in terminal version can be wired without any tools.

Proceed as follows to wire a mounted head transmitter:


1. Open the cable gland and the housing cover on the terminal head or the field housing.
2. Feed the cables through the opening in the cable gland.
3. Connect the cables as shown in →  15. If the head transmitter is fitted with push-in terminals, pay particular attention to the information in the "Connecting to push-in terminals" section". →  17
4. Tighten the cable gland again and close the housing cover.

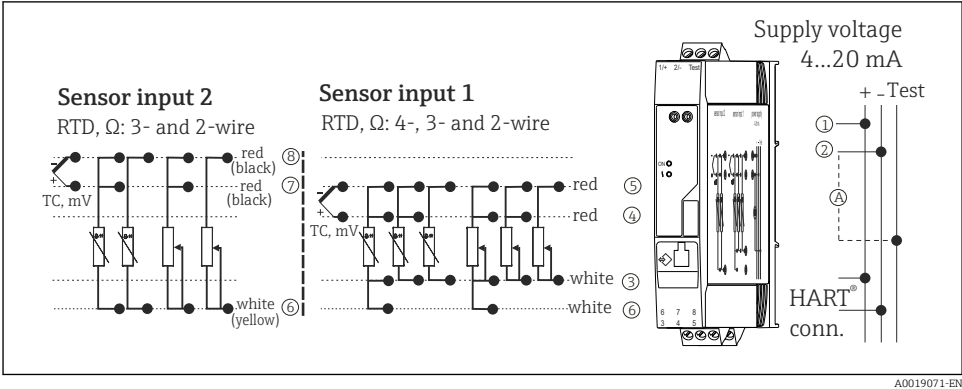
In order to avoid connection errors always follow the instructions in the post-connection check section before commissioning!

### 5.2 Quick wiring guide



A0015015-EN

 9 Terminal assignment of head transmitter



10 Terminal assignment of the DIN rail device

A To check the output current, an ammeter (DC measurement) can be connected between the "Test" and "–" terminals.

A minimum load of 250  $\Omega$  is required in the signal circuit in order to operate the HART<sup>®</sup> transmitter via the HART<sup>®</sup> protocol (terminals 1 and 2).

**NOTICE**

- ▶ ESD - electrostatic discharge. Protect the terminals from electrostatic discharge. Failure to observe this may result in the destruction or malfunction of parts of the electronics.

### 5.3 Connecting the sensor cables

**NOTICE**

When connecting 2 sensors ensure that there is no galvanic connection between the sensors (e.g. caused by sensor elements that are not isolated from the thermowell). The resulting equalizing currents distort the measurements considerably.

- ▶ The sensors must remain galvanically isolated from one another by connecting each sensor separately to a transmitter. The transmitter provides sufficient galvanic isolation (> 2 kV AC) between the input and output.

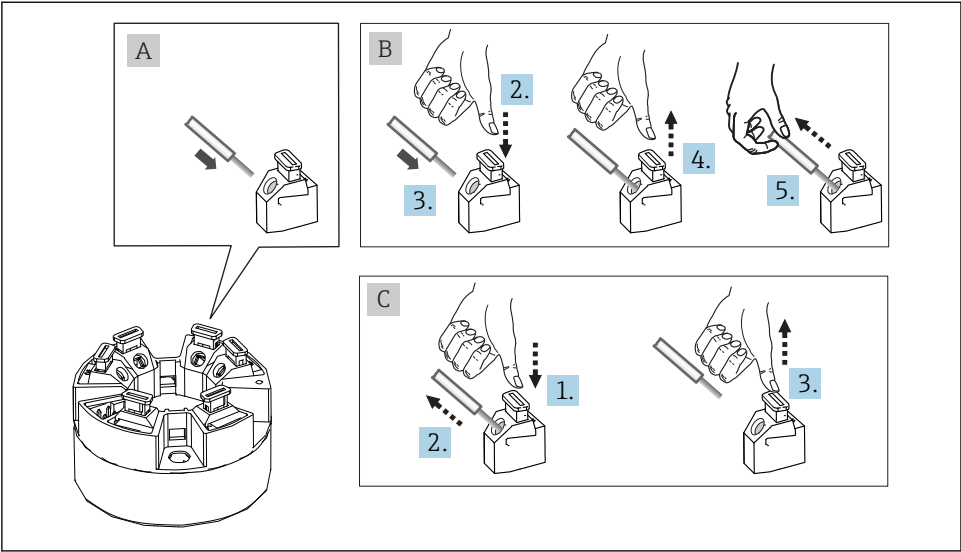
The following connection combinations are possible when both sensor inputs are assigned:

Sensor input 1					
Sensor input 2		RTD or resistance transmitter, 2-wire	RTD or resistance transmitter, 3-wire	RTD or resistance transmitter, 4-wire	Thermocouple (TC), voltage transmitter
	RTD or resistance transmitter, 2-wire	✓	✓	-	✓
	RTD or resistance transmitter, 3-wire	✓	✓	-	✓



Sensor input 1					
	RTD or resistance transmitter, 4-wire	-	-	-	-
	Thermocouple (TC), voltage transmitter	✓	✓	✓	✓

5.3.1 Connecting to push-in terminals



A0039468

11 Push-in terminal connection, using the example of a head transmitter

**Fig. A, solid wire:**

1. Strip wire end. Min. stripping length 10 mm (0.39 in).
2. Insert the wire end into the terminal.
3. Pull the wire gently to ensure it is connected correctly. Repeat from step 1 if necessary.

**Fig. B, fine-strand wire without ferrule:**

1. Strip wire end. Min. stripping length 10 mm (0.39 in).
2. Press down on the lever opener.
3. Insert the wire end into the terminal.
4. Release lever opener.
5. Pull the wire gently to ensure it is connected correctly. Repeat from step 1 if necessary.

**Fig. C, releasing the connection:**

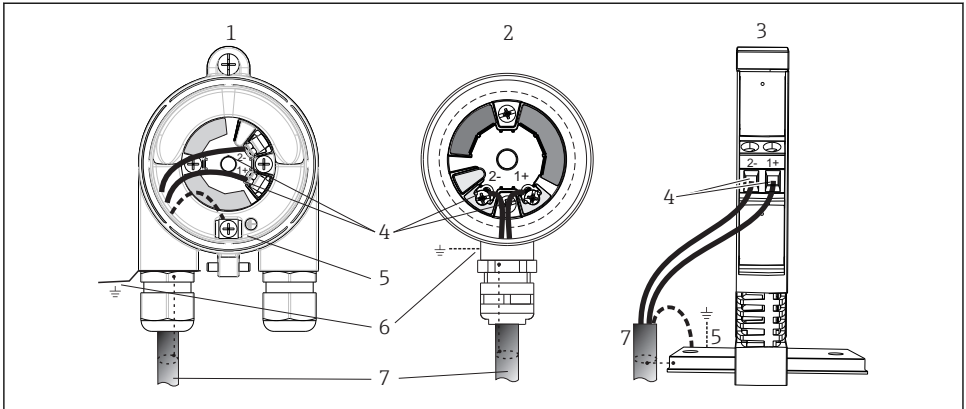
1. Press down on the lever opener.
2. Remove the wire from the terminal.
3. Release lever opener.

## 5.4 Connecting the transmitter

**Cable specification**

- A normal device cable suffices if only the analog signal is used.
- A shielded cable is recommended for HART® communication. Observe grounding concept of the plant.
- In the case of the DIN rail version, a shielded cable must be used if the sensor cable length exceeds 30 m (98.4 ft). The use of shielded sensor cables is generally recommended.

Please also observe the general procedure on →  15.



A0039698

## 12 Connecting the signal cables and power supply

- 1 Head transmitter installed in field housing
- 2 Head transmitter installed in terminal head
- 3 DIN rail transmitter mounted on DIN rail
- 4 Terminals for HART® protocol and power supply
- 5 Internal ground connection
- 6 External ground connection
- 7 Shielded signal cable (recommended for HART® protocol)

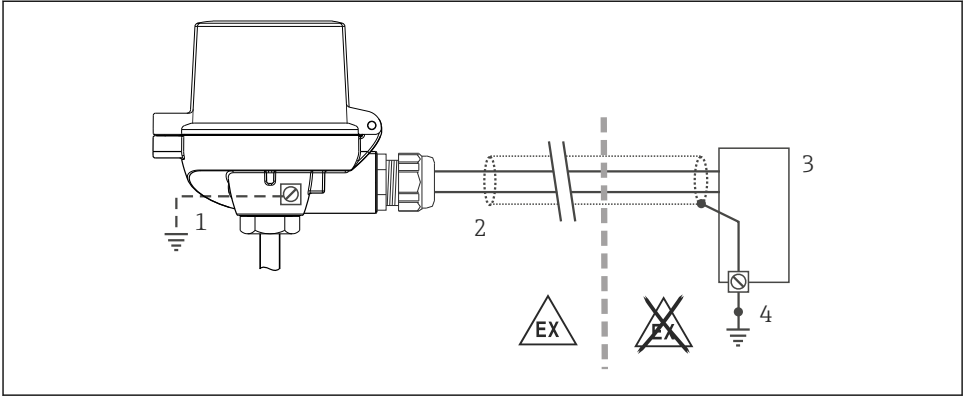


- The terminals for signal cable connection (1+ and 2-) are protected against reverse polarity.
- Conductor cross-section:
  - Max. 2.5 mm<sup>2</sup> for screw terminals
  - Max. 1.5 mm<sup>2</sup> for push-in terminals. Min. stripping length of cable 10 mm (0.39 in).


## 5.5 Special connection instructions

### Shielding and grounding

The specifications of the HART® FieldComm Group must be observed when installing a HART® transmitter.




A0014463

 13 Shielding and grounding the signal cable at one end with HART® communication

- 1 Optional grounding of the field device, isolated from cable shielding
- 2 Grounding of the cable shield at one end
- 3 Supply unit
- 4 Grounding point for HART® communication cable shield

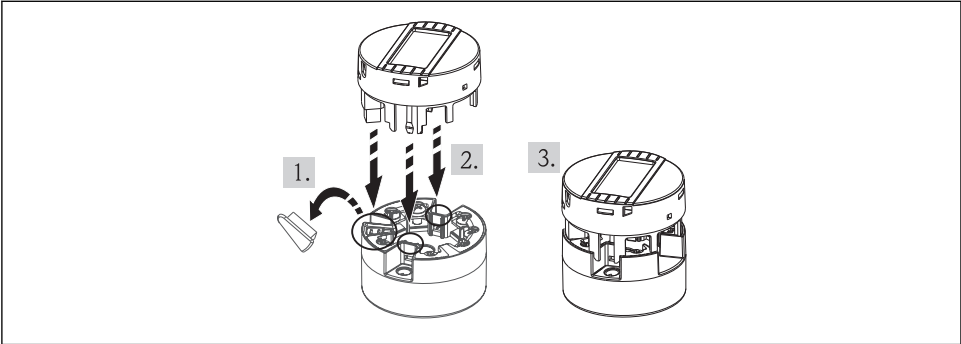
## 5.6 Post-connection check

Device condition and specifications	Notes
Is the device or cable undamaged (visual check)?	--
Electrical connection	Notes
Does the supply voltage match the information on the nameplate?	<ul style="list-style-type: none"><li>■ Head transmitter: <math>U = 11</math> to <math>42\text{ V}_{\text{DC}}</math></li><li>■ DIN rail transmitter: <math>U = 12</math> to <math>42\text{ V}_{\text{DC}}</math></li><li>■ SIL mode: <math>U = 11</math> to <math>32\text{ V}_{\text{DC}}</math> for the head transmitter or <math>U = 12</math> to <math>32\text{ V}_{\text{DC}}</math> for the DIN rail transmitter</li><li>■ Other values apply in the hazardous area, see the corresponding Ex Safety Instructions (XA).</li></ul>
Are the mounted cables relieved of tension?	--
Are the power supply and signal cables connected correctly?	→  15
Are all the screw terminals well tightened and have the connections of the push-in terminals been checked?	--
Are all the cable entries installed, tightened and sealed?	--
Are all housing covers installed and firmly tightened?	--

## 6 Operating options

### 6.1 Measured value display and operating elements

#### 6.1.1 Option: display with transmitter

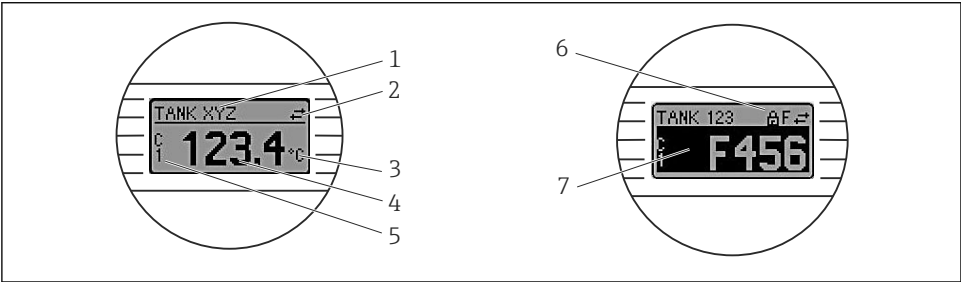


A0010227

14 Attach the display to the transmitter

#### 6.1.2 Display elements

Head transmitter




A0008549

15 Optional LC display for head transmitter

Item no.	Function	Description
1	Displays the TAG	TAG, 32 characters long.
2	'Communication' symbol	The communication symbol appears when read and write-accessing via the fieldbus protocol.
3	Unit display	Unit display for the measured value displayed.
4	measured value display	Displays the current measured value.
5	Value/channel display S1, S2, DT, PV, I, %	e.g. S1 for a measured value from channel 1 or DT for the device temperature

Item no.	Function	Description
6	'Configuration locked' symbol	The 'configuration locked' symbol appears when configuration is locked via the hardware.
7	Status signals	
	Symbols	Meaning
	<b>F</b>	<b>Error message "Failure detected"</b> An operating error has occurred. The measured value is no longer valid.  The display alternates between the error message and "- - -" (no valid measured value present). Detailed information on the error messages can be found in the Operating Instructions.
	<b>C</b>	<b>"Service mode"</b> The device is in service mode (e.g. during a simulation).
	<b>S</b>	<b>"Out of specification"</b> The device is being operated outside its technical specifications (e.g. during warm-up or cleaning processes).
	<b>M</b>	<b>"Maintenance required"</b> Maintenance is required. The measured value is still valid.  The display alternates between the measured value and the status message.

### DIN rail transmitter


 The DIN rail transmitter version does not have an interface to the LC display and therefore does not have a local display either.

*Two LEDs on the front indicate the device status.*

Type	Function and characteristic
Status LED (red)	When the device is operating without errors, the device status is displayed. This function can no longer be guaranteed in the event of an error. <ul style="list-style-type: none"> <li>▪ LED off: without diagnostic message</li> <li>▪ LED is lit: diagnostics display, category F</li> <li>▪ LED flashing: diagnostics display of categories C, S or M</li> </ul>
Power LED (green) 'ON'	When the device is operating without errors, the operating status is displayed. This function can no longer be guaranteed in the event of an error. <ul style="list-style-type: none"> <li>▪ LED off: Power failure or insufficient supply voltage</li> <li>▪ LED is lit: Supply voltage is OK (either via CDI or via supply voltage, terminals 1+, 2-)</li> </ul>

### 6.1.3 Local operation

#### NOTICE

-  **ESD** - electrostatic discharge. Protect the terminals from electrostatic discharge. Failure to observe this may result in the destruction or malfunction of parts of the electronics.

A0014562

16 Hardware settings via DIP switches

1: Connection to head transmitter
2: DIP switches (1 - 64, SW/HW, ADDR and SIM = simulation mode) no function for this head transmitter
3: DIP switch (WRITE LOCK = write protection; DISPL. 180° = switch, turn the display monitor 180°)

Procedure for setting the DIP switch:

1. Open the cover of the terminal head or field housing.
2. Remove the attached display from the head transmitter.
3. Configure the DIP switch on the rear of the display accordingly. In general: switch to ON = function enabled, switch to OFF = function disabled.
4. Fit the display onto the head transmitter in the correct position. The head transmitter accepts the settings within one second.
5. Secure the cover back onto the terminal head or field housing.

Switching write protection on/off

Write protection is switched on and off via a DIP switch on the rear of the optional attachable display. When write protection is active, parameters cannot be modified. A lock symbol on the display indicates that write protection is on. Write protection prevents any write access to the parameters. Write protection remains active even when the display is removed. To disable the write protection, the device must be restarted with the display attached and the DIP switch deactivated (WRITE LOCK = OFF). Alternatively, the display can be removed and reattached during operation to disable write protection.

Turning the display

The display can be rotated 180° using the "DISPL. 180°" DIP switch. The setting is retained when the display is removed.

6.2 Configuration of transmitter and HART® protocol

The transmitter is configured and measured values interrogated via the HART® protocol or CDI (= Common Data Interface). The following operating tools are available for this purpose:

Operating tools

FieldCare, Field Xpert (Endress+Hauser)	SIMATIC PDM (Siemens)
AMS Device Manager (Emerson Process Management)	Field Communicator 375, 475 (Emerson Process Management)

NOTICE

The following applies if using the device in hazardous areas: Before accessing the device via the CDI (= Common Data Interface), disconnect the transmitter from the power supply, terminals (1+) and (2-).


► Failure to comply with this instruction can result in damage to parts of the electronics.

 The configuration of device-specific parameters is described in detail in the Operating Instructions for the device.

# 7 Commissioning


## 7.1 Post-installation check

Before commissioning the measuring point make sure that all final checks have been carried out:

- Checklist “Post-mounting check”, →  14
- Checklist “Post-connection check”, →  20

## 7.2 Switching on the transmitter

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

Step	Display
1	"Display" text and firmware version of the display
2	Device name with firmware and hardware versions
3	Information on the sensor configuration (sensor element and type of connection)
4	Set measuring range
5a	Current measured value or
5b	Current status message  If the switch-on procedure is not successful, the relevant diagnostics event, depending on the cause, is displayed. A detailed list of diagnostic events and the corresponding troubleshooting instructions can be found in the Operating Instructions.

The device is operational after approx. 30 seconds, and the plug-in display after approx. 33 seconds in normal operating mode! Normal measuring mode commences as soon as the switch-on procedure is completed. Measured values and status values appear on the display.




## 7.3 Enabling configuration

If the device is locked and the parameter settings cannot be changed, it must first be enabled via the hardware or software lock. The device is write-protected if the lock symbol appears in the header of the measured value display.

To unlock the device

- either switch the write protection switch on the back of the display to the "OFF" position (hardware write protection), or
- deactivate the software write protection via the operating tool. See the description for the **'Define device write protection'** parameter in the Operating Instructions.

 When hardware write protection is active (write protection switch on the back of the display to the "ON" position), write protection cannot be disabled via the operating tool. Hardware write protection must always be disabled before software write protection can be enabled or disabled.

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