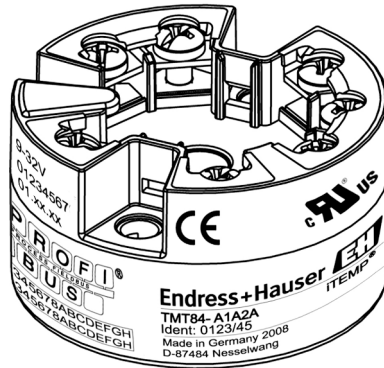


Brief Operating Instructions iTEMP TMT84

Dual-input temperature transmitter



These instructions are Brief Operating Instructions; they do **not** replace the Operating Instructions included in the scope of supply.

Detailed information can be found in the Operating Instructions and the additional documentation.

Available for all device versions via:

- Internet: www.endress.com/deviceviewer
- Smart phone/tablet: Endress+Hauser Operations App



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Table of contents

1	About this document	3
1.1	Safety Instructions (XA)	3
1.2	Symbols used	4
1.3	Tool symbols	4
1.4	Registered trademarks	4
2	Basic safety instructions	4
2.1	Requirements for the personnel	4
2.2	Intended use	5
2.3	Operational safety	5
3	Incoming acceptance and product identification	6
3.1	Incoming acceptance	6
3.2	Product identification	6
3.3	Scope of delivery	7
3.4	Certificates and approvals	7
4	Installation	8
4.1	Installation conditions	8
4.2	Installation	8
4.3	Post-installation check	12
5	Electrical connection	12
5.1	Connection conditions	12
5.2	Connecting the measuring device	13
5.3	Post-connection check	16
6	Operation options	17
6.1	Measured value display and operating elements	17
6.2	Configuration of the head transmitter and PA functions	19
7	Commissioning	19
7.1	Switching on the transmitter	19

1 About this document

1.1 Safety Instructions (XA)

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! The number of the specific Ex documentation (XA...) is provided on the nameplate. If the two numbers (on the Ex documentation and the nameplate) are identical, then you may use this Ex-specific documentation.

1.2 Symbols used

1.2.1 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.

1.3 Tool symbols

Symbol	Meaning
 A0011219	Phillips head screwdriver

1.4 Registered trademarks

PROFIBUS®

Registered trademark of the PROFIBUS Nutzerorganisation e.V. (Profibus User Organization), Karlsruhe, Germany

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 Intended use

The device is a universal and user-configurable temperature transmitter with 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 free from damage?
 - ↳ 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.
3. Does the nameplate match the ordering information on the delivery note?
4. Are the technical documentation and all other necessary documents provided? If applicable: are the Safety Instructions (e.g. XA) for hazardous areas provided?

 If one of these conditions is not satisfied, contact your Endress+Hauser Sales Center.

3.2 Product identification

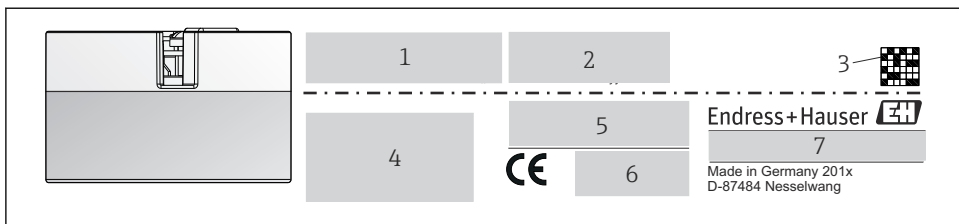
The following options are available for identification of the device:

- Nameplate specifications
- Extended order code with breakdown of the device features on the delivery note
- Enter the serial number from the nameplate in the *W@M Device Viewer* (www.endress.com/deviceviewer): All data relating to the device and an overview of the Technical Documentation supplied with the device are displayed.
- Enter the serial number on the nameplate into the *Endress+Hauser Operations App* or scan the 2-D matrix code (QR code) on the nameplate with the *Endress+Hauser Operations App*: all the information about the device and the technical documentation pertaining to the device is displayed.

3.2.1 Nameplate

The right device?

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



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1 Nameplate of the head transmitter (example, Ex version)

- 1 Power supply, current consumption and radio approval (Bluetooth)
- 2 Serial number, device revision, firmware version and hardware version
- 3 Data Matrix 2D code
- 4 2 lines for the TAG name and extended order code
- 5 Approval in hazardous area with number of the relevant Ex documentation (XA...)
- 6 Approvals with symbols
- 7 Order code and manufacturer ID

3.2.2 Name and address of manufacturer

Name of manufacturer:	Endress+Hauser Wetzler GmbH + Co. KG
Address of manufacturer:	Obere Wank 1, D-87484 Nesselwang or www.endress.com
Address of manufacturing plant:	See nameplate

3.3 Scope of delivery

The scope of delivery of the device comprises:

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

3.4 Certificates and approvals

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 PROFIBUS® PA protocol certification

The temperature transmitter is certified and registered by the PNO (PROFIBUS® User Organization). The device meets the requirements of the following specifications:

- Certified according to PROFIBUS® PA Profile 3.02
- The device can also be operated with certified devices of other manufacturers (interoperability)

4 Installation

4.1 Installation conditions

4.1.1 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 DIN rail clip on DIN rail as per IEC 60715, TH35

4.1.2 Important ambient conditions

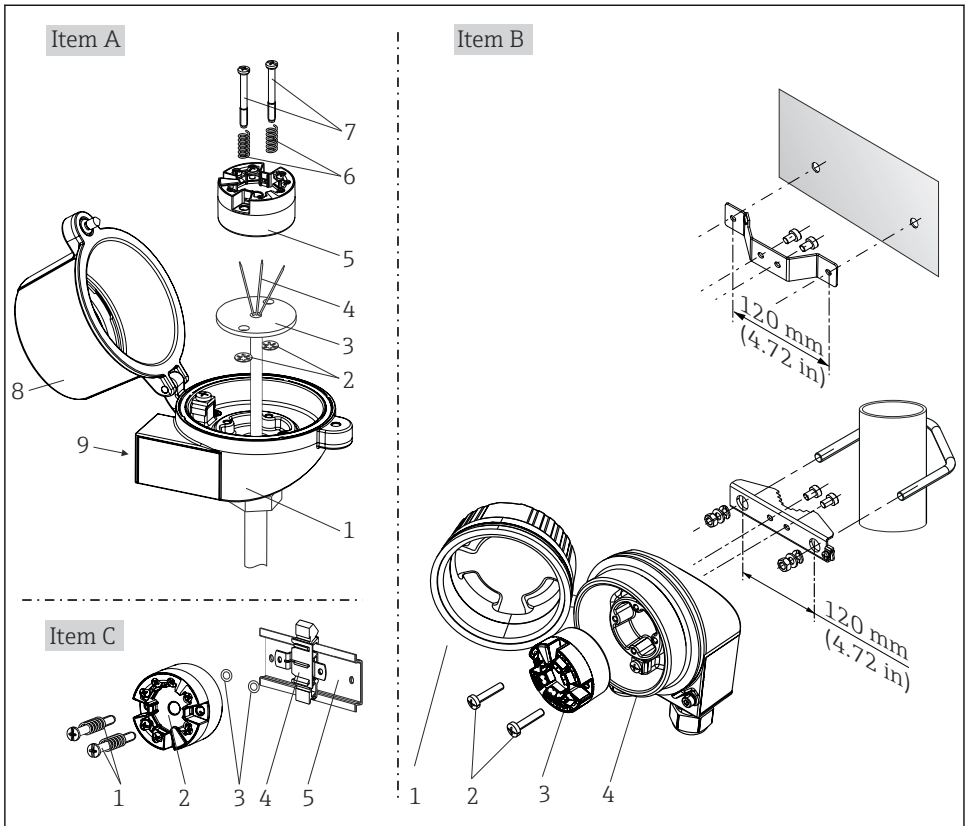
- Ambient temperature: -40 to +85 °C (-40 to 185 °F).
- Head transmitter according to climate class C1
- Condensation permitted for head transmitter as per IEC 60068-2-33
- Max. rel. humidity: 95% as per IEC 60068-2-30
- Degree of protection:
 - Head transmitter with screw terminals: IP 00, with spring 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.)

4.2 Installation

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

- Maximum torque for securing screws = 1 Nm (¾ foot-pound), screwdriver: Pozidriv Z2
- Maximum torque for screw terminals = 0.35 Nm (¼ foot-pound), screwdriver: Pozidriv Z1

4.2.1 Mounting the head transmitter

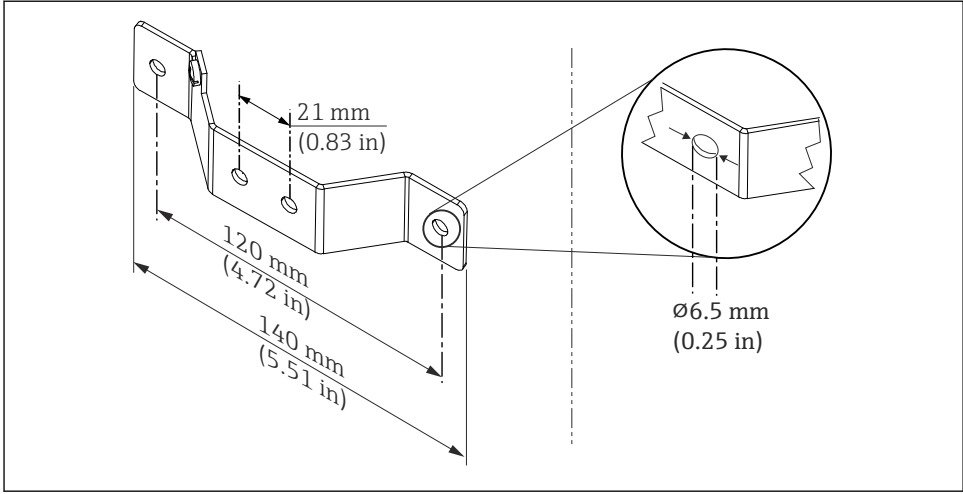


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2 Head transmitter mounting (three versions)

Procedure for mounting in a terminal head, Item 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.



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

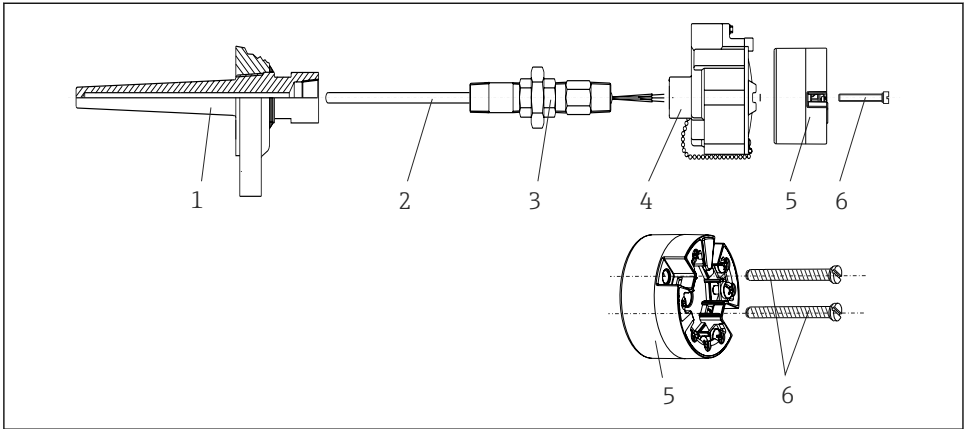
Procedure for mounting in a field housing, Item B:

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.

Procedure for mounting on a DIN rail, Item 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



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4 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 .
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.

4.3 Post-installation check

After installing 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.)?	→  8

5 Electrical connection


CAUTION

- ▶ Switch off power supply before installing or connecting the device. Failure to observe this may result in destruction of parts of the electronics.
- ▶ When connecting Ex-certified devices, please take special note of the instructions and connection schematics in the Ex-specific supplement to these Operating Instructions. Please contact Endress+Hauser's representative if you have any questions.
- ▶ Do not occupy the display connection. Connecting other devices can destroy the electronics.
- ▶ Connect the potential matching line to the outer ground terminal before applying the power supply.

5.1 Connection conditions

A Phillips head screwdriver is required to wire the head transmitter with screw terminals. The spring terminal version can be wired without any tools.

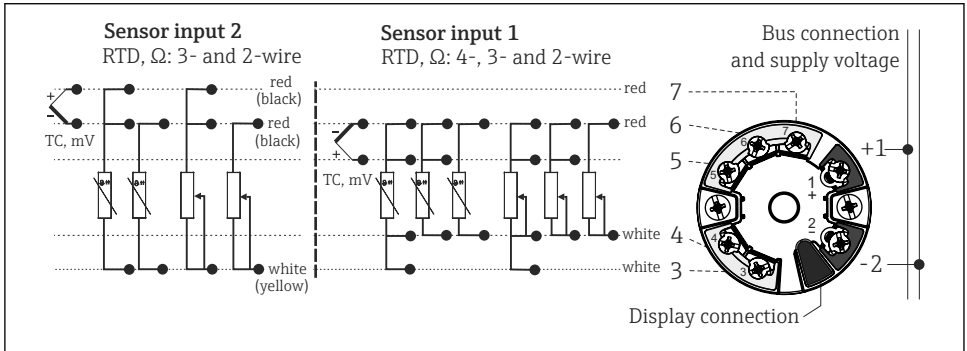
Proceed as follows to wire a mounted head transmitter:

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 . If the head transmitter is fitted with spring terminals, pay particular attention to the information in the "Connecting to spring terminals" section". →  14
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 Connecting the measuring device

Terminal assignment



5 Terminal assignment of head transmitter

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.

5.2.1 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 interfere with the measurements considerably, resulting in false readings.

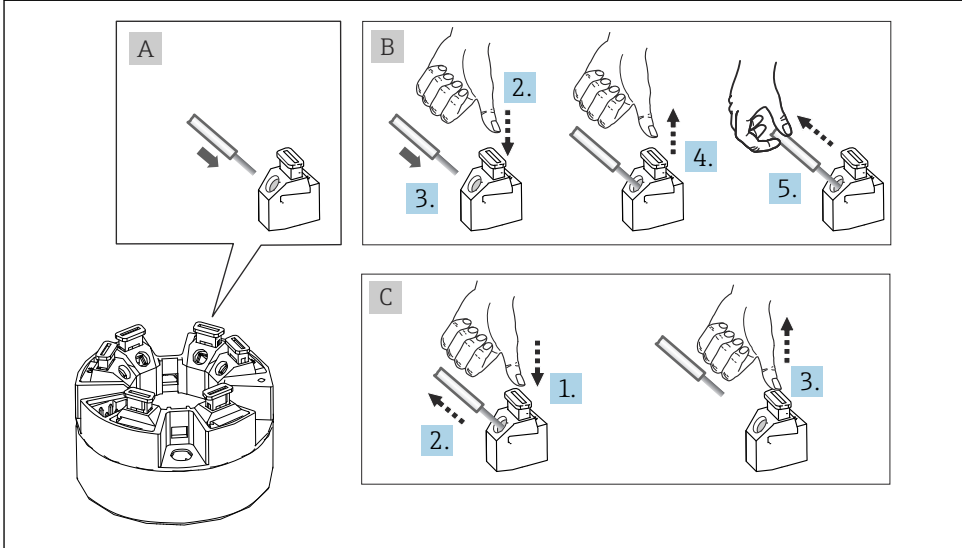
- ▶ The sensors must remain galvanically isolated from one another by connecting each sensor separately to a transmitter. The transmitter provides sufficient galvanic isolation (> 2 kV AC) between the input and output.

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

		Sensor input 1			
		RTD or resistance transmitter, two-wire	RTD or resistance transmitter, three-wire	RTD or resistance transmitter, four-wire	Thermocouple (TC), voltage transmitter
Sensor input 2	RTD or resistance transmitter, two-wire	✓	✓	-	✓
	RTD or resistance transmitter, three-wire	✓	✓	-	✓

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

Connecting to spring terminals



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6 Spring terminal connection, using the example of a head transmitter

Item 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.

Item 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.

Item C, releasing the connection:

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

5.2.2 Fieldbus connection

Fieldbus cable specification as per IEC 61158-2 (MBP), see the Operating Instructions for details.

Devices can be connected to the fieldbus in two ways:

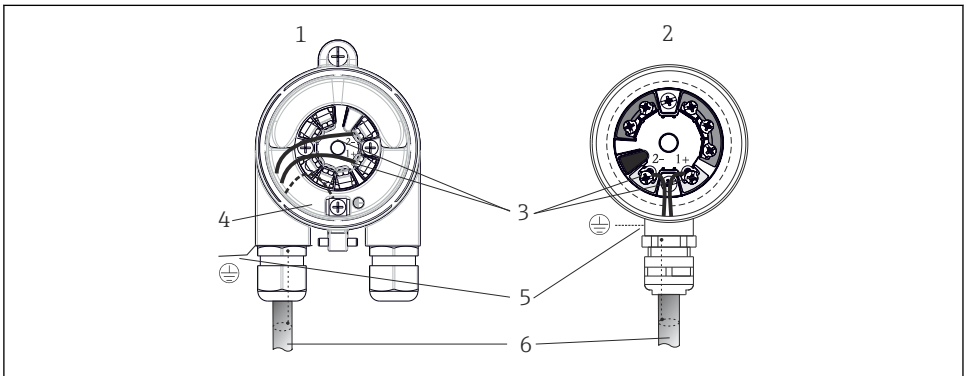
- Using a conventional cable gland
- Using the fieldbus connector (optional, available as an accessory)



Grounding via one of the grounding screws (terminal head, field housing) is recommended.

Cable gland or entry

Please also observe the general procedure on → 13.



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7 *Connecting the signal cables and power supply*

- 1 *Head transmitter installed in field housing*
- 2 *Head transmitter installed in terminal head*
- 3 *Terminals for fieldbus communication and power supply*
- 4 *Internal ground connection*
- 5 *External ground connection*
- 6 *Shielded fieldbus cable*



- The terminals for connecting the fieldbus (1+ and 2-) are not polarity sensitive.
- Conductor cross-section:
 - Max. 2.5 mm² for screw terminals
 - Max. 1.5 mm² for spring terminals. Min. stripping length of cable 10 mm (0.39 in).
- A shielded cable must be used for the connection.

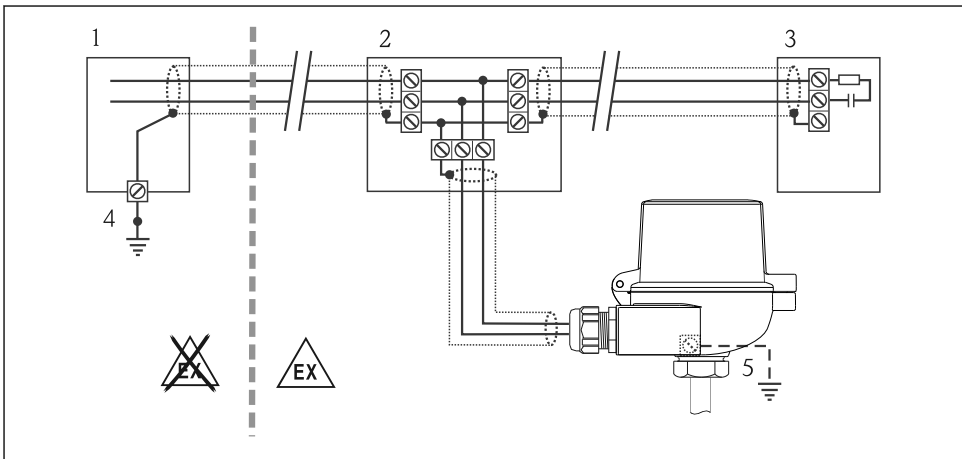
Shielding and grounding

Optimum electromagnetic compatibility (EMC) of the fieldbus system can only be guaranteed if the system components and, in particular, the lines are shielded and the shield forms as complete a cover as possible.

The fieldbus system permits three different types of shielding:

- Shielding at both ends
- Shielding at one end on the feed side with capacitance termination at the field device
- Shielding at one end on the feed side

The best results with regard to EMC are achieved in most cases with one-sided shielding on the feed side (without capacitance termination at the field device). Operation in the event of disturbance variables as per NAMUR NE21 is thus guaranteed.



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8 Shielding and grounding of the fieldbus cable shield at one end

- 1 Supply unit
- 2 Junction box (T-box)
- 3 Bus termination
- 4 Grounding point for fieldbus cable shield
- 5 Optional grounding of the field device, isolated from cable shielding

5.3 Post-connection check

Device condition and specifications	Notes
Are the device or cables free from damage (visual check)?	--
Electrical connection	Notes
Does the supply voltage match the information on the nameplate?	9 to 32 V _{DC}

Device condition and specifications	Notes
Do the cables used meet the required specifications?	Fieldbus cable, Sensor cable, → ☰ 13
Do the cables have adequate strain relief?	--
Are the power supply and signal cables connected correctly?	→ ☰ 13
Are all the screw terminals well tightened and have the connections of the spring terminals been checked?	→ ☰ 14
Are all cable entries mounted, tightened and leak-tight?	--
Are all housing covers installed and firmly tightened?	--
Electrical connection of the fieldbus system	Notes
Are all the connecting components (T-boxes, junction boxes, connectors, etc.) connected with each other correctly?	--
Has each fieldbus segment been terminated at both ends with a bus terminator?	--
Has the max. length of the fieldbus cable been observed in accordance with the fieldbus specifications?	
Has the max. length of the spurs been observed in accordance with the fieldbus specifications?	
Is the fieldbus cable fully shielded and correctly grounded?	

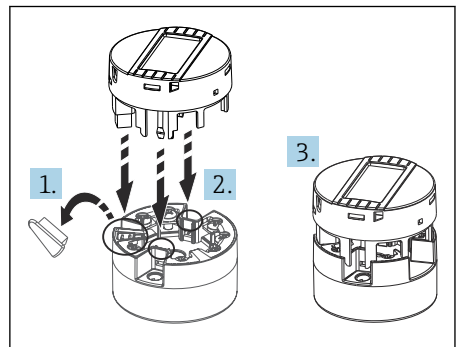
6 Operation options

6.1 Measured value display and operating elements

6.1.1 Option: Display TID10 for head transmitter



The display may also be subsequently ordered at any time after purchasing the transmitter, see the 'Accessories' section in the Operating Instructions for the device.




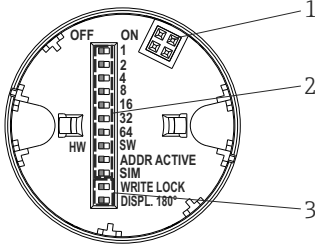

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☰ 9 Attaching the display to the transmitter

6.1.2 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.


 <p style="text-align: right; font-size: small;">A0014562</p> <p> 10 <i>Hardware settings via DIP switches</i></p>	<p>1: Connection to head transmitter</p> <p>2: DIP switches (1 - 64, SW/HW and ADDR) for configuring the device address</p> <p>3: DIP switch (SIM = simulation mode (has no function); WRITE LOCK = write protection; DISPL. 180° = switch (turn) the display screen 180°)</p>
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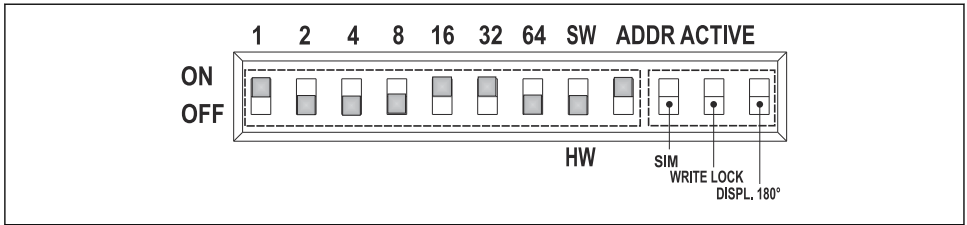
Procedure for setting the DIP switch:

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.

Configuring the device address

- The address must always be configured for a PROFIBUS® PA device. Valid device addresses are in the range between 0 and 125. In a PROFIBUS® PA network, each address can only be assigned once. If an address is not configured correctly, the device is not recognized by the master. The address 126 is used for initial commissioning and service purposes.
- All devices are delivered ex works with the address 126 and software addressing.

 Following a device address change, the head transmitter must be powered up again so that the head transmitter will adopt and save the new device address.



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11 Configuring the device address using the example of bus address 49

DIP switch set to ON: $32 + 16 + 1 = 49$. Furthermore, SW/HW DIP switch set to "HW" and ADDR ACTIVE to "ON".

6.2 Configuration of the head transmitter and PA functions

PROFIBUS® PA functions and device-specific parameters are configured via fieldbus communication. The following configuration systems are available for this purpose:

- Endress+Hauser FieldCare (DTM)
- SIMATIC PDM (EDD)

i The step-by-step procedure for commissioning the fieldbus functions for the first time is described in detail in the comprehensive Operating Instructions, as is the configuration of device-specific parameters.

7 Commissioning

7.1 Switching on the transmitter

Once you have successfully completed the final checks, it is time to switch on the supply voltage. The transmitter performs a number of internal test functions after power-up. During this process, a sequence containing device information appears on the display.

The device operates as normal after approx. 8 seconds, and the attached display after approx. 12 seconds! Normal measuring mode commences as soon as the switch-on procedure is completed. Measured values and status values appear on the display.



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www.addresses.endress.com
