Brief Operating Instructions
iTEMP® TMT82

Dual-input temperature transmitter

These Instructions are Brief Operating Instructions.

For detailed information, refer to the Operating Instructions and other documentation on the CD-ROM provided or visit "www.endress.com/deviceviewer".

These Brief Operating Instructions **do not** act as a substitute for the Operating Instructions included in the scope of delivery.

The complete device documentation comprises:
- These Brief Operating Instructions
- A CD-ROM with PDF files of:
    – Operating Instructions
    – Approval and safety certificates
    – Further device specific information.

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Table of contents

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 (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.

1.1.3   Functional safety

Please refer to Safety Manual SD01172T/09 for the use of approved devices in protective systems according to IEC 61508.

1.2   Document conventions

1.2.1   Safety symbols

Symbol	Meaning
⚠ DANGER A0011189-EN	**DANGER!** This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.
⚠ CAUTION A0011191-EN	**CAUTION!** This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or medium injury.
NOTICE A0011192-EN	**NOTE!** 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
i A0011193	**Tip** Indicates additional information.
A0011194	**Reference to documentation** Refers to the corresponding device documentation.
A0011195	**Reference to page** Refers to the corresponding page number.
A0011196	**Reference to graphic** Refers to the corresponding graphic number and page number.
1., 2., 3.	Series of steps

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 (RT), thermocouples (TC), resistance and voltage transmitters. The head transmitter version of the device is intended for mounting in a flat-face terminal head 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).

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 in accordance with EN 61010-1, the EMC requirements of IEC/EN 61326 and NAMUR Recommendation NE 21 and NE 89.

> **NOTICE**
>
> ▶ The unit must only be powered by a power supply that operates using an energy-limited electric circuit that is compliant with IEC 61010-1, "SELV or Class 2 circuit".

3   Identification
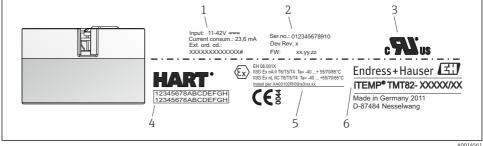
3.1   Device designation

The following options are available for identification of the device:
• Nameplate specifications
• Enter the serial number from the nameplate in *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.

3.1.1   Nameplate

The right device?

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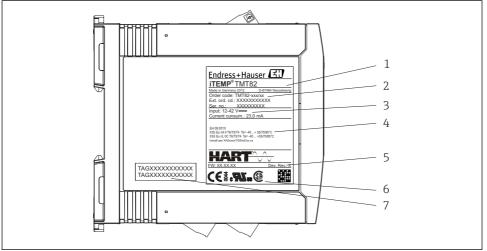

 1   *Nameplate of the head transmitter (example, Ex version)*

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

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⊡ 2   *Nameplate of DIN rail transmitter (example, Ex version)*

1   Product description and manufacturer ID
2   Order code, extended order code and serial number
3   Power supply and current consumption
4   Approval in hazardous area with number of the relevant Ex documentation (XA...)
5   Firmware version and device version
6   Approval logos
7   2 lines for the TAG name

3.2 Scope of delivery

The scope of delivery of the device comprises:
• Temperature transmitter
• Mounting material (head transmitter)
• Hard copy of multi-language Brief Operating Instructions
• Operating Instructions, Functional Safety Manual (SIL mode) and additional documentation on CD-ROM
• Additional documentation for devices which are suitable for use in hazardous areas (⟨Ex⟩ ⟨FM⟩ ⟨CSA⟩), such as Safety Instructions (XA), Control or Installation Drawings (ZD).

3.3 Certificates and approvals

The device left the factory in a safe operating condition. The device complies with the standards EN 61 010-1 "Protection Measures for Electrical Equipment for Measurement, Control, Regulation and Laboratory Procedures" and with the EMC requirements of IEC/EN 61326.

3.3.1   CE mark, Declaration of Conformity

The device therefore meets the legal requirements of the EC guidelines. The manufacturer confirms that the device is compliant with the relevant guidelines by applying the CE mark.

3.3.2   HART® protocol certification

The temperature transmitter is registered by HART® Communication. The device meets the requirements of the HART Communication Protocol Specifications.

3.3.3   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

4   Installation instructions

4.1   Incoming acceptance, transport, storage

4.1.1   Incoming acceptance
• Is the packaging or content damaged?
• Is the delivery complete? Compare the scope of delivery against the information on your order form.
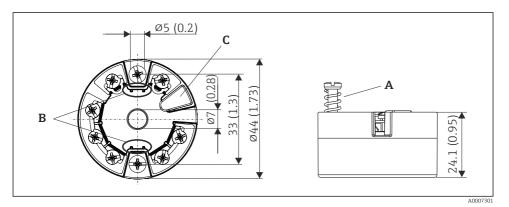
4.1.2   Transport and storage
• Pack the device in such a way as to protect it reliably against impact for storage (and transportation). The original packaging provides optimum protection.
• Permitted storage temperature:
  – Head transmitter: –50 to +100 ℃ (–58 to +212 ℉)
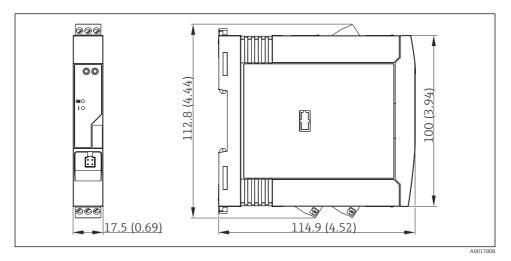 – DIN rail transmitter: –40 to +100 ℃ (–40 to +212 ℉)

4.2   Installation conditions

4.2.1   Dimensions

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

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

> The same dimensions apply to the version with spring terminals. Exception: Height of housing H = 28.1 mm (1.11 in).

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

4.2.2   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

4.2.3   Important ambient conditions

• Ambient temperature: −40 to +85 ℃ (−40 to 185 ℉), for SIL-operation:
  −40 to +70 ℃ (−40 to +158 ℉).
• Head transmitter as per climate class C1, DIN rail transmitter as per climate class B2 according to EN 60654-1.
• Condensation as per IEC 60068-2-33 permitted for head transmitter, not permitted for DIN rail transmitter.
• Maximum relative humidity: 95% according to IEC 60068-2-30
• Degree of protection:
  – With screw terminals: IP 00. In the installed state, it depends on the terminal head or field housing used.
  – When installing in field housing TA30x: IP 66/67 (NEMA Type 4x encl.)
  – DIN rail device: IP 20

NOTICE

▶ When using in the hazardous area, the limit values of the certificates and approvals must be observed (see Safety Instructions XA or CD).

4.3   Installation instructions

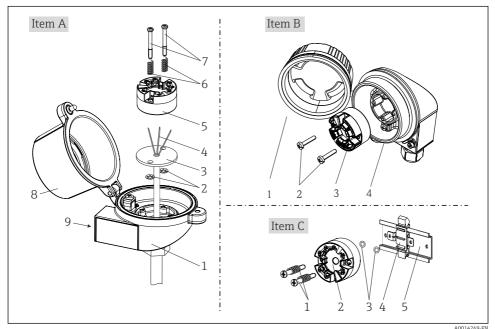A Phillips head screwdriver is required to mount the head transmitter.

NOTICE

Do not overtighten the mounting screws as this could damage the head transmitter.
▶ Maximum torque = 1 Nm (¾ pound-feet).

4.3.1 Mounting the head transmitter

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🖻 5 *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 again (8) tightly.(→ 🖺 13)
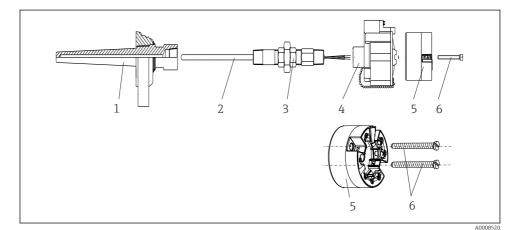
Procedure for mounting in a field housing, item B:

1. Open the cover (1) of the field housing (4).
2. Guide the mounting screws (2) through the lateral bores of the head transmitter (3).
3. Screw the head transmitter to the field housing.
4. After wiring, close the field housing cover (1) again. (→ 🖺 13)

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

🖻 6   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 and transmitter with one another (→ 🖺 14).

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.

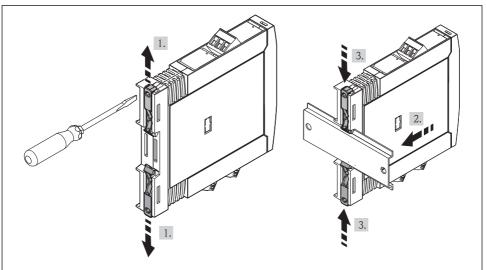▶ After wiring, securely screw the terminal head cover back on.

4.3.2   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)!

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⊞ *7   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.

4.4   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.)?	(→ 📖 9)

5   Wiring

⚠ 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 installing Ex-approved devices in a hazardous area please take special note of the instructions and connection schematics in the respective Ex documentation added to these Operating Instructions. Your supplier is available for assistance if required.
▶ Do not occupy the display connection. An incorrect connection can destroy the electronics.

A Phillips head screwdriver is required to wire the head transmitter with screw terminals. A flat-bladed screwdriver must be used for the version with spring terminals and for the DIN rail transmitter.

NOTICE

Do not overtighten the screw terminals, as this could damage the transmitter.
▶ Maximum torque = 1 Nm (¾ pound-feet).

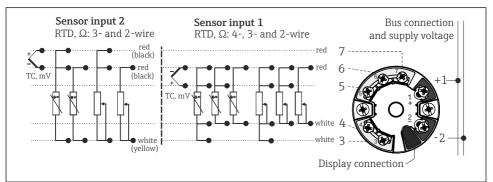For wiring a mounted head transmitter, proceed as follows:

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 (→ 📖 14). If the head transmitter is fitted with spring terminals, pay particular attention to the information in the "Connecting to spring terminals" section" (→ 📖 15).

4.   Retighten the cable gland and close the housing cover.

In order to avoid connection errors always take note of the hints given in the section connection check!
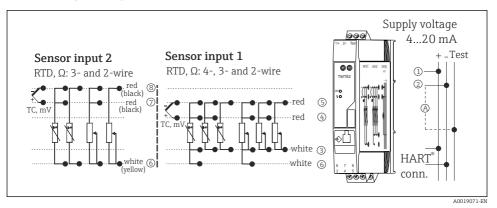
5.1 Quick wiring guide

Terminal assignment of head transmitter

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Terminal assignment of DIN rail transmitter

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

To operate the device via the HART® protocol (terminals 1 and 2), a minimum load of 250 Ω is required in the signal circuit.

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

5.2   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.
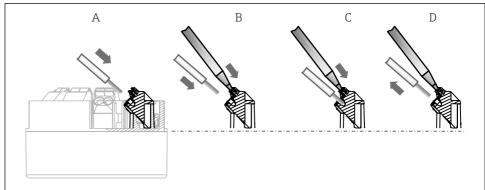
The following connection combinations are possible when both sensor inputs are assigned:

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

1)   Permitted combinations in the SIL mode, see Functional Safety Manual SD01172T/09

5.2.1   Connecting to spring terminals

A flat-bladed screwdriver, size 3 mm is required.

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🔲 *8   Spring terminal connection*

Pos. A, solid wire:

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

Pos. B, fine-strand wire without ferrule:

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

Pos. C and D, releasing the connection:

1. Operate lever opener with tool (C).
2. Remove wire from terminal (D).
3. Release lever opener.

When connecting flexible cables and spring terminals, it is not recommended to use ferrules.

5.3   Connecting the power supply and signal cables

⚠ CAUTION
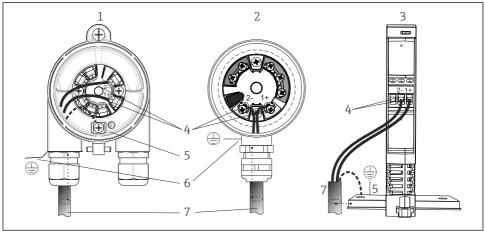
▸ Switch off power supply before installing or connecting the transmitter. Failure to observe this may result in destruction of parts of the electronics.

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.
- On the sensor side, shielded cables must be used for the DIN rail transmitter from a length of 30 m (98.4 ft).

Please also observe the general procedure on (→ 🖺 13).

🖀 9   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 connecting the signal cable (1+ and 2-) are protected against reverse polarity.
> • Conductor cross-section:
>   – Max. 2.5 mm^2 for screw terminals
>   – max. 1.5 mm^2 for spring terminals. Min. stripping length of wire10 mm (0.39 in).

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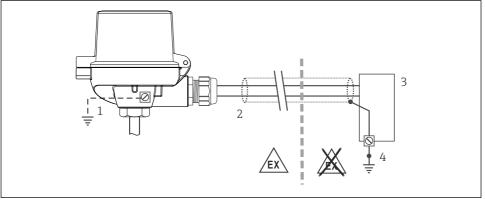
Optimum electromagnetic compatibility (EMC) can only be guaranteed if the system components and, in particular, the lines are shielded and the shield forms as complete a cover as possible.

HART® communication allows 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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⊡ *10*   *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

NOTICE

If the shielding of the cable is grounded at more than one point in systems without potential matching, power supply frequency equalizing currents can occur that damage the signal cable or have a serious effect on signal transmission.

▶ In such cases the shielding of the signal cable is to be grounded on only one side, i.e. it must not be connected to the ground terminal of the housing (terminal head, field housing). The shield that is not connected should be insulated!

5.5   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 specifications on the nameplate?	• Head transmitter: U = 11 to 42 V_{DC} • DIN rail transmitter: U = 12 to 42 V_{DC} • SIL mode: U = 11 to 32 V_{DC} for the head transmitter or U = 12 to 32 V_{DC} for the DIN rail transmitter
Do the cables have adequate strain relief?	--
Are the power supply and signal cables correctly connected?	(→ 🕮 14)
Are all the screw terminals well tightened and have the connections of the spring terminals been checked?	--
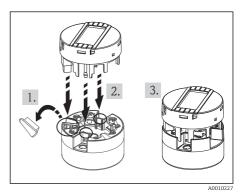
Device condition and specifications	Notes
Are all the cable entries installed, tightened and sealed?	--
Are all housing covers installed and firmly tightened?	--

6   Operating options

6.1   Measured value display and operating elements

6.1.1   Option: Display TID10 with transmitter

ℹ️ The display may also be ordered at a later stage (see "Accessories" section in the Operating Instructions on the CD-ROM provided).

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🖾 *11   Attach the display to the transmitter*

6.1.2   Display elements

Head transmitter

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🖾 *12   Optional LC display TID10 for head transmitter*

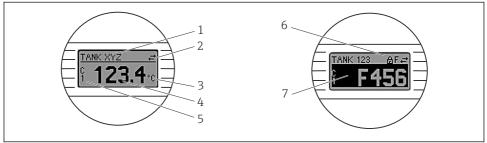| Item No.	Function	Description
1	Displays the TAG	TAG, 32 characters long.
2	'Communication' symbol	The communication symbol appears when read and write-accessing via the fieldbus protocol.
3	Unit display	Unit display for the measured value displayed.
4	Measured value display	Displays the current measured 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
6	'Configuration locked' symbol	The 'configuration locked' symbol appears when configuration is locked via the hardware.
7	Status signals	

	Symbols	Meaning
	F	**Error message "Failure detected"** 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 on the CD-ROM provided.
	C	**"Service mode"** The device is in service mode (e.g. during a simulation).
	S	**"Out of specification"** The device is being operated outside its technical specifications (e.g. during warm-up or cleaning processes).
	M	**"Maintenance required"** 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 TID10 and therefore does not have a local display either.
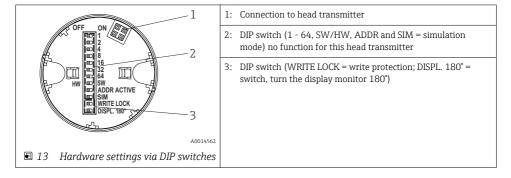
Two LEDs on the front indicate the device status in accordance with NAMUR NE44.

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. • LED off: without diagnostic message • LED is lit: diagnostics display, category F • LED flashing: diagnostics display of categories C, S or M
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. • LED off: Power failure or insufficient supply voltage • LED is lit: Supply voltage is OK (either via CDI or via supply voltage, terminals 1+, 2-)

6.1.3 Local operation

NOTICE

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

1:	Connection to head transmitter
2:	DIP switch (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°)

  🖾 *13   Hardware settings via DIP switches*

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 key symbol on the display indicates that the write protection is on. Write protection prevents any write access to the parameters. The write protection remains active even when the display is removed. To deactivate the write protection, the device must be restarted with the display attached and the DIP switch deactivated (WRITE LOCK = OFF).

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 and measured value display are configured via the HART® protocol or CDI (= Endress+Hauser 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

For use in hazardous areas: Before accessing the device with the Commubox FXA291 via the CDI (= Endress+Hauser 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 on the CD-ROM provided.

7   Commissioning

7.1   Post-installation check

Before commissioning the measuring point make sure that all final checks have been carried out:
- Checklist "Post-installation check", (→ 🕮 13)
- Checklist "Post-connection check", (→ 🕮 18)

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	Firm logo
3	Device name with firmware and hardware versions
4	Information on the sensor configuration (sensor element and type of connection)
5	Set measuring range
6a	Current measured value or
6b	Current status message ℹ️ 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 on the CD-ROM.

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 keyhole 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 on the supplied CD-ROM.

ℹ️ 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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