JUMO dTRANS T07

Two-channel temperature transmitter with HART®/Ex/SIL for installation in terminal head, B form, and for mounting on DIN rails

Brief Instructions

70708000T97Z001K000

V3.00/EN/00681622/2023-01-16

Contents

Contents

1 Important information about this document

1.1 How this document works and how to use it

1.1.1 How this document works

These instructions contain information that is required in the various phases of the device's lifecycle: from product identification, product acceptance and storage to mounting, connection, basic operation, and startup, through to troubleshooting, maintenance and disposal.

1.1.2 Safety information

When using the device in potentially explosive areas, you must adhere to any relevant national standards. A separate Ex safety manual has been created for measuring systems that are used in potentially explosive areas; this safety manual forms an integral component of this operating manual. The installation regulations, connection values and safety information contained in this manual must also be observed at all times. Always make sure you are using the Ex safety manual that corresponds to your Ex-approved device. The number for the corresponding Ex safety manual can be found on the nameplate. You can only use an Ex safety manual when both numbers (on the Ex safety manual and on the nameplate) match completely.

1.1.3 Functional safety

NOTE!

Observe the SIL safety manual when using approved devices in safety-related systems according to IEC 61508.

1.2 Symbols

1.2.1 Warning symbols

CAUTION!

This symbol in connection with the signal word indicates that **material damage or data loss** will occur if the respective precautionary measures are not taken.

CAUTION!

This symbol indicates that **components could be destroyed** by electrostatic discharge (ESD = Electro Static Discharge) if the respective cautionary measures are not taken.

Only use the ESD packages intended for this purpose to return device inserts, assembly groups, or assembly components.

1.2.2 Note symbols

NOTE!

This symbol refers to **important information** about the product, its handling, or additional benefits.

REFERENCE!

This symbol refers to **additional information** in other sections, chapters, or other manuals.

1 Important information about this document

1.3 Other applicable device documentation

Document	Purpose and content of the document
Data sheet JUMO dTRANS T07	**Planning aid for the device** The document provides all technical data related to the device and an overview of all accessories that can be ordered for the device.
Operating manual JUMO dTRANS T07	**Detailed manual** The manual provides all information, from the receipt of goods, to the description of parameters and troubleshooting.
Safety Manual SIL JUMO dTRANS T07	This manual for functional safety according to IEC 61508:2010 describes deviating requirements for device installation, startup, and operation of the safety function.
Safety Manual Ex JUMO dTRANS T07	Safety information and technical data for electrical equipment for potentially explosive areas according to Directive 2014/34/EU (ATEX).

NOTE!

The documents listed are available:
At www.jumo.net, under "Documentation" on the product page for the dTRANS T07.

1.4 Registered trademarks

HART® Trademark registered to the FieldComm Group™

2.1 Requirements for personnel

Staff involved in installation, startup, diagnosis, and maintenance must meet the following criteria:

- Qualified personnel: Hold qualifications for their function and area of work
- Have been authorized by the system operator
- Are familiar with local regulations
- Prior to starting work: Have read and understood the instructions in this manual and additional documentation, as well as any certificates (depending on the application)
- Follow instructions and note underlying conditions

Operating staff must meet the following criteria:

- Have been authorized by the system operator and have received instructions in line with the requirements of the task at hand
- Follow the instructions in this manual

2.2 Intended use

The dTRANS T07 series is a range of universal and configurable transmitters with either one or two sensor inputs for RTD temperature probes (RTD), thermocouples (TC), potentiometers, and voltage sensors.

The devices are available in two versions: for installation in a B-form terminal head according to DIN EN 50446 or for DIN-rail mounting according to IEC 60715 (TH35). Using a mounting element available as an accessory, the head transmitter can also be mounted to DIN rail.

The manufacturer is not liable for any damage resulting from improper use or failure to observe the intended use.

2.3 Operational safety

NOTE!

The device must be in good technical working order and safe for operation during use.
The operator is responsible for operating the device without disruptions.

Areas that require approval

To prevent any risk to persons or the plant when the device is used in areas subject to approval requirements (e.g., explosion protection or safety-related systems):

- Use the technical data on the nameplate to check whether the ordered device can be used for its intended purpose in the approval-relevant area; the nameplate is located on the side of the transmitter housing
- Observe any specifications in separate documentation that forms an integral part of these instructions

Fault safety

The measurement device meets all general safety requirements according to EN 61010-1, EMC requirements according to the IEC/EN 61326 series, and NAMUR recommendations NE 21 and NE 89.

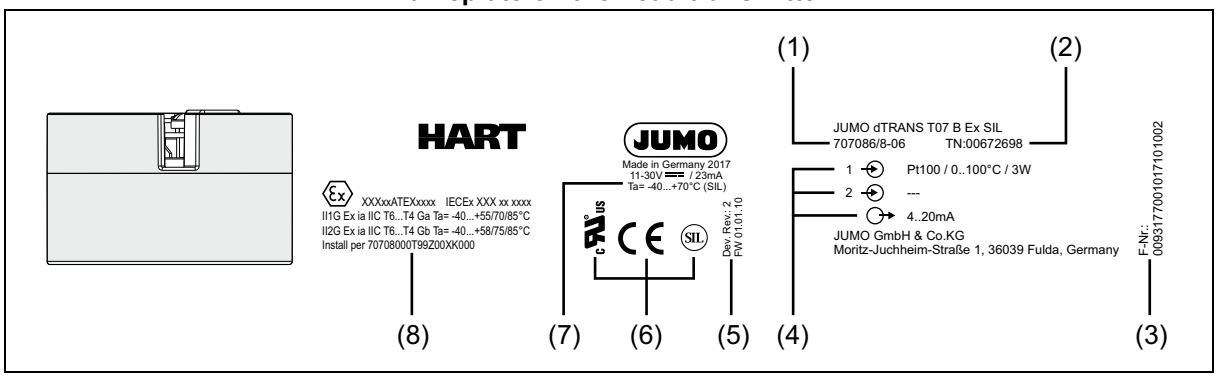
NOTE!

Only an SELV voltage is admissible for external voltage supply. The device must be equipped with an electrical circuit that meets the requirements of EN 61010-1 with regard to "Limited-energy circuits".

3 Identifying the device version

3.1 Nameplate

Nameplate on the head transmitter



(1) Device type

Compare the specifications on the nameplate with your order documents. The supplied device version can be identified using the order code in 10.

Example: Type 707086/8-06 (dTRANS T07 B Ex SIL – Two-wire transmitter with Ex and SIL approval for installation in terminal head, form B)

(2) Part no. (TN)

The part no. uniquely identifies an article in the catalog. It is important for communication between the customer and the sales department.

(3) Fabrication number (F-Nr)

The date of manufacture (year/calendar week) and the hardware version number are some of the aspects specified in the fabrication number.

Example: 009317700101**1710**1002
Here, we are looking at the 12th to the 15th digit (from the left).
The device was produced in the **10th** week of 20**17**.

(4) Inputs and output

Example: Input 1 configured for Pt100 in a 3-wire circuit for a temperature range of 0 to 100 °C, input 2 is not configured, output 4 to 20 mA.

(5) Device revision and firmware version

Example: Device revision 2, firmware version 01.01.10.

(6) Approvals and certificates

Example: Device is SIL and UL-approved and CE-compliant.

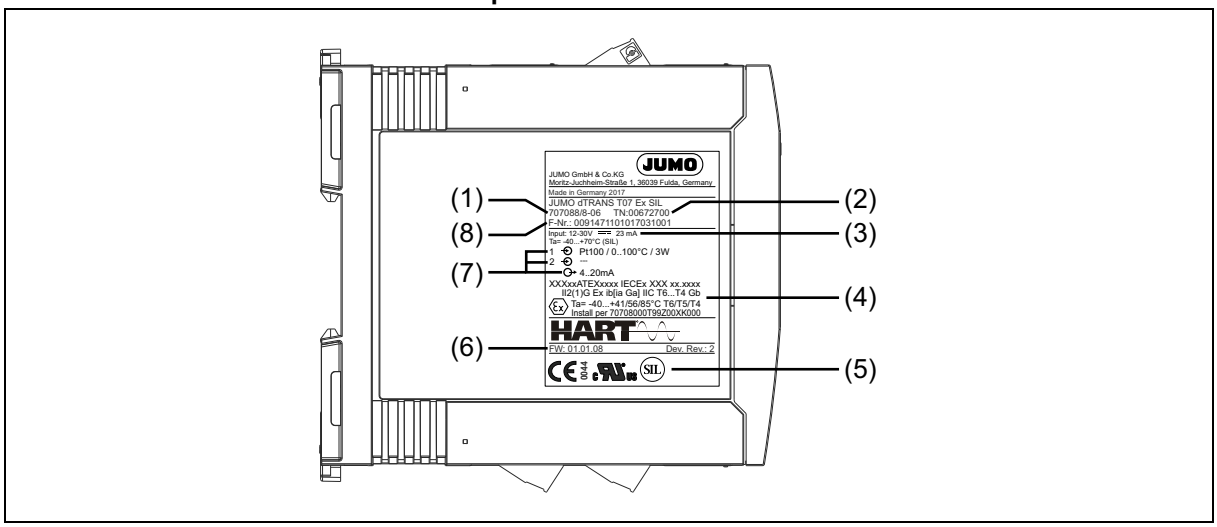
(7) Voltage supply and admissible ambient temperature in SIL mode

Example: Voltage range DC 11 to 30 V, current consumption 23 mA, admissible ambient temperature in SIL mode -40 to +70 °C.

(8) Ex-approvals

Identification marking for approval in potentially explosive areas according to the ATEX Directive and designation for the corresponding Ex safety manual (installation on ...)

Nameplate on DIN rail devices



(1) Device type

Compare the specifications on the nameplate with your order documents. The supplied device version can be identified using the order code in 10.

Example: Type 707088/8-06 (dTRANS T07 T Ex SIL – 2-wire transmitter with Ex and SIL approval for mounting on DIN rails)

(2) Part no. (TN)

The part no. uniquely identifies an article in the catalog. It is important for communication between the customer and the sales department.

(3) Voltage supply and admissible ambient temperature in SIL mode

Example: Voltage range DC 12 to 30 V, current consumption 23 mA, admissible ambient temperature in SIL mode -40 to +70 °C.

(4) Ex-approvals

Identification marking for approval in potentially explosive areas according to the ATEX Directive and designation for the corresponding Ex safety manual (installation on ...)

(5) Approvals and certificates

Example: Device is SIL and UL-approved and CE-compliant.

(6) Firmware version and device revision

Example: Firmware version 01.01.08, device revision 2.

(7) Inputs and output

Example: Input 1 configured for Pt100 in a 3-wire circuit for a temperature range of 0 to 100 °C, input 2 is not configured, output 4 to 20 mA.

(8) Fabrication number (F-Nr)

The date of manufacture (year/calendar week) and the hardware version number are some of the aspects specified in the fabrication number.

Example: 00914711010**1703**1001
Here, we are looking at the 12th to the 15th digit (from the left).
The device was produced in the **3rd** week of 20**17**.

3 Identifying the device version

3.2 Order details

		(1)	**Basic type**
	707080		dTRANS T07 B – Two-wire transmitter for installation in terminal head, form B
	707081		dTRANS T07 B SIL – Two-wire transmitter with SIL approval for installation in terminal head, form B
	707082		dTRANS T07 T – Two-wire transmitter for mounting on DIN rail
	707083		dTRANS T07 T SIL – Two-wire transmitter with SIL approval for mounting on DIN rail
	707085		dTRANS T07 B Ex – Two-wire transmitter with Ex approval for installation in terminal head, form B
	707086		dTRANS T07 B Ex SIL – Two-wire transmitter with Ex and SIL approval for installation in terminal head, form B
	707087		dTRANS T07 T Ex – Two-wire transmitter with Ex approval for mounting on DIN rail
	707088		dTRANS T07 T Ex SIL – Two-wire transmitter with Ex and SIL approval for mounting on DIN rail
		(2)	**Configuration**
X	8		Default settings (0 to 100 °C, Pt100 three-wire circuit, 4 to 20 mA)
		(3)	**Electrical connection type**
X	06		Screw terminals

	(1)		(2)		(3)
Order code		/		-	
Order example	707080	/	8	-	06

3.3 Scope of delivery

	Type							
	707080	707081	707082	707083	707085	707086	707087	707088
Transmitter in the version ordered	X	X	X	X	X	X	X	X
Operating manual	--	--	--	--	--	--	--	--
SIL safety manual	--	X	--	X	--	X	--	X
Ex safety manual	--	--	--	--	X	X	X	X
Mounting materials (for mounting in the terminal head)	X	X	--	--	X	X	--	--
Quick start guide	X	X	X	X	X	X	X	X

3.4 Accessories

Designation	Part no.
BD7 plug-in display for dTRANS T07 BD7	00672701
AB7 terminal head for dTRANS T07 B	00672702
FG7 field housing with display window for dTRANS T07 B	00672705
MW7 wall mounting set for field housing	00672707
MR7 tube mounting set for field housing	00672708
HART modem USB	00443447
Mounting element for mounting type 707080 B on DIN rail TH 35	00352463
End holder (screwable) for DIN rail TH 35	00528648

Ex-i repeater power supply/input isolating amplifier type 707530/38	00577948

3.5 Certificates and approvals

The device left the factory in perfectly safe working order. The device meets the requirements of the standard EN 61010-1 "Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use" as well as the EMC requirements under the IEC/EN 61326 series.

3.5.1 CE identification marking and declaration of conformity

The device meets the legal requirements of EU/EEU Directives. The manufacturer confirms compliance with the relevant directives with the use of the CE mark.

3.5.2 Certification of the HART® protocol

The temperature transmitter is registered by the FieldComm Group™. The device meets the requirements of HART® Communication Protocol Specifications, Revision 7.

3.5.3 Functional safety

Options for both device versions (head transmitter/DIN rail device) are available for use in safety-related systems according to IEC 61508.

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

4 Mounting

4.1 Acceptance of goods, storage, and transport

4.1.1 Goods acceptance

- Is the packaging and its contents free from damage?
- Is the delivered product complete? Compare the scope of delivery with your order details.

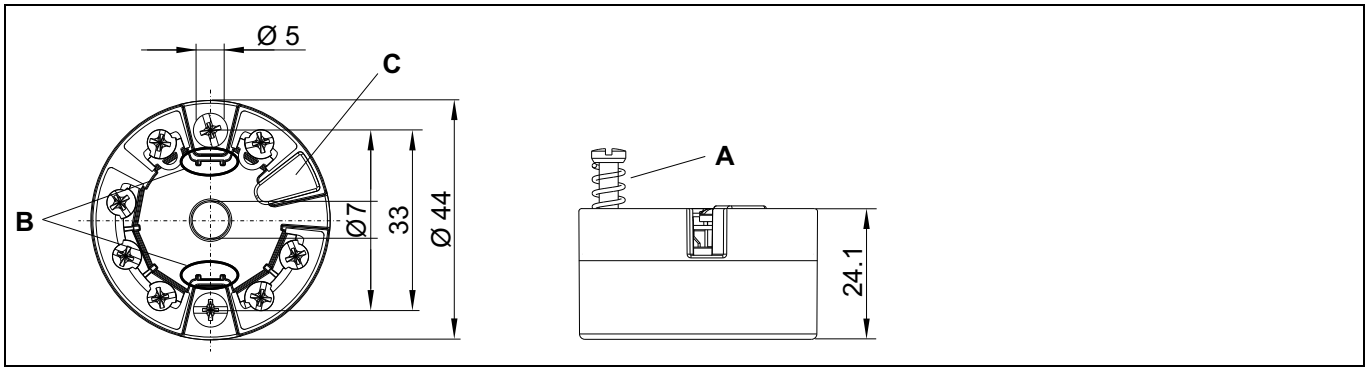
4.1.2 Transport and storage

- The device must be packaged so that it is protected against impacts during storage (and transport). The original packaging offers optimal protection.
- Admissible storage temperature:
  Head transmitter -50 to +100 °C
  DIN rail device -40 to +100 °C

4.2 Conditions for installation

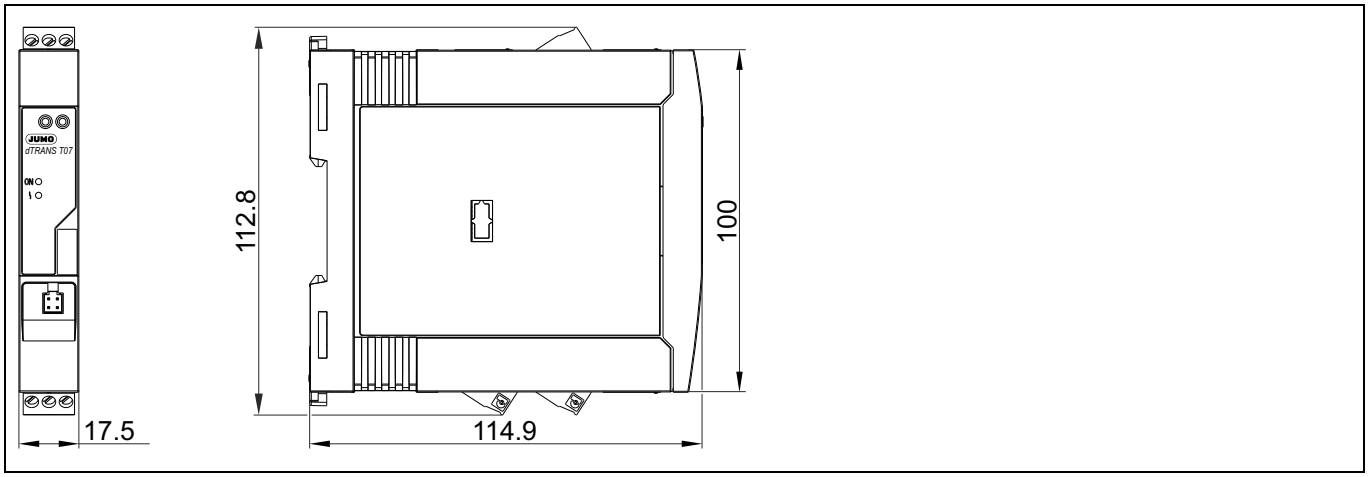
4.2.1 Dimensions

Head transmitter



A Spring deflection mounting screws ≥ 5 mm (not with US-M4 mounting screws)
B Mounting elements for plug-on display BD7
C internal service interface (not intended for use)

DIN rail device



4.2.2 Mounting site

- Head transmitter:
  In terminal head, form B, according to DIN EN 50445 directly mounted to a measuring insert with a cable passage (central hole 7 mm), in field housing, offset from process.
- DIN rail transmitter:
  Designed to be mounted on DIN rails (IEC 60715 TH35)

NOTE!

Using the accessory "Mounting element for mounting type 707080 B onto DIN rails TH 35", the head transmitter can also be mounted on DIN rails according to IEC 60715.

4.2.3 Important environmental influences

- Ambient temperature: -40 to +85 °C, in SIL mode: -40 to +70 °C.
- Head transmitter according to climate class C1, DIN rail device according to B2 according to EN 60654-1
- Condensation according to IEC 60068-2-33 admissible for head transmitter, not admissible for DIN rail device

- Maximum relative humidity: 95 % according to IEC 60068-2-30
- Head transmitter protection type: IP00. Depending on the terminal head used when installed. When installed in field housing FG7: IP66/67 (NEMA Type 4x encl.)
- DIN rail device protection type: IP20

NOTE!

For application in potentially explosive areas, the limit values for the certificates and approvals (see Ex safety manual of dTRANS T07) must be met.

4.3 Mounting

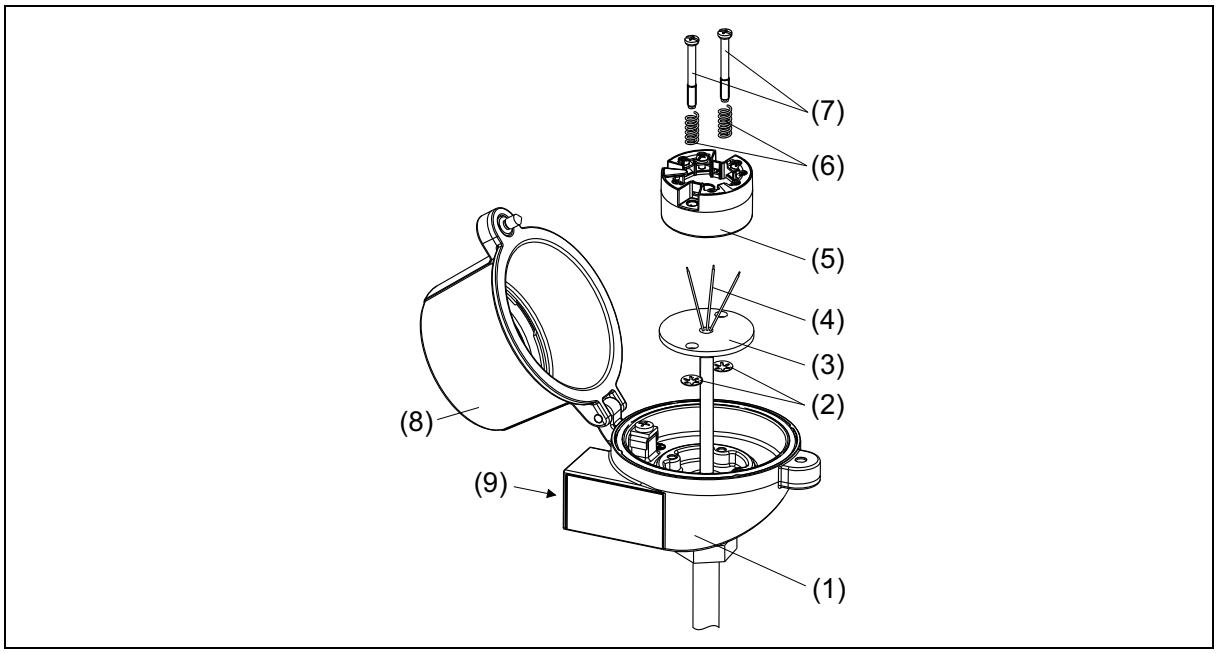
A cross-head screwdriver is required when mounting the head transmitter.

NOTE!

Do not screw the mounting screws too tight otherwise the head transmitter could be damaged, maximum torque = 1 Nm.

4.3.1 Mounting the head transmitter

Mounting a terminal head, form B, according to DIN 43729

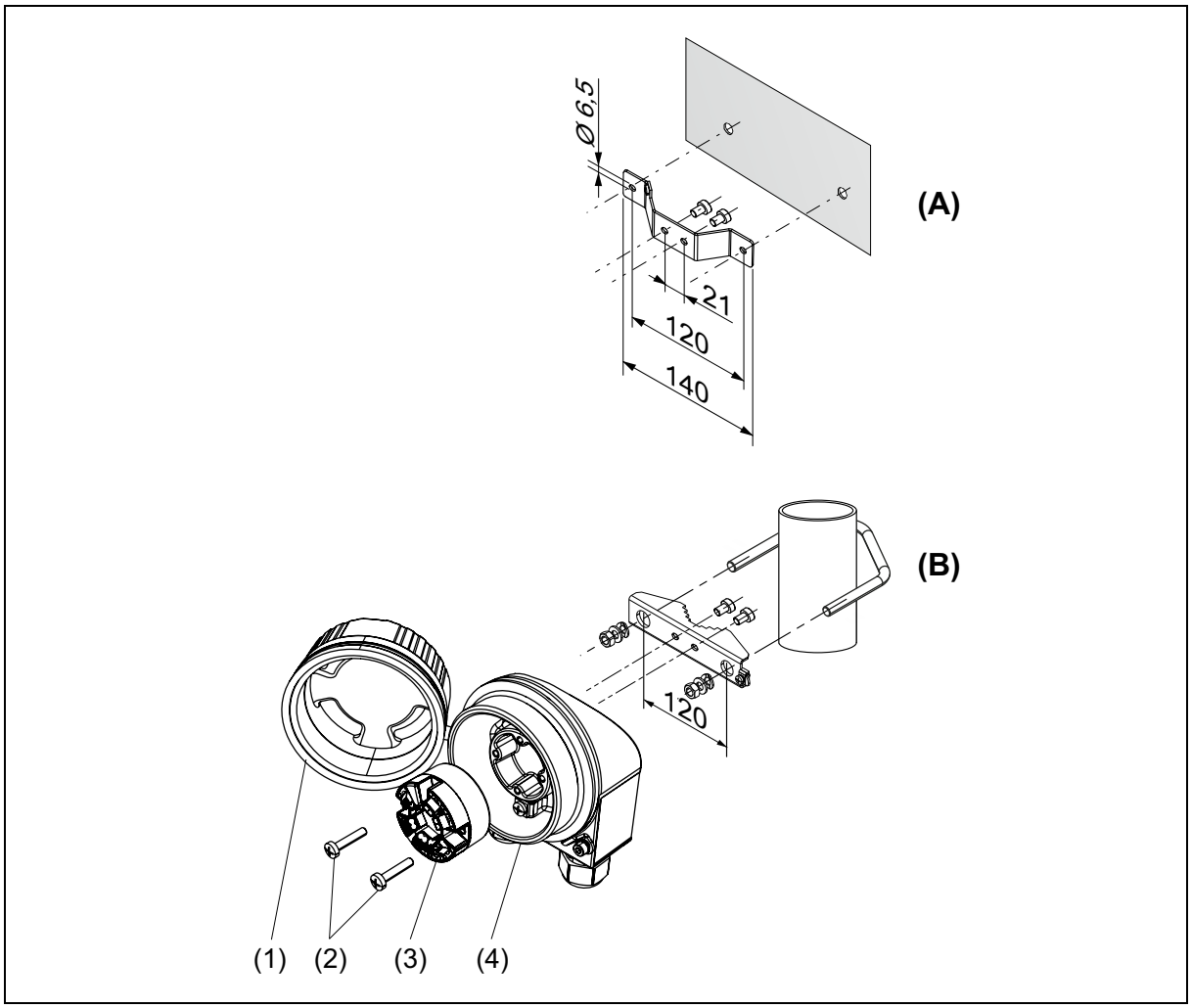


(1) Terminal head
(2) Retaining rings
(3) Measuring insert
(4) Connection wires
(5) Head transmitter
(6) Mounting springs
(7) Mounting screws
(8) Lid to terminal head
(9) Cable passage

Process:

1. Open the lid to the terminal head (8).
2. Guide the connecting wires (4) for the measuring insert (3) through the central hole in the head transmitter (5).
3. Place the mounting springs (6) onto the mounting screws (7).
4. Guide the mounting screws (7) through the side holes in the head transmitter and the measuring insert (3). Then secure both the mounting screws with retaining rings (2).
5. Then tighten the head transmitter (5) with the measuring insert (3) in the terminal head.
6. After completing the wiring process, see page 18, close the lid to the terminal head (8) tightly.

Mounting in field housing for wall mounting (A) or pipe mounting (B)



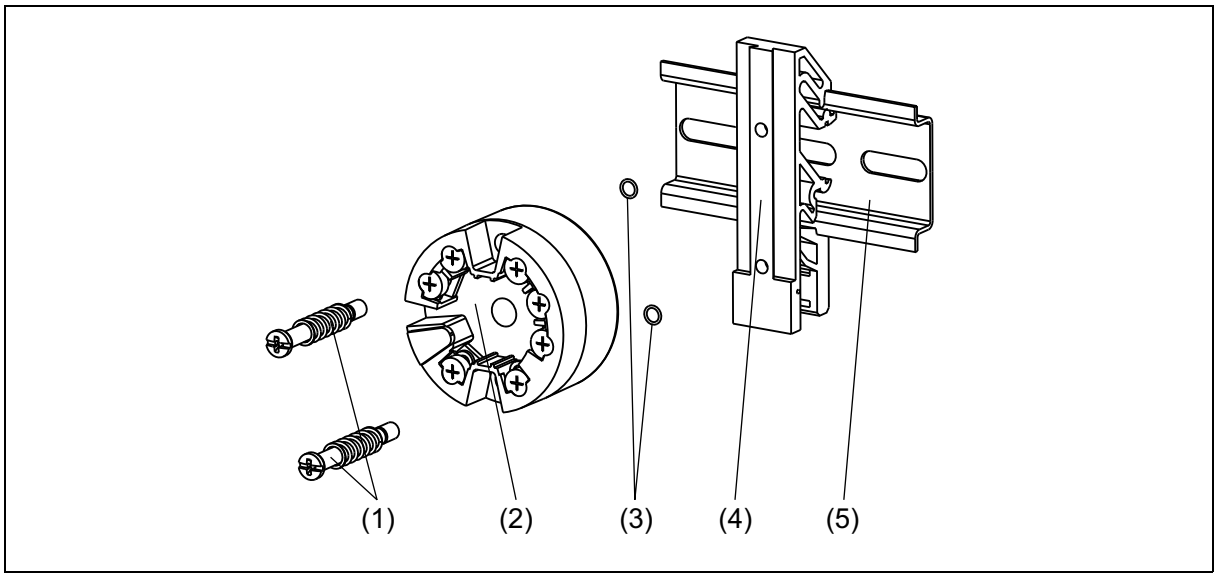
(1) Lid to field housing
(2) Mounting screws with springs
(3) Head transmitter
(4) Field housing

Process:

1. Open the lid (1) to the field housing (4).
2. Guide the mounting screws (2) through the side holes in the head transmitter (3).
3. Screw the head transmitter tightly onto the field housing.
4. After completing the wiring process, see page 18, close the lid to the field housing (1).

4 Mounting

Mounting on DIN rails according to IEC 60715



(1) Mounting screws with springs
(2) Head transmitter
(3) Retaining rings
(4) Mounting element for DIN rail
(5) DIN rail

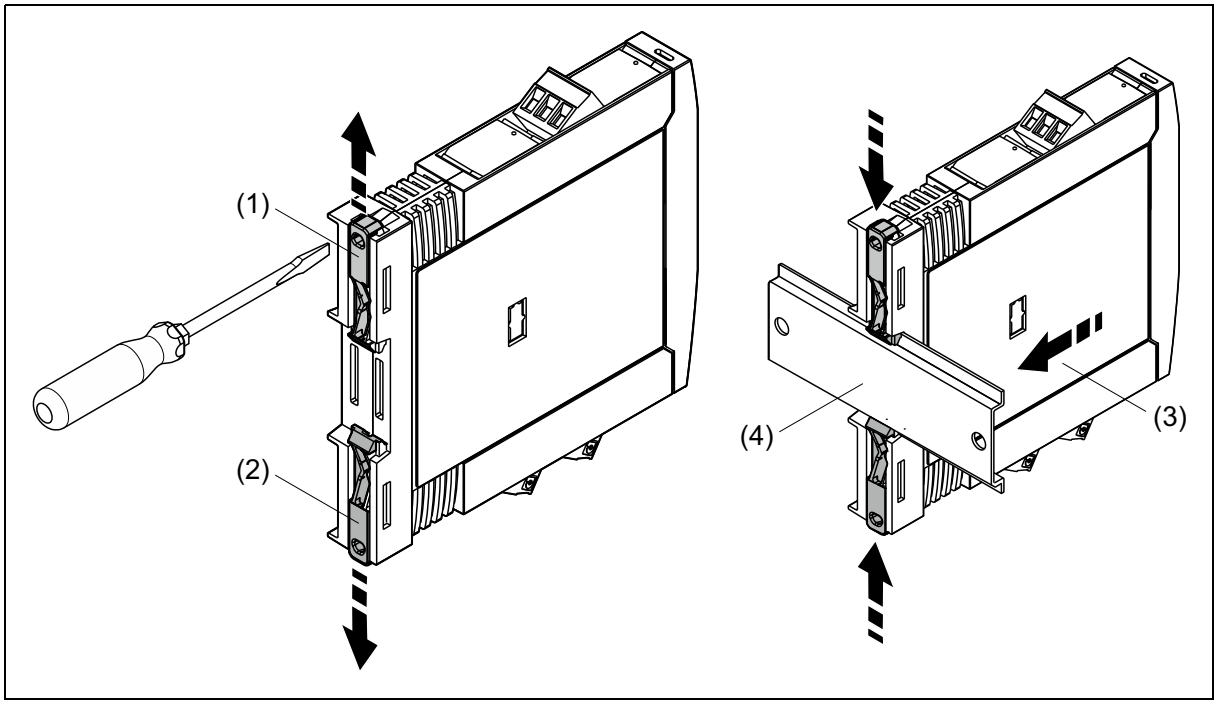
Process:

1. Press the mounting element (4) onto the DIN rail (5) until it engages.
2. Place the mounting screws onto the mounting screws (1) and guide these through the side holes in the head transmitter (2). Then secure both the mounting screws with retaining rings (3).
3. Tightly screw the head transmitter (2) onto the mounting element for the DIN rail (4).

4.3.2 DIN rail device installation

NOTE!

Mount the device **vertically** and make sure it is pointing in the **right direction** (sensor connection at the bottom/voltage supply at the top)!
If the installation position is wrong, the measurement will not meet the maximum measuring accuracy when connecting a thermocouple and when using the internal cold junction.



(1) Top DIN rail clip
(2) Bottom DIN rail clip
(3) DIN rail device
(4) DIN rail

1. Slide the top DIN rail clip (1) up and the bottom clip (2) down until they engage.
2. Place the device (3) onto the DIN rail (4) from the front.
3. Slide the two DIN rail clips toward the DIN rail until they engage.

4.4 Mounting checklist

Perform the following checks after mounting the device:

State and specifications of the device	Important information
Does the device show any signs of damage (visual check)?	-
Do the environmental influences meet the device's specifications (e.g., ambient temperature, measuring range)?	⇨ Page 13

5 Electrical connection

5.1 Installation notes

A cross-head screwdriver is required when wiring the head transmitter with screw terminals. Use a cross-head screwdriver to wire DIN rail devices.

CAUTION!

Destruction of electronic components or the entire electronics system

- ▶ Do not install or wire the device under operating voltage.
- ▶ Do not connect a third-party connection to the connector for the head transmitter's plug-in display.

CAUTION!

Failure to adhere to approval requirements for devices with Ex approval

- ▶ When connecting devices with Ex approval, observe the notes and connection diagrams in the Ex safety manual (additional documentation) for this device.

NOTE!

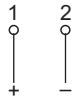
Do not screw the mounting screws too tight otherwise the transmitter could be damaged. Use a suitable screwdriver.
• Maximum torque for mounting screws = 1 Nm, screwdriver: Pozidriv PZ2
• Maximum torque for screw terminals = 0.35 Nm, screwdriver: Pozidriv PZ1

Always complete the following steps when wiring an installed head transmitter:

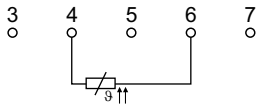
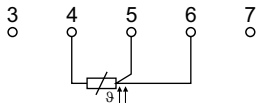
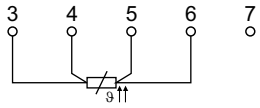
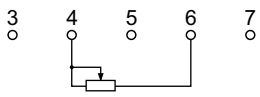
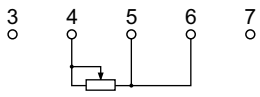
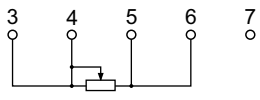
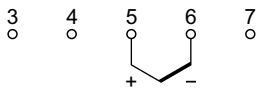
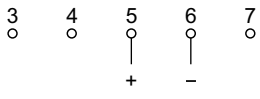
1. Open the cable fitting and case lid on the terminal head or field housing.
2. Guide the wires through the opening in the cable fitting.
3. Connect the wires according to the connection diagram on page 19.
4. Tighten the cable fitting again and then close the case lid.

To prevent connection errors, always read the notes in the connection checklist prior to startup.

5.2 Terminal assignment for the head transmitter

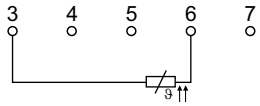
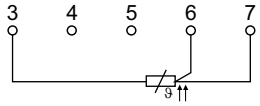
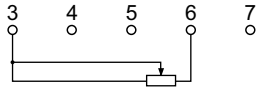
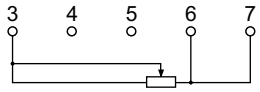
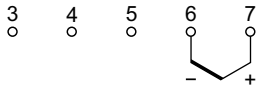
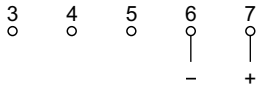
Connection for	Explanations	Terminals
Voltage supply DC 11 to 42 V (standard) DC 11 to 32 V (SIL) Current output 4 to 20 mA HART communication	R_b max. = (U_b max. – 11 V) ÷ 0.023 A R_b = load resistance U_b = voltage supply Burden ≥ 250 Ω required in the signal circuit	

Analog input (sensor input) 1

RTD temperature probe 2-wire circuit	▪ Sensor current ≤ 0.3 mA ▪ Compensation for the line resistance is possible (0 to 30 Ω)	
RTD temperature probe 3-wire circuit	▪ Sensor current ≤ 0.3 mA ▪ Sensor line resistance max. 50 Ω per line	
RTD temperature probe 4-wire circuit	▪ Sensor current ≤ 0.3 mA ▪ Sensor line resistance max. 50 Ω per line	
Resistance/potentiometer 2-wire circuit	▪ Sensor current ≤ 0.3 mA ▪ Compensation for the line resistance is possible (0 to 30 Ω)	
Resistance/potentiometer 3-wire circuit	▪ Sensor current ≤ 0.3 mA ▪ Sensor line resistance max. 50 Ω per line	
Resistance/potentiometer 4-wire circuit	▪ Sensor current ≤ 0.3 mA ▪ Sensor line resistance max. 50 Ω per line	
Thermocouple		
Voltage sensor		

Analog input (sensor input) 2

5 Electrical connection

Connection for	Explanations	Terminals
RTD temperature probe 2-wire circuit	▪ Sensor current ≤ 0.3 mA ▪ Compensation for the line resistance is possible (0 to 30 Ω)	
RTD temperature probe 3-wire circuit	▪ Sensor current ≤ 0.3 mA ▪ Sensor line resistance max. 50 Ω per line	
Resistance/potentiometer 2-wire circuit	▪ Sensor current ≤ 0.3 mA ▪ Compensation for the line resistance is possible (0 to 30 Ω)	
Resistance/potentiometer 3-wire circuit	▪ Sensor current ≤ 0.3 mA ▪ Sensor line resistance max. 50 Ω per line	
Thermocouple		
Voltage sensor		

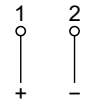
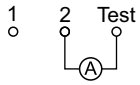
CAUTION!

Electrostatic discharge!

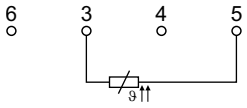
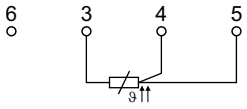
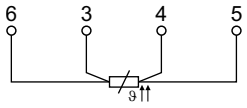
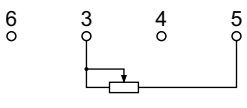
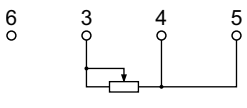
Failure to observe this information could lead to parts of the electronics system being destroyed or malfunctioning.

▶ Protect the terminals against electrostatic discharge.

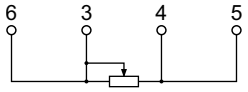
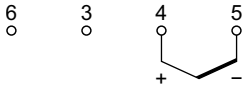
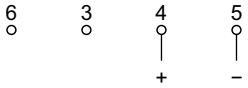
5.3 Terminal assignment for DIN rail devices

Connection for	Explanations	Terminals
Voltage supply DC 12 to 42 V (standard) DC 12 to 32 V (SIL) Current output 4 to 20 mA HART® communication	R_b max. = (U_b max. – 12 V) ÷ 0.023 A R_b = load resistance U_b = voltage supply Burden ≥ 250 Ω required in the signal circuit	
Ammeter	For testing the output current	
HART® communication	On the front of the unit, for field communicator or similar	

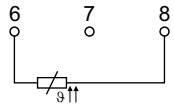
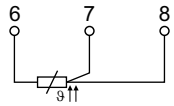
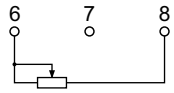
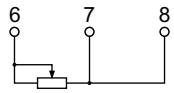
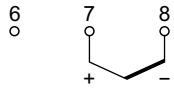
Analog input (sensor input) 1

RTD temperature probe 2-wire circuit	▪ Sensor current ≤ 0.3 mA ▪ Compensation for the line resistance is possible (0 to 30 Ω)	
RTD temperature probe 3-wire circuit	▪ Sensor current ≤ 0.3 mA ▪ Sensor line resistance max. 50 Ω per line	
RTD temperature probe 4-wire circuit	▪ Sensor current ≤ 0.3 mA ▪ Sensor line resistance max. 50 Ω per line	
Resistance/potentiometer 2-wire circuit	▪ Sensor current ≤ 0.3 mA ▪ Compensation for the line resistance is possible (0 to 30 Ω)	
Resistance/potentiometer 3-wire circuit	▪ Sensor current ≤ 0.3 mA ▪ Sensor line resistance max. 50 Ω per line	

5 Electrical connection

Connection for	Explanations	Terminals
Resistance/potentiometer 4-wire circuit	▪ Sensor current ≤ 0.3 mA ▪ Sensor line resistance max. 50 Ω per line	
Thermocouple		
Voltage sensor		

Analog input (sensor input) 2

RTD temperature probe 2-wire circuit	▪ Sensor current ≤ 0.3 mA ▪ Compensation for the line resistance is possible (0 to 30 Ω)	
RTD temperature probe 3-wire circuit	▪ Sensor current ≤ 0.3 mA ▪ Sensor line resistance max. 50 Ω per line	
Resistance/potentiometer 2-wire circuit	▪ Sensor current ≤ 0.3 mA ▪ Compensation for the line resistance is possible (0 to 30 Ω)	
Resistance/potentiometer 3-wire circuit	▪ Sensor current ≤ 0.3 mA ▪ Sensor line resistance max. 50 Ω per line	
Thermocouple		
Voltage sensor		

CAUTION!

Electrostatic discharge!

Failure to observe this information could lead to parts of the electronics system being destroyed or malfunctioning.

▶ Protect the terminals against electrostatic discharge.

5.4 Connecting sensor lines

NOTE!

When connecting two sensors, make sure that the sensors are not galvanically connected (e.g., due to sensor elements that are not isolated from the protection tube). The resulting compensating currents would significantly distort the measurement.
The sensors must remain galvanically isolated from one another; to achieve this, each sensor must be separately connected to a transmitter. The transmitter guarantees sufficient galvanic isolation (>2 kV AC) between the input and output.

If both sensor inputs are assigned then the following connection combinations are possible:

Sensor input 2	**Sensor input 1**			
	RTD or potentiometer, 2-wire	RTD or potentiometer, 3-wire	RTD or potentiometer, 4-wire	Thermocouple (TC), voltage sensor
RTD or potentiometer, 2-wire	X	X	-	X
RTD or potentiometer, 3-wire	X	X[a]	-	X[a]
RTD or potentiometer, 4-wire	-	-	-	-
Thermocouple (TC), voltage sensor	X	X[a]	X[a]	X[a]

[a] Admissible combination in SIL mode; refer to the "SIL safety manual" for dTRANS T07.

5 Electrical connection

5.5 Connecting the voltage supply and signal cable

CAUTION!

Destruction of electronic components

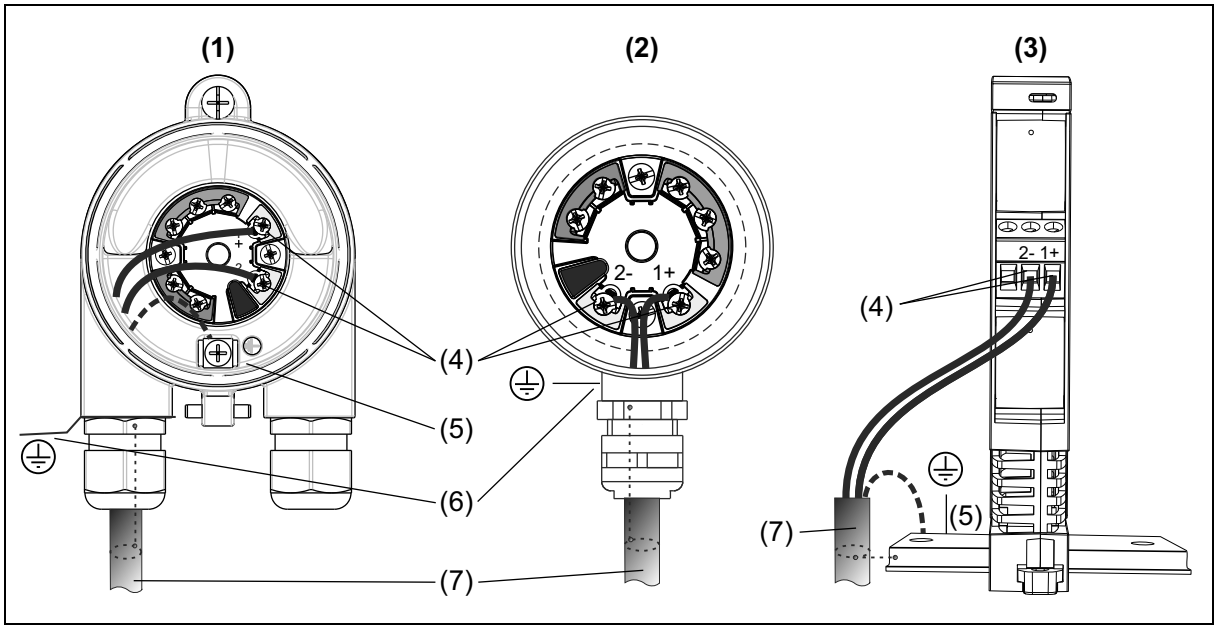
▶ Do not install or wire the transmitter under operating voltage.

NOTE!

Cable specification:

● A normal installation cable will suffice if you are only using the analog signal.
● We recommend using a shielded cable when using HART® communication. Observe the plant's earthing concept.
● When using 30-meter+ sensor lines with the DIN rail variant, always use a shielded cable. The use of shielded sensor wires is generally recommended.

Always observe the installation notes on 18.



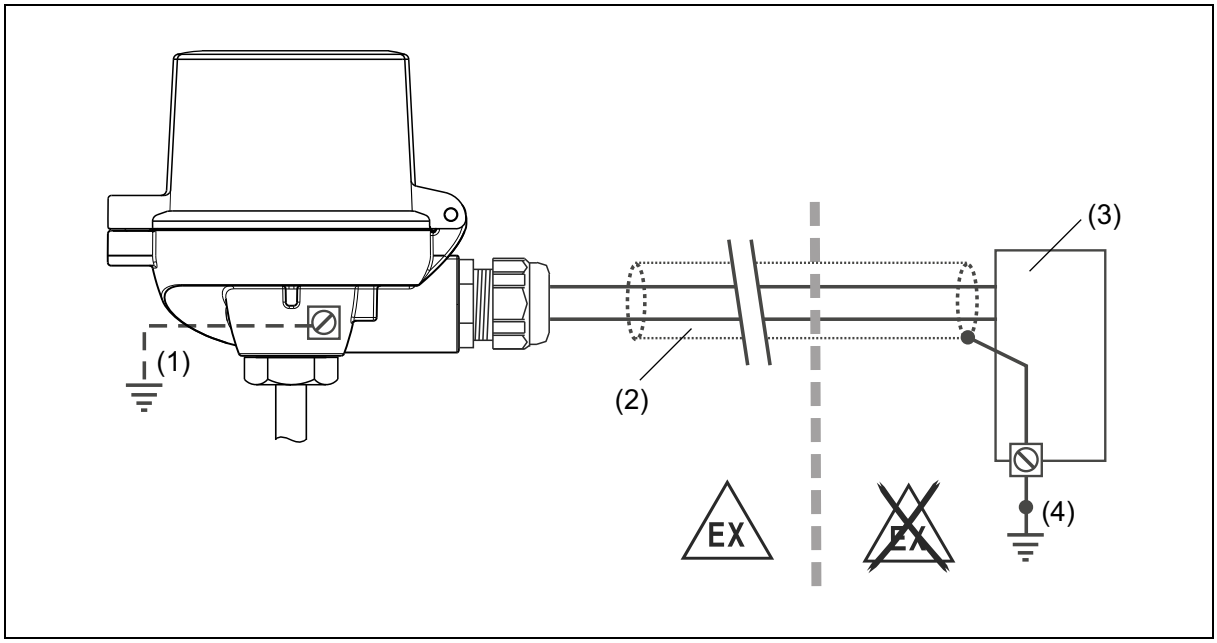
(1) Head transmitter installed in field housing
(2) Head transmitter installed in terminal head
(3) DIN rail device mounted on a DIN rail
(4) Connection terminals for HART® protocol and voltage supply
(5) Internal earthing terminal
(6) External earthing terminal
(7) Shielded signal cable (recommended for HART® protocol)

NOTE!

The terminals for the signal cable connection (1+ und 2-) are protected against polarity reversal. Line cross-section max. 2.5 mm^2. Length of wire to be stripped: at least 10 mm.

5.6 Shielding and earthing

Always observe the specifications issued by the HART® FieldComm Group during installation.



(1) Optional earthing of the field device, insulated from shield
(2) One-sided earthing of the shield
(3) Power supply unit
(4) Earthing point for HART® communication shield

NOTE!

If the cable shield is grounded at several points in systems without potential equalization, mains-frequency equalization currents can occur that may damage the signal cable or significantly affect the signal transmission.

- Ground the shield of the signal cable on one side only (do not connect to the ground terminal of the terminal head or field housing).
- Insulate the shield that is not connected.

5 Electrical connection

5.7 Connection checklist

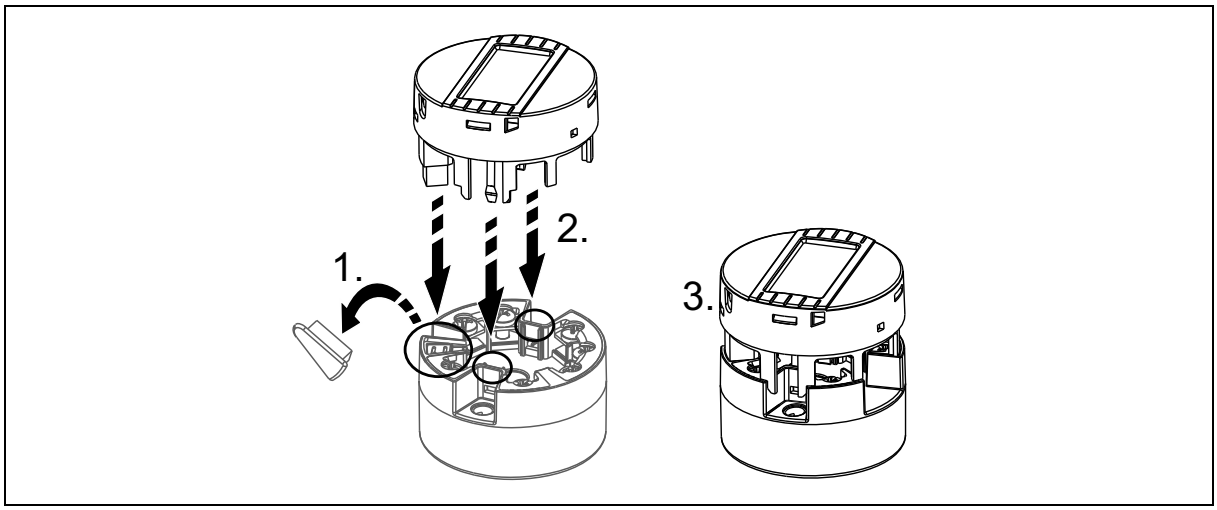
State and specifications of the device	**Important information**
Do the device or cables show any signs of damage (visual check)?	-
Electrical connection	**Important information**
Does the voltage supply match the specifications on the nameplate?	Head transmitter: U = 11 to 42 V_{DC} DIN rail device: U = 12 to 42 V_{DC} SIL mode: U = 11 to 32 V_{DC} for head transmitters or U = 12 to 32 V_{DC} for DIN rail devices
Has tension been removed from the mounted cables?	-
Are the auxiliary energy supply and signal cable connected correctly?	⇨ Page 24
Are all the screw terminals tight enough?	-
Are all cable inlets mounted, tight enough, and sealed?	-
Are all case lids mounted and tight?	-

6.1 Measured value display and operating elements

6.1.1 Head transmitter with optional BD7 plug-in display

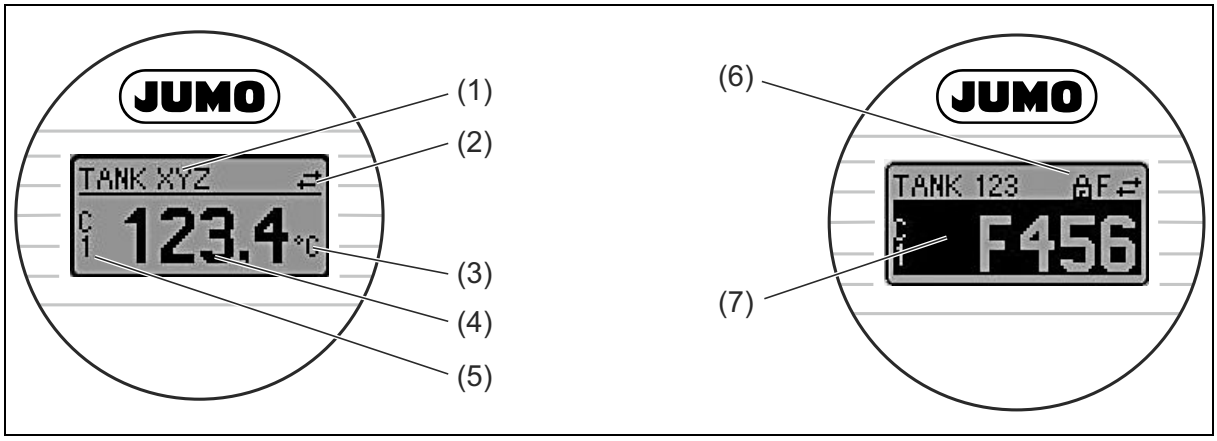
NOTE!

The plug-in display can also be reordered, see "Accessories" chapter in the dTRANS T07 operating manual.



6.1.2 Display elements

Head transmitter



Pos.	Function	Description
(1)	Measuring points TAG display	TAG for the measuring point, 32 characters long
(2)	"Communication" display	The communication symbol appears during read and write access via the fieldbus protocol.
(3)	Units display	Units display for the measured value displayed
(4)	Measured value display	Displays the current measured value
(5)	Values/channel display S1, S2, DT, PV, I, %	e.g., S1 for a measured value from channel 1 or DT for device temperature
(6)	"Configuration locked" display	When parameterization/configuration is locked using the hardware, the "Configuration locked" symbol appears.

(7)	Status signals	
	Symbols	**Meaning**
	F	**"Operating fault" error message** An operating fault has occurred. The measured value is no longer valid. An error message and "- - - -" (no valid measured value available) alternate in the display. Detailed information about the error messages can be found in the device's operating manual.
	C	**"Service mode"** The device is in service mode (e.g., during a simulation).
	S	**"Outside of specification"** The device is being operated outside of its technical specifications (e.g., during launch phase or cleaning).
	M	**"Maintenance required"** Maintenance is required. The measured value is still valid. The measured value and status message alternate in the display.

DIN rail device

NOTE!

The DIN rail variant does not come with an interface for the plug-in display and therefore has no on-site display.

Two LEDs on the front indicate the device status according to NAMUR NE44.

Type	Function and features
Status LED (red)	The device status is displayed when the device contains no errors. This function can no longer be guaranteed in the event of a fault. • LED off: No diagnosis message • LED lit up: Diagnostic display, category F • LED flashing: Diagnostic display, category C, S, or M
Power LED (green) "ON"	The operating status is displayed when the device contains no errors. This function can no longer be guaranteed in the event of a fault. • LED off: Power cut or insufficient voltage supply • LED lit up: Voltage supply is OK

6.1.3 Operating on-site

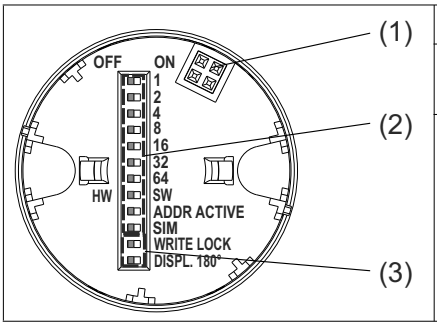
Miniature switches (DIP switches) on the back of the optional BD7 plug-in display can be used to adjust hardware settings for the fieldbus interface.

CAUTION!

Electrostatic discharge!

Failure to observe this information could lead to parts of the electronics system being destroyed or malfunctioning.

▶ Protect the terminals against electrostatic discharge.



(1)	Plug connection to the head transmitter
(2)	DIP switch (1 to 64, SW/HW, ADDR, and SIM = simulation mode) has no function for this head transmitter
(3)	DIP switch (WRITE LOCK DISPL. 180° = toggle, rotate the display by 180°)

Process for adjusting the DIP switch:

1. Open the lid on the terminal head or field housing.
2. Remove the plug-in display from the head transmitter.
3. Configure the DIP switch on the back of the display accordingly.
   In general: Switch to ON = Function is active; switch to OFF = Function is disabled.
4. Connect the plug-in display in the right position on the head transmitter. The head transmitter adopts the settings within one second.
5. Secure the lid back onto the terminal head or field housing.

Switching write protection on and off

Write protection is switched on or off using a DIP switch on the back of the optional plug-in display. If write protection is active, the parameters cannot be changed. A key symbol on the display indicates when write protection is active. Write protection prevents any write access to the parameters. Write protection remains in place even if the display is unplugged. To disable write protection, the device must be restarted when the display is plugged in and the DIP switch is disabled (WRITE LOCK = OFF).

Rotating the display

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

6.2 Transmitter configuration and HART® protocol

The transmitter is configured and the measured value requested using the HART® protocol. The following operating tools can be used for this:

- PACTWare™ (DTM-based systems asset management tool)
- Field communicator 375/475 (Emerson Process Management)

NOTE!

The configuration of the device-specific parameters is described in detail in the dTRANS T07 operating manual.

7 Startup

7.1 Installation checklist

Make sure that all final checks have been completed before starting up your measuring point:

- "Mounting" checklist, ⇨Page 17
- "Connection" checklist, ⇨Page 26

7.2 Switching on the transmitter

Once you have conducted the final checks, switch on the voltage supply. Once switched on, the transmitter runs through its built in test functions. After this process, all of the display's pixels are activated after around 7 seconds. The following sequence of messages then appears on the display:

Step	Display
1	"Display" text and display firmware version
2	Device name with firmware and hardware version
3	Sensor configuration display (sensor element and connection type)
4	Selected measuring range
5a	Current measured value or
5b	Current status message

NOTE!

If the switch-on process is not successful, the corresponding diagnostic event is displayed, depending on the cause. A detailed list of diagnostic events and the relevant troubleshooting process are provided in the dTRANS T07 operating manual.

In standard operation, the device works after around 30 s while the plugged in display works after 33 s. Normal measuring mode begins following a successful switch-on process. Measured and/or status values appear on the display.

7.3 Enabling parameterization

If the device is locked against parameterization, this has to be enabled using the hardware or software lock. If the lock symbol appears in the header in the measured value display, the device is read only.

To unlock

- Either switch the write protection switch located on the back of the plug-in display to the "OFF" position (hardware write protection), ⇨Page 28, or
- Deactivate software write protection using the operating tool, see description of the device parameter, "Defining the write protection code" in the dTRANS T07 operating manual.

NOTE!

When the hardware write protection is active (write protection switch on the back of the plug-in display is in the "ON" position), the write protection cannot be deactivated via the operating tool. The hardware write protection must always be deactivated before the software write protection can be activated or deactivated.

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