

JUMO dTRANS T09 AS

Cable transmitter for temperature



Operating Manual



70709000T90Z001K000

V2.00/EN/00733462/2022-11-09

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1 Introduction

1.1 Safety information

General

This manual contains information that must be observed in the interest of your own safety and to avoid material damage. This information is supported by symbols which are used in this manual as indicated.

Please read this manual before starting up the device. Store this manual in a place that is accessible to all users at all times.

If difficulties occur during startup, please do not intervene in any way that could jeopardize your warranty rights!

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.



READ THE DOCUMENTATION!

This symbol, which is attached to the device, indicates that the associated **documentation for the device** must be **observed**. This is necessary to identify the nature of the potential hazard, and to take measures to prevent it.

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.



DISPOSAL!

At the end of its service life, the device and any batteries present do not belong in the trash! Please ensure that they are **disposed of** properly and in an **environmentally friendly** manner.

1.2 Description and intended use

The cable transmitter for Pt100 or Pt1000 sensors is ideal for the simple retrofitting of plants and can be configured and extracted via an interface.

The cable transmitter's high level of vibration and shock resistance makes it reliable and durable. It is connected on the input and output side via M12 plug connectors.

JUMO dTRANS T09 AS: cable transmitter for temperature with analog output.

The cable transmitter is UL-approved. The approval stipulates use of the cable transmitter indoors only.


The protection offered by the cable transmitter may be impaired if the cable transmitter is used in a way that does not comply with the manufacturer's intended use.

1.3 Hot media

Hot media may result in the device surfaces becoming hot and presenting a risk of injury.

- Allow the device and plant to cool down.
- Wear suitable protective equipment.
- If required, install contact protection.

1.4 Approvals

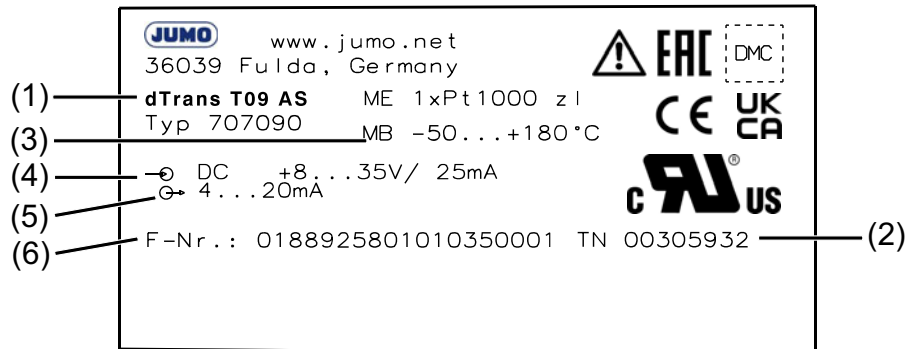
	Designation	UL
	Testing agency	-
	Certificate no.	2022-07-27-E201387
	Inspection basis	UL 61010-1, 3 Ed. Mai 2012 revised 19. Juli 2019 und CAN/CSA-C22.2 No. 61010-1 (2012-05). 3. Ed. with revision through 2018-11
	Valid for	Type 707090, 707091

2 Identifying the device version

2.1 Nameplate

Position

The nameplate is located on the housing surface.



(1) Device name

(2) Part no.

(3) Input measuring range

(4) Voltage supply and maximum current consumption
⇒ For more in-depth information, see "Technical Data"

(5) Output

(6) Fabrication number

Part no.

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

Fabrication number (F-Nr)

Among other things, the fabrication number indicates the date of manufacture (year/calendar week).



Date of manufacture

The device's date of manufacture (year and calendar week) is part of the fabrication number. Digits 12 to 15 denote the year of manufacture (YY) and the calendar week (WW).

2 Identifying the device version

2.2 Order details

The following order details include the transmitter 707091 that belongs to the device series. Further information can be found in the joint data sheet 707090 or the associated operating manual 707091.

(1) Basic type		
707090	JUMO dTRANS T09 AS – Cable transmitter for temperature with analog output of 4 to 20 mA	
707091	JUMO dTRANS T09 DS – Cable transmitter for temperature with IO-Link interface	
(2) Configuration		
8	Default setting ^a	
9	Customer-specific setting	
(3) Measurement input^b		
1011	1× Pt100 in four-wire circuit	
1013	1× Pt1000 in four-wire circuit	
(4) Extra codes		
061	With UL approval	

^a In the JUMO dTRANS T09 AS version the output is scaled to 0 to 100 °C per default. In the JUMO dTRANS T09 DS version the output is not scalable (fixed setting at -50 to +260 °C).
⇒ For an overview of the default configuration, see "Configurable parameters", Page 12.

^b If feature Pt100 is selected, the connection of a Pt1000 sensor is not possible. Likewise, if feature Pt1000 is selected, the connection of a Pt100 sensor is not possible.

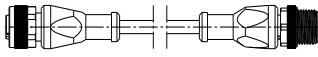
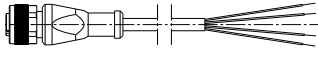
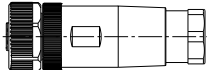
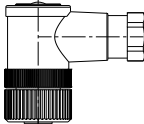
	(1)		(2)		(3)		(4)
Order code		/		-		/	
Order example	707090	/	8	-	1011	/	061

2.3 Scope of delivery

Designation
1 cable transmitter in the version ordered
1 operating manual

2 Identifying the device version

2.4 Accessories

Designation		Part no.
Connecting cable (input side)	M12 connecting cable (PUR), 5-pole (shielded) 	500 mm 00638312
		1 500 m 00638313
Connecting cable (output side)	Connecting cable (PVC), with socket M12 × 1, 4-pole, 2000 mm 	00404585
Cable socket M12 × 1 for self-assembly (output side)	straight, without connecting cable, 5-pole 	00419130
	angled, without connecting cable, 5-pole 	00419133
Designation		Part no.
Required configuration tools:	Setup program on CD-ROM, multilingual	00485016
	PC interface with USB/TTL converter and USB line	00456352
	Configuration line, 4-pole with connector and socket M12 × 1, and Western plug RJ-45	00484692
Power supply units for transmitter, single and 4-fold (data sheet 707500)		-
Isolation amplifier and supply isolator for the galvanic isolation of standard signals and voltage supply for two-wire transmitters (data sheet 707530)		00577948

The cable transmitter may only be installed, connected and started up by qualified and authorized personnel observing these operating instructions, the applicable standards, and the legal requirements (depending on the application).

If you experience difficulties during installation and startup, please contact the manufacturer.

The device can be installed in any position.



NOTE!

The cable transmitter is not suitable for safety-critical applications.



NOTE!

The cable transmitter is not suitable for installation and application in potentially explosive areas.



NOTE!

The cable transmitter and the connected temperature sensor must be connected to the potential equalization system of the plant via the process connection. Suitable shielded lines must also be used to ensure continuous shielding.

Mounting the cable transmitter

Insert the cable transmitter into the corresponding connecting cable and tighten it by hand.



NOTE!

Mount the device so that abrasion at the process connection is avoided.

4 Electrical connection



NOTE!

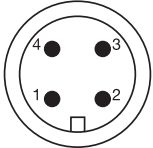
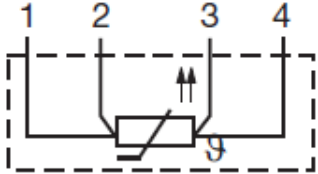
When using the device with UL approval, the user must make sure that the accessory he uses is also approved for a UL application (e. g. cable with UL approval AVLV2/8 and/or cable with UL approval CYJV/7 or CYJV/8 or PVVA/7 or PVVA2/8, in each case approved for ambient temperatures > 90 °C).

4.1 Connection elements

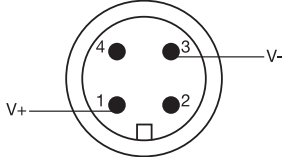

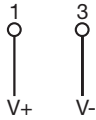




4.2 Input

RTD temperature probe

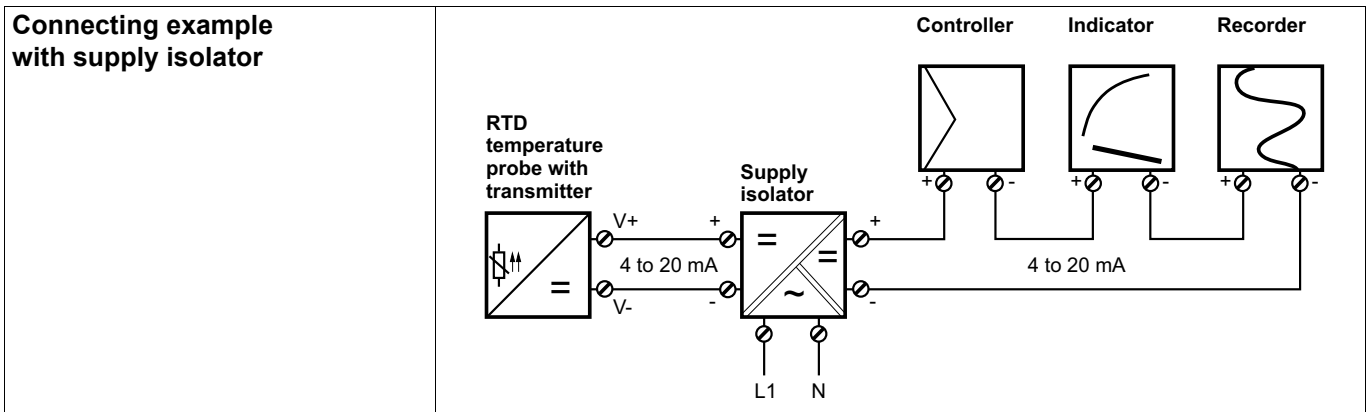
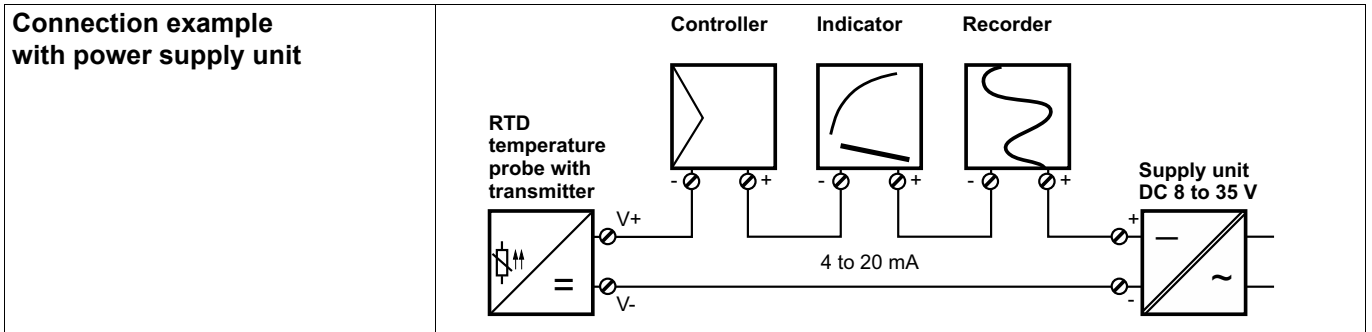
Electrical connection	M12, A-coded, socket, 4-pole according to DIN EN 61076-2-101	Terminal assignment
RTD temperature probe in four-wire circuit	 <p>Top view of the M12 plug connector from the associated RTD temperature probe!</p>	

4.3 Output

Machine connector M12 × 1, 4-pole, according to DIN EN 61076-2-101 (A-coded, pin)	Electrical connection	Terminal assignment
	Voltage supply DC 8 to 35 V 	
	Current output 4 to 20 mA 	
Warning: do not connect pin 2 and pin 4 to voltage!	Setup communication via special configuration line (see accessories) (only for configuration – continuous operation is not admissible)	

4 Electrical connection

4.4 Connection examples



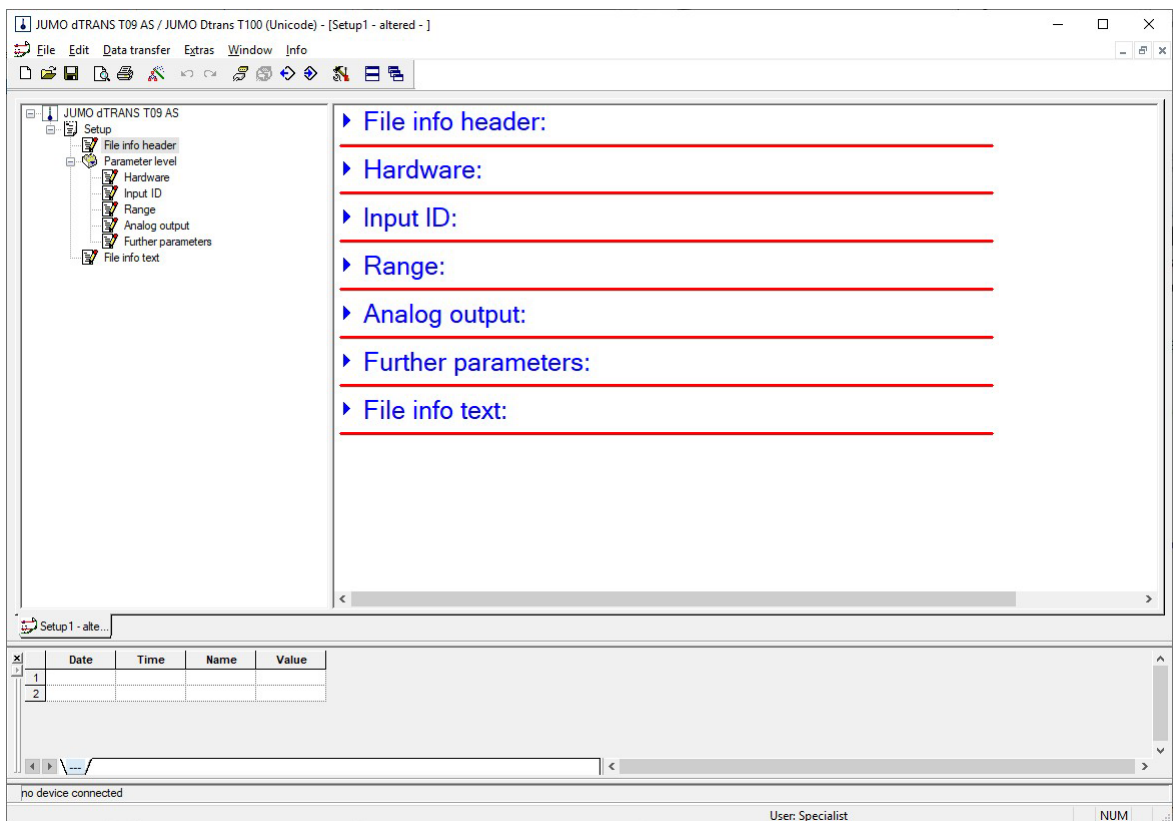
5 Setup program

5.1 JUMO dTRANS T09 AS, type 707090 (two-wire 4 to 20 mA)

The setup program is used for configuring the transmitter using a PC.
For this purpose the following is required:

- Please only use the configuration line, 4-pole with connector and socket M12 × 1, and Western plug RJ-45 with part no. 00484692.
- PVC connecting cable, length 2 000 mm
- PC interface with USB/TTL converter
- and USB line

The transmitter must be connected to a voltage supply for configuration. If no power supply unit or supply isolator is available, it can also be supplied using a 9 V block battery.



Configurable parameters

Measurement point detection	TAG number	Up to 10 characters
Measuring range configurable in °C/°F	<ul style="list-style-type: none"> • Offset • Measuring range start • Measuring range end 	Depending on the selected measuring range, 0 °C -50 to 0 to 260 °C -50 to 100 to 260 °C
Analog output	<ul style="list-style-type: none"> • Reversion of the output • Signal for probe break/short-circuit 	4 to 20 mA , 20 to 4 mA > 21 mA , < 3.8 mA
Other parameters	<ul style="list-style-type: none"> • Filter time constant • Unit 	0 to 0.1 to 125 s °C, °F

5.2 Hardware and software requirements

The hardware and software requirements can be obtained from the manufacturer's website.

5.3 Note on Windows user management

If several users are managed on the PC, the user who intends to work with the program must be logged in during installation. The user must have administrator rights during installation. Failure to observe this information means that correct and complete installation cannot be guaranteed!

5.4 Fine adjustment

Fine adjustment means a correction of the output signal. Fine adjustment is carried out with the setup program. The 4 mA value (zero point) and the 20 mA value (end value) can be separately adjusted with the setup program.

5.5 Connection diagram

Usage

The PC interface with USB-TTL converter is only designed for service use over a limited period, such as the transfer of setup data.

It links JUMO devices to a PC through a galvanically isolated connection. The Western plug RJ-45 is intended specifically for JUMO devices and not for third-party equipment.



CAUTION!

Do not mix up the socket RJ-45 with an ISDN or network connection.

To perform the setup, establish the following connections:

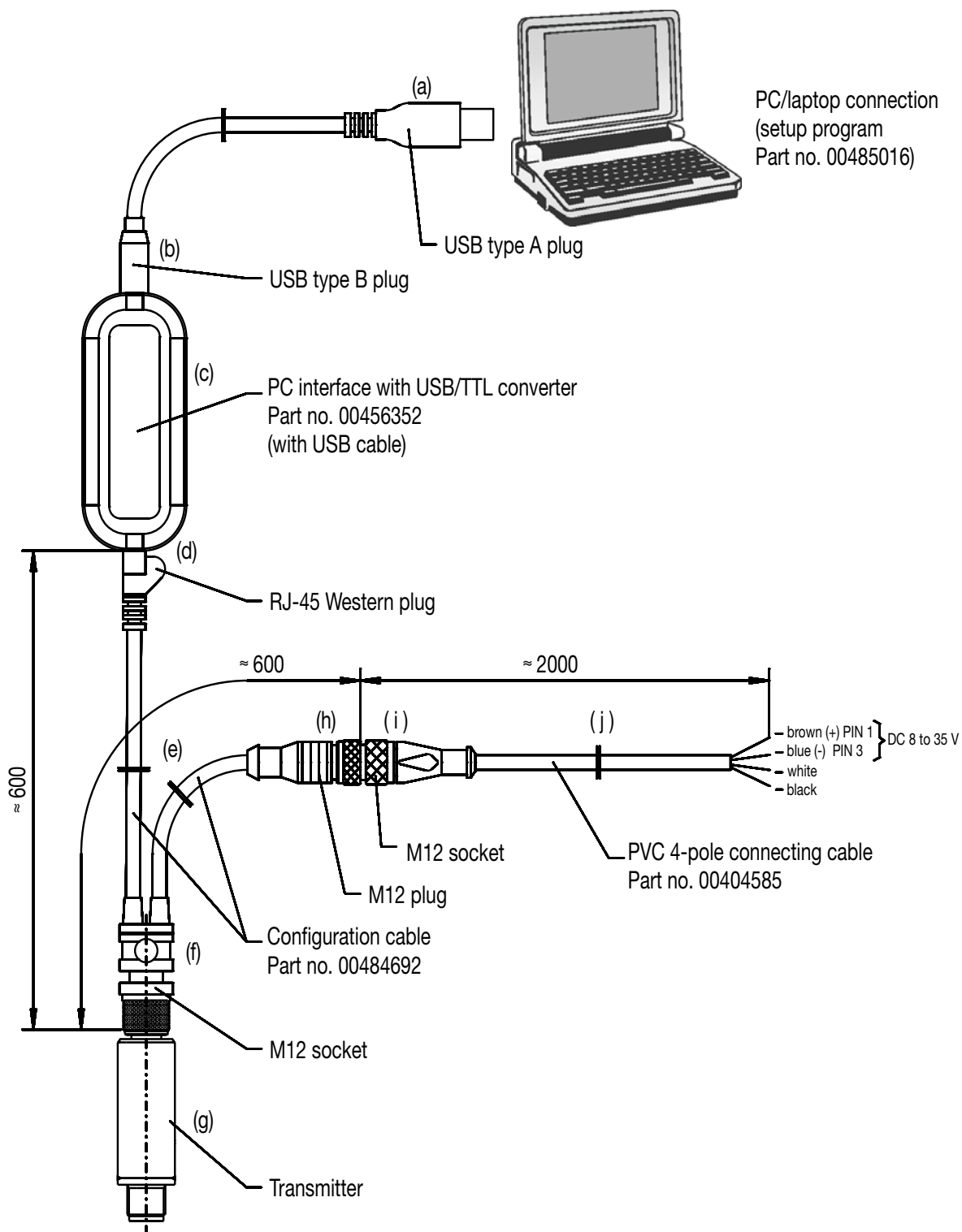
1. Connect USB connector type A (a) to the PC/laptop. Then connect USB connector type B (b) to the PC interface with USB-/TTL converter (c). This ensures a safe grounding on the PC/laptop side.
2. Connect the Western plug RJ-45 (d) of the configuration cable (e) to the PC interface with USB-/TTL converter (c). Connect the socket M12 × 1 (f) to the transmitter (g).
3. Connect the socket M12 × 1 (i) of the PVC connecting cable (j) to the connector M12 × 1 (h) of the configuration cable (e).
4. Connect the DC 8 to 35 V voltage supply to the PVC connecting cable (j).




NOTE!

Remove the modular cable (not shown as it is not required for this setup) of the PC interface with USB/TTL converter including two adapters (socket and pins) (required for other devices).

5 Setup program



6.1 General Information

Electrical connection (input side)	Machine connector M12 × 1, 4-pole, according to DIN EN 61076-2-101 (socket version with union nut)
Electrical connection (output side)	Machine connector M12 × 1, 4-pole, according to DIN EN 61076-2-101 (pin version)
Housing	Stainless steel
Protection type with mating connector	IP66, IP67, and IP69 according to DIN EN 60529
Installation position	Any
Weight	JUMO dTRANS T09 AS, type 707090 = ca. 35 g JUMO dTRANS T09 DS, type 707091 = ca. 43 g
Potential equalization	
Functional bonding conductor FB ^a	

^a The temperature probe must be connected to the plant's potential equalization system via the process connection. Suitable shielded lines must also be used to ensure continuous shielding.

6.2 Electrical data

Voltage supply (U_b)	DC 8 to 35 V (pin 1 = +, pin 3 = -) The transmitter is designed only for operation in SELV and PELV circuits in accordance with DIN EN 50178.
Current consumption	≤ 25 mA (incl. load)
Electrical safety	Protection rating III according to DIN EN 61140
Galvanic isolation	No galvanic isolation between sensor and output
Reverse voltage protection	Yes
Requirement	The auxiliary energy of the cable transmitter must meet SELV requirements. Furthermore, the device must be equipped with an electrical circuit that meets the requirements of EN 61010-1 with regard to "Limited-energy circuits".

6 Technical data

6.3 Input

RTD temperature probe	Pt100 (DIN EN 60751:2009 / IEC 60751:2008) in four-wire circuit or Pt1000 (DIN EN 60751:2009 / IEC 60751:2008) in four-wire circuit ^a		
Measuring range	-50 to +260 °C		
Smallest measuring span	10 K		
Sampling rate	1 measurement per second		
Input filter	Digital filter 1st order, filter constant can be set		
	Calibration accuracy of the electronic components	Temperature influence of the electronic components	Measuring current
Pt100	0.2 K or 0.13 % ^{b,c}	≤ ±(15 ppm/K × [measuring range end value + 200] + 50 ppm/K × set measuring range) × Δθ ^d	≤ 600 μA
Pt1000	0.1 K or 0.08 % ^{b,c}		≤ 105 μA
Sensor line resistance	≤ 11 Ω per line		

^a If feature Pt100 is selected, the connection of a Pt1000 sensor is not possible. Likewise, if feature Pt1000 is selected, the connection of a Pt100 sensor is not possible. See order details.

^b Information provided as a % relates to the measuring range. The greater value is valid.

^c The tolerance of the temperature sensor must be added to ensure the measuring accuracy of the transmitter.

^d Δθ = deviation of the ambient temperature from the reference temperature (25 °C).

6.3.1 Measuring circuit monitoring

Underrange	Linear drop up to 3.8 mA (according to NAMUR recommendation 43)
Overrange	Linear drop up to 20.5 mA (according to NAMUR recommendation 43)
Probe short-circuit/ probe and line break	≤ 3.6 mA or ≥ 21.0 mA (configurable)
Current limiting in the event of a probe short circuit or probe break	≤ 25 mA

6.4 Output

Output signal	Load-independent direct current 4 to 20 mA
Transmission behavior	Temperature linear
Maximum burden (R _B)	R _B = (U _B - 8 V) ÷ 23 mA, max. 600 Ω
Burden influence	≤ ±0.02 % per 100 Ω ^a
Voltage supply influence	≤ ±0.01 % per V deviation from 24 V ^a
Setting time after switch-on or reset	≤ 5 s

^a % specifications refer to the measuring range end value of 20 mA.

6.5 Environmental influences

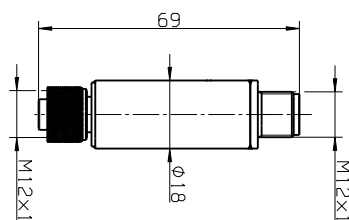
Transmitter

Ambient temperature	-40 to +85 °C
Storage temperature	-40 to +85 °C
Resistance to climatic conditions	
During operation	≤ 100 % relative humidity without condensation on device outer case
During storage	≤ 90 % relative humidity without condensation
Climate class	3K7 according to DIN EN 60721-3-3
Vibration strength	10 g at 10 to 2 000 Hz according to DIN EN 60068-2-6
Shock resistance	20 g for 11 ms according to DIN EN 60068-2-27 50 g for 1 ms according to DIN EN 60068-2-27
Calibration/reference conditions	DC 24 V at 25 °C ±5 °C (77 °F ±9 °F)
Electromagnetic compatibility (EMC)	DIN EN 61326
Interference emission	Class B ^a
Interference immunity	Industrial requirement

^a The product is suitable for industrial use as well as for households and small businesses.

6.6 Dimensions

Type 707090,
JUMO dTRANS T09 AS



Cable transmitter for temperature with analog output 4 to 20 mA



* Figure with connecting cable (not included in scope of delivery, see accessories)

7 China RoHS

						
产品组别 Product group: 707090	产品中有害物质的名称及含量 China EEP Hazardous Substances Information					
部件名称 Component Name						
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
外壳 Housing (Gehäuse)	○	○	○	○	○	○
过程连接 Process connection (Prozessanschluss)	○	○	○	○	○	○
螺母 Nuts (Mutter)	○	○	○	○	○	○
螺栓 Screw (Schraube)	○	○	○	○	○	○
<p>本表格依据SJ/T 11364的规定编制。</p> <p>This table is prepared in accordance with the provisions SJ/T 11364.</p> <p>○：表示该有害物质在该部件所有均质材料中的含量均在GB/T 26572规定的限量要求以下。 Indicate the hazardous substances in all homogeneous materials' for the part is below the limit of the GB/T 26572.</p> <p>×：表示该有害物质至少在该部件的某一均质材料中的含量超出GB/T 26572规定的限量要求。 Indicate the hazardous substances in at least one homogeneous materials' of the part is exceeded the limit of the GB/T 26572.</p>						



JUMO GmbH & Co. KG

Street address:
Moritz-Juchheim-Straße 1
36039 Fulda, Germany

Delivery address:
Mackenrodtstraße 14
36039 Fulda, Germany

Postal address:
36035 Fulda, Germany

Phone: +49 661 6003-0
Fax: +49 661 6003-607
Email: mail@jumo.net
Internet: www.jumo.net

JUMO Instrument Co. Ltd.

JUMO House
Temple Bank, Riverway
Harlow, Essex, CM20 2DY, UK

Phone: +44 1279 63 55 33
Fax: +44 1279 62 50 29
Email: sales@jumo.co.uk
Internet: www.jumo.co.uk

JUMO Process Control, Inc.

6724 Joy Road
East Syracuse, NY 13057, USA

Phone: +1 315 437 5866
Fax: +1 315 437 5860
Email: info.us@jumo.net
Internet: www.jumousa.com

