



JUMO dTRANS T09

Cable transmitter for temperature

Brief description

The cable transmitter for Pt100 or Pt1000 sensors is ideal for simple retrofitting of plants. You can choose between analog output (4 to 20 mA) or IO-Link interface.

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

JUMO dTRANS T09 AS: cable transmitter for temperature with analog output (707090)

JUMO dTRANS T09 DS: cable transmitter for temperature with IO-Link interface (707091)

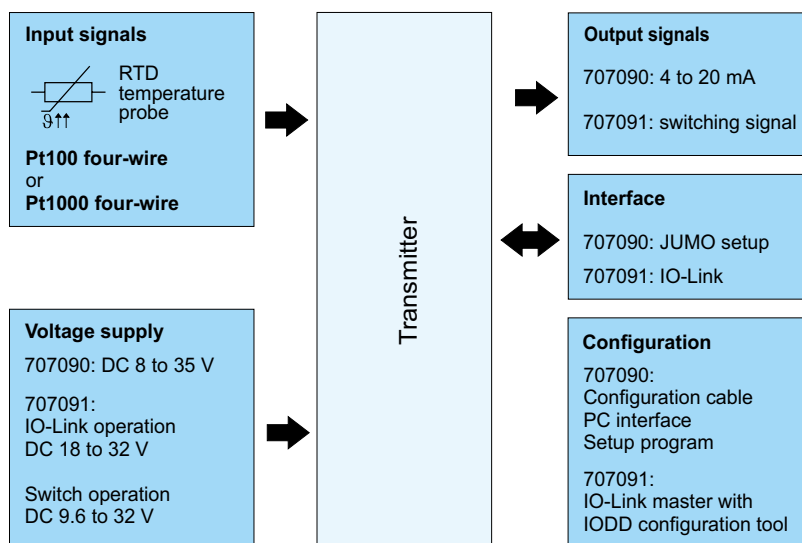


Type 707090, JUMO dTRANS T09 AS
 Cable transmitter for temperature with analog output 4 to 20 mA



Type 707091, JUMO dTRANS T09 DS
 Cable transmitter for temperature with IO-Link interface

Block diagram



Special features

- Efficient retrofitting and simple digitization of plants with only a short plant downtime
- Analog output or IO-Link interface
- Reduced mounting and commissioning costs (Plug and Play)
- Stainless steel case
Protection type: IP66, IP67, and IP69
- High degree of vibration and shock resistance
- Pre-assembled lines (accessories)

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Technical data

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

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 limits	-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 % specifications refer to the set measuring span. The greater value is valid.

^c The deviation 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).

Measuring circuit monitoring

Underrange	Linear drop up to 3.8 mA	(according to NAMUR recommendation 43)
Overrange	Linear drop up to 20.5 mA	
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	

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.

Electrical data

Voltage supply (U _b)	DC 8 to 35 V (pin 1 = +, pin 3 = -)
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 transmitter must meet SELV requirements. Optionally, an energy-limited electrical circuit according to DIN EN 61010-1 can be used.

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JUMO dTRANS T09 DS, type 707091 (IO-Link interface)

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 limits	-50 to +260 °C		
Sampling rate	160 ms		
Input filter	Digital filter 2nd order, filter constant can be set		
	Calibration accuracy of the electronic components	Temperature influence of the electronic components	Measuring current
	Pt100 $\leq \pm 0.08\%^{b,c}$	$\leq 0.003\% \text{ pro } K^d$	$\leq 1 \text{ mA}$
	Pt1000 $\leq \pm 0.1\%^{b,c}$	$\leq 0.0025\% \text{ pro } K^d$	$\leq 500 \mu\text{A}$
Sensor line resistance	$\leq 11 \Omega$ per line		
Galvanic isolation	No galvanic isolation between sensor and output		
Resolution	14-bit		

^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 % specifications refer to the set measuring span.

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

^d Deviation of the ambient temperature from the reference temperature (25 °C).

Measuring circuit monitoring

Process data invalid	IO-Link event configurable; appears in the process value as an error value
Overrange	
Underrange	
Device is defective	

Output

Number	1 output in IO-Link operation (output signal according to IO-Link communication standard version 1.1, see section "Interface", Page 4) 2 outputs for switch operation (SIO mode; SIO = standard IO)
Switching functions configurable	Hysteresis function or window function Normally closed contact or normally open contact Output p-switching (PNP) or n-switching (NPN) Switch-on and switch-off delay
Switching current	$\leq 100 \text{ mA}$ per output
Voltage drop at switching transistor	$\leq 2 \text{ V}$
Short-circuit proof	Yes (clocked)
Reverse polarity protected	Yes
Current limiting	Yes
Hysteresis	
For hysteresis function	Configurable
For window function	Fixed setting (symmetrical; $\pm 0.25\%$ of the measuring range)
Switch-on, switch-off delay	0 to 100 s

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Interface

Communication interface	IO-Link device V 1.1 (downward compatible to V 1.0)
Communication mode (data transfer rate)	COM3 (230.4 kBaud)
IO Device Description (IODD)	The IODD can be localized and downloaded on the JUMO website in the product area for this device or at www.io-link.com with the "IODDfinder".
Max. line length acc. to IO-Link standard	20 m
Output mode	
Switching output type	Transistor switching output can be configured as NPN, PNP, or Push/Pull
Short-circuit proof	Yes (clocked)
Resistant to overload	Yes
Protected against polarity reversal	Yes
Ampacity of the switching outputs	100 mA in each case
Voltage drop of the switching outputs	Max. 2 V in each case

Electrical data

Voltage supply	
In IO-Link operation	DC 18 to 32 V
In switch operation	DC 9.6 to 32 V
Nominal voltage	DC 24 V
Current consumption	
In idle mode	≤ 12 mA (at nominal voltage)
In IO-Link operation	≤ 20 mA (at nominal voltage)
In switch operation	≤ 200 mA (at nominal voltage and with 2 switching outputs)
Electrical safety	Protection rating III according to DIN EN 61140
Intended use	Temperature measurement in industrial plants
Requirement	The auxiliary energy of the transmitter must meet SELV requirements. Optionally, an energy-limited electrical circuit according to DIN EN 61010-1 can be used.

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JUMO dTRANS T09 AS and DS

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
Measuring range limits	-50 to +260 °C
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 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.

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.

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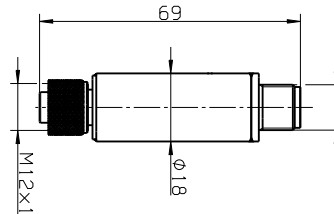
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Dimensions

Basic types

Type 707090,
JUMO dTRANS T09 AS

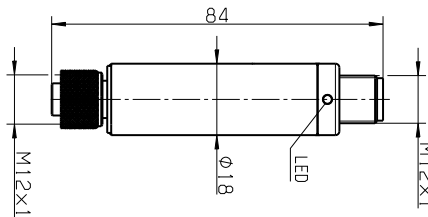


Cable transmitter for temperature with analog output 4 to 20 mA



*

Type 707091,
JUMO dTRANS T09 DS



Cable transmitter for temperature with IO-Link interface



*

* Figure with connection line (not included in scope of delivery, see accessories)

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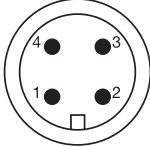
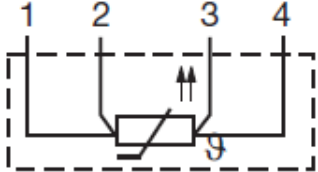
Connection diagram

The connection diagram in the data sheet provides preliminary information about the connection options. For the electrical connection, only use the installation instructions or the operating manual. The knowledge and the correct technical compliance with the safety information and warnings contained in these documents are mandatory for mounting, electrical connection, and startup as well as for safety during operation.



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>	

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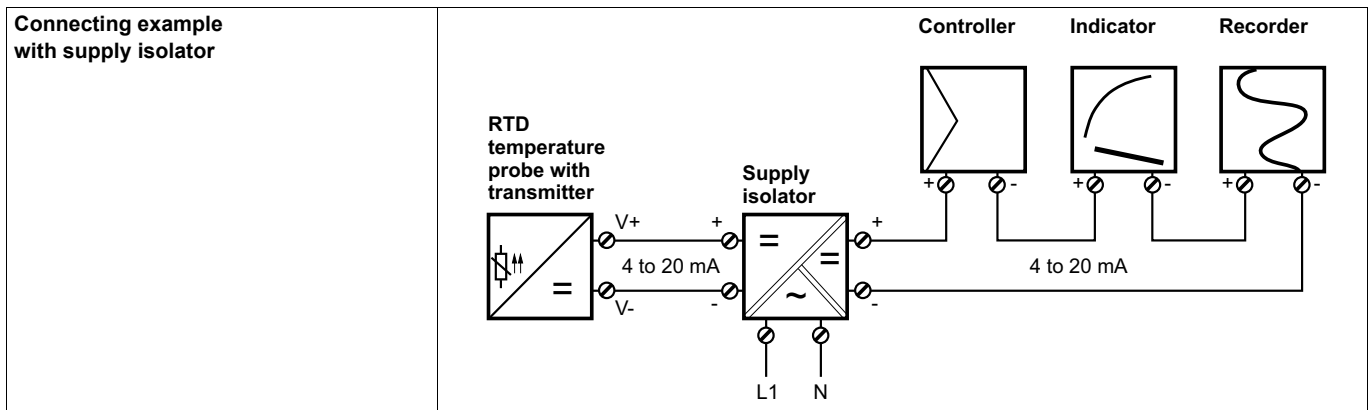
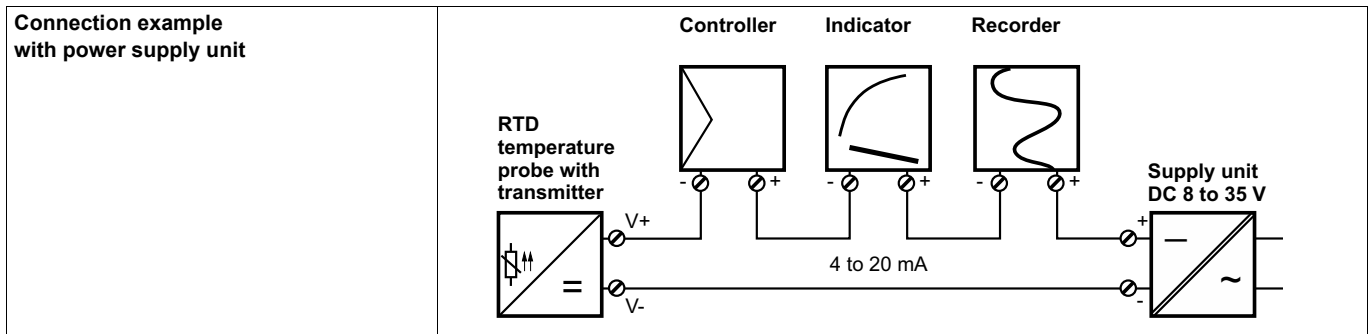
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Output

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

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)	



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JUMO dTRANS T09 DS, type 707091 (IO-Link interface)

Connection	Terminal assignment	
Switch operation		
Voltage supply ^a DC 9.6 to 32 V	1 BN (brown) ^b 3 BU (blue)	L+ L-
Switching output 1	4 BK (black)	C/Q = OUT1
Switching output 2	2 WH (white)	I/Q = OUT2
IO-Link operation		
Voltage supply ^a DC 18 to 32 V	1 BN (brown) 3 BU (blue)	L+ L-
IO-Link	4 BK (black)	C/Q = IO-Link
Switching output 2	2 WH (white)	I/Q = OUT2

^a The auxiliary energy of the transmitter must meet SELV requirements. Optionally, an energy-limited electrical circuit according to DIN EN 61010-1 can be used.

^b The color coding is **only** valid for A-coded standard cables!

Connection example

IO-Link operation with 1 switching output	Switch operation with 2 switching outputs
p-switching (PNP)	p-switching (PNP)
n-switching (NPN)	n-switching (NPN)



Setup program

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

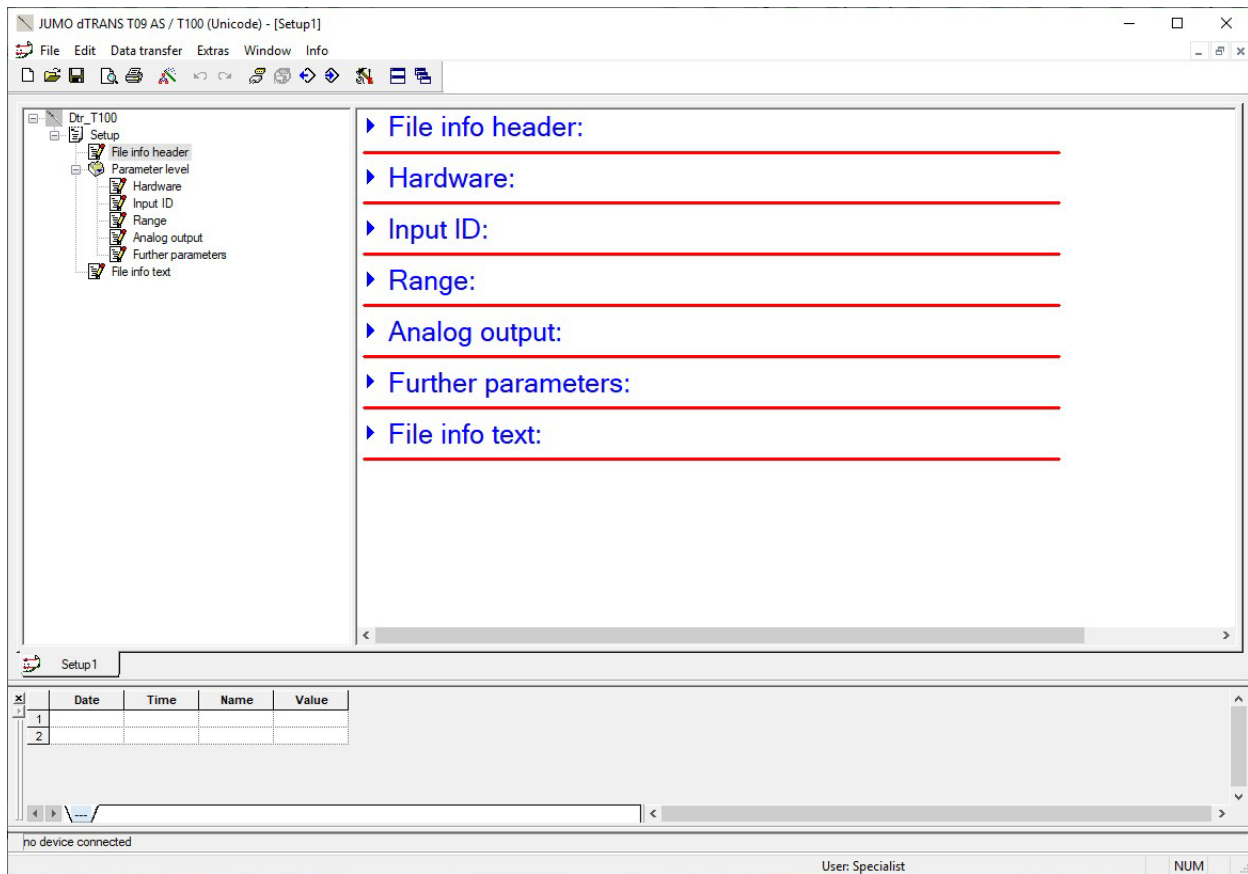
The setup program is used for the configuration of the programmable two-wire transmitter using a PC. For this purpose the following is required:

- 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 line, length 2 000 mm
- PC interface with USB/TTL converter
- and USB line

(see also accessories for the programmable two-wire transmitter)

The two-wire 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
Measuring range configurable in °C/°F	<ul style="list-style-type: none"> • Offset • Measuring range start • Measuring range end
Analog output	<ul style="list-style-type: none"> • Reversion of the output • Signal for probe break/short-circuit
Other parameters	<ul style="list-style-type: none"> • Filter time constant • Unit




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Areas of application

JUMO dTRANS T09, cable transmitter for temperature		Application options:
	<p>Connection Directly or via cable</p>  <ul style="list-style-type: none"> • JUMO dicoTEMP 100 (type 608740) • All RTD temperature probes with M12 connectors • JUMO Dtrans T100 without electronic components (type 902815) • JUMO VIBROtemp with M12 connector (type 902040) • RTD temperature probes with connecting line • and more 	 <p>Type 608740 Type 902815 Type 902040</p>

Order details

(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	
9	Customer-specific setting	
(3) Measurement input^a		
1011	1× Pt100 in four-wire circuit	
1013	1× Pt1000 in four-wire circuit	

^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. In the JUMO dTRANS T09 AS version the output is scaled to 0 to 100 °C per default.

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

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Accessories

General Information

Designation		Part no.
Connection cable	JUMO M12 connecting cable, 5-pole	500 mm 00638312
		1 500 mm 00638313
Connecting line	PVC connecting line, with socket M12 × 1, 2 000 mm	00404585
Cable socket M12 × 1 for self-assembly	straight, without connecting line, 5-pole	00419130
	Angled, without connecting line, 5-pole	00419133

JUMO dTRANS T09 AS, type 707090

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

JUMO dTRANS T09 DS, type 707091

Designation		Part no.
IO-Link master upon request		--
Device data (IODD) on www.jumo.de or on http://ioddfinder.io-link.com .		--