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JUMO dTRANS T06 Junior

Entry-level multifunctional four-wire transmitter

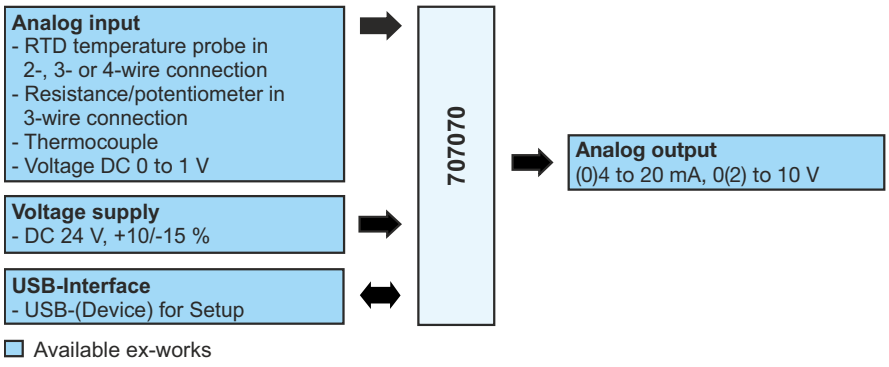
Brief description

The dTRANS T06 Junior (type 707070) transmitter acquires the temperature through an RTD temperature probe with 2, 3, or 4-wire circuit or thermocouple. Resistance transmitters with a 3-wire circuit, as well as DC voltage signals in the range from 0 to 1 V can also be connected for the measurement conversion.
The output signal is galvanically isolated from the measurement input and the voltage supply (triple isolation).
Depending on the measurement input, different linearization variants (linear, temperature-linear, or customer-specific) are possible. The variants 0(4) to 20 mA or 0(2) to 10 V are available as the output signal.
Process variables such as temperature or pressure are reliably emitted at the analog output and monitored for out of range.
If a malfunction occurs the transmitter sends a defined output signal according to the recommendation of NAMUR NE 43, which downstream systems can recognize.
The operating statuses are signaled optically using a two-color LED (red, green).
Smooth operation is indicated through a permanent green LED; malfunction status is indicated through a permanent red LED.
The transmitter is configured using the convenient PC setup program without connecting an additional voltage supply (USB-powered).



Type 707070/...

Block diagram



☐ Available ex-works

Special features

- High galvanic signal separation
- Customer-specific linearization
- Output simulation
- Min./Max.drag indicator function
- Operating hours counter
- Convenient setup configuration (USB-powered)
- UL approval

Approvals/approval marks (see "Technical data")

c UL us

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Technical data

Analog input

Noise suppression, filter time, measuring value offset, and fine adjustment can be adjusted for all input variants.

RTD temperature probe

Designation	Standard	Measuring range	Measuring accuracy[a]	R_{100} / R_0	ITS
Pt50	GOST 6651-2009 A.2			1.3911	90
2/3-wire circuit		-200 to +850 °C	±0.5 K		
4-wire circuit		-200 to +850 °C	±0.3 K		
Pt100, Pt500, Pt1000	IEC 60751:2008			1.3851	90
2/3-wire circuit		-100 to +200 °C	±0.2 K		
		-200 to +850 °C	±0.4 K		
4-wire circuit		-100 to +200 °C	±0.1 K		
		-200 to +850 °C	±0.2 K		
Ni100, Ni500, Ni1000	DIN 43760:1987-09			1.618	IPTS-68
2/3-wire circuit		-60 to +250 °C	±0.4 K		
4-wire circuit		-60 to +250 °C	±0.2 K		
Ni100	GOST 6651-2009 A.5			1.6172	90
2/3-wire circuit		-60 to +180 °C	±0.4 K		
4-wire circuit		-60 to +180 °C	±0.2 K		
Pt100	GOST 6651-2009 A.2			1.3911	90
2/3-wire circuit		-100 to +200 °C	±0.2 K		
		-200 to +850 °C	±0.4 K		
4-wire circuit		-100 to +200 °C	±0.15 K		
		-200 to +850 °C	±0.25 K		
Cu50	GOST 6651-2009 A.3			1.428	90
2/3-wire circuit		-180 to +200 °C	±0.5 K		
4-wire circuit		-180 to +200 °C	±0.3 K		
Cu100	GOST 6651-2009 A.3			1.428	90
2/3-wire circuit		-180 to +200 °C	±0.4 K		
4-wire circuit		-180 to +200 °C	±0.2 K		

Ambient temperature influence	≤ ±0.005 %/K deviation from 22 °C
Measuring current	< 0.3 mA
Sensor line resistance	≤ 50 Ω per line for 3 and 4-wire circuit ≤ 100 Ω line resistance for 2-wire circuit
Lead compensation	Not required for 3-wire circuit. In 2-wire circuits, lead compensation is performed in the software by entering a fixed line resistance.
Special features	- Can also be programmed in °F - Basic sensor type can be changed with sensor factor (e.g., Pt50 to Pt100)

[a] The accuracy specifications refer to the maximum measuring range.

Thermocouples

Designation	Standard	Measuring range	Measuring accuracy[a]	ITS
Fe-CuNi “L”	DIN 43710:1985-12	-200 to +900 °C	±0.1 %	IPTS-68
Fe-CuNi “J”	DIN EN 60584-1:2014	-210 to +1200 °C	±0.1 % from -100 °C	90
Cu-CuNi “U”	DIN 43710:1985-12	-200 to +600 °C	±0.1 % from -100 °C	IPTS-68
Cu-CuNi “T”	DIN EN 60584-1:2014	-200 to +400 °C	±0.1 % from -150 °C	90
NiCr-Ni “K”	DIN EN 60584-1:2014	-200 to +1300 °C	±0.1 % from -80 °C	90
NiCr-CuNi “E”	DIN EN 60584-1:2014	-200 to +1000 °C	±0.1 % from -80 °C	90
NiCrSi-NiSi “N”	DIN EN 60584-1:2014	-200 to +1300 °C	±0.1 % from -80 °C	90
Pt10Rh-Pt “S”	DIN EN 60584-1:2014	-50 to 1768 °C	±0.15 % from 20 °C	90
Pt13Rh-Pt “R”	DIN EN 60584-1:2014		±0.15 % from 50 °C	

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Designation	Standard	Measuring range	Measuring accuracy[a]	ITS
Pt30Rh-Pt6Rh “B”	DIN EN 60584-1:2014	-50 to 1820 °C	±0.15 % from 400 °C	90
W5Re-W26Re “C”	ASTM E230M-11	0 to 2315 °C	±0.15 %	90
W5Re-W20Re “A1”	GOST R 8.585-2001	0 to 2500 °C	±0.15 %	90
W3Re-W25Re “D”	ASTM E1751M-09	0 to 2315 °C	±0.25 %	90
Chromel®-COPEL® "L"	GOST R 8.585-2001	-200 to +800 °C	±0.1 % from -80 °C	90
Chromel®-Alumel®	GOST R 8.585-2001	-270 to +1372 °C	±0.1 % from -80 °C	90
Platinel II	ASTM E1751M-09	0 to 1395 °C	±0.15 %	90

Ambient temperature influence	≤ ±0.005 %/K deviation from 22 °C, plus accuracy of the cold junction from 700 °C for Pt30Rh-Pt6Rh “B”
Measuring range start/end	Freely programmable within the limits in steps of 0.1 K
Cold junction	Pt1000 internal, thermostat (fixed constant value), adjustable
Cold junction accuracy (internal)	±1 K
Cold junction temperature (fixed constant value)	-20 to +80 °C adjustable
Special features	Can also be programmed in °F

[a] The accuracy specifications refer to the maximum measuring range.

Voltage

Designation	Measuring range	Measuring accuracy[a]	Ambient temperature influence
Voltage freely scalable Input resistance R_E > 1 MΩ	Voltage DC 0 to 1 V	±0.05 %	≤ ±0.005 %/K deviation from 22 °C

[a] The accuracy specifications refer to the maximum measuring range.

Resistance transmitter

Designation	Measuring range	Measuring accuracy[a]	Ambient temperature influence
Resistance transmitter	0 to 10 kΩ	±10 Ω	≤ ±0.01 %/K deviation from 22 °C

Connection type	Potentiometer in 3-wire circuit
Sensor line resistance	Max. 50 Ω per line
Resistance Ra, Rs, Re	The measuring range can be easily adjusted to any measuring task by entering the resistance values Ra, Rs, and Re in 0.1-Ω steps and using scaling.
Special features	

[a] The accuracy specifications refer to the maximum measuring range.

Resistance/potentiometer

Designation	Measuring range	Measuring accuracy[a]	Ambient temperature influence
Sensor type resistance/potentiometer	0 to 400 Ω 0 to 4000 Ω 0 to 10 kΩ	±0.4 Ω ± 4 Ω ±10 Ω	≤ ±0.01 %/K deviation from 22 °C

Connection type	Resistance in 2, 3, or 4-wire circuit
Sensor line resistance	≤ 50 Ω per line for 3 and 4-wire circuit ≤ 100 Ω line resistance for 2-wire circuit
Resistance values	The measuring range can easily be adjusted to any measuring task by entering the resistance values Rx and Ro in 0.1-Ω steps and using scaling.
Special features	

[a] The accuracy specifications refer to the maximum measuring range.

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Measuring circuit monitoring

In the event of a malfunction, the outputs move to a defined (configurable) status.

Measuring probe	Out of range	Probe/cable break	Probe/cable short circuit
RTD temperature probe	Is detected	Is detected	Is detected
Resistance transmitter or resistance/potentiometer	Is detected	Is detected	Is not detected
Thermocouple	Is detected	Is detected	Is not detected
Voltage DC 0 to 1 V	Is detected	Is detected	Is not detected

Test voltage

Input and output against voltage supply	DC 1000 V
Measurement input against analog output	DC 1000 V

Analog output

Output signal	Load resistance R_{Load}	Accuracy	Burden influence
Voltage DC 0(2) to 10 V Current DC 0(4) to 20 mA	≥ 2000 Ω ≤ 500 Ω	≤ ±0.05 % referring to 10 V ≤ ±0.05 % referring to 20 mA	≤ ±15 mV ≤ ±0.02 %/100 Ω
Resolution D/A converter	>15 bit		

Limits according to NAMUR recommendation NE 43 in case of deviation above/below measured range	Signal type 4 to 20 mA
Measurement information M	3.8 to 20.5 mA
Failure information A for deviation below measured value/short circuit ("NAMUR Low")	≤ 3.6 mA
Failure information A for deviation above measured value/probe break ("NAMUR High")	≥ 21 mA

Electrical data

Voltage supply	DC 24 V, +10/-15 % SELV or PELV
Power consumption	With voltage supply 24 V: max. 1.5 W
Electrical safety	Acc. to DIN EN 61010-1
Electromagnetic compatibility Interference emission Interference immunity	According to DIN EN 61326-1 Class B domestic industrial requirement
Sampling rate	500 ms
Input filter	Digital filter, 2nd order; filter time constant can be adjusted from 0 to 100 s

Environmental influences

Operating, storage temperature range	-10 to +70 °C, -20 to +80 °C
Resistance to climatic conditions	≤ 85 % relative humidity, annual average, no condensation

Housing

Site altitude	Maximum 2000 m above sea level
Case type, material	Plastic housing, polycarbonate (use in interiors only)
Flammability class	UL94 V0
Electrical connection	Using screw terminals with a cross section of: - max. 2.5 mm^2, wire or stranded wire with ferrule - min. 0.2 mm^2, wire or stranded wire with ferrule
Electrical wiring	In line with the operating conditions, the temperature may exceed 60 °C at the terminals. As a result, the insulation of the cables connected at the terminals may be damaged. The affected cables must be heat-resistant up to at least 80 °C.
Mounting on	Mounting rail 35 mm × 7.5 mm according to DIN IEC 60715
Close mounting	Permitted
Installation position	Vertical

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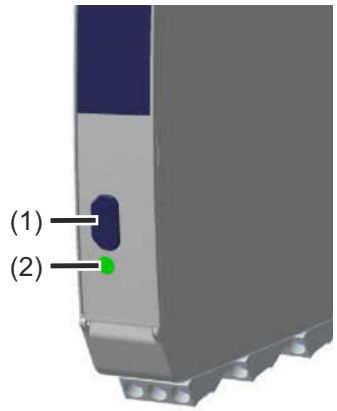
Protection type	IP20 according to DIN EN 60529
Weight with screw terminals	Approx. 110 g

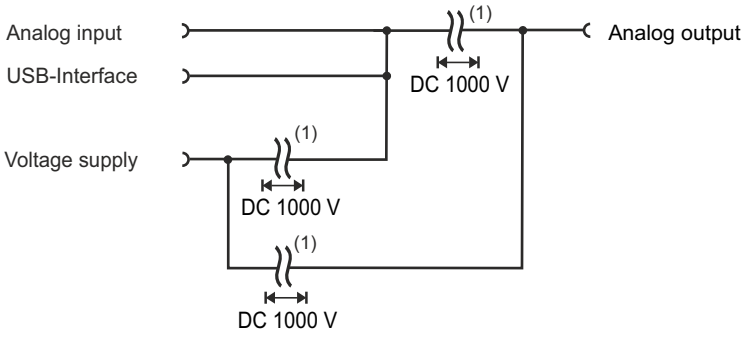
Approvals/approval marks

Approval mark	Test facility	**Certificate/certification number**	**Inspection basis**	**Valid for**
c UL us	Underwriters Laboratories	E201387	UL 61010-1	All modules

Display and control elements

Legend	**Comment**	
(1)	USB interface for configuration	
(2)	LED for operating status display	

Galvanic isolation



(1) The voltage of von DC 1000 V between the circuit parts is a test voltage and has not to be seen as a continuous voltage to be applied.
This device has no separation of the mains circuits according to DIN EN 61010-1:2011-07.
This device is designed as a SELV - oder PELV device and has to be supplied with a circuit, that meet the requirements of limited energy circuits according EN 61010-1.

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Connection elements

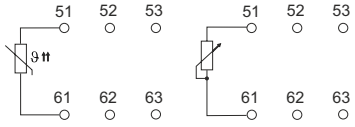
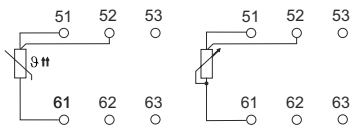
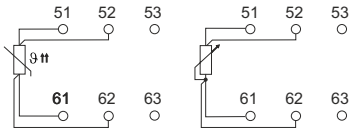


(L+, L-)	Voltage supply	(41, 42, 43)	Analog output
		(51, 52, 53, 61, 62, 63)	Analog input

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 execution of the safety information and warnings contained in these documents are mandatory for installation, electrical connection, startup, and for safety during operation.

Analog input

Connection	Screw terminal	Symbol and terminal designation
RTD temperature probe or resistance/potentiometer in 2-wire circuit	(51, 61)	
RTD temperature probe or resistance/potentiometer in 3-wire circuit	(51, 52, 61)	
RTD temperature probe or resistance/potentiometer in 4-wire circuit	(51, 52, 61, 62)	

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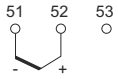
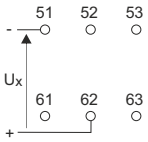
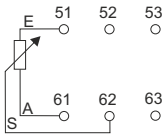
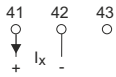
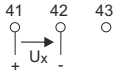
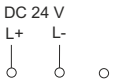
Connection	Screw terminal	Symbol and terminal designation
Thermocouple	(51, 52)	
Voltage DC 0 to 1 V	(51, 62)	
Resistance transmitter A = Start E = End S = Slider	(51, 61, 62)	

Analog output

Connection	Screw terminal	Symbol and terminal designation
Current DC 0(4) to 20 mA (configurable)	(41, 42)	
Voltage DC 0(2) to 10 V (configurable)	(41, 42)	

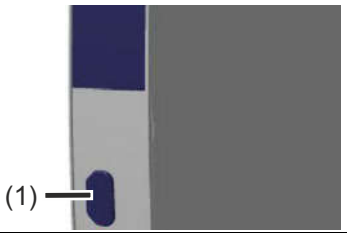
Voltage supply (according to nameplate)

DC 24 V

Connection	Screw terminal	Symbol and terminal designation
DC: The device may only be connected to SELV or PELV electrical circuits that meet the requirements of "Limited-energy circuits" as per DIN EN 61010-1.	(L+) (L-)	

Interfaces

USB (device)

Connection	Socket	Symbol and terminal designation
USB interface (device) Micro-B connector, standard (5-pole)	(1)	

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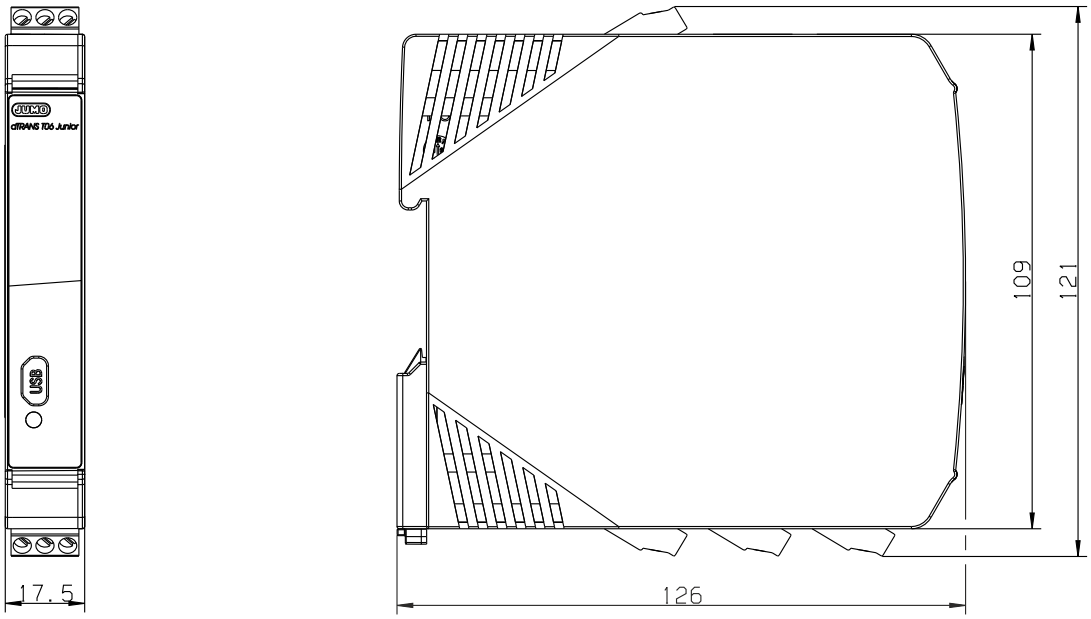
Dimensions



Order details

	(1)	Basic type
707070		dTRANS T06 Junior
	(2)	**Version**
8		Standard with default settings (Pt100 in 3-wire circuit, 0 to 100°C, 4 to 20 mA)
9		Customer-specific configuration (specifications in plain text)
	(3)	**Voltage supply**
29		DC 24 V, +10/-15 % (the device may only be connected to SELV or PELV electrical circuits)

	(1)	/	**(2)**	-	**(3)**
Order code		/		-	
Order example	707070	/	8	-	29

Scope of delivery

- JUMO dTRANS T06 Junior in the ordered version
- Operating manual

General accessories

Item	Part no.
Setup program dTRANS T06 Junior, multilingual	00728281
USB cable A connector to Micro-B connector, length 3 m	00616250
Screw-on end clamp for mounting rail	00528648