

# JUMO dTRANS T06

## Multifunctional Four-Wire Transmitter in Mounting Rail Case in Accordance with DIN EN 61508 and EN ISO 13849

### Brief description

The transmitter acquires the temperature through an RTD temperature probe or a thermocouple (double thermocouple). The transmitter can also acquire standard signals such as current 0(4) to 20 mA or voltage 0 to (1)10 V.

Additionally resistance/potentiometer with two-wire/three-wire/four-wire circuit can be acquired. The output signal is galvanically isolated from the measurement input and voltage supply. Depending on the measurement input, different linearization variants (linear, temperature-linear, customer-specific, etc.) are possible. Variants 0(4) to 20 mA and, alternatively, 0(2) to 10 V are available as output signals.

Process variables such as temperature or pressure are reliably emitted at the analog output and monitored for measuring overrange and underrange.

The Type 707071 is functionally expandable through the extra code, relay output and an RS485 interface.

Visualization of measured values is accomplished using a dot-matrix LCD display with white backlight. The operating status is signaled optically using a two-color LED (red/green).

If a malfunction occurs the transmitter sends a defined output signal according to the recommendation of NAMUR NE 43, which downstream systems can recognize.

Smooth operation is indicated by a permanent green LED; malfunction statuses are indicated by a permanent red LED.

The sensor type, measuring range, linearization, output signal, limit values, etc. can be configured via setup program. Alternatively, configuration is also possible via four keys on the device. The 707071/8-XX-058 device fulfills the requirements of SIL 2 / SIL 3 in accordance with DIN EN 61508 and PL c / PL d in accordance with DIN EN ISO 13849 as well as the requirements of DIN EN 60730-2-9.

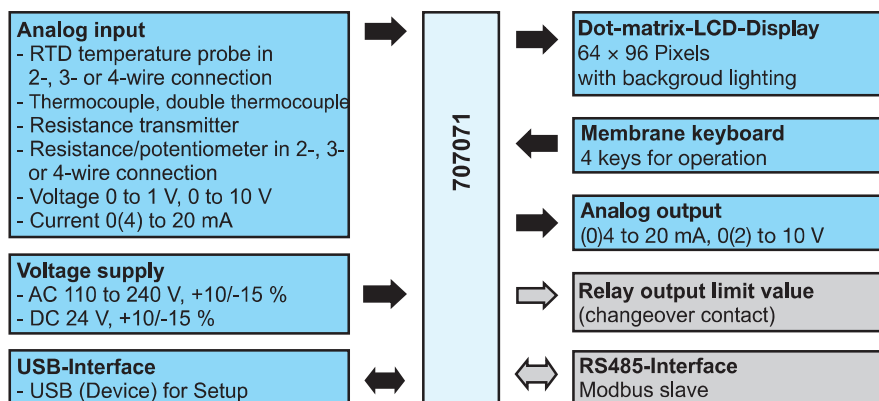
The systematic suitability for HW and SW is SC = 3. Depending on the architecture, SIL 2 / PL c for HFT = 0 (single device) and SIL 3 / PL d for HFT = 1 (two devices) is attainable.



Type 707071/...

Type 707071/...058

### Block diagram



- Available ex-works
- Extra code

### Special features

- Universal input for a large number of sensors and standard signals
- Intuitive operation and configuration on the device or through a USB interface with setup program
- RS485 interface Modbus RTU and relay output limit value (optional)
- Intelligent additional functions such as min./max. drag indicator, operating hours counter, and output simulation
- SIL 2 / SIL 3 in accordance with DIN EN 61508 and PL c/d in accordance with ISO 13849 (optional)
- Sensor matching for RTD temperature probes
- Customer-specific linearization
- High galvanic signal separation
- Service and operation hours counter
- Connection diagram retrievable in the display

### Approvals/approval marks (see "Technical data")



## 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 <sup>a</sup>	R <sub>100</sub> / R <sub>0</sub>	ITS
Pt50 2/3-wire circuit 4-wire circuit	GOST 6651-2009 A.2	-200 to +850 °C -200 to +850 °C	±0.5 K ±0.3 K	1.3911	90
Pt100 2/3-wire circuit 4-wire circuit	IEC 60751:2008	-100 to +200 °C -200 to +850 °C -100 to +200 °C -200 to +850 °C	±0.2 K ±0.4 K ±0.1 K ±0.2 K	1.3851	90
Pt500, Pt1000 2/3-wire circuit 4-wire circuit	IEC 60751:2008	-100 to +200 °C -200 to +850 °C -100 to +200 °C -200 to +850 °C	±0.2 K ±0.4 K ±0.1 K ±0.2 K	1.3851	90
Ni100, Ni500, Ni1000 2/3-wire circuit 3-wire circuit	DIN 43760:1987-09	-60 to +250 °C -60 to +250 °C	±0.4 K ±0.2 K	1.618	IPTS-68
Ni100 2/3 wire circuit 3-wire circuit	GOST 6651-2009 A.5	-60 to +180 °C -60 to +180 °C	±0.4 K ±0.2 K	1.6172	90
Pt100 2/3-wire circuit 4-wire circuit	GOST 6651-2009 A.2	-100 to +200 °C -200 to +850 °C -100 to +200 °C -200 to +850 °C	±0.2 K ±0.4 K ±0.15 K ±0.25 K	1.3911	90
Cu50 2/3-wire circuit 4-wire circuit	GOST 6651-2009 A.3	-180 to +200 °C -180 to +200 °C	±0.5 K ±0.3 K	1.428	90
Cu100 2/3-wire circuit 4-wire circuit	GOST 6651-2009 A.3	-180 to +200 °C -180 to +200 °C	±0.4 K ±0.2 K	1.428	90

Ambient temperature influence	≤ ±0.005 %/K deviation from 22 °C
Measuring current	< 0.3 mA
Sensor line resistance	≤ 50 Ω per wire in 3- and 4-wire circuits ≤ 100 ohm internal resistance in 2-wire circuits
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)

<sup>a</sup> The accuracy specifications refer to the maximum measuring range. Smaller measuring ranges lead to reduced linearization accuracy.

### Thermocouples

Designation	Standard	Measuring range	Measuring accuracy <sup>a</sup>	ITS
Fe-CuNi "L"	DIN 43710:1985-12	-200 to +900 °C	±0.1 %	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	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 -50°C	90

Designation	Standard	Measuring range	Measuring accuracy <sup>a</sup>	ITS
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 -60°C	90
Pt13Rh-Pt "R"	DIN EN 60584-1:2014			
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® "K"	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, additionally the cold junction accuracy
Measuring range start/end	Freely programmable within the limits in steps of 0.1 K
Cold junction	Pt1000 internal, thermostat (fixed constant value), adjustable
Reference point accuracy (internal)	±1 K
Reference point temperature (fixed constant value)	-20 to +80 °C adjustable
Special features	Can also be programmed in °F

<sup>a</sup> The accuracy specifications refer to the maximum measuring range. Smaller measuring ranges lead to reduced linearization accuracy.

### Standard signals

Designation	Measuring range	Measuring accuracy <sup>a</sup>	Ambient temperature influence
<b>Voltage</b> freely scalable Input resistance $R_E > 500 \text{ k}\Omega$ Input resistance $R_E > 1 \text{ M}\Omega$	DC 0 to 10 V DC 0 to 1 V (mV input)	±5 mV ±0.05 %	≤ ±0.005 %/K Deviation from 22°C
<b>Current</b> (voltage drop ≤ 2 V), freely scalable	DC 0(4) to 20 mA	±20 µA	≤ ±0.005 %/K Deviation from 22°C
Galvanic isolation	See Chapter "Electrical data", page 4 and Chapter "Galvanic isolation", page 6		
Special features	Measuring range scaling, adjustable		

Limits in accordance with NAMUR recommendation NE 43 in case of deviation above/below measured range	<b>Signal type 4 to 20 mA</b>
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

<sup>a</sup> The accuracy specifications refer to the maximum measuring range. Smaller measuring ranges lead to reduced linearization accuracy.

### Resistance transmitter

Designation	Measuring range	Measuring accuracy <sup>a</sup>	Ambient temperature influence
Resistance transmitter	max. 10 kΩ	±10 Ω	≤ ±0.01 %/K Deviation from 22 °C
Connection type	Resistance transmitter: 3-wire connection		
Sensor line resistance	max. 50 Ω per line		
Resistance values	Freely programmable within the limits in steps of 0,1 Ω		
Special features	Measuring range scaling, adjustable		

<sup>a</sup> The accuracy specifications refer to the maximum measuring range. Smaller measuring ranges lead to reduced linearization accuracy.

## Resistance/potentiometer

Designation	Measuring range	Measuring accuracy <sup>a</sup>	Ambient temperature influence
Sensor type resistance/potentiometer	max. 10 kΩ	±10 Ω	≤ ±0.01 %/K Deviation from 22 °C

Connection type	Potentiometer with 2-, 3- or 4-wire connection
Sensor line resistance	≤ 50 Ω per line at 3- or 4-wire connection ≤ 100 Ω line resistance at 2-wire connection
Resistance values	Freely programmable within the limits in steps of 0,1 Ω
Special features	Measuring range scaling, adjustable

<sup>a</sup> The accuracy specifications refer to the maximum measuring range. Smaller measuring ranges lead to reduced linearization accuracy.

## 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	is detected	is detected	is not detected
Thermocouple (single)	is detected	is detected	is not detected
Double thermocouple	is detected	is detected	is detected
Voltage 0 to 10 V 0 to 1 V	is detected is detected	is not detected is not detected	is not detected is not detected
Current 4 to 20 mA 0 to 20 mA	is detected is detected	is detected is not detected	is detected is not detected

## Analog output

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

## Relay output

Designation	Function
Limit value relay output	Relay (changeover contact) Contact protection circuit: Fuse cut-out of 3.15 AT installed in pin branch 30000 switching operations at a switching capacity of AC 240 V, 3 A, 50 Hz (resistive load) or up to DC 30 V, 3 A. Minimum current DC 12 V, 100 mA.

## Display

Type, resolution	Dot-matrix LCD display with 64 × 96 pixels
Brightness setting	Contrast can be adjusted on device, background lighting can be switched off via timeout

## Electrical data

Voltage supply	DC 24 V, +10/-15 % or AC 110 to 240 V +10/-15 %, 48 to 63 Hz
Power consumption	At voltage supply 240 V: max. 3 W, 10 VA At voltage supply 24 V: max. 3 W
Inputs and outputs Conductor cross section	Max. 2.5 mm <sup>2</sup> , wire or strand with ferrule
Electrical safety	According to DIN EN 61010-1 Overvoltage category III, pollution degree 2

Electromagnetic compatibility	According to DIN EN 61326-1
Interference emission	Class A - For industrial applications only -
Interference immunity	Industrial requirements
Sampling rate	500 ms
Input filter	Digital filter, 2nd order; filter time constant can be set 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 MSL
Case type, material	Plastic case, polycarbonate (indoor use)
Flammability class	UL94 V0
Electrical connection	Via pluggable screw terminals
Cabling	Under operating conditions the temperature on the connectors can exceed 60 °C. This can destroy the cable isolation of the connection wires. The cabling must be temperature resistant up to 80 °C.
Mounting on	Mounting rail 35 mm × 7.5 mm in accordance with DIN IEC 60715
Close mounting	Permitted
Installation position	Vertical
Protection type	IP20 according to DIN EN 60529
Weight with screw terminals	Approx. 200 g

## Approvals/approval marks

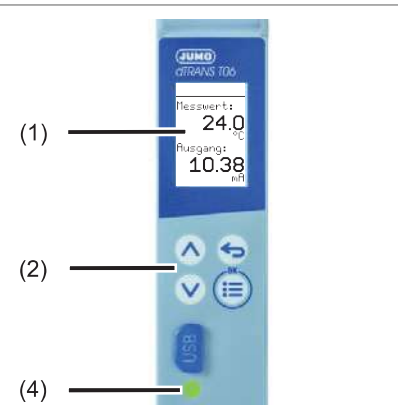
Approval mark	Test facility	Certificate/certification number	Inspection basis	Valid for
SIL2, SIL3	TÜV Nord (German Technical Inspection Agency)	SEBS-A.093409/14V1.0	DIN EN 61508 1-7	All modules
PL c / PL d	TÜV Nord (German Technical Inspection Agency)	SEBS-A.093409/14V1.0	DIN EN ISO 13849	All modules
c UL us	Underwriters Laboratories	2018-10-8-E201387	UL 61010-1	All modules
DNV-GL	DNV-GL	TAA00002C4	DNVGL-CG-0339	All modules

## Connection possibilities of the sensors

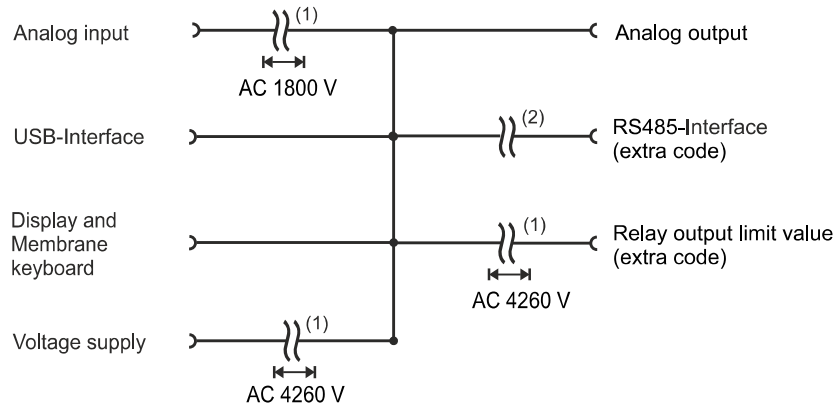
JUMO probes according to data sheets 901006 and 902006 can be connected. The values are described in safety manual 90000000T99Z000K000.

## Display and control elements

Legend	Comment
(1)	LCD display, black/white with background lighting 64 × 96 pixels
(2)	4 keys for operating the device
(4)	LED



## Galvanic isolation



- (1) The voltage specifications correspond to the test voltages (alternating voltage, rms values) according to EN 61010-1:2011-07 for the type test.  
 (2) Functional galvanic isolation for the connection of SELV or PELV circuits.

## Limit value monitoring

The relay output can be activated as follows depending on an adjustable limit value (1):

Switching behavior, left	Switching behavior, symmetrical	Switching behavior, right
<p><b>Alarm function7 (AF7):</b> ON electrical circuit from a fixed limit value</p> <p>(1) Limit value (2) Switching differential</p>	<p><b>Alarm function7 (AF7):</b> ON electrical circuit from a fixed limit value</p> <p>(1) Limit value (2) Switching differential</p>	<p><b>Alarm function7 (AF7):</b> ON electrical circuit from a fixed limit value</p> <p>(1) Limit value (2) Switching differential</p>
<p><b>Alarm function8 (AF8):</b> OFF electrical circuit from a fixed limit value</p> <p>(1) Limit value (2) Switching differential</p>	<p><b>Alarm function8 (AF8):</b> OFF electrical circuit from a fixed limit value</p> <p>(1) Limit value (2) Switching differential</p>	<p><b>Alarm function8 (AF8):</b> OFF electrical circuit from a fixed limit value</p> <p>(1) Limit value (2) Switching differential</p>

## Connection elements



(11, 12, 13 14) Voltage supply

(21, 22, 23, 24) Limit value relay output

(31, 32, 33, 34) RS485 interface

(41, 42, 43, 44) Analog output

(51, 52, 53, 54) 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/instructions contained in these documents are mandatory for installation, electrical connection, startup, and for safety during operation.

### Analog input

Connection	Screw terminals	Symbol and terminal designation
Thermocouple	(51, 52)	
Double thermocouple (galvanically isolated)	(51, 52, 53, 54)	
RTD temperature probe or resistance/potentiometer 2-wire connection	(51, 52, 53, 54)	

Connection	Screw terminals	Symbol and terminal designation
RTD temperature probe or resistance/potentiometer 3-wire connection	(51, 52, 53, 54)	
RTD temperature probe or resistance/potentiometer 4-wire connection	(51, 52, 53, 54)	
Voltage DC 0 to 10 V	(51, 52, 53, 54)	
Voltage DC 0 to 1 V (mV input)	(51, 52, 53, 54)	
Current DC 0(4) to 20 mA	(51, 52, 53, 54)	
Resistance transmitter A = Start E = End S = Slider	(51, 52, 53, 54)	

## Analog output

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

## Limit value relay output

Connection	Screw terminals	Symbol and terminal designation
Normally Closed Contact Pin (installed fine wire fuse 3.15 AT) Normally Open Contact	21 22 23	


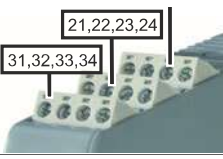
## Voltage supply (according to nameplate)

### AC 240 V (DC 24 V)

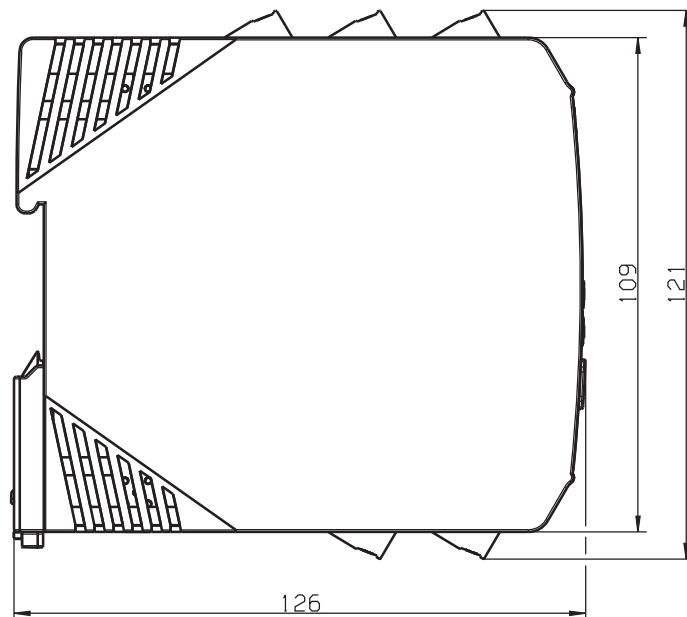
Connection	Screw terminals	Symbol and terminal designation
<b>AC:</b>	L1 line conductor N neutral conductor	
<b>DC:</b> The device has only to be connected at SELV- or PELV-circuits	(L+) (L-)	

## Interfaces

### USB device, RS485

Connection	Socket, Screw terminals	Symbol and terminal designation
USB-interface device Micro-B, standard (5-pole)	(3)	 (3)
RS485-interface	(31, 32, 33, 34)	 21,22,23,24 31,32,33,34
		31 TxD+/RxD+      Transmission/received data + 32 GND              Ground 33 TxD-/RxD-      Transmission/received data -

## Dimensions



## Order details

<b>(1) Basic type</b>	
707071	dTRANS T06
<b>(2) Version</b>	
8	Standard with default settings
9	Customer-specific configuration (specifications in plain text)
<b>(3) Voltage supply</b>	
23	AC 110 to 240 V, +10/-15 %, 48 to 63 Hz
29	DC 24 V, +10/-15 % (The device has only to be connected at SELV- or PELV-circuits)
<b>(4) Extra codes <sup>a</sup></b>	
000	None
018	RS485 interface Modbus RTU and limit value relay output
058	SIL and PL approval (yellow front foil)
062	DNV-GL approval

**Order code**      (1) / (2) - (3) / (4)  
 /  -  /  , ...<sup>a</sup>  
**Order example**      707071 / 8 - 23 / 000

<sup>a</sup> List extra codes in sequence and separate using commas.

## Scope of delivery

- JUMO dTRANS T06 in the ordered version
- 1 operating manual

## General accessories

Item	Part no.
Setup program dTRANS T06 series, multilingual	00668006
USB cable A-connector to Micro-B connector, length 3 m	00616250
Screw-on end clamp for mounting rail	00528648