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JUMO dTRANS T04
Four-wire Transmitter, settable via
DIP switch/PC setup program

for connection to Pt100/Pt1000 resistance thermometer
or potentiometer,
rail-mounted to EN 60715

Brief description

These transmitters are designed for industrial applications and are used to measure the temperature or resistance through a Pt100 or Pt1000 resistance sensor or potentiometer in two-wire or three-wire circuit connection.
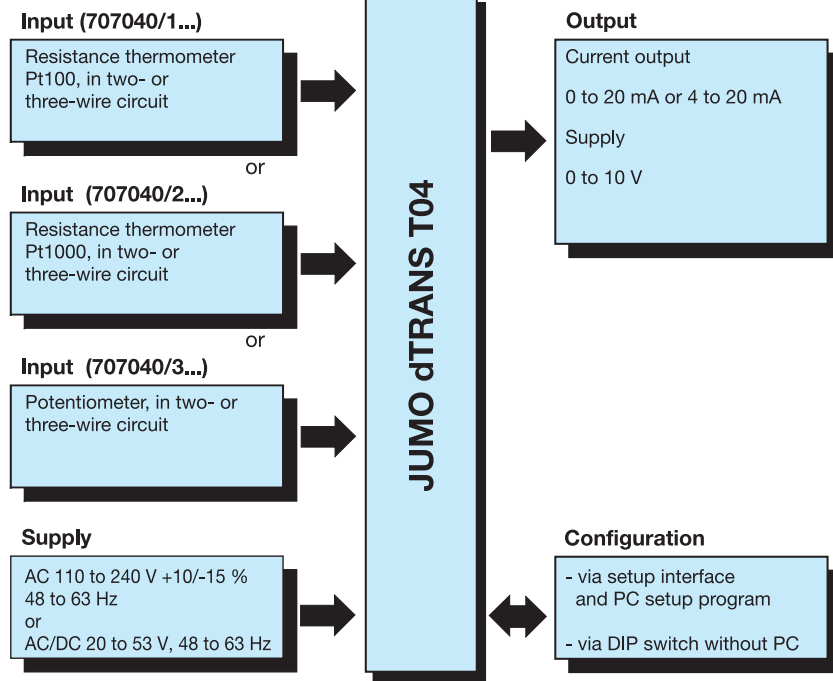
The 0 to 20 mA, 4 to 20 mA or 0 to 10 V output signal is available linear with temperature/resistance. The continuous analog signal path enables a fast reaction of the output to a temperature change (analog continuous measurement instead of digital sampling rate). This results in a low-noise output signal that is immune to interference. High precision, even with small ranges, is ensured by the range-specific gain adjustment.

The transmitter can be set either on the instrument itself, via DIP switch, or through the PC setup program.

dTRANS T04
Type 707040/...

Block structure

Input (707040/1...)

Resistance thermometer Pt100, in two- or three-wire circuit

or

Input (707040/2...)

Resistance thermometer Pt1000, in two- or three-wire circuit

or

Input (707040/3...)

Potentiometer, in two- or three-wire circuit

JUMO dTRANS T04

Output

Current output

0 to 20 mA or 4 to 20 mA

Supply

0 to 10 V

Supply

AC 110 to 240 V +10/-15 %
48 to 63 Hz
or
AC/DC 20 to 53 V, 48 to 63 Hz

Configuration

- via setup interface
  and PC setup program

- via DIP switch without PC

Key features

- Measuring range selectable via DIP switch or through the PC setup program

- Choice of signal output:
  0 to 10 V, 0 to 20 mA or 4 to 20 mA

- Fast response, thanks to continuous analog measurement

- Low-noise current signal, immune to interference

- Electrical isolation between input, output/mains supply

- Current/voltage output

Controls

The chosen measuring range and output response can be set via DIP switch. Using the PC setup program, additional ranges and parameters are configurable.

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Technical data

Input

Measurement input	Pt100 EN 60751	Pt1000 EN 60751	Potentiometer
Range limits	-200 to +850 °C	-200 to +850 °C	0 to 11000 Ω
Connection circuit	Two- and three-wire circuit		
Configuration	Through DIP switch or using the PC setup program		
Shortest span	25 °C	25 °C	250 Ω
Largest span	1050 °C	1050 °C	11000 Ω
Range start for shortest span	-50 to +20 °C	-50 to +20 °C	0 to 500 Ω
Range start for other spans	See range organization on Page 5 and Page 6		
Unit	°C (°F settable through the PC setup program)	°C (°F settable through the PC setup program)	Ω
Sensor lead resistance for 3-wire connection	≤ 11 Ω per conductor		
Sensor lead resistance for 2-wire connection	Factory-set: 0 Ω lead resistance, adjustable through the PC setup program		
Sensor current	≤ 0.5 mA	≤ 0.1 mA	≤ 0.1 mA
Sampling rate	Continuous measurement (analog signal path)		

Output

Measurement input	Pt100 EN 60751	Pt1000 EN 60751	Potentiometer
Output signal - Current: - Voltage:	selectable through DIP switch or PC setup program proportional DC current 0 to 20 mA or 4 to 20 mA DC voltage 0 to 10 V		
Transfer characteristic - For resistance thermometer: - For potentiometer:	Linear with temperature Linear with resistance		
Transfer accuracy	≤ ±0.1 %[a]		
Residual ripple	≤ ±0.2 %[a]		
Burden (with current output)	≤ 750 Ω		
Burden error	≤ ±0.01 % per 100 Ω[a]		
Current limiting	> 21.6 to < 28 mA (24 mA typical)		
Load (with voltage output)	≥ 10 kΩ		
Load error	≤ ±0.1 %[a]		
Voltage limiting	> 11 to < 14 V (12 V typical)		
Settling time on a temperature change	≤ 40 msec		
Settling time after switch-on or reset	≤ 200 msec		
Calibration conditions	AC 230 V or DC 24 V (depending on the supply) at 23 °C (±5 °C)		
Calibration accuracy	≤ ±0.3 %[a, b] or ≤ ±0.3 °C[b]	≤ ±0.5 %[a, b] or ≤ ±0.5 °C[b]	≤ ±0.3 %[a]
Voltage supply error	≤ ±0.05 %[a]		

[a] All data refer to the range end value 10 V or 20 mA.
[b] The larger value applies.

Measuring circuit monitoring

Underrange: - Current output 4 to 20 mA - Current output 0 to 20 mA - Voltage output 0 to 10 V	Falling to ≤ 3.6 mA < 0 mA (-0.05 mA typical) < 0 V -0.6 V typical)
Overrange: - Current output 4 to 20 mA - Current output 0 to 20 mA - Voltage output 0 to 10 V	Rising to > 21.6 to < 28 mA (24 mA typical) Rising to > 21.6 to < 28 mA (24 mA typical) Rising to > 11 to < 14 V (12 V typical)

Probe short-circuit:	
- Current output 4 to 20 mA	≥ 1.5 to ≤ 3.6 mA (2 mA typical)
- Current output 0 to 20 mA	< 0 mA (-0.05 mA typical)
- Voltage output 0 to 10 V	< 0 V (-0.6 V typical)
Probe and lead break:	Signal is configurable.
- Current output 4 to 20 mA	Positive signal: > 21.6 to < 28 mA (24 mA typical)
	Negative signal: ≥ 1.5 to ≤ 3.6 mA (2 mA typical)
- Current output 0 to 20 mA	Positive signal: > 21.6 to < 28 mA (24 mA typical)
	Negative signal: < 0mA (-0.05 mA typical)
- Voltage output 0 to 10 V	Positive signal: > 11 V to < 14 V (12 V typical)
	Negative signal: < 0 V (-0.6 V typical)

Electrical data

Voltage supply	AC 110 to 240 V +10/-15 %, 48 to 63 Hz	AC/DC 20 to 53 V, 48 to 63 Hz
Power consumption	4 VA	3 VA
Electrical safety	To EN 61010, Part 1 Overvoltage category III, pollution degree 2, for switching cabinet mounting to EN 50178	To EN 61010, Part 1 Protection class III, for operation with SELV/PELV circuits
Test voltage	3700 V	500 V
Electrical isolation	The supply is electrically isolated from the input and the output. There is no electrical isolation between input, output and setup connector.	

Environmental influences

Operating temperature range	-25 to +55 °C
Storage temperature range	-40 to +90 °C
Storage temperature humidity	Rel. humidity ≤ 85 %, no condensation
Temperature error	≤ ±0.01 %/°C[a]
Climatic conditions	EN 60721-3-3 3K3 Rel. humidity ≤ 85 % annual average, no condensation
Vibration strength	According to GL Characteristic 2
EMC - Interference emission - Immunity to interference	EN 61326 Class B[b] To industrial requirements
IP enclosure protection	IP20 to EN 60529

[a] All data refer to the range end value 10 V or 20 mA.
[b] The product is suitable for industrial use as well as for households and small businesses.

Housing

Material	Polycarbonate
Flammability class	UL 94 V0
Dimensions (W × H × D)	22.5 mm × 93.5 × 60 mm
Screw terminal	2,5 mm^2 wire cross-section/2.5 mm wire dia.
Mounting	On 35 mm × 7.5 mm DIN rail to EN 60715 A.1, for installation in control cabinets
Operating position	Unrestricted
Weight	Approx. 100 g

PC setup program

The PC setup program is used for configuration and fine adjustment of the transmitter from a PC (e.g. when the sensor drifts). Connection is through the PC interface with USB/TTL converter and adapter and the setup interface of the transmitter. In order to configure the transmitter, it must be connected to the supply.

Configurable parameters

- TAG number (14 characters)
- response to probe and cable break
- range start, range end
- output signal 0(4) to 20mA or 0 to 10V
- lead resistance for 2-wire circuit

Fine adjustment

Fine adjustment means correction of the output signal of a configured transmitter; systematic errors such as those caused by an unsuitable probe mounting can be compensated. The signal can be adjusted in the range ±0.2 mA for current output and ±0.1 V for voltage output. Fine adjustment can only be carried out through the setup program.

Hardware and software requirements

The following hardware and software requirements must be met for installing and operating the PC setup program:
- IBM-PC or compatible PC with Pentium processor or higher
- 512 MB main memory
- 500 MB available on hard disk
- CD-ROM drive
- 1 free USB interface
- Windows® 7, 8 or 10 (32-bit version and 64-bit version)

DIP switch configuration

Function or measuring range for Pt100 and Pt1000	Function or measuring range for potentiometer	DIP switch 1	2	3	4	5	6
PC setup[a]	PC setup[a]						
Output 0 to 10 V	Output 0 to 10 V	•					
Output 0 to 20 mA	Output 0 to 20 mA		•				
Output 4 to 20 mA	Output 4 to 20 mA	•	•				
Range 0 to 50 °C	Range 0 to 500 Ω			•			
Range 0 to 60 °C	Range 0 to 1 kΩ				•		
Range 0 to 100 °C	Range 0 to 2 kΩ			•	•		
Range 0 to 150 °C	Range 0 to 3 kΩ					•	
Range 0 to 200 °C	Range 0 to 4 kΩ			•		•	
Range 0 to 250 °C	Range 0 to 5 kΩ				•	•	
Range 0 to 300 °C	Range 0 to 6 kΩ			•	•	•	
Range 0 to 400 °C	Range 0 to 7 kΩ						•
Range 0 to 500 °C	Range 0 to 8 kΩ			•			•
Range 0 to 600 °C	Range 0 to 9 kΩ				•		•
Range -20 to +80 °C	Range 0 to 10 kΩ			•	•		•
Range -30 to +60 °C	Range 0 to 11 kΩ					•	•
Range -30 to +70 °C				•		•	•
Range -40 to +60 °C					•	•	•
Range -50 to +50 °C				•	•	•	•

• = on

[a] When configuring through the PC setup program, the input **and** output must be configured from the PC.

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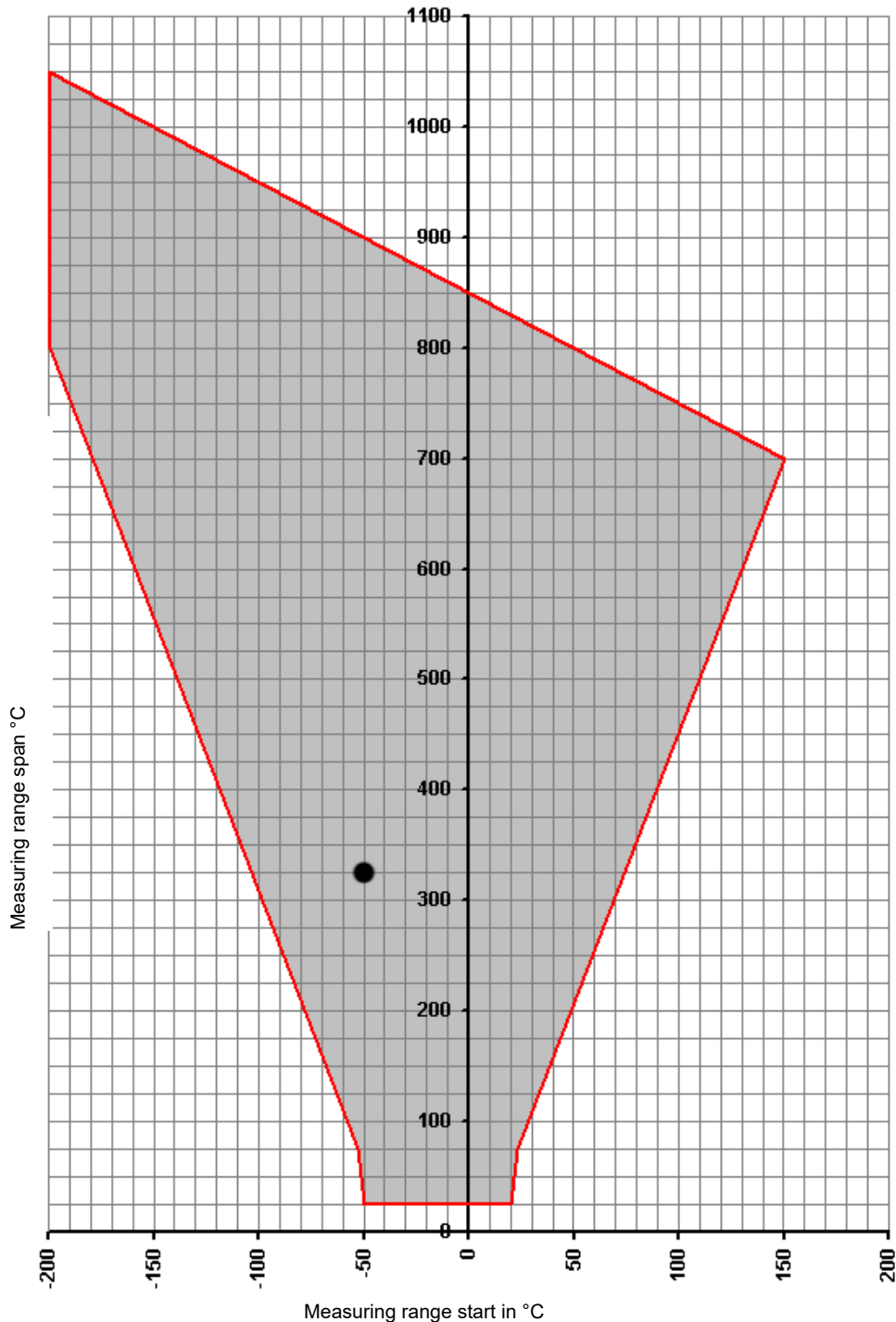# Measuring range organization (resistance thermometer)

All the possible range-start values in relation to the range span are contained within the gray area.

range span = range end – range start

Example: Range start = -50 °C, range end = 275 °C
                      Rrange span = range end – range start = 275 °C - (-50 °C) = 325 °C

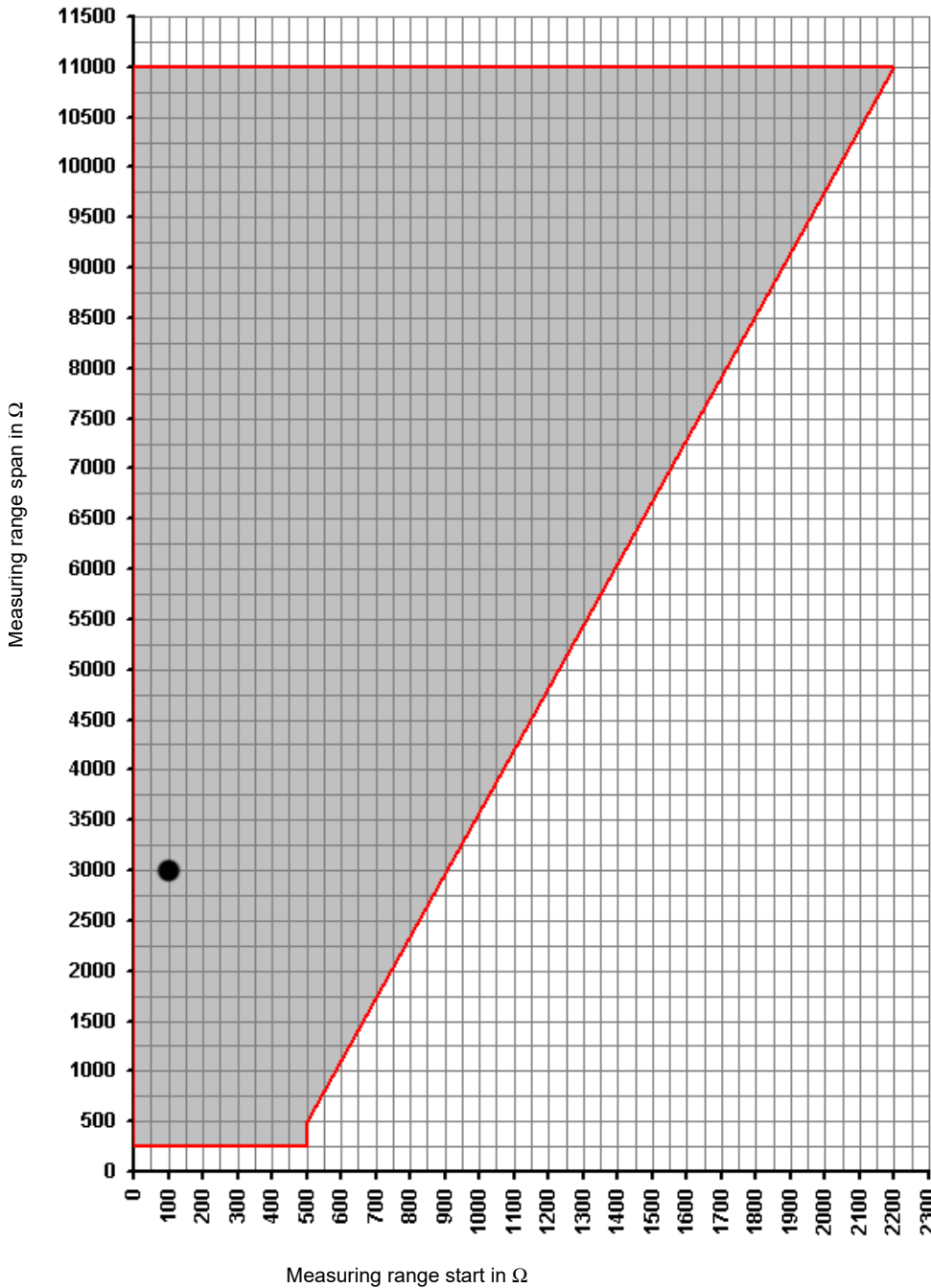   **Please note:** When selecting the range start, make sure it lies within the gray area.

Measuring range organization (potentiometer)

Measuring range span in Ω (y-axis), Measuring range start in Ω (x-axis)

All the possible range-start values in relation to the range span are contained within the gray area.

range span = range end – range start

Example: Range start = 100 Ω, range end = 3100 Ω
Rrange span = range end – range start = 3100 Ω – 100 Ω = 3000 Ω

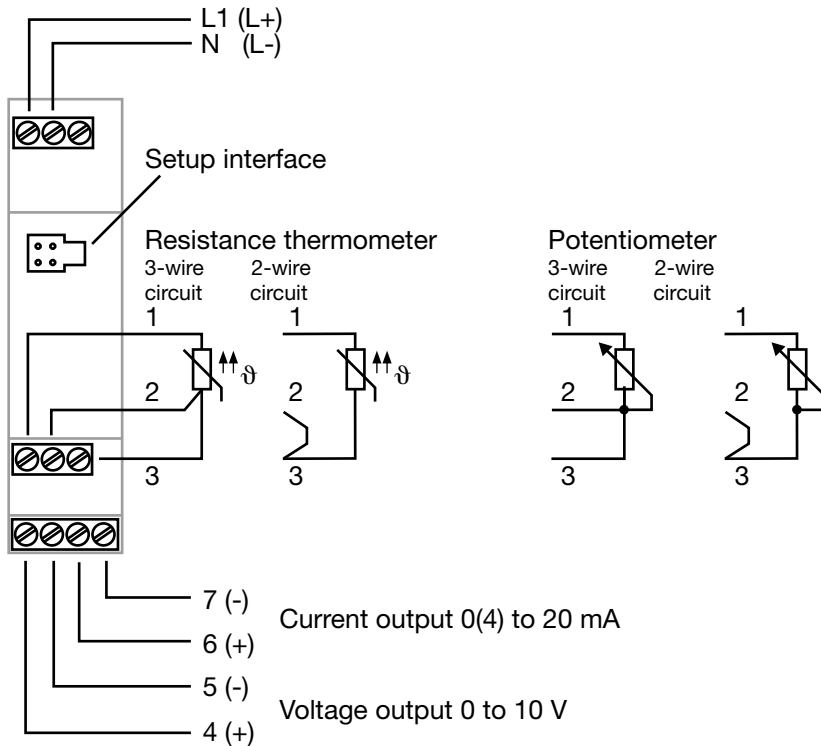**Please note:** When selecting the range start, make sure it lies within the gray area.
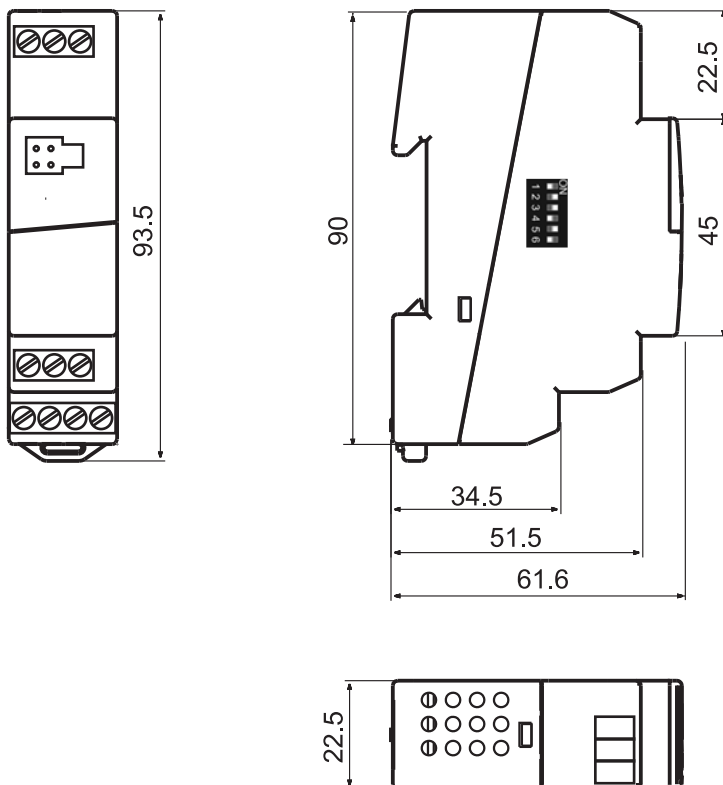
Connection diagram

L1 (L+)
N (L-)

Setup interface

Resistance thermometer
3-wire circuit   2-wire circuit

Potentiometer
3-wire circuit   2-wire circuit

7 (-)
6 (+)   Current output 0(4) to 20 mA

5 (-)
4 (+)   Voltage output 0 to 10 V

Dimensions

93.5

22.5

90

45

34.5

51.5

61.6

22.5

Order details

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				(1)	**Basic version**[a]
			707040/1		dTRANS T04 for Pt100 resistance thermometer
			707040/2		dTRANS T04 for Pt1000 resistance thermometer
			707040/3		dTRANS T04 for potentiometer
				(2)	**Input**
x	x			888	Factory-set[b] (three-wire circuit, 0 to 100 °C)
		x		888	Factory-set[b] (three-wire circuit, 0 to 1 kΩ)
x	x	x		999	Configuration to customer specification (please specify in plain text)[c]
				(3)	**Output**
x	x	x		888	Factory-set (0 to 20 mA)
x	x	x		999	Setting to customer specification (please specify in plain text)[c]
				(4)	**Voltage supply**
x	x	x		22	AC/DC 20 to 53 V, 48 to 63 Hz
x	x	x		23	AC 110 to 240 V +10/-15 %, 48 to 63 Hz

[a] It is not possible to switch between the sensor types.
[b] Additional measuring ranges are selectable via DIP switch or PC setup program (see page 4).
[c] Please check whether the required measuring range and output can be set via DIP switch. In such a case, "factory-set" can be ordered.

	(1)	(2)	(3)	(4)
Order code	[____] -	[____] -	[____] -	[____]
Order example	707040/1 -	888 -	888 -	23

Standard accessory

Operating Manual

Accessories – Data Sheet 709700

Article	Part no.
PC setup program, multilingual	00448774
PC interface with USB/TTL converter, adapter (socket) and adapter (pins)	00456352