

TS 04

Head-mounted
temperature transmitter,
programmable via push-button,
Pt 100 2/3-wire (RTD)

10/11-8.16 EN



■ Input

- Pt 100 resistance thermometer (2-wire or 3-wire)

■ Output

- 2-wire technique
- 4...20 mA
- Temperature-linear

■ Deviation 0.15 %

■ Programming of the measuring range via push-button

- Setting of the measuring range is drift-free, faster and more precise than with instruments using zero or span potentiometers
- Range programming without a special software
- Flexible setting of upper and lower range value

Functional description

The TS 04 head-mounted temperature transmitter converts the temperature-dependent resistance value of a connected Pt 100 sensor directly into a stable 4...20 mA standard signal that is linear to the temperature.

The user can assign the sensor-temperature-range rapidly and conveniently to the 4...20 mA output-signal-range by programming the instrument via its push-button.

A supply voltage of 8...30 V DC is provided to the 2-wire temperature transmitter. The instrument is loop-powered, i.e. the signal lines are used for power transmission and signal information. The 4...20 mA current flowing in the current loop between the power supply and the transmitter covers the TS 04 transmitter's current consumption up to 3.8 mA. The normal modulation range (4...20 mA) contains the temperature information from the sensor.

Technical data

Output

Output signal (temperature-linear)	4...20 mA
Current consumption	3.8 mA
Max. output current	22 mA
Error current signal	22 mA
(Sensor or sensor cable break, or sensor signal out of range between -200 and 850 °C (-328 and 1562 °F), short-circuit or device error)	
Optical error current signalling through permanently lit LED	

Input

Resistance thermometer	Pt 100 (IEC 751) 2-wire or 3-wire
Max. span	1050 K
Min. span	40 K
Conversion in °F: $T[°F] = 9/5 \times T[°C] + 32$ K	
Max. sensor cable resistance	
3-wire circuitry	< 10 Ω per feed cable (Sensor cable resistances must be identical)
2-wire circuitry	to be added to Pt 100 value (Sensor cable resistance is directly considered for the measuring accuracy)
Max. length of sensor feed cable	< 3 m (For up to 3 m of length the specified EMC can be ensured)
Pt 100 measuring current	approx. 1 mA

Power supply (protected against polarity reversal)

(2-wire technique: power cable = signal cable)

Supply voltage	$V_s = 8...30$ V DC
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Max. load

$$R(k\Omega) = \frac{(V_{smax} - V_{smin})}{20}$$

(e.g. $V_s = 24$ V, $R = 800$ Ω)

General specifications

Measuring rate	500 ms
Response time ($T_{70\%}$)	500 ms
Electrical isolation (I/O)	none
Electromagnetic compatibility	
Compliance with	89/336/EEC
RFI suppression	EN50081-1
EMI/RFI shielding to	EN50082-2, EN61000-4-2/-3/-4/-6/-8

Note: Observe the max length of 3 m for the sensor feed cable.
Use shielded power/signal cables, ground on one side

Meets the requirements for CE conformity

Installation category II

Degree of pollution 1

Insulation class II

Inflammability class UL 94 HB

Environmental capabilities

Ambient temperature range	-20...70 °C (-4...158 °F)
Storage temperature	-40...70 °C (-40...158°F)
Relative humidity (non-condensing)	max. 95 %

Mechanical construction

Dimensions	see dimensional drawing
Weight	30 g
Housing material	ABS
Color	black
Terminals	max. 2.5 mm ²

Characteristics at rated conditions¹⁾

acc. to IEC 770 (referred to 25 °C / 77 °F)

Balancing uncertainty	< 0.15 % or < 0.15 K The greater value is valid
Linearity deviation	< 0.05 % or < 0.05 K The greater value is valid.

Influences

Ambient temperature drift	< 0.1 %/10 K or < 0.1 K/10 K The greater value is valid
Long-term drift (can be re-adjusted)	< 0.1 % per year
Supply voltage influence	0.008 %/V referred to 20 V

Standard measuring range

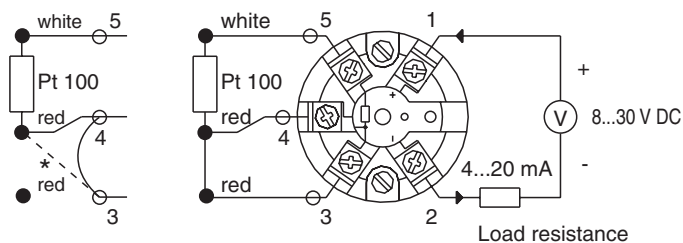
Pt 100, 3-wire, 0...100 °C (32...212 °F)

Overranging (22 mA) in case of error

¹⁾ Percentage related to measuring span

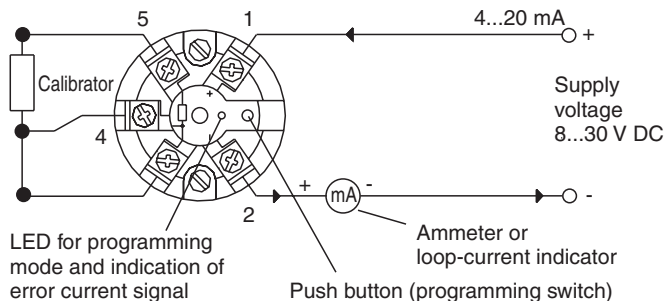
Connecting diagram

Connecting the sensor of a 2-wire Pt 100 / 3-wire Pt 100



* When connecting a 2-wire Pt 100 sensor it is recommended to realize the shorting link between the terminals 3 and 4 in such a way that the two red wires of the 3-wire sensor cable are connected to the same terminal block of the measuring inset.

Programming the measuring range by using the push-button



1. Connect Pt 100/ Ω or temperature calibrator (always in 3-wire technique), supply voltage, and ammeter or loop current indicator.

Note: All connection cables between the calibrator and the TS 04 input terminals must have the same resistance.

2. Set simulator to desired start-point of the measuring range.
3. Press push-button for app. 5 second until red LED flashes.

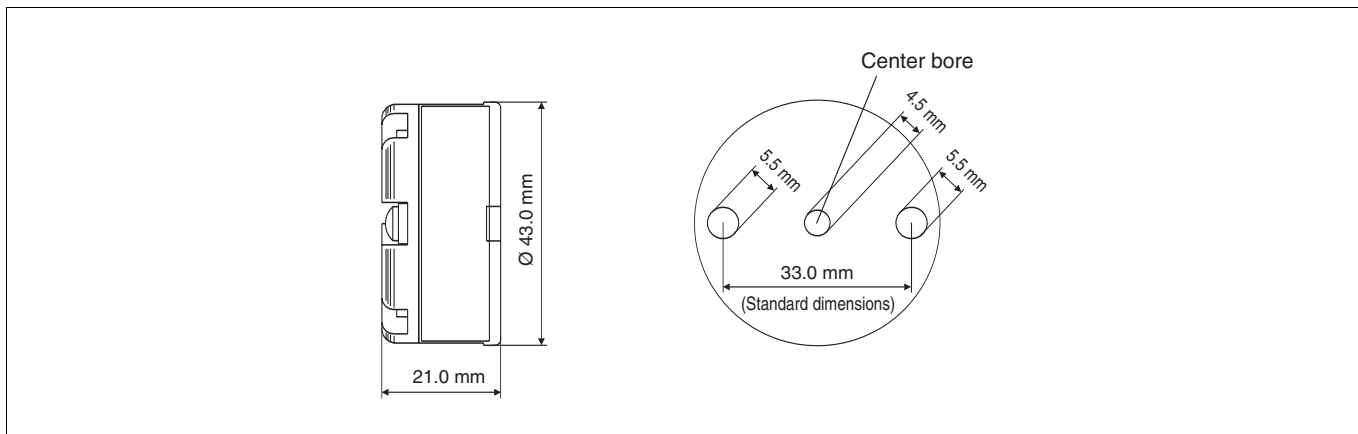
4. Set to desired end-point of the measuring range and let transmitter line up for 10 seconds.

5. Press push-button; red LED first flashes with a higher frequency and is then extinguished. This indicates acknowledgement of the programmed measuring range.

6. Finally check the 4 and 20 mA output signal of the transmitter by setting the lower and upper range value again.



Dimensional drawing (dimensions in mm)



Ordering information			
	Catalog No.		
TS 04 Standard parameter-setting, Pt 100, 0...100 °C, 3 wire circuit, overranging in case of sensor or device error (22 mA)	V11506-1300		

