

Resistance thermometer Model TR31, miniature design

WIKA data sheet TE 60.31

Applications

- Machine building, plant and vessel construction
- Propulsion technology, hydraulics
- General applications

Special features

- Measuring ranges from -50 ... +250 °C, accuracy class per DIN EN 60751
- Integrated transmitter (4 ... 20 mA), very easy to configure via software
- Electrical connection via circular connector M12
- Process connection, protection tube and case made of stainless steel



Resistance thermometer model TR31

Description

Resistance thermometers of this series are used as universal thermometers for the measurement of liquid and gaseous media.

They can be used for pressures up to 40 bar (special designs to 400 bar dependent on insertion length and diameter). All electrical components are protected against splashed water and are designed to withstand vibration.

Insertion length, process connection, measuring elements, etc., can be selected for each application.

The TR31 resistance thermometer consists of a protection tube, which can be fixed into the process using a permanently-welded threaded connection or a compression fitting. A version with no process connection is also available. The electrical connection is made via an M12 x 1 circular connector.

Output signal Pt100

The model TR31-P resistance thermometer is available with a direct Pt100 signal.

Output signal 4 ... 20 mA

In the model TR31-W resistance thermometer, a software-programmable 4 ... 20 mA output signal is built in. Thus the measured temperature values can be transmitted safely and simply.

Specifications

Output signal Pt100, model TR31-P	
Temperature range	Measuring range without neck tube -50 ... +150 °C, with neck tube -50 ... +250 °C
Measuring element	Pt100 (measuring current: 0.1 ... 1.0 mA)
Connection method	3-wire 4-wire
Sensor tolerance value ¹⁾ per DIN EN 60751	Class B Class A

Output signal 4 ... 20 mA, model TR31-W	
Temperature range	Measuring range without neck tube -50 ... +150 °C, with neck tube -50 ... +250 °C ²⁾
Measuring element	Pt100 (measuring current: approx. 0.5 mA)
Connection method	3-wire
Sensor tolerance value ^{1) 3)} per DIN EN 60751	Class B Class A
Measuring span	minimum 20 K, maximum 300 K
Basic configuration	Measuring range 0 ... 150 °C, other measuring ranges are adjustable
Analogue output	4 ... 20 mA, 2-wire
Measuring deviation per DIN EN 60770, 23 °C ± 5 K	0.2 % (Transmitter) ³⁾
Linearisation	linear to temperature per DIN EN 60751
Linearisation error	±0.1 % ⁴⁾
Switch-on delay, electrical	< 10 ms
Signalling of sensor burnout	configurable: NAMUR downscale < 3.6 mA (typically 3 mA) NAMUR upscale > 21.0 mA (typically 23 mA)
Sensor short-circuit	not configurable, generally NAMUR downscale < 3.6 mA (typically 3 mA)
Load R _A	$R_A \leq (U_B - 9V) / 0.023 \text{ A}$ with R _A in Ω and U _B in V
Effect of load	± 0.05 % / 100 Ω
Power supply	DC 10 ... 35 V
Max. permissible residual ripple	10 % at 24 V / maximum 300 Ω Load
Power supply input	protected against reverse polarity
Power supply effect	± 0.025 % / V
Electromagnetic compatibility (EMC)	2004/108/EC, EN 61326 emission (group 1, class B) and interference immunity (industrial application) ⁵⁾
Temperature units	configurable °C, °F, K
Info data	TAG No., descriptor and message can be stored in transmitter
Configuration and calibration data	permanently stored in EEPROM
Electrical connection	M12 x 1, 4-pin circular connector

Ambient conditions	
Ambient and storage temperature	-40 ... +85 °C
Ingress protection	IP 67 IEC 529 / EN 60529 The stated ingress protection only applies when plugged in using mating connectors that have the appropriate ingress protection.
Response time ⁶⁾	t ₅₀ < 3.3 s t ₉₀ < 9.7 s (for protection tube diameter 6 mm)
Materials	Case: stainless steel 1.4571
Vibration resistance	■ 3 g (DIN EN 60751, standard) ■ 20 g (DIN EN 60751, special designs, up to a max. insertion length of 160 mm, no compression fittings)

Readings in % refer to the measuring span

For a correct determination of the overall measuring error, both sensor and transmitter measuring deviations have to be considered.

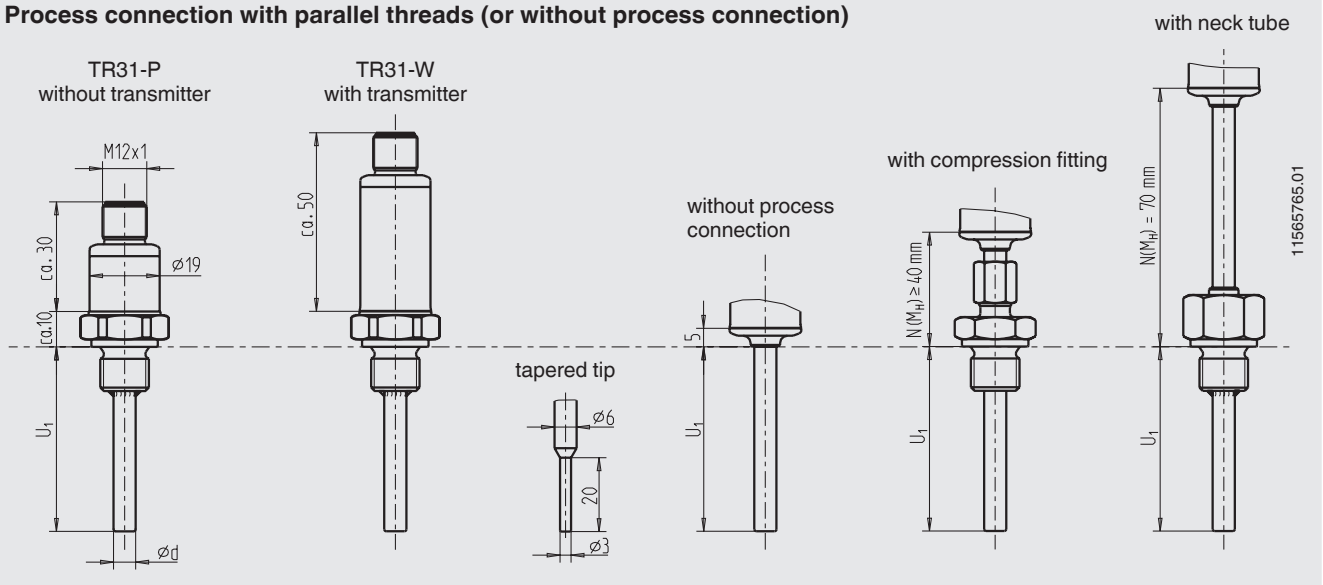
- 1) For detailed specifications for Pt100 sensors, see Technical Information IN 00.17 at www.wika.com.
- 2) The temperature transmitter should therefore be protected from temperatures over 85 °C
- 3) For measuring spans smaller than 50 K additional 0.1 K
- 4) ± 0.2 % for measuring ranges with a lower limit less than 0 °C
- 5) Use RTDs with shielded cable, and ground the shield on at least one end of the lead, if the lines are longer than 30 m or leave the building.
- 6) Measurement in accordance with DIN EN 60751 4.3.3

Protection tube

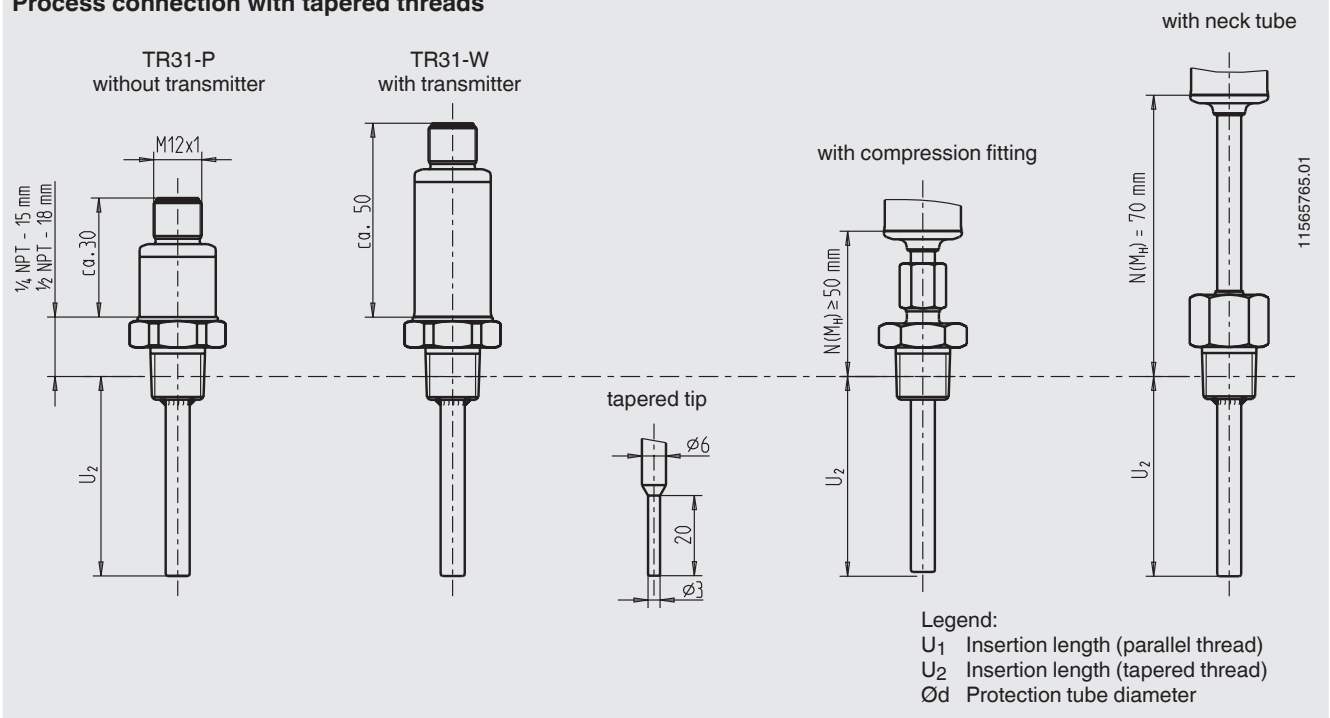
Materials	Stainless steel 1.4571 (316Ti)
Process connection (welded / compression fitting)	<ul style="list-style-type: none"> ■ G ¼ B (not for probe diameter 8 mm) ■ G ⅜ B ■ G ½ B ■ ¼ NPT (not for probe diameter 8 mm) ■ ½ NPT ■ without
Insertion lengths	25, 50, 75, 100, 120, 150, 200, 300, 400 or 500 mm (other insertion lengths possible; ask for delivery times)
Diameter	<ul style="list-style-type: none"> ■ 3 mm (only for insertion length 25 mm) ■ 6 mm (insertion length 50 ... 500 mm) ■ 6 mm, tapered to 3 mm (insertion length 50 ... 500 mm) ■ 8 mm (insertion length 50 ... 500 mm)

Dimensions in mm

Process connection with parallel threads (or without process connection)



Process connection with tapered threads


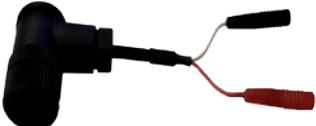


Available documentation/certification

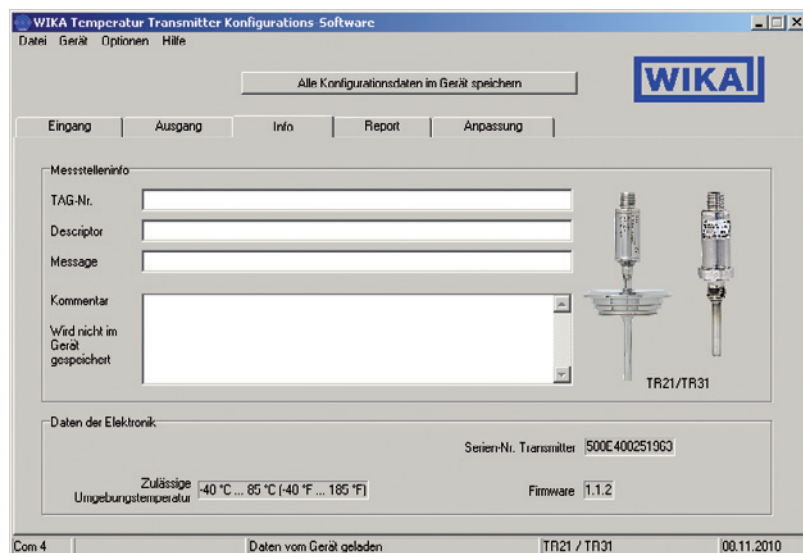
- 2.2 Test certificate
- 3.1 Acceptance test certificate
- DKD certificate

Accessories

Configuration set

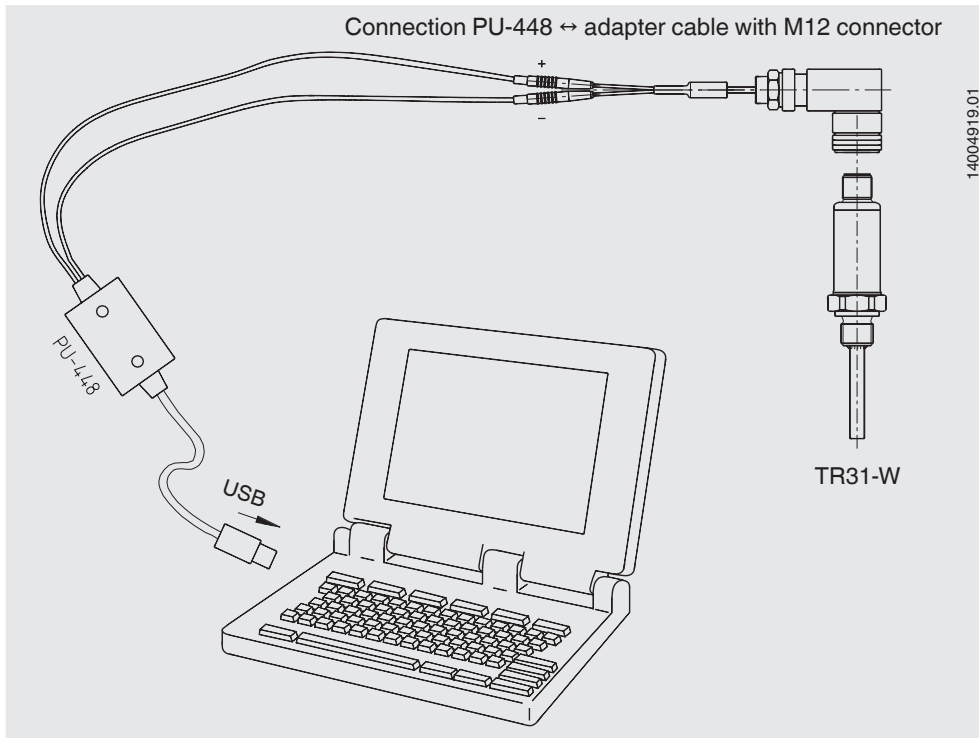
Model	Special features	Order No.
Programming unit Model PU-448 	<ul style="list-style-type: none"> ■ Easy to use ■ LED statusdisplay ■ Compact version ■ Now no further power supply is needed for either the programming unit or for the transmitter ■ Measuring the loop current of the model TR31 resistance thermometer is possible 	11606304
Adapter cable M12 to PU-448 	Adapter cable for the connection of a model TR31-W resistance thermometer to the model PU-448 programming unit	14003193

Software



WIKA_TT configuration software (multilingual) as a free download from www.wika.com

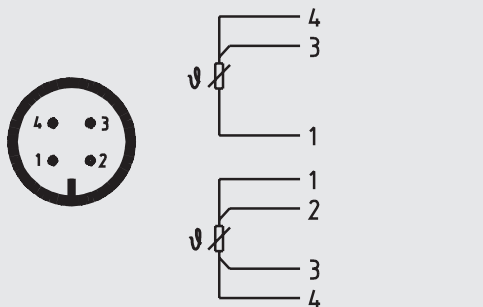
Connecting PU-448 programming unit



Electrical connection

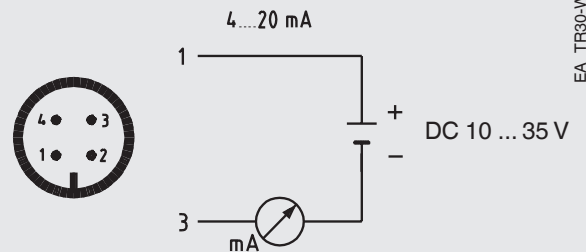
Output signal Pt100, model TR31-P

Circular connector M12 x 1, 4-pin



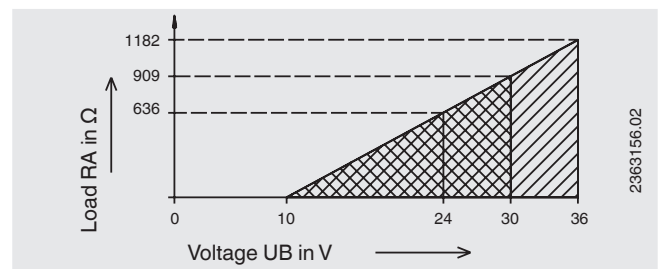
Output signal 4 ... 20 mA, model TR31-W

Circular connector M12 x 1, 4-pin



Load diagram for model TR31-W

The permissible load depends on the loop supply voltage.



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