

Resistance thermometer Model TR30, compact design

WIKA data sheet TE 60.30



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
- TR30-W: integrated transmitter, programmable and able to be calibrated via software
- Electrical connection via angular connector or circular connector
- Process connection and thermowell made of stainless steel
- Ex-i explosion-protected versions

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.

The TR30 resistance thermometer consists of a thermowell, 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 angular DIN connector or an M12 x 1 circular connector.



Resistance thermometer model TR30
Fig. left: with circular connector M12 x 1
Fig. right: with angular DIN connector

Output signal Pt100

The model TR30-P resistance thermometer is available with a direct Pt100 signal. An intrinsically-safe variant can be supplied as an option.

Output signal 4 ... 20 mA

In the model TR30-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.

The model TR30-W resistance thermometer is available, as an option, in an intrinsically-safe variant.

Output signal 0 ... 10 V

In the model TR30-V resistance thermometer is a built-in transmitter with fixed measuring range. This variant is primarily used in machine building.

Specifications

Output signal Pt100, model TR30-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	2-wire 3-wire 4-wire
Sensor tolerance value ¹⁾ per DIN EN 60751	Class B Class A
Electrical connection	■ M12 x 1, 4-pin circular connector ■ Angular DIN connector Form A for cable with Ø 6 ... 8 mm, cross section max. 1.5 mm ²
Explosion protection (option)	Intrinsically safe to Ex-i (ATEX) gas/dust, per directive 94/9/EC Marking: II 1G Ex ia IIC T* or II 2D Ex iaD 21 T*

Output signal 4 ... 20 mA, model TR30-W	
Temperature range	Measuring range without neck tube -50 ... +150 °C, with neck tube -50 ... +250 °C ²⁾
Measuring element	Pt100 (measuring current: 0.5 mA)
Sensor tolerance value ¹⁾ per DIN EN 60751	Class B
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 immunity (industrial locations) ⁵⁾ , and also to NAMUR NE21
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 ■ Angular DIN connector Form A for cable with Ø 6 ... 8 mm, cross section max. 1.5 mm ²
Explosion protection (option)	Intrinsically safe to Ex-i (ATEX) gas/dust, per directive 94/9/EC Marking: II 1G Ex ia IIC T* or II 2D Ex iaD 21 T* Safety-related maximum values for the current loop circuit (connections + and -): U _i = DC 30 V C _i = 6,2 nF I _i = 120 mA L _i = 110 μH P _i = 800 mW

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 less than 50 K additional 0.1 K

4) ± 0.2 % for lower limit of range 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.

Output signal 0 ... 10 V, model TR30-V

Temperature range	Measuring range without neck tube -50 ... +150 °C, with neck tube -50 ... +200 °C ²⁾ , measuring ranges are not adjustable
Measuring element	Pt100 (measuring current: 0.5 mA)
Sensor tolerance value ¹⁾ per DIN EN 60751	Class B
Measuring span	minimum 50 K, maximum 250 K
Basic configuration	Measuring range 0 ... 100 °C
Measuring ranges	-50 ... +50, 0 ... 50, 0 ... 80, 0 ... 100, 0 ... 120, 0 ... 150, 0 ... 200 °C
Analogue output	0 ... 10 V, 3-wire
Overall measuring error ³⁾	< 0.5 % of span
Power supply	DC 12 ... 30 V
Max. permissible residual ripple	10 %
Electromagnetic compatibility (EMC)	2004/108/EC, EN 61326 Emission (Group 1, Class B) and Immunity (industrial locations) ⁵⁾
Electrical connection	■ M12 x 1, 4-pin circular connector ■ Angular DIN connector Form A for cable with Ø 6 ... 8 mm, cross section max. 1.5 mm ²

Ambient conditions

Ambient and storage temperature	-40 ... +85 °C
Ingress protection	Model TR30-P with angular connector: -40 ... +125 °C IP 67 IEC 529 / EN 60529 for M12 x 1 circular connector IP 65 IEC 529 / EN 60529 for angular DIN connector, Form A The stated ingress protection only applies when plugged-in using line connectors that have the appropriate ingress protection.
Accuracy ⁴⁾	-1 Kelvin
Response time	t ₅₀ < 5 s t ₉₀ < 10 s (for thermowell diameter 6 mm)
Materials	Case and process connection: Stainless steel
Vibration resistance (TR30-P, TR30-W)	■ 3 g (DIN EN 60751, standard) ■ 20 g (DIN EN 60751, special designs, up to a max. insertion length of 160 mm, no compression fitting)

Thermowell

Materials	Stainless steel 1.4571 (316Ti)
Process connection (firmly welded / compression fitting)	■ 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
Thermowell insertion lengths	25, 50, 75, 100, 120, 150, 200, 300, 400 or 500 mm (other insertion lengths possible; ask for delivery times)
Thermowell diameter	■ 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)

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 less than 50 K additional 0.1 K

4) measured at 100 °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.

Available documentation/certification

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

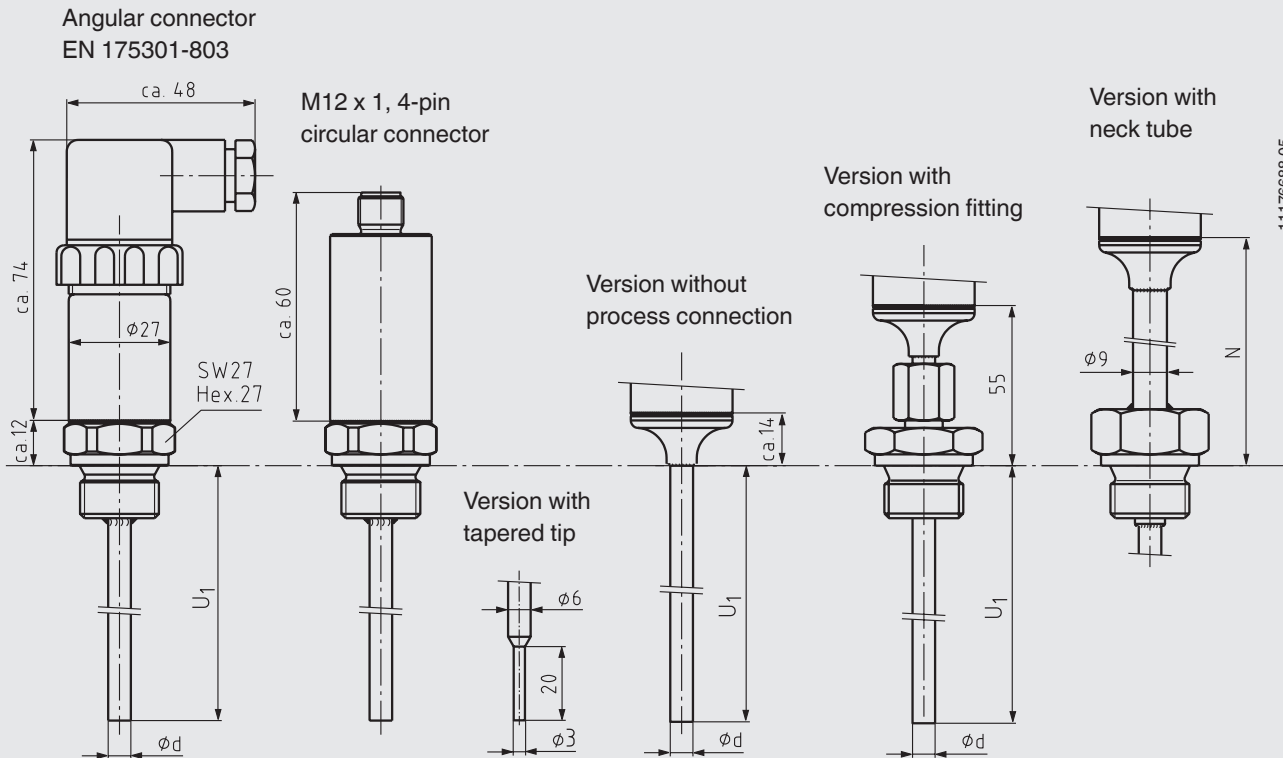
Explosion protection (option)

Models TR30-P and TR30-W resistance thermometers are available with a EC type-examination certificate for "intrinsically safe", Ex-i, ignition protection. These instruments comply with the requirements of 94/9/EC (ATEX) directive for gas and dust.

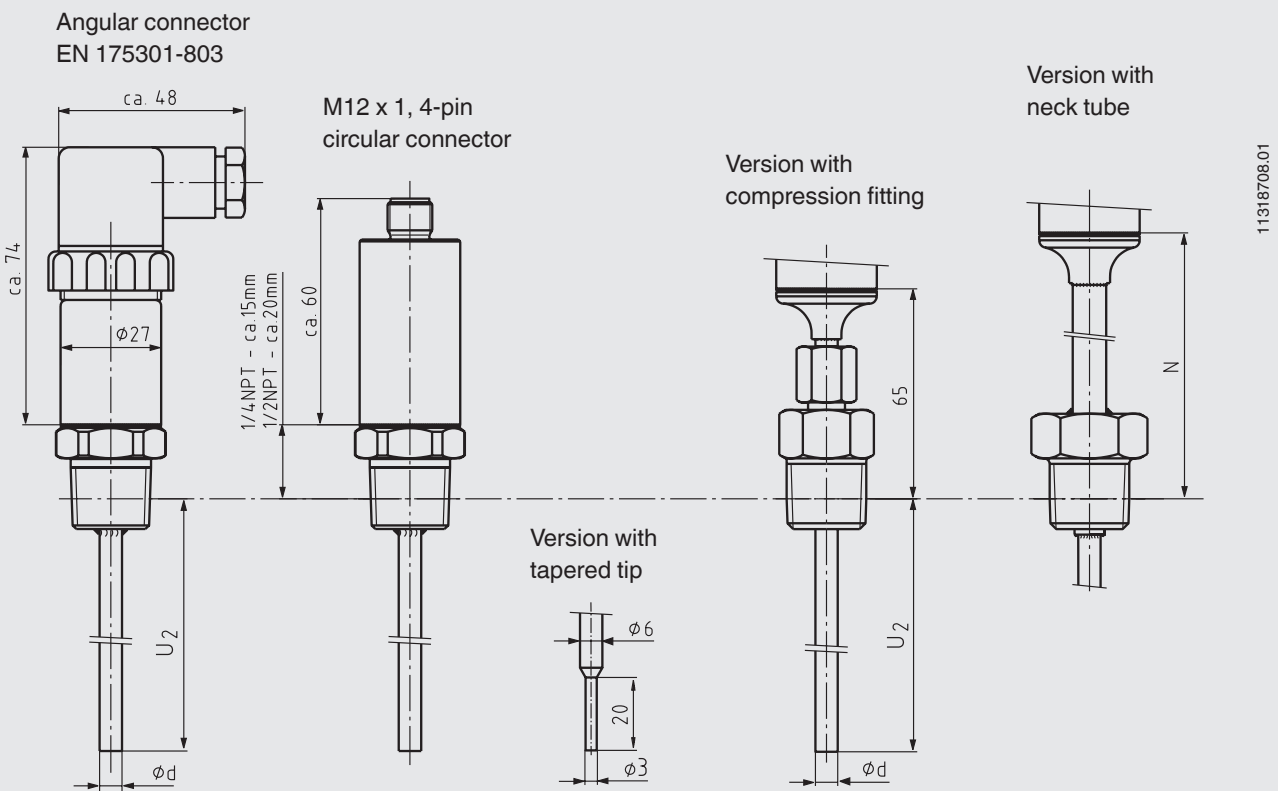
The classification/suitability of the instrument for the respective category can be seen on the EC type-examination certificate and in the operating instructions.

Dimensions in mm

Process connection with parallel threads (or without process connection)



Process connection with tapered threads




Legend:

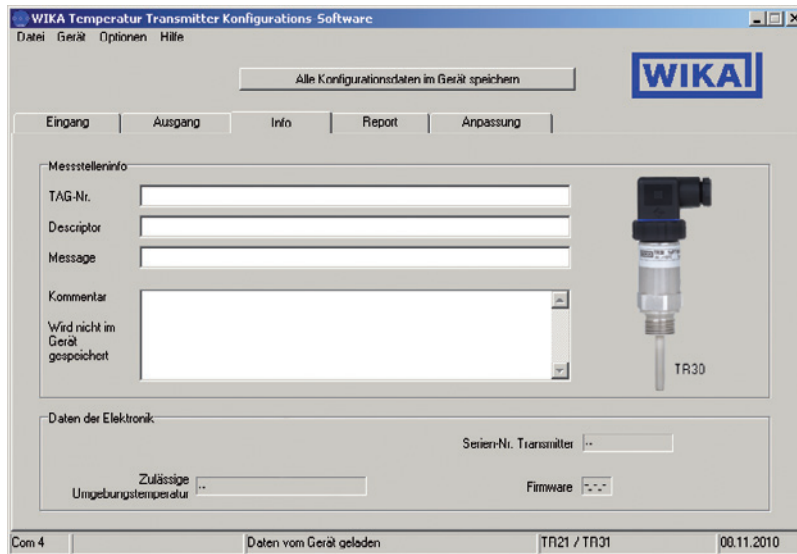
- U_1 Insertion length (parallel thread)
- U_2 Insertion length (tapered thread)
- N Neck tube length (70 mm)
- ϕd Thermowell diameter

Accessories

Configuration set

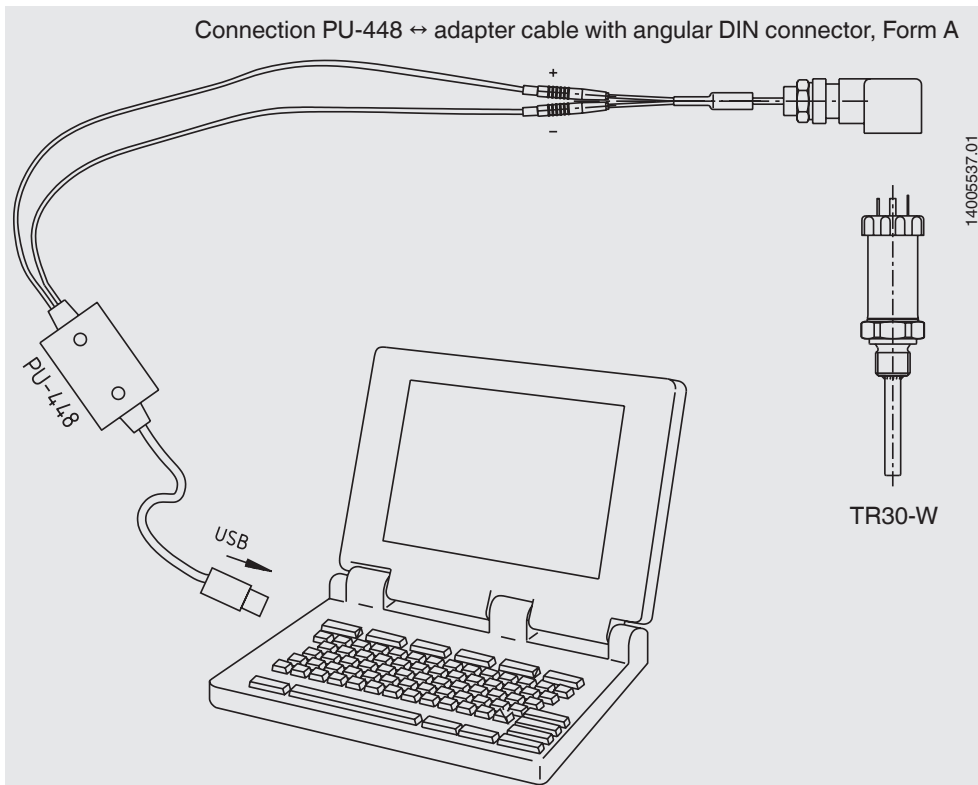
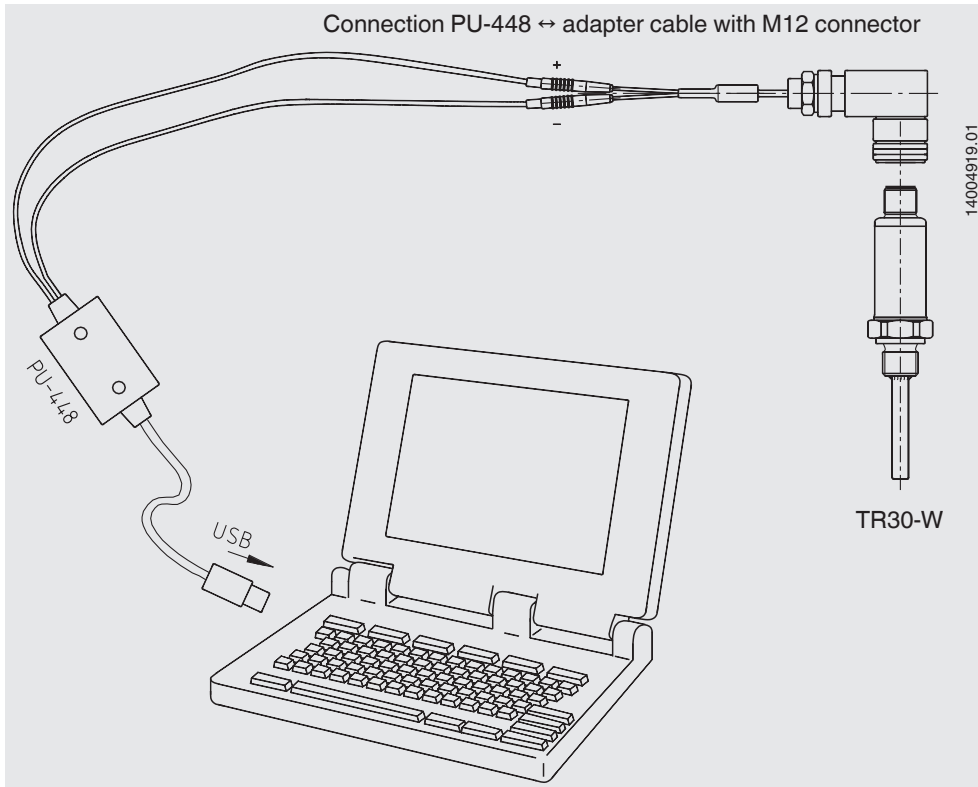
Model	Special features	Order No.
Programming unit Model PU-448 	<ul style="list-style-type: none"> ■ Easy to use ■ LED statusdisplay ■ Compact design ■ Now no further power supply is needed for either the programming unit or for the transmitter ■ Measuring the loop current of the model T24 transmitter and the model TR21, TR30 and TR31 resistance thermometers is possible 	11606304
Adapter cable M12 to PU-448	M12 adapter cable for the connection of a model TR30-W resistance thermometer to the PU-448 programming unit	14003193
Adapter cable Angular DIN connector to PU-448	Adapter cable of angular DIN connector for the connection of a model TR30-W resistance thermometer to the PU-448 programming unit	14005324

Software



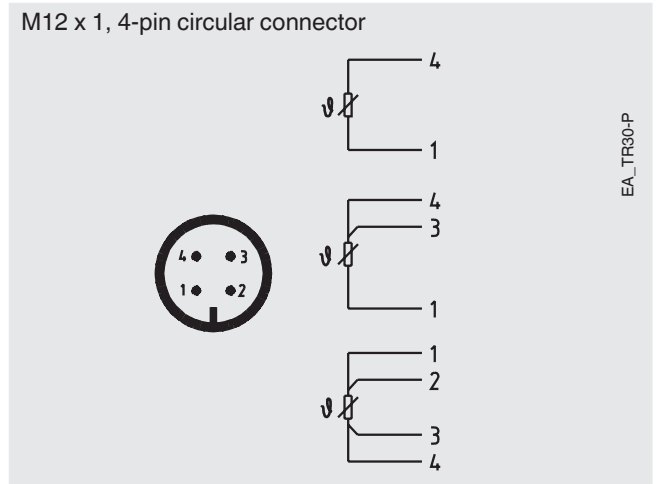
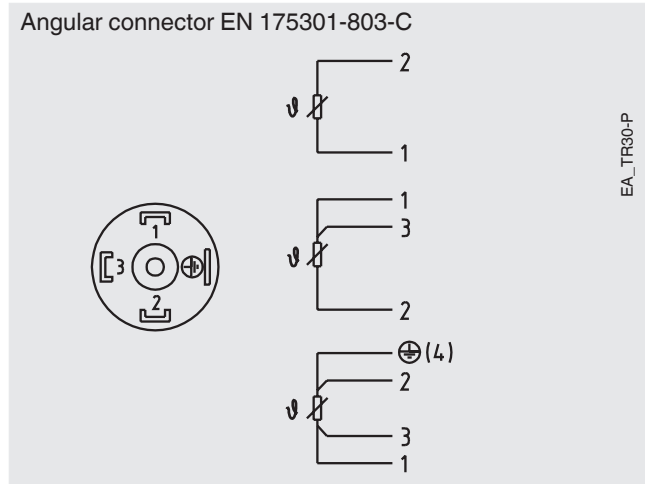
WIKA_TT configuration software (multilingual) as a free download from www.wika.com

Connecting PU-448 programming unit

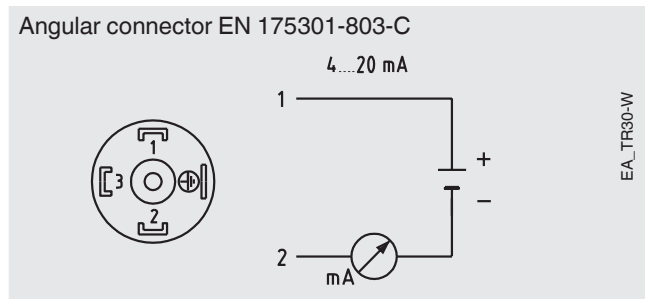


Electrical connection

■ Output signal Pt100, model TR30-P

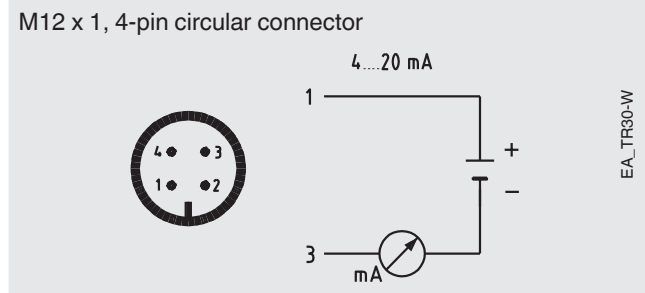
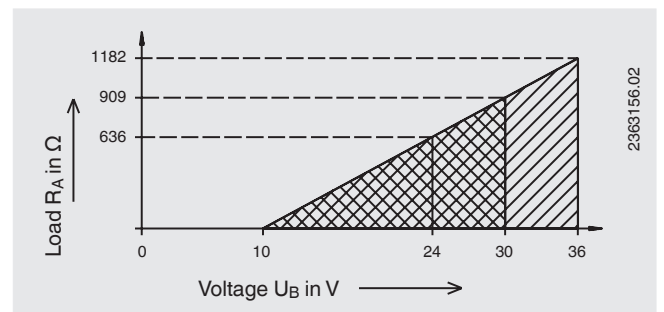


■ Output signal 4 ... 20 mA, model TR30-W

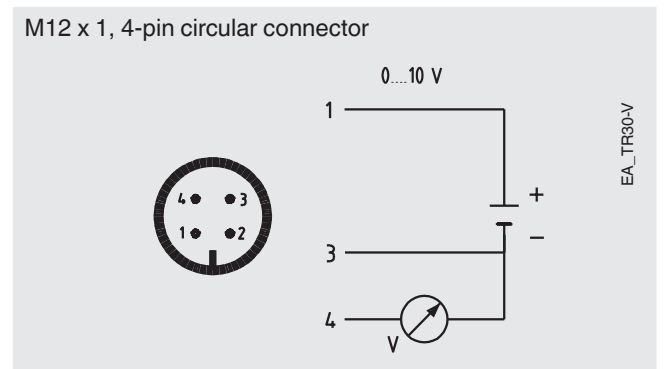
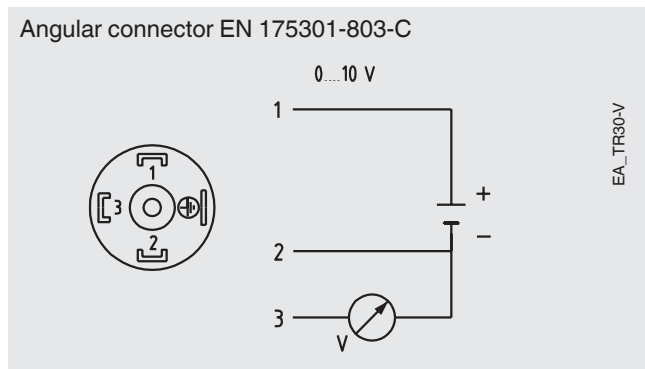


Load diagram for model TR30-W

The permissible load depends on the loop supply voltage.



■ Output signal 0 ... 10 V, model TR30-V



Ordering information

Model / Output signal / Explosion protection / Electrical connection / Neck tube / Process connection / Measuring element / Connection method / Temperature range / Transmitter lower values / Transmitter end value / Probe diameter / Thermowell insertion lengths / Certificates / Options

© 2008 WIKA Alexander Wiegand SE & Co. KG, all rights reserved.
The specifications given in this document represent the state of engineering at the time of publishing.
We reserve the right to make modifications to the specifications and materials.



WIKAL Alexander Wiegand SE & Co. KG
Alexander-Wiegand-Straße 30
63911 Klingenberg/Germany
Tel. (+49) 9372/132-0
Fax (+49) 9372/132-406
E-mail info@wika.de
www.wika.de