

Resistance thermometer Threaded, compact version Model TR36

WIKA data sheet TE 60.36

Applications

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

Special features

- Sensor range -50 ... +250 °C [-58 ... +482 °F]
- Compact design
- Electrical connection via angular connector DIN EN 175301-803 form A
- With direct sensor output (Pt100 in 2-, 3- or 4-wire connection) or integrated transmitter
- Integrated transmitter with 4 ... 20 mA output signal, individually parameterisable with free-of-charge WIKAsoft-TT PC configuration software



Threaded resistance thermometer, model TR36

Description

Resistance thermometers of these series are used as universal thermometers for the measurement of liquid and gaseous media in the range -50 ... +250 °C [-58 ... +482 °F].

They can be used for pressures up to 140 bar [2,030 psi] with 3 mm [0.12 in] protection tube diameters, up to 270 bar [3,916 psi] with 6 mm [0.24 in] protection tube diameters, and up to 400 bar [5,801 psi] with 8 mm [0.31 in] protection tube diameters, depending on the instrument version. All electrical components are protected against splash water and designed to withstand vibration (8 g, depending on instrument version).

The TR36 resistance thermometer consists of a probe tube, which can be fixed into the process using a permanently welded threaded connection or a compression fitting. A version without process connection is also available.

The instrument version with integrated transmitter can be configured individually via the WIKAsoft-TT PC configuration software. Measuring range, dampening, error signalling per NAMUR NE 043 and TAG no. can be adjusted.



Page 1 of 7

Specifications

Measuring element			
Type of measuring element			
Version 4 20 mA	Pt1000 (measuring current < 0.3 mA; self-heating can be ignored)		
Version Pt100	Pt100 (measuring current 0.1 1.0 mA)		
	→ For detailed specifications for Pt sensors, see Technical information IN 00.17 at www.wika.com.		
Connection method			
Version 4 20 mA	2-wire		
Version Pt100	2-wire	The lead resistance is recorded as an error in the measurement	
	3-wire	With a cable length of 30 m or longer, measuring deviations can occur	
	4-wire	The lead resistance can be ignored	
Tolerance value of the measuring element ¹⁾ per IEC 60751			
Version 4 20 mA	Class A		
Version Pt100	 Class A Class B at 2-wire 		

Accuracy specifications (4 20 mA version)			
Tolerance value of the measuring element $^{\rm 1)}$ per IEC 60751	Class A		
Measuring deviation of the transmitter per IEC 62828	± 0.25 K or 0.25 % of the set span (greater value applies)		
Total measuring deviation per IEC 62828 ²⁾	Measuring deviation of the measuring element + transmitter		
Influence of ambient temperature	0.1 % of the set measuring span / 10 K T_{a}		
Influence of supply voltage	± 0.025 % of the set measuring span / V (depending on the supply voltage $U_B)$		
Influence of load	± 0.05 % of the set measuring span / 100 Ω		
Linearisation	Linear to temperature per IEC 60751		
Output error	± 0.1 % ³⁾ of the set measuring span		
Reference conditions			
Ambient temperature Ta ref	23 °C		
Supply voltage U _B ref	DC 24 V		

1) Depending on the process connection, the deviation can be bigger.

2) During transient interferences (e.g. burst, surge, ESD) take into account an increased measuring deviation of up to 2.5 %.

3) ± 0.2 % for start of measuring range less than 0 °C [32 °F]

Example calculation: Total measuring deviation

(measuring range 0 ... 150 °C, load 200 Ω, supply voltage 20 V, ambient temperature 33 °C, process temperature 100 °C)

Sensor element (class A per IEC 60751: 0.15 + (0.0020(t))):	±0.350 K
Measuring deviation of the transmitter ±0.25 K:	±0.250 K
Output error ±(0.1 % of 150 K):	±0.150 K
Influence of load ±(0.05 $\%$ / 100 Ω of 150 K):	±0.150 K
Influence of supply voltage ±(0.025 % / V of 150 K):	±0.150 K
Influence of ambient temperature \pm (0.1 % / 10 K T _a of 150 K):	±0.150 K

Measuring deviation (typical)

sqrt (0.35 K² + 0.25 K² + 0.15 K² + 0.15 K² + 0.15 K² + 0.15 K²) sqrt (0.275 K²) = 0.524 K

Measuring deviation (maximum)

0.35 K + 0.25 K + 0.15 K + 0.15 K + 0.15 K + 0.15 K = 1.2 K

Measuring range		
Temperature range		
Version 4 20 mA	Without neck tube -30 +150 °C [-22 +302 °F] With neck tube -30 +250 °C [-22 +482 °F] $^{1)}$	
Version Pt100	Class A	Without neck tube -30 +150 °C [-22 +302 °F] With neck tube -30 +250 °C [-22 +482 °F] ¹⁾
	Class B	Without neck tube -50 +150 °C [-58 +302 °F] With neck tube -50 +250 °C [-58 +482 °F] ¹⁾
Unit (4 20 mA version)	Configurable °C, °F, K	
Temperature at the connector (Pt100 version)	Max. 85 °C [185 °F]	
Measuring span (4 20 mA version)	Minimum 20 K, maximum 300 K	

1) The temperature transmitter should therefore be protected from temperatures over 85 $^\circ C$ [185 $^\circ F].$

Process connection			
Type of process connection	 G ¼ B G ¾ B G ½ B ¼ NPT ½ NPT M12 x 1.5 M20 x 1.5 		
Protection tube			
Protection tube diameter	 3 mm [0.12 in] 6 mm [0.24 in] 8 mm [0.31 in] 		
Insertion length U ₁	 50 mm [1.97 in] 75 mm [2.95 in] ¹) 100 mm [3.94 in] ¹) 120 mm [4.72 in] ¹) 150 mm [5.91 in] ¹) 200 mm [7.87 in] ¹) 250 mm [9.84 in] ¹) 300 mm [11.81 in] ¹) 350 mm [13.78 in] ¹) 400 mm [15.75 in] ¹) 		
Material (wetted)	Stainless steel 1 4571		

1) Not for protection tube diameter 3 mm [0.12 in]

If the resistance thermometer is to be operated in an additional protection tube, a spring-loaded compression fitting must be used.



Output signal (4 20 mA version)				
Factory configuration				
Measuring range	Measuring range 0 150 °C [32 302 °F]			
	Other measuring ranges are adjustable			
Current signals for error signalling	Configurable in accordance with NAMUR NE 043 downscale < 3.6 mA (3.5 mA) upscale > 21.0 mA (21.5 mA)			
Current value for sensor short-circuit	Not configurable in accordance with NAMUR NE 043 downscale \leq 3.6 mA (3.5 mA)			
Communication				
Info data	TAG no., description and user message can be stored in transmitter			
Configuration and calibration data	Permanently stored			
Configuration software	WIKAsoft-TT → Configuration software (multilingual) as a download from www.wika.com			
Voltage supply				
Supply voltage U _B	DC 10 30 V			
Supply voltage input	Protected against reverse polarity			
Permissible residual ripple of supply voltage	10 % generated by $U_B{<}3$ % ripple of the output current			
Time response				
Switch-on delay, electrical	Max. 4 s (time before the first measured value)			
Warm-up time	After approx. 4 minutes, the instrument will function to the specifications (accuracy) given in the data sheet.			

Electrical connection	
Connection type	Angular connector DIN EN 175301-803 form A for cables with 6 8 mm $[0.24 \dots 0.31 \text{ in}]$ diameter, cross-section max. 1.5 mm ²
Material	
Case material of the connector	PA
Flat gasket	VMQ

Pin assignment





Operating conditions			
Ambient temperature range	-40 +85 °C [-40 +185 °F]		
Storage temperature range	-40 +85 °C [-40 +185 °F]		
Climate class per IEC 60654-1	Cx (-40 +85 °C [-40 +185 °F], 5 95 % r. h.)		
Maximum permissible humidity, condensation	100 % r. h., condensation allowed		
Maximum operating pressure ^{1) 2)}			
For protection tube diameter 3 mm [0.12 in]	140 bar [2,030 psi]		
For protection tube diameter 6 mm [0.24 in]	270 bar [3,916 psi]		
For protection tube diameter 8 mm [0.31 in]	400 bar [5,801 psi]		
Salt fog	IEC 60068-2-11		
Vibration resistance per IEC 60751	10 2,000 Hz, 8 g ¹⁾		
Shock resistance per IEC 60068-2-27	50 g, 6 ms, 3 axes, 3 directions, three times per direction		
Ingress protection (IP code)	IP65 per IEC/EN 60529		
	The stated ingress protection only applies when plugged in using line connectors that have the appropriate ingress protection.		
Weight	Approx. 0.2 0.7 kg [0.44 1.54 lbs] - depending on version		

1) Dependent on the instrument version

2) Reduced operating pressure when using a compression fitting: Stainless steel = max. 100 bar [1,450 psi] / PTFE = max. 8 bar [116 psi]

Approvals

Logo	Description	Region	
CE	EU declaration of conformity	European Union	
	EMC directive ¹⁾ DIN EN 55011 (CISPR11): Emission (group 1, class B) DIN EN 61326-1, DIN EN 61326-2-3: immunity (industrial application)		
	RoHS directive		

1) During transient interferences (e.g. burst, surge, ESD) take into account an increased measuring deviation of up to 2.5 %.

Certificates (option)

Certification type	Measurement accuracy	Material certificate
2.2 test report	x	x
3.1 inspection certificate	x	x
DAkkS calibration certificate	x	-

The different certifications can be combined with each other.

For calibration, the measuring insert is removed from the thermometer. The minimum length (metal part of the probe) for carrying out a 3.1 measurement accuracy test or DAkkS is 100 mm [3.94 in].

Calibration of shorter lengths on request.

[→] Approvals and certificates, see website

Dimensions in mm [in]

Process connection with parallel threads (or without process connection)



Process connection with tapered thread



At a process temperature of > 150 °C [302 °F], a neck tube length N of 70 mm [2.76 in] is necessary.

Legend:

- A Insertion length
- N Neck tube length (70 mm [2.76 in])
- Ød Protection tube diameter
- X Height process connection
 - 1/4 NPT = 15 mm [0.59 in]
 - 1/2 NPT = 19 mm [0.75 in]

Connecting the PU-548 programming unit



(predecessor, programming unit model PU-448, also compatible)

Accessories

Model		Description	Order number
· · · · · · · · · · · · · · · · · · ·	Programming unit Model PU-548	 Easy to use LED status display Compact design No further voltage supply needed, neither for the programming unit nor for the transmitter (replaces programming unit model PU-448) 	14231581
	Adapter cable DIN angular connector to PU-548	Adapter cable DIN angular connector for the connection of a resistance thermometer with a DIN EN 175301-803 angular connector form A to the model PU-548 programming unit	14005324

Ordering information

Model / Output signal / Transmitter temperature unit / Process temperature / Transmitter initial value / Transmitter end value / Process connection / Protection tube diameter / Insertion length A (U_1) or A (U_2) / Neck length N (M_H) / Accessories / Certificates

© 08/2021 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.

WIKA data sheet TE 60.36 · 02/2022



ICS Schneider Messtechnik GmbH Briesestrasse 59

Briesestrasse 59 D-16562 Hohen Neuendorf / OT Bergfelde Tel.: +49 3303 5040-66 Fax: +49 3303 5040-68 E-Mail: info@ics-schneider.de



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

Page 7 of 7