

# Pipe surface resistance thermometer, for clamping Model TR57-M, miniature design

WIKA data sheet TE 60.57

## Applications

- Sanitary applications
- Food and beverage industry
- Bio and pharmaceutical industry, production of active ingredients

## Special features

- No intrusion into the pipeline
- Compact design for space-saving mounting
- Simple and fast electrical connection using an M12 x 1 plug connection
- Measuring insert removable and calibratable



Pipe surface resistance thermometer, model TR57-M

## Description

Pipe surface resistance thermometers of the TR57-M series are used for non-invasive temperature measurement on pipelines.

These resistance thermometers can be retrofitted at any time to an existing pipe, without opening or interrupting the process. The resistance thermometers can be used in a temperature range from -20 ... +150 °C.

The fixing of the measuring insert onto the pipeline is achieved using a pipe adapter. The measuring insert is spring-loaded and the sensor tip is isolated against the ambient temperature through the silicon lining of the pipe adapter.

The measuring insert can be removed for calibration.

All electrical components are protected against moisture (IP67).

The resistance thermometer is available with direct sensor output or integrated transmitter.

Through the compact design, this resistance thermometer is designed specifically for operation in applications with limited mounting space.

Process connection, sensor and connection method can each be selected for the respective application from the ordering information. The electrical connection is made via an M12 x 1 circular connector.

## Specifications

Thermometer with transmitter and 4 ... 20 mA output signal	
Process temperature range	Standard: -20 ... +100 °C (-4 ... +212 °F), max. 150 °C (302 °F) for 30 min <sup>1)</sup> Extended: -20 ... +150 °C (-4 ... +302 °F) <sup>1)</sup> , only with transmitter measuring range 0 ... 150 °C
Connection method	3-wire
Measurement accuracy of the overall instrument	2.5 % of full scale value <sup>2)</sup>
Measurement accuracy of the overall instrument with thermal compound	1.0 % of full scale value <sup>2)</sup>
Measuring range of the transmitter	<ul style="list-style-type: none"> <li>■ -10 ... +50 °C</li> <li>■ 0 ... 100 °C</li> <li>■ 0 ... 150 °C</li> </ul> The measuring range is fixed.
Analogue output	4 ... 20 mA, 2-wire
Power supply U <sub>B</sub>	DC 10 ... 30 V
Response time	approx. t <sub>90</sub> = 10 s <sup>2)</sup>
Switch-on delay, electrical	Max. 1 s (time before the first measured value)
Current value for error signalling	Upscale approx. 22 mA
Load R <sub>A</sub>	$R_A \leq (U_B - 10 \text{ V}) / 23 \text{ mA}$ with R <sub>A</sub> in Ω and U <sub>B</sub> in V
Electrical connection	M12 x 1 circular connector (4-pin)
Power supply input	Protected against reverse polarity
Electromagnetic compatibility (EMC)	EN 61326 emission (group 1, class B) and interference immunity (industrial application) <sup>3)</sup>

Thermometer with direct sensor output with Pt100	
Process temperature range	-20 ... +150 °C (-4 ... +302 °F)
Measuring element	Pt100 (measuring current max. 10 mA, 0.3 ... 1 mA recommended)
Temperature at the connector	Max. 85 °C (185 °F)
Connection method	3-wire <sup>3)</sup>
Tolerance value of the measuring element in accordance with IEC 60751	Class A <sup>2)</sup>
Measurement accuracy of the overall instrument	2.5 % of full scale value <sup>2)</sup>
Measurement accuracy of the overall instrument with thermal compound	1.0 % of full scale value <sup>2)</sup>
Response time	approx. t <sub>90</sub> = 10 s <sup>2)</sup>
Electrical connection	M12 x 1 circular connector (4-pin)

Ambient conditions	
Ambient/storage temperature range	Without transmitter: -20 ... +85 °C (-4 ... +185 °F) With transmitter: -20 ... +60 °C (-4 ... +140 °F)
Maximum permissible humidity per IEC 60068-2-30 var. 2	70 % r. h. <sup>4)</sup>
Ingress protection	IP67 per IEC/EN 60529

For detailed specifications for Pt sensors, see Technical information IN 00.17 at [www.wika.com](http://www.wika.com).

Readings in % refer to the measuring span

1) The temperature transmitter should therefore be protected from temperatures over 60 °C (140 °F).

2) Measuring results are dependent upon the individual mounting situation

Recommendation for achieving a high measurement accuracy:

- The bigger the pipe cross-section, the bigger the contact surface is between sensor and pipe surface.
- The thinner the pipe wall, the better the thermal connection is between sensor and process medium.
- The higher the flow rate, the better the heat transfer is between the process medium and the environment at the pipe surface.

3) Use resistance thermometers with shielded cable, and, if the lines are longer than 30 m or leave the building, ground the shield on at least one end of the lead. The instrument must be operated grounded.

4) Only with M12 circular connector fitted or during storage with M12 protection cap fitted

### Measuring insert

Spring	Stainless steel 1.4310
Probe insert	PEEK
Sensor tip	935 silver
M12 circular connector	PA / gold-plated contacts
Weight	20 g

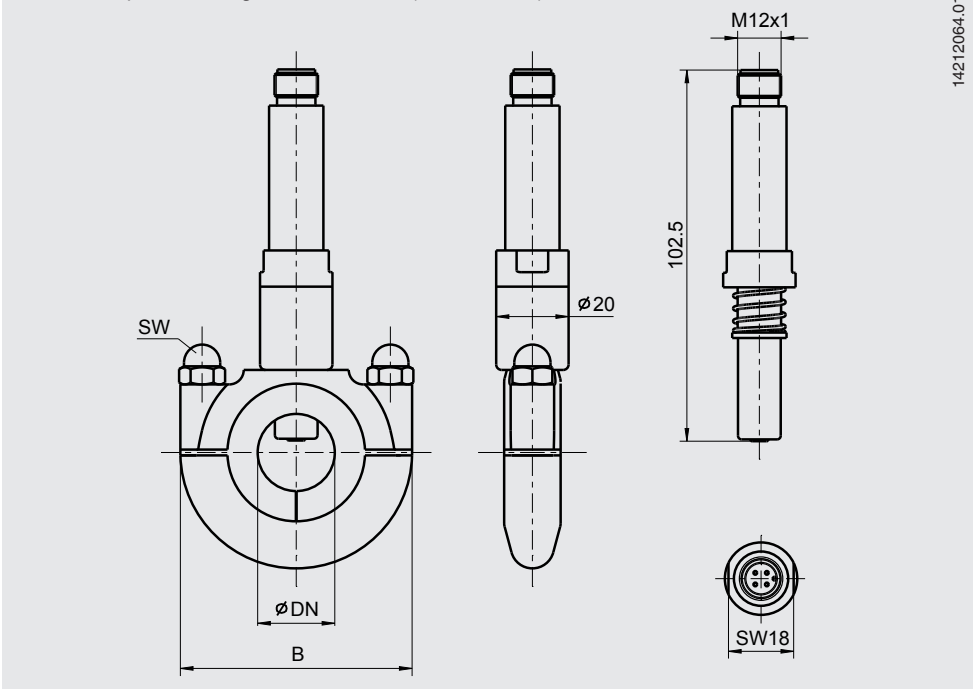
### Process connection

Pipe adapter	Stainless steel 1.4405
Weight	
■ Size 1	120 g
■ Size 2	170 g
■ Size 3	395 g
■ Size 4a, 4b	955 g
Case	Stainless steel 1.4305
Adapter insert	Silicone HTV/PTFE

## Dimensions in mm

With transmitter

Process temperature range -20 ... +150 °C (-4 ... +302 °F)



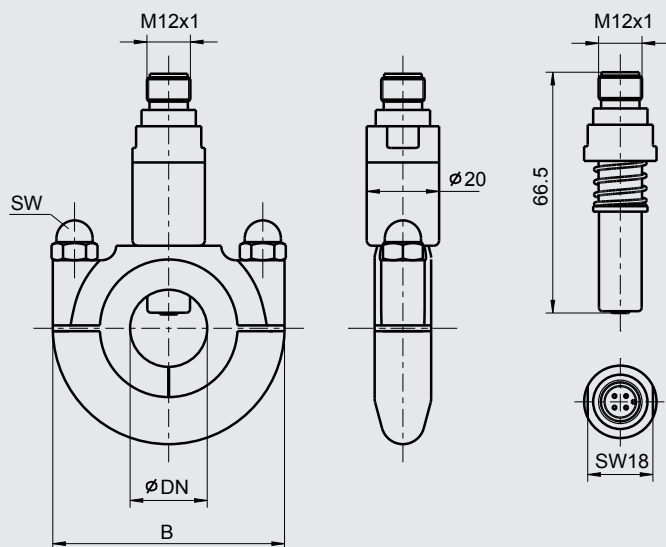
With transmitter

Process temperature range -20 ... +100 °C (-4 ... +212 °F), max. 150 °C (302 °F) for 30 min

Without transmitter

Process temperature range -20 ... +150 °C (-4 ... +302 °F)

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### Overview of pipe adapters with pipe diameter

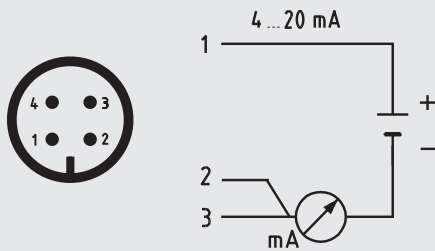
Adapter designation	Outer diameter of pipe in mm	Nominal width of pipe in mm/inch	Standard	Dimensions in mm	
				B	SW
120	12.0	DN 10	EN 10357 series B	51	11
130	13.0	DN 10	EN 10357 series A	51	11
130	12.7	1/2"	DIN 11866 row C / ASME BPE	51	11
135	13.5	DN 8	DIN 11866 row B (ISO 1127)	51	11
172	17.2	DN 10	DIN 11866 row B (ISO 1127)	51	11
180	18.0	DN 15	EN 10357 series B	51	11
190	19.0	DN 15	EN 10357 series A	51	11
190	19.0	3/4"	DIN 11866 row C / ASME BPE	51	11
213	21.3	DN 15	DIN 11866 row B	64	11
230	23.0	DN 20	EN 10357 series A	64	11
254	25.4	1"	DIN 11866 row C / ASME BPE	64	11
269	26.9	DN 20	DIN 11866 row B	64	11
280	28.0	DN 25	EN 10357 series B	64	11
290	29.0	DN 25	EN 10357 series A	64	11
337	33.7	DN 25	DIN 11866 row B	64	11
337	34.0	DN 32	EN 10357 series B	64	11
350	35.0	DN 32	EN 10357 series A	64	11
381	38.1	1 1/2"	DIN 11866 row C / ASME BPE	92	14
400	40.0	DN 40	EN 10357 series B	92	14
410	41.0	DN 40	EN 10357 series A	92	14
424	42.4	DN 32	DIN 11866 row B	92	14
483	48.3	DN 40	DIN 11866 row B	92	14
508	50.8	2"	DIN 11866 row C / ASME BPE	92	14
520	52.0	DN 50	EN 10357 series B	92	14
530	53.0	DN 50	EN 10357 series A	92	14
603	60.3	DN 50	DIN 11866 row B	133	14
635	63.5	2 1/2"	DIN 11866 row C / ASME BPE	133	14
700	70.0	DN 65	EN 10357 series A	133	14
761	76.1	DN 65	DIN 11866 row B	133	14
761	76.2	3"	DIN 11866 row C / ASME BPE	133	14
850	85.0	DN 80	EN 10357 series A	133	14
889	88.9	DN 80	DIN 11866 row B	133	14

## Accessories

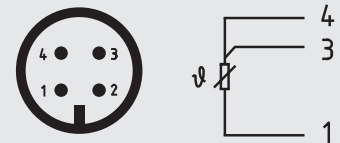
Model	Special features	Order number	
M12 connection cable	Cable socket straight, 4-pin, ingress protection IP67 ■ Temperature range -20 ... +80 °C	Cable length 2 m	14086880
		Cable length 5 m	14086883
	Cable socket straight, 4-pin, ingress protection IP69K, Hygienic Design ■ Temperature range -40 ... +80 °C	Cable length 3 m	14137167
		Cable length 5 m	14137168
	Angled socket, 4-pin, ingress protection IP67 ■ Temperature range -20 ... +80 °C	Cable length 2 m	14086889
		Cable length 5 m	14086891
	Angled socket, 4-pin, ingress protection IP69K, Hygienic Design ■ Temperature range -40 ... +80 °C	Cable length 3 m	14137169
		Cable length 5 m	14137170

## Electrical connection

### Output signal 4 ... 20 mA M12 x 1 circular connector (4-pin)



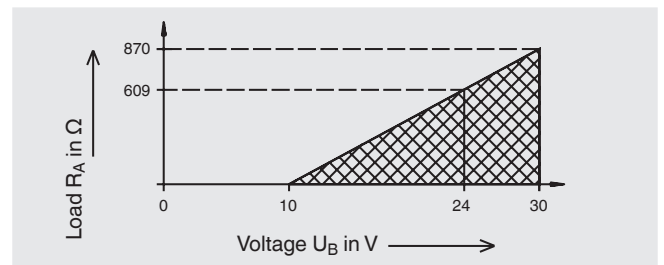
### Output signal Pt100 sensor M12 x 1 circular connector (4-pin)




Pin	Signal	Description
1	L+	10 ... 30 V
2	L-	0 V
3	L-	0 V
4	C	do not use

### Load diagram

The permissible load depends on the loop supply voltage.



## Approvals

Logo	Description	Country
	<b>EU declaration of conformity</b> <ul style="list-style-type: none"><li>■ EMC directive <sup>1)</sup> EN 61326 emission (group 1, class B) and interference immunity (industrial application)</li><li>■ RoHS directive</li></ul>	European Union

1) Only for built-in transmitter

Approvals and certificates, see website

## Ordering information

Model / Output signal (Pt100 or 4 ... 20 mA) / Measuring range / Outer diameter of pipe / Certificates / Options

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