

## Strap-on thermometer with connection lead Model TF44

WIKA data sheet TE 67.14

### Applications

- Heat pumps
- Combined heat and power plants
- Solar thermal systems
- Heating, ventilation, air-conditioning and refrigeration systems
- Machine building

### Special features

- Measuring ranges from -50 ... +200 °C
- The pipeline system remains sealed
- The medium is not affected
- Easy mounting with quick-mounting bracket
- Good heat transfer through aluminium sleeve

### Description

The model TF44 strap-on thermometer is used for temperature measurement on pipe surfaces in the range -50 ... +200 °C (-58 ... +392 °F). As a result of the indirect temperature measurement, on one hand any influence on the medium is avoided, and, on the other hand, the medium has no effect on the service life of the thermometer (e.g. high pressure loading, aggressive media).

The specially contoured, aluminium probe sleeve enables exceptional heat transfer from the pipeline to the thermometer. The use of a thermal compound is usually not required. In order to keep the influence of the ambient temperature as low as possible, we recommend that the measuring point is well insulated. In particular, for large temperature differences between medium and the environment, good insulation of the measuring point is essential.



**Fig. left: Mounted on a pipe**  
**Fig. right: With quick-mounting bracket**

For quick and particularly easy mounting, the TF44 features WIKAI quick-mounting brackets for different pipe diameters. With these, model TF44 strap-on thermometers can be mounted easily without tools.

The TF44 consists of a measuring element within an aluminium sleeve. The connection of the probe to the evaluation electronics is achieved via a connection lead from PVC or silicone.

## Measuring element

WIKA standardly uses the following measuring elements for the model TF44 strap-on thermometer:

- Pt1000, class B per DIN EN 60751
  - Pt100, class B per DIN EN 60751
  - NTC 10 k, B (25/85) = 3976
  - NTC 5 k, B (25/85) = 3976
  - NTC 2.7 k, B (25/85) = 3977
- KTY and others on request

Platinum elements offer the advantage of meeting international standards (IEC/EN 60751).

Due to material- and production-specific criteria, a standardisation of semiconductor elements, e.g. NTCs and KTY, is not possible. For this reason their interchangeability is limited.

Further advantages of platinum elements are: better long-term stability and better behaviour over temperature cycles as well as a wider temperature range.

High measurement accuracy and linearity are also possible with NTCs, but only in a limited temperature range.

This is set against the lower temperature sensitivity of platinum elements.

### Strengths and weaknesses of the different measuring elements

	NTC	Pt100	Pt1000	KTY
<b>Temperature range</b>	-	++	++	-
<b>Accuracy</b>	-	++	++	-
<b>Linearity</b>	-	++	++	++
<b>Long-term stability</b>	+	++	++	+
<b>International standards</b>	-	++	++	-
<b>Temperature sensitivity [dR/dT]</b>	++	-	+	+
<b>Impact of the connection lead</b>	++	-	+	+

### Connection method

The lead resistance of the connection lead affects the measured value of 2-wire connections and must be taken into consideration.

For copper cable with cross-section 0.22 mm<sup>2</sup> the following value applies: 0.162 Ω/m → 0.42 °C/m for Pt100

With a Pt1000 measuring element, the influence of the connection lead of 0.04 °C/m is a factor of 10 lower.

Strap-on thermometers generally have no contact with the medium being measured. Equally, the influence of the ambient temperature can only be kept low through very good insulation.

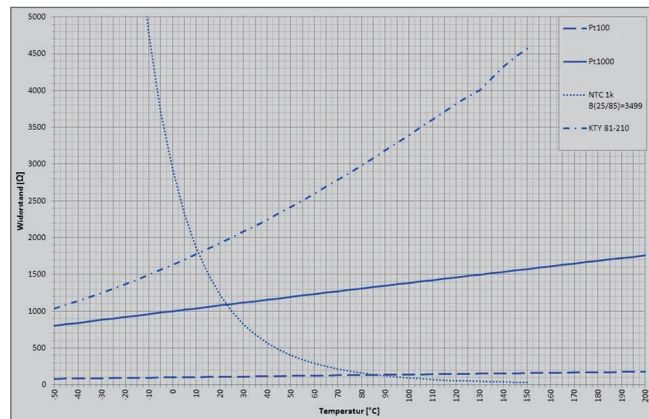
A high-accuracy determination of the temperature of the medium is therefore not possible with this type of measurement.

In order to keep the cost of the measuring point low and to minimise the influence of the connection lead, as standard, we offer our strap-on thermometers with Pt1000 in a 2-wire connection.

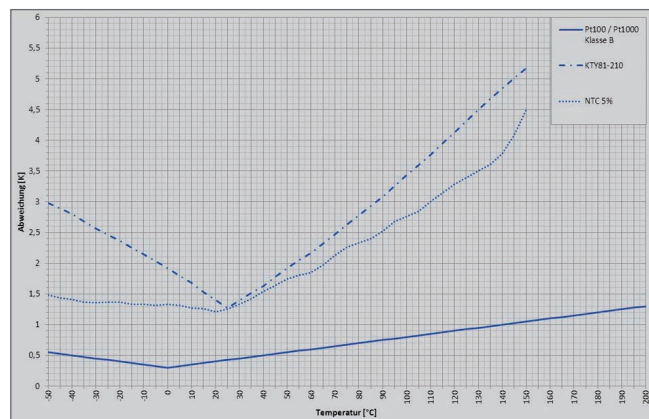
### Characteristic curves

The following characteristic curves show the typical curve shapes for the standard WIKA measuring elements, depending on the temperature and the typical tolerance curves.

#### ■ Typical characteristic curves



#### ■ Typical tolerance curves



## Temperature ranges

### Medium temperature (measuring range)

Since the measuring element is in direct contact with the connection lead, the measuring range of the strap-on thermometer is dependent, on one hand, on the measuring element and, on the other, on the insulation material of the connection lead:

Insulation material of the connection lead	Measuring range
PVC	-20 ... +105 °C
Silicone	-50 ... +200 °C

Measuring element	Measuring range
NTC	-30 ... +130 °C
Pt100	-50 ... +200 °C
Pt1000	-50 ... +200 °C
KTY	-50 ... +150 °C

### Ambient temperature

The maximum permissible ambient temperature depends on the insulation material of the connection lead.

## Probe sleeve

### Material

- Aluminium

The thermal conductivity of aluminium is around twice as high as that of brass, and several times higher than that of stainless steel. Because of this, there is an optimal heat transfer to the measuring element.

### Dimensions

- 6 x 6 mm square section with groove for pipe mounting

Due to the extremely small probe sleeve, the heat dissipation is reduced to the minimum. The installation of insulation is also made much easier by this. Together with good insulation of the measuring point, with the TF44, the best possible measuring result for a strap-on thermometer can be achieved.

## Response time

The response time of a thermometer is strongly influenced by

- the probe sleeve
- the heat transfer to the measuring element
- the flow rate of the medium

Through the selection of aluminium for the probe sleeve and the design of the model TF44 thermometer, there is an optimal heat transfer from medium to measuring element.

Quick temperature changes cannot, however, be detected satisfactorily with a strap-on thermometer. In such a case, invasive temperature measurement is needed. For this application, we recommend our model TF35 (see data sheet TE 67.10) and model TF37 (see data sheet TE 67.12) screw-in thermometers.

## Connection lead

In order to be matched to the prevailing environmental conditions, connection leads are available with different insulation materials.

The lead ends can also be supplied with blank bare wires, end splices or ready-made with customer-specific plug connector.

The following table gives an overview of the main characteristics of insulation materials available for the TF44.

Insulation material	PVC	Silicone
Highest working temperature	105 °C	200 °C
Flammability	self-extinguishing	self-extinguishing
Water absorption	slight	slight
Suitability for steam	good	limited
Chemical resistance against	Dilute bases	+
	Dilute acids	+
	Alcohol	+
	Petrol	-
	Benzene	-
	Mineral oil	+

Legend:  
+ resistant  
- not resistant

The values given in the table are only given as guide values, and are not to be used as the minimum requirements in specifications.

For the model TF44 strap-on thermometer, as standard, we offer PVC or silicone-insulated connection leads with a cross-section of 0.22 mm<sup>2</sup> (24 AWG).

## Vibration resistance

The typical uses for the model TF44 strap-on thermometers are those areas where only low to medium vibration levels occur. Nevertheless, the probes have been designed in such a way that the acceleration values, defined in IEC/EN 60751, of 3 g can generally be exceeded for higher demands.

Depending on the version, installation situation, medium and temperature, the vibration resistance can be up to 6 g.

## Shock resistance

Up to 100 g, depending on version, installation situation and temperature

## Accessories

The model TF44 thermometers have been developed for mounting on pipes. Mounting is particularly easy and time-saving with WIKA's own quick-mounting brackets, designed specifically for the TF44 in galvanised spring steel, which is available for different pipe diameters from 12 to 42 mm.

Due to the materials, the geometry and the construction of the TF44, it is not necessary to apply thermal compound between the probe sleeve and the pipeline. If desired anyway, a small quantity of thermal compound is sufficient.

On ordering separately, please give the order number!



## Electrical connection

- Blank bare wires
- End splices
- Connector to specification

## Ingress protection

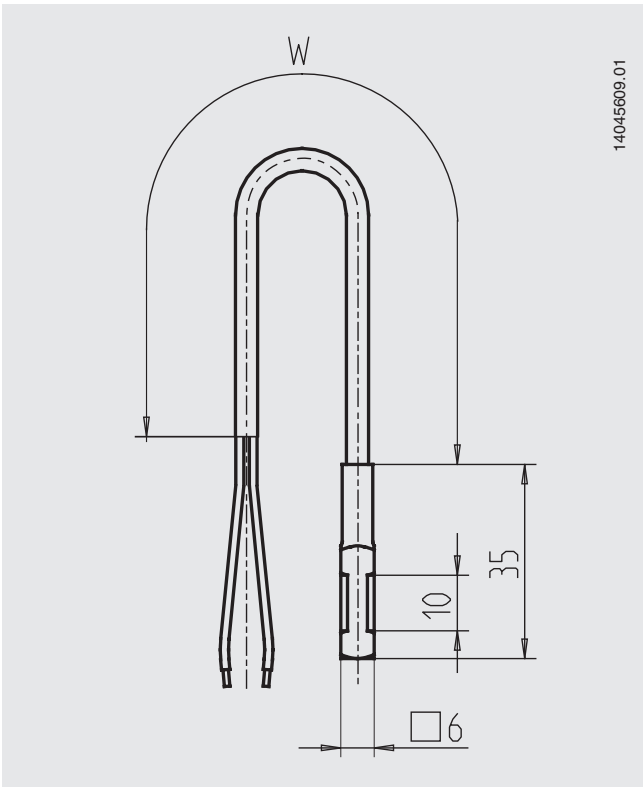
IP66, IP67

When ordering, it is also possible to select quick-mounting brackets or worm-drive hose clips as well as thermal compound. Furthermore, these are available separately as accessory articles.

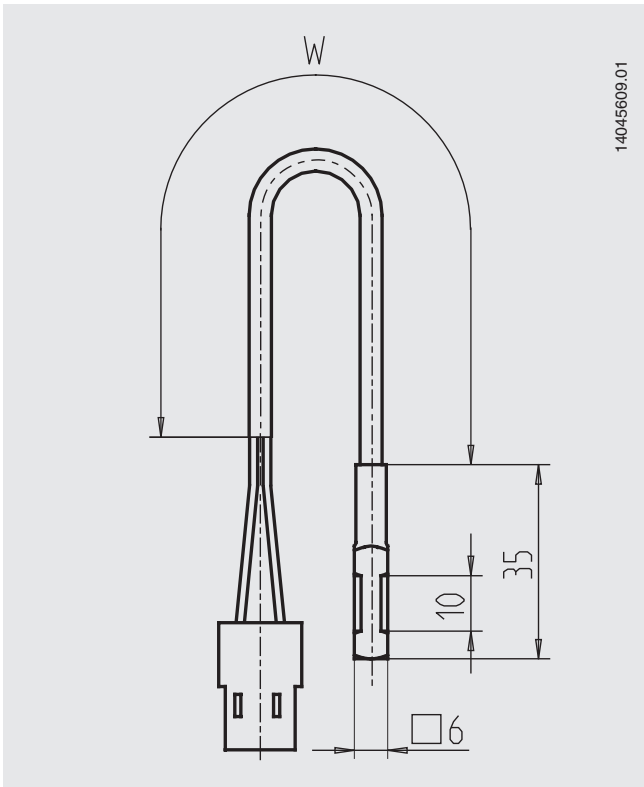
Article	Order number	
<b>Quick-mounting bracket, galvanised steel</b>		
	for pipe diameter 12 ... 15 mm	14145991
	for pipe diameter 19 ... 22 mm	14100349
	for pipe diameter 25 ... 28 mm	14100347
	for pipe diameter 32 ... 35 mm	14149603
	for pipe diameter 39 ... 42 mm	14149604
<b>Worm-drive hose clip, galvanised steel</b>		
	Clamping range 16 ... 27 mm	14050509
	Clamping range 25 ... 40 mm	14049067
	Clamping range 40 ... 60 mm	14050517
	Clamping range 60 ... 80 mm	14050518
	Clamping range 80 ... 100 mm	14041143
<b>Silicone thermal compound paste</b>		
	1 g syringe	11516870
	100 g tube	1606212

# Dimensions in mm

Model TF44 with blank bare wires, with end splices



Model TF44 with connector



Legend:  
W Cable length

## Ordering information

When ordering choose one criterion from each category.

### Measuring range

- -20 ... +105 °C
- -30 ... +130 °C
- -50 ... +200 °C

### Probe version

- Square section 6 x 6 mm, aluminium

### Measuring element

- Pt1000, class B per DIN EN 60751
- Pt100, class B per DIN EN 60751
- NTC 10 k, B (25/85) = 3976
- NTC 5 k, B (25/85) = 3976
- NTC 2.7 k, B (25/85) = 3977

Others on request

### Connection lead

- PVC / PVC
- Silicone / Silicone

### Cable length

- 1,000 mm
- 2,000 mm
- 3,000 mm

Others on request (in 500 mm steps)

### Electrical connection

- Blank bare wires
- End splices

Others on request

### Mounting accessories

- Without
- Quick-mounting bracket, galvanised steel, for pipe diameters 12 ... 15 mm
- Quick-mounting bracket, galvanised steel, for pipe diameters 19 ... 22 mm
- Quick-mounting bracket, galvanised steel, for pipe diameters 25 ... 28 mm
- Quick-mounting bracket, galvanised steel, for pipe diameters 32 ... 35 mm
- Quick-mounting bracket, galvanised steel, for pipe diameters 39 ... 42 mm
- Worm-drive hose clip, galvanised steel, clamping range 16 ... 27 mm
- Worm-drive hose clip, galvanised steel, clamping range 25 ... 40 mm
- Worm-drive hose clip, galvanised steel, clamping range 40 ... 60 mm
- Worm-drive hose clip, galvanised steel, clamping range 60 ... 80 mm
- Worm-drive hose clip, galvanised steel, clamping range 80 ... 100 mm

### Thermal compound

- Without
- Silicone thermal compound, 1 g syringe

## Ordering information

Model / Measuring range / Probe design / Measuring element / Connection lead / Cable length / Electrical connection / Mounting accessories / Thermal compound

© 10/2012 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.

