

Strap-on temperature sensor with connection lead Model TF44

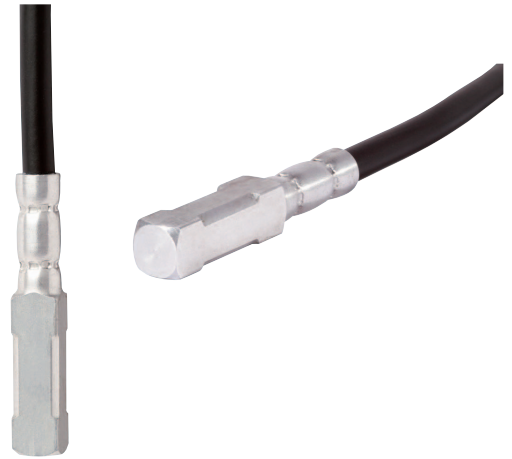
WIKA data sheet TE 67.14

Applications

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

Special features

- Measuring ranges from -50 ... +200 °C
- The pipeline system remains sealed
- Measuring medium is not affected
- Simple, fast mounting
- Good heat transfer through aluminium sleeve



Strap-on temperature sensor, model TF44

Description

Measuring element, tolerance

For the model TF44 strap-on temperature sensor, WIKA uses the following measuring elements as standard:

- Pt1000, class B per DIN EN 60751
- Pt100, class B per DIN EN 60751
- NTC, $R_{25} = 10 \text{ k}\Omega \pm 5 \%$
- NTC, $R_{25} = 5 \text{ k}\Omega \pm 5 \%$
- NTC, $R_{25} = 2.7 \text{ k}\Omega \pm 5 \%$

KTY and others on request

Platinum elements offer the advantage of meeting international standards (IEC 751 / DIN EN 60751). Due to material- and production-specific criteria, a standardisation of semiconductor elements, e.g. NTC's 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 measuring accuracy and linearity are also possible with NTC's, 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
Temperature range	-	++	++	-
Accuracy	-	++	++	-
Linearity	-	++	++	++
Long-term stability	+	++	++	+
International standards	-	++	++	-
Temperature sensitivity [dR/dT]	++	-	+	+
Impact of the connection lead	++	-	+	+

Connection method:

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

For copper cable with a cross-section of 0.22 mm², 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.

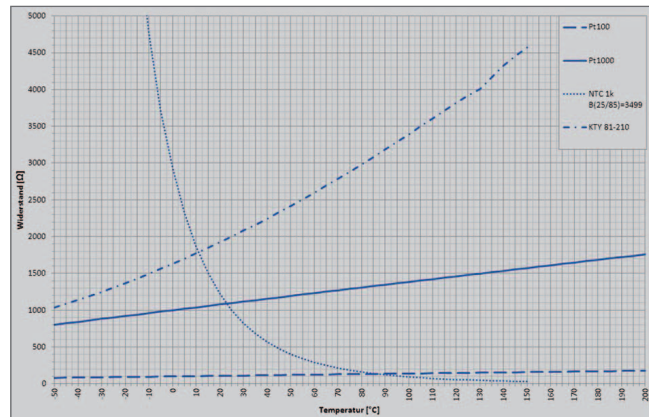
Strap-on temperature sensors generally have no contact with the medium being measured. Equally, the influence of the ambient temperature can only be kept low through very good insulation. A high-accuracy determination of the temperature is therefore not possible with this style of measurement.

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

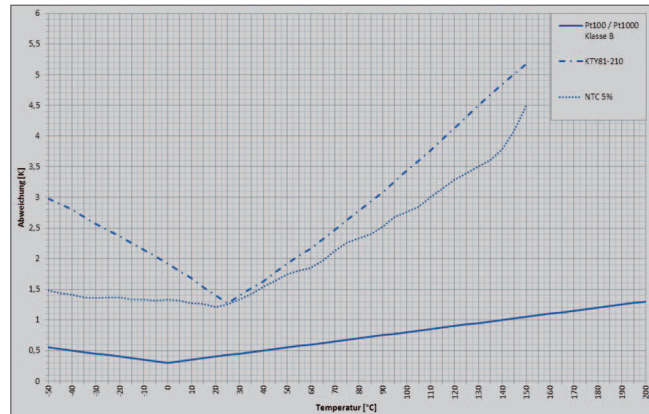
Characteristic curves

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 sensor 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.

Sensor 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 nut for pipe clip mounting

Due to the extremely small sensor 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 sensor can be achieved.

Response time

The response time of the temperature sensor is strongly influenced by

- the thermowell used (diameter, material)
- the heat transfer from thermowell to the measuring element
- the flow-rate of the medium

Through the selection of aluminium for the sensor sleeve and the design of the model TF44 temperature sensor, an optimal heat transfer exists from medium to measuring element.

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

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 absorbing		low	low
Suitability for steam		good	limited
chemical resistance against	dilute alkaline solutions	+	+
	dilute acids	+	+
	Alcohol	+	+
	Benzine	+	-
	Benzol	-	-
Mineral oil		+	+

+ = 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 temperature sensor, as standard, we offer PVC- or silicone-insulated connection leads with a cross-section of 0.22 mm² (AWG 24).

Vibration resistance

The typical uses for the model TF44 strap-on temperature sensors are those areas where only low to medium vibration levels occur. Nevertheless the sensors have been designed in such a way that the acceleration values, defined in DIN EN 60751 (IEC 751), of 3 g can generally be exceeded for higher demands.

Depending on version, installation situation, medium and Temperature the vibration resistance averages up to 6 g.

Shock resistance

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

Electrical connection

- Blank bare wires
- End splices
- Connector to specification

Ingress protection

IP 65

Accessories

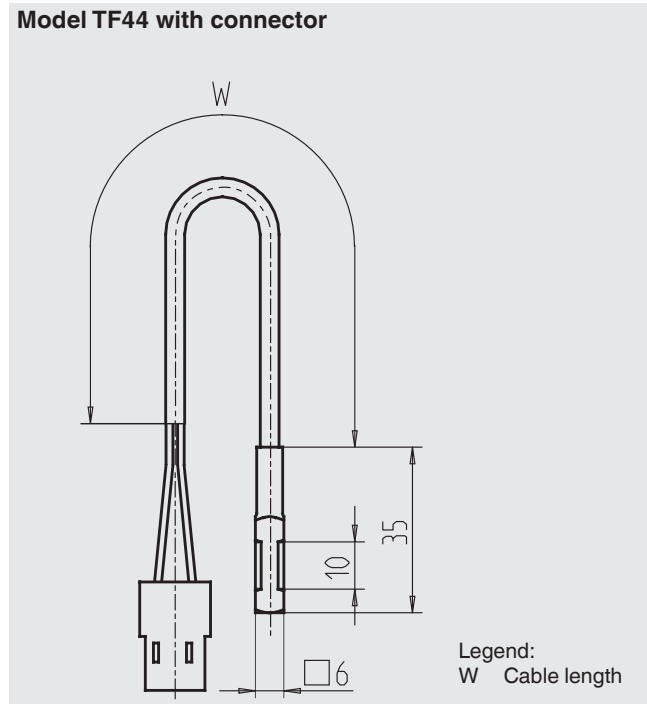
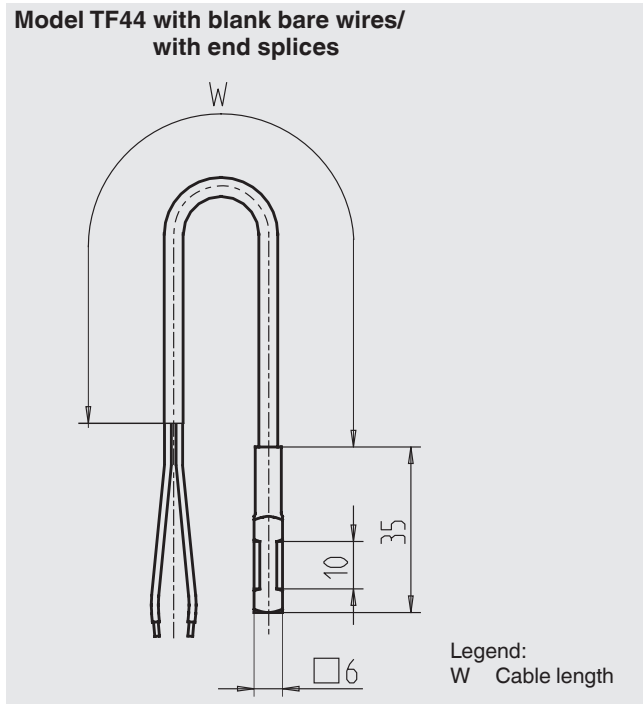
The model TF44 temperature sensor has been designed for pipe mounting using a pipe clip. Due to the materials, the geometry and the construction used for the TF44, an appliance of the heat-transfer paste between sensor sleeve and pipeline is not necessary. If desired, a small amount of the heat-transfer paste is sufficient.

Pipe clips and heat-transfer paste are available as accessories.

On ordering, please give the order number!

Article	Order no.
Worm-drive hose clip, galvanised steel, clamping range 16 ... 27 mm	14050509
Worm-drive hose clip, galvanised steel, clamping range 25 ... 40 mm	14049067
Worm-drive hose clip, galvanised steel, clamping range 40 ... 60 mm	14050517
Worm-drive hose clip, galvanised steel, clamping range 60 ... 80 mm	14050518
Worm-drive hose clip, galvanised steel, clamping range 80 ... 100 mm	14041143
Silicone heat-transfer paste, 1 g syringe	11516870
Silicone heat-transfer paste, 100 g tube	1606212

Dimensions in mm



Ordering information

When ordering choose one criterion from each category.

Measuring range

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

Sensor 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, $R_{25} = 10 \text{ k}\Omega \pm 5 \%$
- NTC, $R_{25} = 5 \text{ k}\Omega \pm 5 \%$
- NTC, $R_{25} = 2.7 \text{ k}\Omega \pm 5 \%$

Others on request

Connection lead

- PVC / PVC
- Silicone / Silicone

Others on request

Lead 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

Ordering information

Model / Measuring range / Sensor version / Measuring element / Connection lead / Cable length / Electrical connection

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