

# Threaded thermometer With connection lead Model TF37

WIKA data sheet TE 67.12



for further approvals  
see page 6

## Applications

- Mobile hydraulics
- Machine building
- Compressors
- Refrigeration technology
- Heating, ventilation and air-conditioning

## Special features

- Measuring ranges from -50 ... +260 °C
- Customer-specific designs
- Very high vibration resistance
- Connection lead from PVC, silicone, PTFE

## Description

The model TF37 threaded thermometer, which is highly resistant to vibration, is used in applications with strong vibrations and where, due to high medium temperature, a decoupling of the electrical connection point and the measuring point is necessary.

A thermowell made of brass or stainless steel prevents the measuring element from coming into contact with the medium, thus enabling direct installation of the instrument in the process. The fixed mounting thread guarantees quick and easy installation in the process.

The transition point from the thermowell to the connection lead is dust and waterproof (IP65 or IP66/IP67).



**Fig. left: Model TF37 with standard thermowell**

**Fig. right: Model TF37 with fast-response thermowell**

## Measuring element

WIKA standardly uses the following measuring elements for the model TF37 threaded thermometer:

- Pt1000, class F 0.3 per IEC 60751
- Pt100, class F 0.3 per IEC 60751
- NTC,  $R_{25} = 10 \text{ k}\Omega$ ,  $B(25/85) = 3976$
- NTC,  $R_{25} = 5 \text{ k}\Omega$ ,  $B(25/85) = 3976$
- KTY81-210

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, a wider temperature range as well as a high measurement accuracy and linearity.

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

### 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]	++	-	+	+
Influence of the supply line	++	-	+	+

### Connection method

The model TF37 threaded thermometers have a 2-wire connection design as standard. 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  $0.22 \text{ mm}^2$  the following value applies:  $0.162 \text{ }\Omega/\text{m} \rightarrow 0.42 \text{ }^\circ\text{C}/\text{m}$  for Pt100

Alternatively, a version with Pt1000 can be chosen, with which the influence of the supply line (at  $0.04 \text{ }^\circ\text{C}/\text{m}$ ) is smaller by a factor of 10.

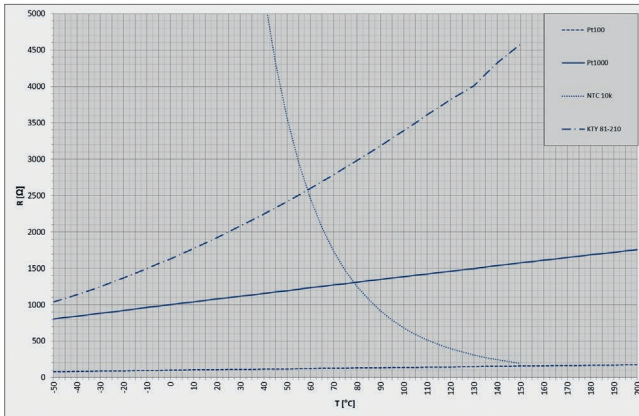
The lead resistance becomes still less significant in relation to the basic resistance  $R_{25}$  with a KTY or NTC element.

With a Pt100 measuring element, there is the additional possibility of selecting a 4-wire connection, thus eliminating the influence of the lead resistance on the measuring result.

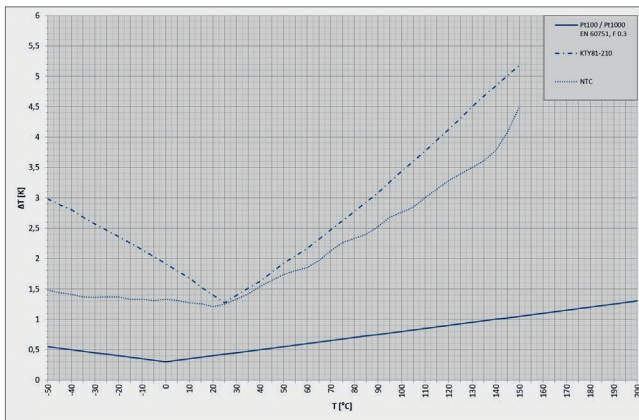
## Characteristic curves

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)

The permissible measuring range is dependent on the combination of measuring element and connection lead.

Insulation material of the connection lead	Permissible ambient temperature
PVC	-20 ... +105 °C
Silicone	-50 ... +200 °C
PTFE	-50 ... +260 °C

Measuring element	Measuring range
NTC	-30 ... +130 °C
Pt100	-50 ... +260 °C
Pt1000	-50 ... +260 °C
KTY	-50 ... +150 °C

### Ambient temperature

The max. permissible ambient temperature depends upon the insulation material of the connection lead and on the connector fitted, as required.

## Thermowell

### Material

- Brass
- Stainless steel

### Diameter F<sub>1</sub>

- Standard: 6.0 mm
- Fast response: 8.0 mm / tip tapered to 4 mm
- Others on request

### Process connection E

Mounting thread:

- G ¼ B
- G ⅜ B
- G ½ B
- M14 x 1.5
- M14 x 1.5 per ISO 9974-2
- R ¼-ISO7
- R ⅜-ISO7
- ¼ NPT
- ½ NPT

Others on request

### Insertion length U<sub>1</sub>

- 20 mm
- 30 mm
- 40 mm
- 50 mm
- 60 mm
- Others on request

## Response time

The response time is strongly influenced by

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

Due to the design of the model TF37 threaded thermometer, there is optimum heat transfer from the medium to the measuring element.

## Connection lead

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

The lead end is supplied as standard with stripped wires. In addition, there is the possibility to fit end splices or customer-specific connectors.

The following table gives an overview of the main characteristics of the insulation materials available for the TF37.

Insulation material	PVC	Silicone	PTFE
<b>Highest working temperature</b>	105 °C	200 °C	260 °C
<b>Flammability</b>	self-extinguishing	self-extinguishing	not flammable
<b>Water absorption</b>	low	low	none
<b>Suitability for steam</b>	good	limited	very good
<b>Chemical resistance against</b>	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.

## Vibration resistance

Due to the specific assembly of the measuring elements used, the vibration resistance of the model TF37 threaded thermometer is very high. The defined acceleration values of 3 g for higher demands, as per IEC/EN 60751, have been far exceeded.

Depending on the thermowell design, the mounting situation, medium and temperature, the vibration resistance can be up to 30 g.

## Shock resistance

Up to 500 g, depending on version, installation situation, medium and temperature

## Static operating pressure

The model TF37 standard instrument is suitable for static pressures up to a maximum of 50 bar. For higher pressure ranges, please contact a WIKA contact person.

## Electrical connection

- Stripped wires
- End splices

Customer-specific connectors available on request

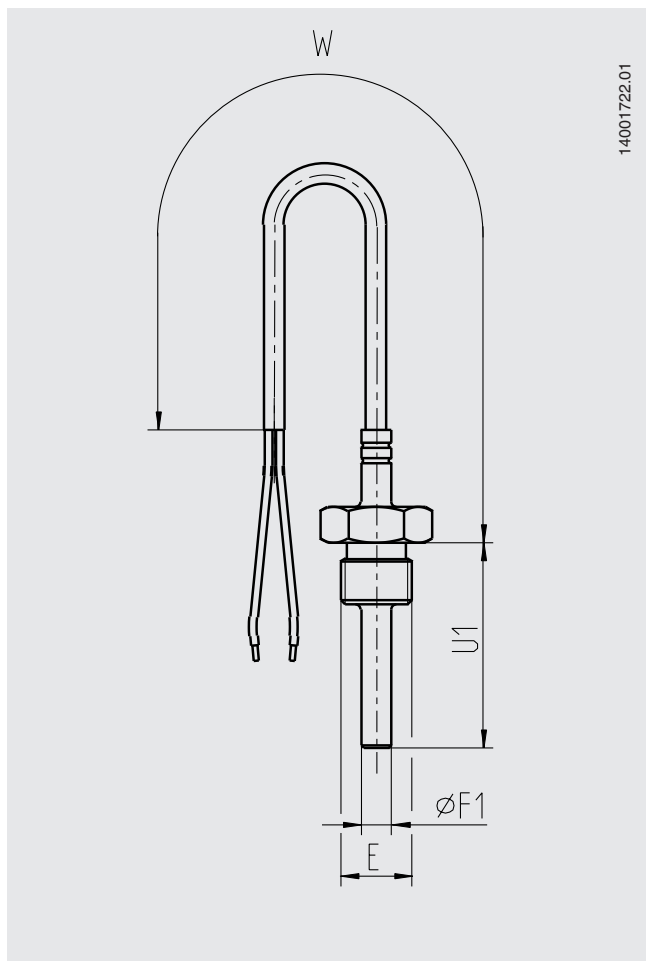
## Ingress protection

The specification of the ingress protection refers to the thermowell/connection lead transition. This is dependent on the insulation material of the connection lead.

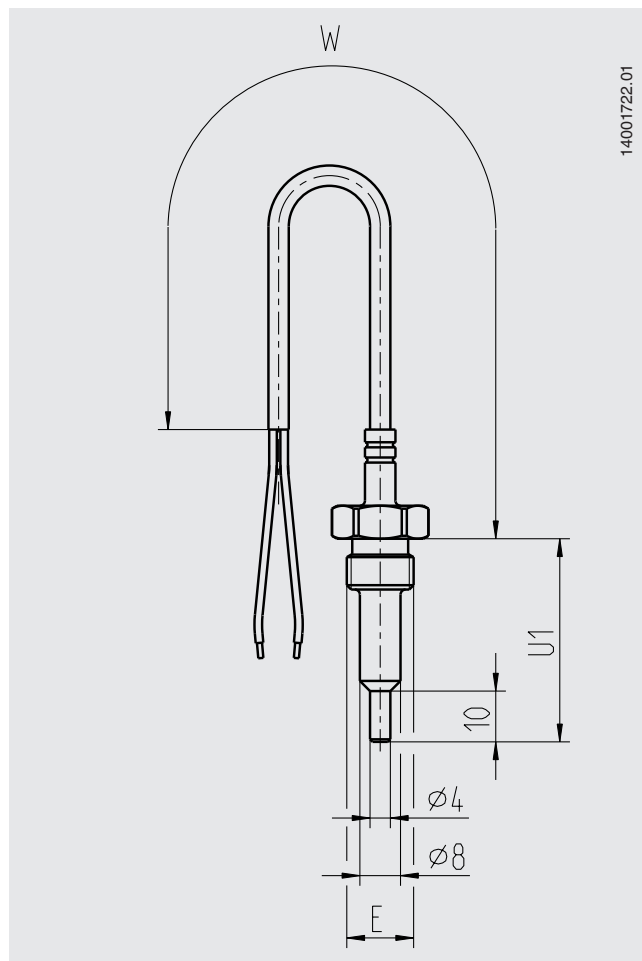
Insulation material	Ingress protection
PVC	IP65
Silicone	IP66, IP67
PTFE	IP65

## Dimensions in mm

Model TF37 with standard thermowell




Model TF37 with fast-response thermowell



Legend:

- Ø F<sub>1</sub> Thermowell diameter
- U<sub>1</sub> Insertion length
- W Cable length
- E Thread

## Approvals

Logo	Description	Country
	<b>EU declaration of conformity</b> RoHS directive	European Union
	<b>Uzstandard (option)</b> Metrology, measurement technology	Uzbekistan

Approvals and certificates, see website

## Manufacturer's information and certificates

Logo	Description
-	China RoHS directive

### Ordering information

Model / Measuring element / Connection method / Tolerance / Thermowell material and diameter  $F_1$  / Process connection E / Insertion length  $U_1$  / Connection lead / Cable length W / Electrical connection

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**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