

OEM Screw-in Thermometers with Plug Connection Model TF35

WIKA Data Sheet TE 67.10

Applications

- Mobile hydraulics
- Machine building
- Compressors
- Automotive
- Refrigeration technology, heating, air condition and ventilation

Special Features

- Measuring ranges from -50 ... +300 °C
- High vibration resistance
- Compact design
- Plug connector for electrical connection



Screw-in Thermometers Model TF35

Description

Measuring element, tolerance

WIKA uses the following standard elements in the TF35 series:

- NTC, $R_{25} = 2.5 \text{ k}\Omega \pm 5 \%$
- NTC, $R_{25} = 10 \text{ k}\Omega \pm 5 \%$
- Pt100, class B per DIN EN 60 751
- Pt1000, class B per DIN EN 60 751
- Ni1000, DIN 43 760
- KTY10-6
- KTY11-6
- KTY81-210

Others on request

Platinum elements offer the advantage of meeting international standards (IEC 751 / DIN EN 60 751).

Nickel elements are also standardised, but not international. 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, a wider temperature range as well as a high accuracy and linearity.

High accuracy and linearity are also possible with NTC's, but only in a limited temperature range.

Strengths and weaknesses of the different measuring elements:

	NTC	Pt100	Pt1000	Ni1000	KTY
Temperature range	-	++	++	+	-
Accuracy	-	++	++	+	-
Linearity	-	++	++	+	++
Long term stability	+	++	++	++	+
International standards	-	++	++	+	-
Temperature sensitivity [dR/dT]	++	-	+	+	+
Impact of connection cable	++	-	+	+	+

Wiring:

The screw-in thermometers of the TF35 series are built in 2-wire-connection.

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

For copper cable with cross section 0.22 mm² the following value applies: 0.162 Ω/m → 0.42 °C/m for Pt100

Alternatively a design with Pt1000 can be selected, with which the influence of the leads, with 0.04 °C/m, is smaller by a factor of around 10. This is also the case for a Ni1000 sensor element.

The lead resistance becomes still less significant in relation to the basic resistance R₂₅ with an KTY or NTC element.

Temperature ranges

■ Medium temperature (measuring range)

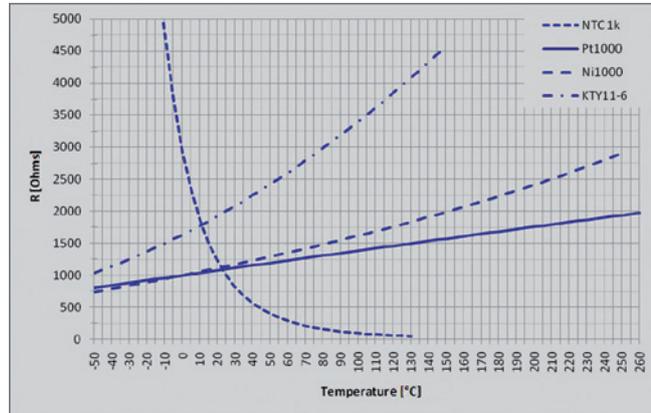
The measuring range mainly depends on the measuring element:

Measuring element	Measuring range
NTC	-40 ... +130 °C
Pt100	-50 ... +200 °C / -50 ... +300 °C
Pt1000	-50 ... +200 °C / -50 ... +300 °C
Ni1000	-50 ... +200 °C
KTY	-50 ... +150 °C

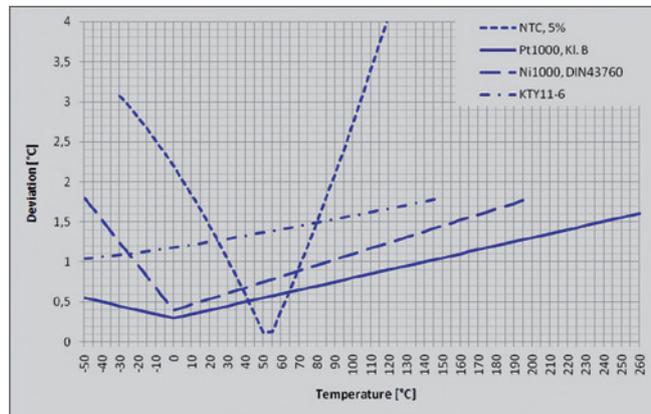
Characteristic curves

The following characteristic curves show the typical curve progressions for the WIKA standard measuring elements over temperature as well as the typical tolerance curves.

Typical characteristic progressions



Typical tolerance curves



■ Ambient temperature

The permissible ambient temperature depends on the electrical connection:

Electrical connection	Ambient temperature
Plug connector type AMP Junior Power Timer	-40 ... +150 °C
FASTON blade terminals	-40 ... +150 °C
Connector Deutsch DT04-2P	-40 ... +150 °C
Bayonet connector DIN 72 585	-40 ... +140 °C
Circular connector M12 x 1	-40 ... +100 °C

Note:

Due to the short overall length the temperature at the connection plug may rise to inadmissibly high values. It is essential to avoid this with a corresponding design of the test point.

Thermowell

Material

- Brass
- Stainless steel 1.4305

Others on request

Diameter D

- 7.5 mm
- 6.0 mm
- 5.0 mm
- 4.0 mm

Others on request

Process connection

Screw-in threads:

- G ¼ B
- G ⅜ B
- M10 x 1.5
- M12 x 1.5
- M14 x 1.5
- R¼-ISO7
- R⅜-ISO7
- ¼" NPT

Others on request

Insertion length U

- 28 mm
- 30 mm
- 40 mm
- 50 mm
- 60 mm
- 65 mm

Others on request

Vibration resistance

Due to a special mounting of the measuring elements in the thermowell the vibration resistance of the TF35 series is extremely high.

The acceleration values of 3 g for increased demands per DIN EN 60 751 (IEC 751) can be exceeded by far.

Depending upon the installation situation, medium, temperature and insertion length the vibration resistance can be up to 10 g.

Shock resistance

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

Response time

The response time is mainly affected by

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

WIKA has optimised the design of the TF35 screw-in thermometers for an optimal heat transmission.

The table shows typical response times for WIKA TF35 screw-in thermometers:

Thermowell		Response time	
Material	Diameter	t _{0.5}	t _{0.9}
Brass	7.5 mm	2.2 s	6 s
Stainless steel	7.5 mm	2.5 s	6.5 s

Note:

A smaller thermowell diameter can be chosen in order to improve the response time.

Working pressure

Max. 600 bar, depending on medium, temperature and thermowell design

Electrical connection

- Plug connector type AMP Junior Power Timer
- FASTON blade terminals 6.3 x 0.8 mm
- FASTON blade terminals 4.8 x 0.8 mm
- Circular connector M12 x 1
- Connector Deutsch DT04-2P
- Bayonet connector, DIN 72 585

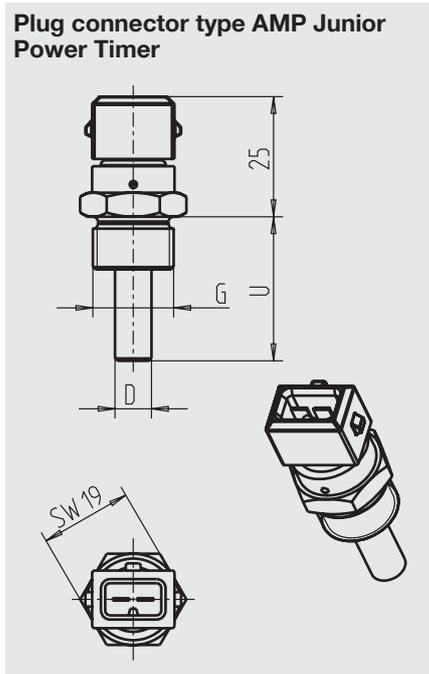
Other connections on request

Case ingress protection

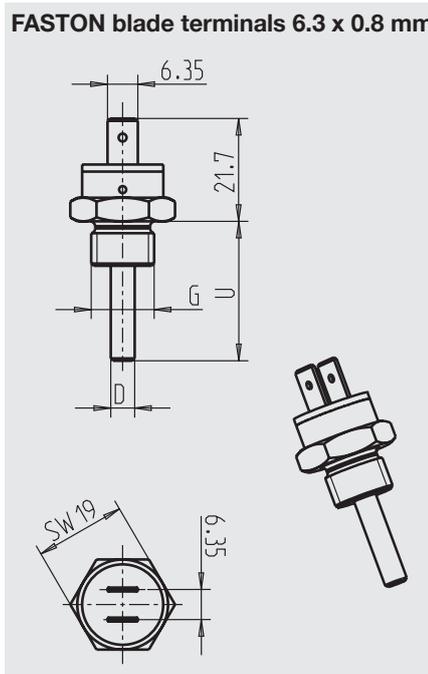
IP 66 / IP 67 when connected with mating plug

Dimensions in mm

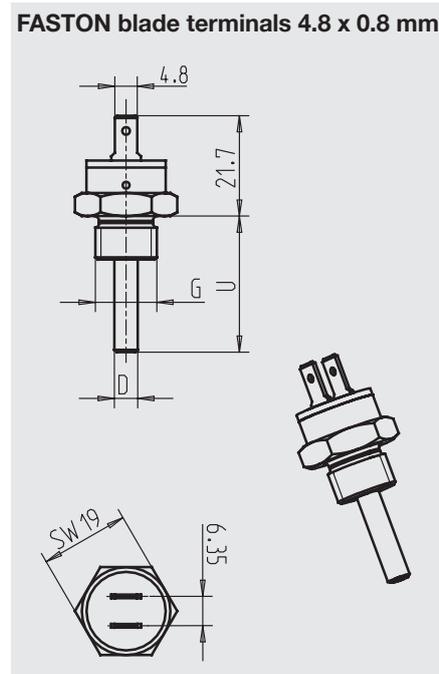
Plug connector type AMP Junior Power Timer



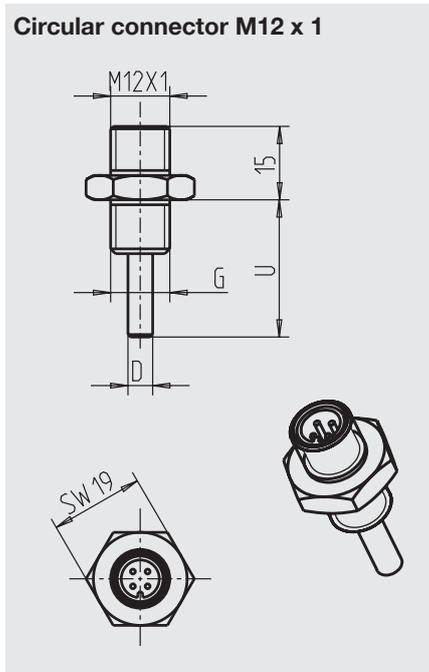
FASTON blade terminals 6.3 x 0.8 mm



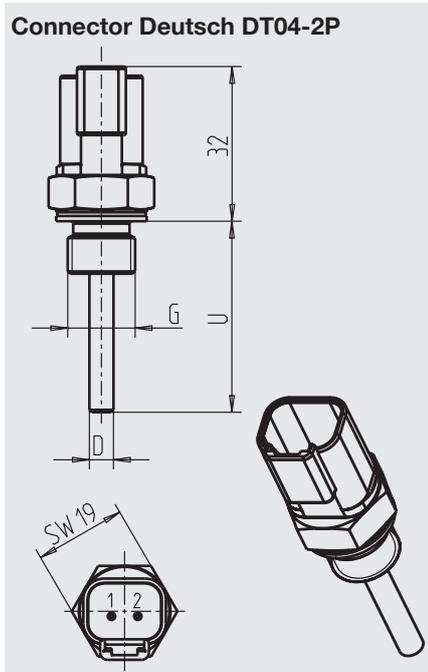
FASTON blade terminals 4.8 x 0.8 mm



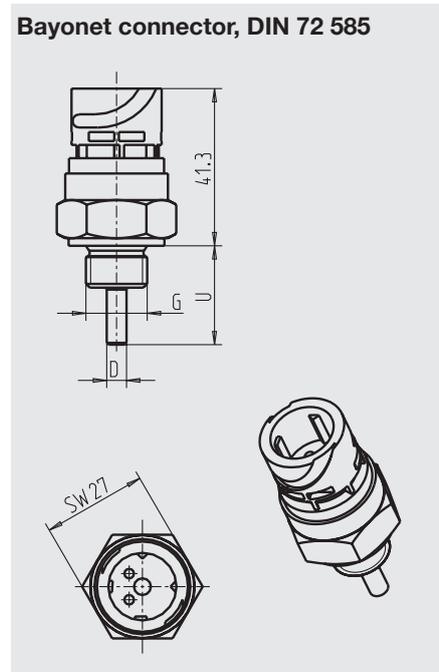
Circular connector M12 x 1



Connector Deutsch DT04-2P



Bayonet connector, DIN 72 585



Ordering information

Model / Measuring range / Measuring element / Tolerance / Thermowell material and diameter / Process connection / Insertion length / Electrical connection

Modifications may take place and materials specified may be replaced by others without prior notice. Specifications and dimensions given in this leaflet represent the state of engineering at the time of printing.

