

Threaded thermometer With plug connection Model TF35

WIKA data sheet TE 67.10



Applications

- Mobile working machines
- Compressors and pumps
- Heating, ventilation and air-conditioning
- Refrigeration technology
- Machine building

Special features

- Measuring ranges from -50 ... +250 °C [-58 ... +482 °F]
- Very high vibration resistance
- Compact design
- Electrical connection via plug connection

Description

The model TF35 threaded thermometer is used for temperature measurement of liquid and gaseous media in the range -50 ... +250 °C [-58 ... +482 °F].

The integrated thermowell with threaded connection enables direct installation into the process. Depending on the requirements, the thermowell made of brass or stainless steel can be selected. By default, the TF35 thermometer can be used for pressures up to 50 bar [725 psi]. The directly mounted coupler connector ensures simple commissioning of the thermometer.



Fig. left: AMP Junior Power Timer connector
Fig. right: Circular connector M12 x 1



Fig. left: Deutsch instrument connector DT04-2P
Fig. right: Rectangular connector EN 175301-803

Measuring element

WIKA standardly uses the following measuring elements for the model TF35 threaded thermometer:

- Pt1000, class F 0.3 per IEC/EN 60751
- Pt100, class F 0.3 per IEC/EN 60751
- NTC 10 kOhm, $B(25/85) = 3976$
- NTC 5 kOhm, $B(25/85) = 3976$
- NTC 2.5 kOhm, $B(20/85) = 3541$
- NTC 2.252 kOhm, $B(25/85) = 3974$
- KTY81-210

Others on request

Note:

For UL approval only Pt elements are valid.

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 limited temperature range.

Strengths and weaknesses of the different measuring elements

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

Connection method

The model TF35 threaded thermometers have a 2-wire connection design as standard.

With this connection method, the lead resistance of the connection lead affects the measured value 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

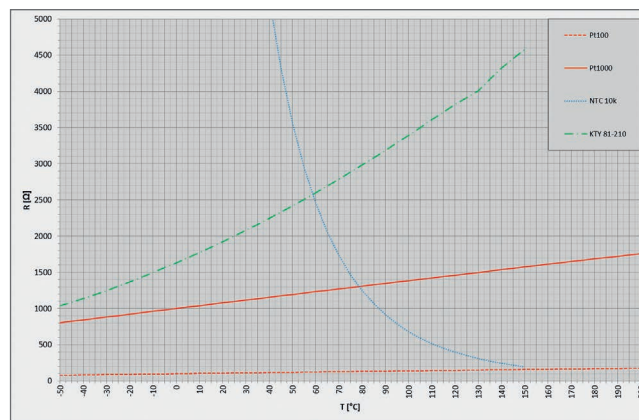
Alternatively, a version with Pt1000 can be chosen, with which the influence of the supply line (at 0.04 °C/m) is smaller by a factor of 10.

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

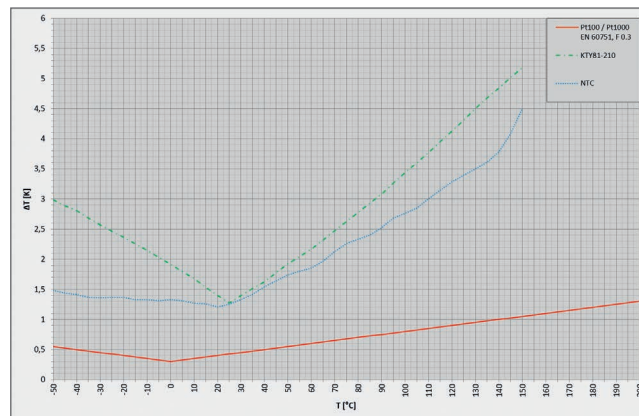
Characteristic curves

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 measuring range depends basically on the measuring element:

Measuring element	Measuring range
Pt1000	-50 ... +200 °C [-58 ... +392 °F] or -50 ... +250 °C [-58 ... +482 °F]
Pt100	-50 ... +200 °C [-58 ... +392 °F] or -50 ... +250 °C [-58 ... +482 °F]
NTC	-30 ... +130 °C [-22 ... +266 °F]
KTY	-50 ... +150 °C [-58 ... +302 °F]

Ambient temperature

The maximum permissible ambient temperature depends on the material of the electrical connection:

Electrical connection	Ambient temperature
AMP Junior Power Timer	-40 ... +130 °C [-40 ... +266 °F]
FASTON blade terminal	-40 ... +130 °C [-40 ... +266 °F]
Deutsch instrument connector DT04-2P	-40 ... +130 °C [-40 ... +266 °F]
Bayonet connector DIN 72585	-40 ... +130 °C [-40 ... +266 °F]
Circular connector M12 x 1	-40 ... +90 °C [-40 ... +194 °F]
Rectangular connector EN 175301-803	-40 ... +100 °C [-40 ... +212 °F]

Note:

Due to short installation length there is a risk that the temperature at the connector will rise up to an inadmissibly high value. This absolutely must be taken into account when designing the measuring point.

The temperature at the connector must not exceed the above mentioned temperature range.

Thermowell

Material

- Brass
- Stainless steel

Diameter F₁

- Standard: 6 mm [0.24 in]
 - Fast response: 8 mm [0.31 in] with tapered tip 4 mm [0.16 in]
- Others on request

Process connection E

Mounting thread:

- G ¼ B
- G ⅜ B
- G ½ B
- M14 x 1.5
- ¼ NPT
- ½ NPT

Others on request

Insertion length U

- 20 mm [0.79 in]
- 30 mm [1.18 in]
- 40 mm [1.57 in]
- 50 mm [1.97 in]
- 60 mm [2.36 in]

Others on request

Response time

The response time is strongly influenced by

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

Due to the design of the model TF35 threaded thermometer, there is optimum heat transfer from the medium to the measuring element.

The following table shows typical response times for the model TF35 threaded thermometers:

Thermowell		Response time	
Material	Diameter	t _{0.5}	t _{0.9}
Brass	6 mm [0.24 in]	2.2 s	6 s
Stainless steel	6 mm [0.24 in]	2.5 s	6.5 s

Vibration resistance

Due to the specific assembly of the measuring elements used, the vibration resistance of the model TF35 threaded thermometer is very high. The defined acceleration value of 3 g for higher demands, as per IEC/EN 60751, has been significantly improved upon.

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

Shock resistance

Up to 500 g, depending on the design, mounting situation, the medium and temperature

Static operating pressure

The model TF35 standard instruments are suitable for static pressures up to a max. of 50 bar [725 psi]. For higher pressure ranges, please contact a WIKA contact person.

Electrical connection

The electrical connection of the TF35 is realised via a plug connection. This guarantees safe and fast commissioning of the device. The following plug connections are available:

- AMP Junior Power Timer connector
- FASTON blade terminal 6.3 x 0.8 mm
- Deutsch instrument connector DT04-2P
- Bayonet connector DIN 72585
- Circular connector M12 x 1
- Circular connector M12 x 1 with neck tube 45 mm
- Rectangular connector EN 175301-803

Ingress protection

The ingress protection depends on the electrical connection.

Electrical connection	Ingress protection
AMP Junior Power Timer	IP66, IP67
FASTON blade terminal	IP52
Deutsch instrument connector DT04-2P	IP66, IP67, IP69K
Bayonet connector DIN 72585	IP66, IP67
Circular connector M12 x 1	IP66, IP67
Rectangular connector EN 175301-803	IP65

Note:

The stated ingress protection only applies when plugged in using mating connectors that have the appropriate ingress protection.

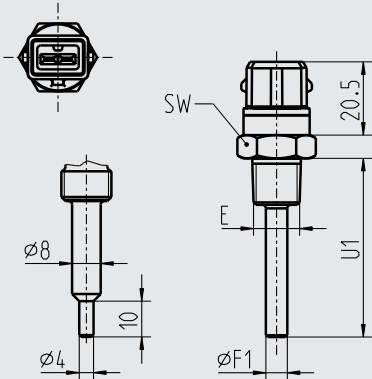
Accessories

On request, WIKA supplies a suitable mating connector for the electrical connections as a separate accessory.

Dimensions in mm

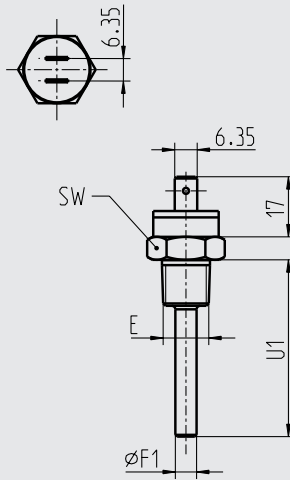
AMP Junior Power Timer connector

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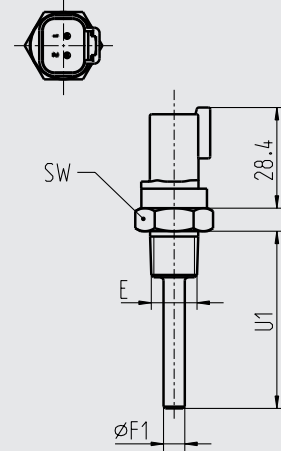
FASTON blade terminal 6.3 x 0.8 mm

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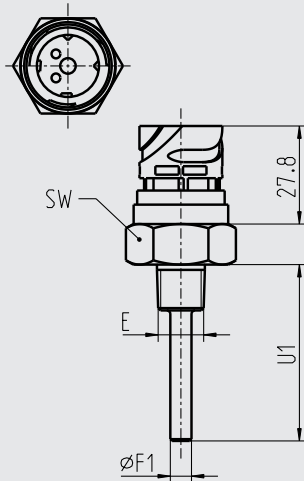
Deutsch instrument connector DT04-2P

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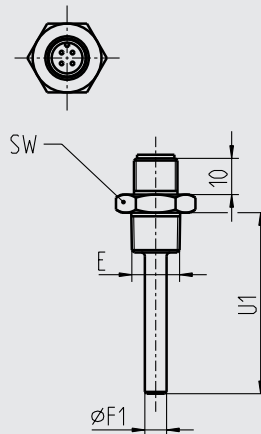
Bayonet connector, DIN 72585

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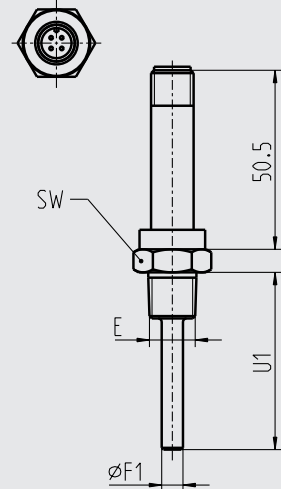
Circular connector M12 x 1

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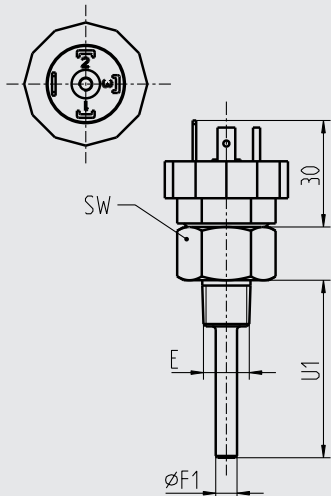
Circular connector M12 x 1 with neck tube 45 mm

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Rectangular connector EN 175301-803, form A

11578549.01



Approvals

Logo	Description	Country
	EU declaration of conformity RoHS directive	European Union
	UL (option) Component certification	USA and Canada
	EAC (option) Import certificate	Eurasian Economic Community
	GOST (option) Metrology, measurement technology	Russia
	KazInMetr (option) Metrology, measurement technology	Kazakhstan
	Uzstandard (option) Metrology, measurement technology	Uzbekistan

Manufacturer's information and certificates

Logo	Description
-	China RoHS directive

Approvals and certificates, see website

Ordering information

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

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