Instruction Manual

TFK03

Compact resistance thermometer (Pt100) with M12x1 connector

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Safety Information

General Instructions

To ensure safe operation, the device should only be operated according to the specifications in the instruction manual. The requisite Health & Safety regulations for a given application must also be observed. This statement also applies to the use of accessories.
Every person who is commissioned with the initiation or operation of this device must have read and understood the operating instructions and in particular the safety instructions!
The work safety instructions in this manual as well as the safety, accident prevention and environmental protection regulations generally valid for the work area must be observed.

The liability of the manufacturer expires in the event of damage due to improper use, non-observance of this operating manual, use of insufficiently qualified personnel and unauthorized modification of the device.

Proper Usage

The temperature sensors TFK03 are designed to monitor the temperatures of liquids or gases which do not attack the device materials.
All other usage is regarded as being improper and outside the scope of the device.

In particular, applications in which shock loads occur (for example, pulsed operation) should be discussed and checked in advance with our technical staff.

The series TFK03 flow meter devices should not be deployed as the sole agents to prevent dangerous conditions occurring in plant or machinery. Machinery and plant need to be designed in such a manner that faulty conditions and malfunctions do not arise that could pose a safety risk for operators.

Dangerous substances

For dangerous media such as e.g. Oxygen, Acetylene, flammable or toxic substances as well as refrigeration systems, compressors, etc. must comply with the relevant regulations beyond the general rules.

Qualified Personnel

The TFK03 devices may only be installed by trained, qualified personnel who are able to mount the devices correctly. Qualified personnel are persons, who are familiar with assembling, installation, placing in service and operating these devices and who are suitably trained and qualified.

Inward Monitoring

Please check directly after delivery the device for any transport damages and deficiencies. Additional with reference to the accompanying delivery note the number of parts must be checked.
Claims for replacement or goods which relate to transport damage can only be considered valid if the delivery company is notified without delay.

Mounting and Commissioning

- The temperature measuring point should be prepared according to the indications for screw-in holes. For more information, please see of VDE/VDI directive 3511 and 3512 page 3.
- For sealing purposes, please use gaskets according to DIN 7603A.
- If the sensor is smooth, compression fittings can be used
- The correct torque depends on material and design of the sealing used. It should not exceed 80 Nm.
- The mounting location should be free from strong vibration.
- The mounting location should be at a characteristic point in the process.
  The active length (the temperature-sensitive part) of a resistance thermometer is max. 30 mm at the lower end of the immersion tube. In media with temperature stratification, therefore, only the temperature at the level of the end of the immersion tube is measured. If you want to measure the average temperature, special designs are required - please enquire.
- The smaller the dimension of the probe, the faster it will respond to temperature changes. The response speed is improved most by reducing the diameter of the probe.

Installation of ceramic protective fittings in systems below operating temperature:
Plant temperature: 1600 °C / insertion speed = 1 - 2 cm/min.
1200 °C / insertion speed = 10-20 cm/min.

Electrical connection

Wiring is made via the connectors in the connexion head. The exact wiring details can be taken from the drawings.

The measuring current for resistance thermometers Pt-100 is 0.3 -1.0 mA for Pt-500: 0.1 - 0.7 mA, and for Pt-1000: 0.1 - 0.3 mA. This may not be exceeded.

For resistance thermometers, we recommend commercial copper-sheathed conductors with a preferably 1,5 mm² cross-section as connection. To avoid magnetic or electrical interference, the use of twisted and shielded conductors is recommended.

When connecting transmitters, the installation, connection and testing instructions of the respective versions used must be observed.

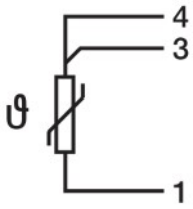
Resistance output:

The connection type has a considerable influence on the measuring accuracy.

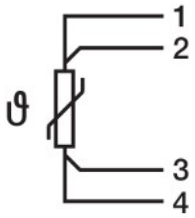
- The 3-wire circuit compensates the lead resistance and its changes with a high degree of accuracy. The prerequisite for this type of connection is three similar connection lines, preferably three cores of the same line.
- The 4-wire circuit compensates for all errors that can be caused by lead resistances.

Plug

3-wire

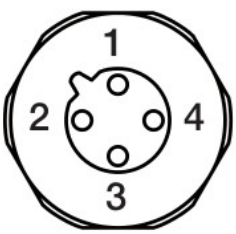


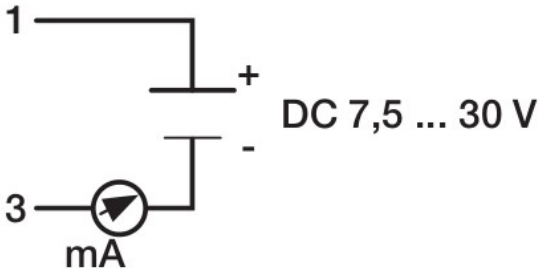
4-wire



1 = brown
2 = white
3 = blue
4 = black

Current output 4...20 mA:





Maintenance

The resistance thermometers described here are maintenance-free. They do not contain any components that need to be repaired or replaced on site. Repairs are carried out exclusively at the manufacturer's works.
Depending on the conditions of use, the temperature measuring device should be checked approx. once a year for compliance with its specifications.

TFK03

Compact Resistance Temperature Sensor (Pt100) with Circular Connector M12x1

- very small design because of M12x1 connector
- integrated transmitter optional
- resistance and current output
- wetted parts made of stainless steel 1.4571
- measuring range from -200 °C to 600 °C
- short response time
- easy to service
- max. pressure: 25 bar (40 bar on request)

Description:

A temperature-dependent electrical resistance is integrated in a stainless steel protective tube. This changes its ohmic resistance depending on the temperature of the medium.
In the version with built-in transmitter, this value is converted into a 4...20 mA current signal and provided at the terminals of the circular plug. In the version without transmitter, the pure resistance value can be tapped at the connector. To achieve short response times, there is a version with a rejuvenated immersion shaft.
The circular connector M12x1 offers a very high degree of protection (IP68) and, thanks to its compact design, very flexible installation options.

Typical applications:

The resistance thermometers are very well suited for use in general machine, apparatus, plant, container and pipeline construction, as well as in the chemical and process engineering and food industries, where they are preferably used for detecting the temperature in liquid and gaseous media. Their compact design makes them particularly suitable for installation in places with limited space.

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Models:

TFK03.xPx:	output Pt100, 2-,3 or 4-wire single or double element
TFK03.A04:	output 4–20 mA, 2-wire

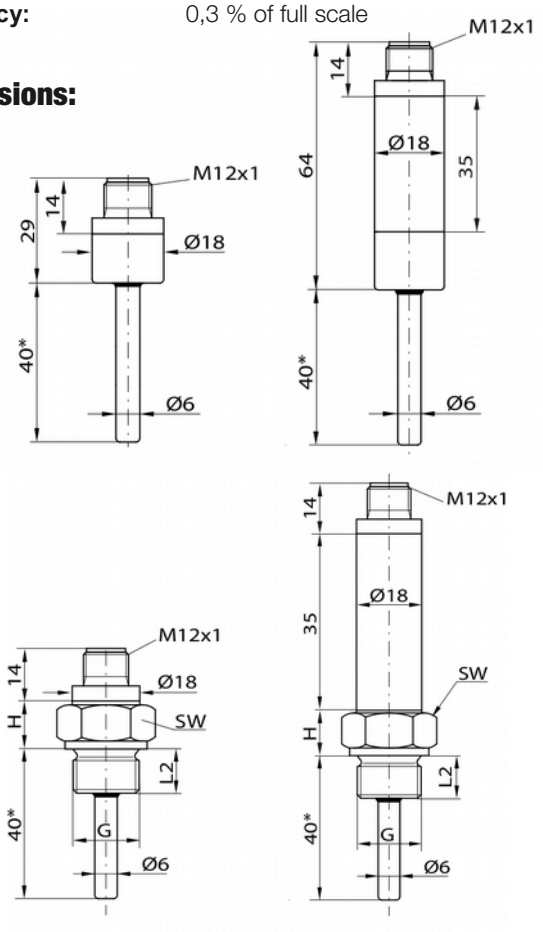
Technical Data:

Sensor:	Pt100 acc. to DIN IEC 751, class A
Measuring ranges:	-50…200 °C w/o neck tube -50…400 °C with neck tube 50 mm 0…600 °C with neck tube -200..+100 °C with neck tube 50 mm
Electr. connection:	circular connector M12x1
Protection class:	IP68, IP69K acc. to EN 60529/ IEC 529
Thermowell:	
Diameter	6 or 8 mm
Material:	stainless steel 1.4571
Housing:	stainless steel 1.4435
Process connection:	fix screw connection or movable compression fitting others (e.g. Clamp) on request
Max. pressure:	PN 25 (PN 40 on request)

Transmitter:

Power supply:	10...30 VDC
Output:	4...20 mA, 2-wire, HART protocol
Min. turn down ratio:	20 Kelvin
Max. turn down ratio:	800 Kelvin
Accuracy:	0,3 % of full scale

Dimensions:



Order Code:

Order number:	TFK03.	1P2.	6.	08F.	0050.	200.	0

Compact resistance temperature sensor, M12x1

Sensor:
1P2 = 1 x Pt100, 2-wire
1P3 = 1 x Pt100, 3-wire
1P4 = 1 x Pt100, 4-wire
2P2 = 2 x Pt100, 2-wire
A04 = 4–20 mA* (HART protocol)
*please specify measuring range preferably 0..50 °C, 0..100 °C, 0…120 °C)

Diameter of immersion shaft:
6 = 6 mm
8 = 8 mm

Process connection:
0 = without screw conn., only immersion shaft (compression fitting see accessories)
08F = G 1/4 A fix
10F = G 3/8 A fix
15F = G 1/2 A fix
2NF = 1/2" NPT fix
other connections on request

Installation length L:**
0025 = 25 mm (only with fix screw connection)
0050 = 50 mm (only with fix screw connection)
0075 = 75 mm (only with fix screw connection)
0100 = 100 mm **
0160 = 160 mm **
0200 = 200 mm **
0250 = 250 mm **
0500 = 500 mm **
xxxx = please specify in plain text

Temperature range:
200 = -50…150 °C without neck tube
400 = -50…400 °C with neck tube 50 mm
600 = 0…600 °C with neck tube
a) w/o transmitter 50 mm
b) with transmitter 100 mm, also fix measuring insert
100 = -200...+100 °C with neck tube 50 mm (special design)

Options:
0 = without
VR = rejuvenated immersion shaft (description see “Options”)

** with fix screw connection: measured from sealing edge of screw connection
with removable connection: entire shaft length

Accessories:

Order number:	SVQ.	V.08.	06

Compression fitting (installation length min. 100 mm)

Process connection:
V.08 = G 1/4 male
V.10 = G 3/8 male
V.15 = G 1/2 male
V.08N = 1/4“ NPT
V.15N = 1/2“ NPT

Diameter of immersion shaft:
06 = 6 mm
08 = 8 mm

SM12 plug M12x1 with PVC-cable (see separated data sheet)

Options:

Thermowell reduced to 3 mm diameter for faster response times. Only for versions with fixed screw connection and thermowell diameter 6 mm.

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