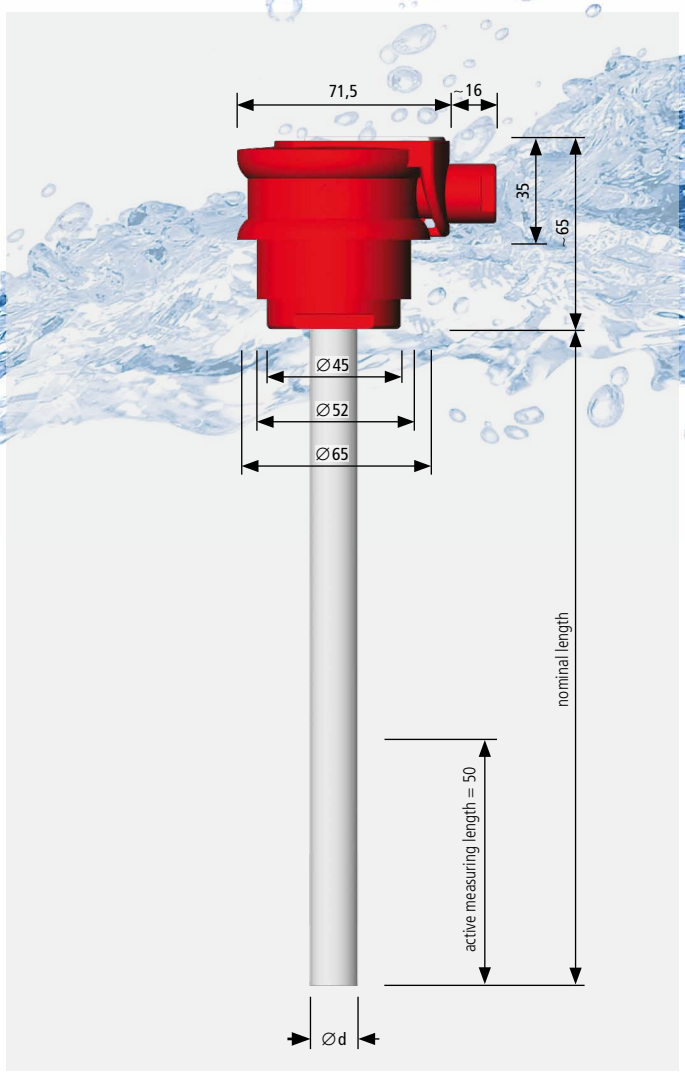
Measuring Temperatures with Temperature Sensors TF...



Temperature sensor with terminal casing LC

Particularly in surface treatment, the precise measurement and control of temperatures is of decisive importance for the subsequent quality of the treated items. To keep the temperature of the liquid in storage tanks within the desired range, also prevents negative effects on the process liquids, such as freezing, crystallisation and excessive viscosity.

The following functions need to be implemented:

- Control of the temperature in order to automate process steps (such as keeping the desired process temperature)
- Monitoring of the temperature in order to avoid possible damage to the process, the process liquid (e.g. damage by excessive temperatures) and the tank (e.g. thermal damage)

With the aid of temperature sensors and suitable electronic units, you can control and monitor the temperature of liquids easily and cheaply.

Our temperature sensors are available in the following versions:

- with rigid immersion tubes made of various materials
- with flexible tube made of PFA

All versions can be equipped with one, two or three Pt 100 elements. Other temperature sensors specified by you can also be integrated.

The function of the temperature sensor results from the integrated Pt 100 sensor element. The temperature is determined from the temperature-dependent change in the electrical resistance of the Pt 100 element. At 0°C, the element has a resistance of exactly 100 Ω. As the temperature increases, the resistance of the element changes in direct proportion to the temperature change.

A suitable electronic unit generates a low, constant current through the Pt 100 element and measures the resulting voltage across the element. The resistance of the element, and thus its temperature, can then be determined with the aid of Ohm's Law (R = U/I).

The connection between the electronic unit and the Pt 100 element can be made with 2, 3 or 4 wires. We provide 4-wire connections because these permit compensation for the resistance of the connecting wires.

Particularly in the case of long wires, the measurement result can be significantly distorted by the wire resistance. Therefore, the connection of temperature sensors to electronics should not exceed 50 m and should be executed generally with 3 or 4 wires. For longer lengths, it is possible to interpose a temperature transmitter with a standard output signal of 4…20 mA.

Temperature sensors with a flexible protective tube made of PFA (Ø 6 mm) with a standard length of 1.6 m (other lengths possible) are extremely resistant to chemicals and the maximum operating temperature is 200°C. They are also suitable for use in cleanroom applications (physiologically benign) and can be mounted to the measuring point in plants and tanks where space is limited. The Pt 100 sensor element, with an active measuring length of 50 mm, is mounted to the end of the protective tube.

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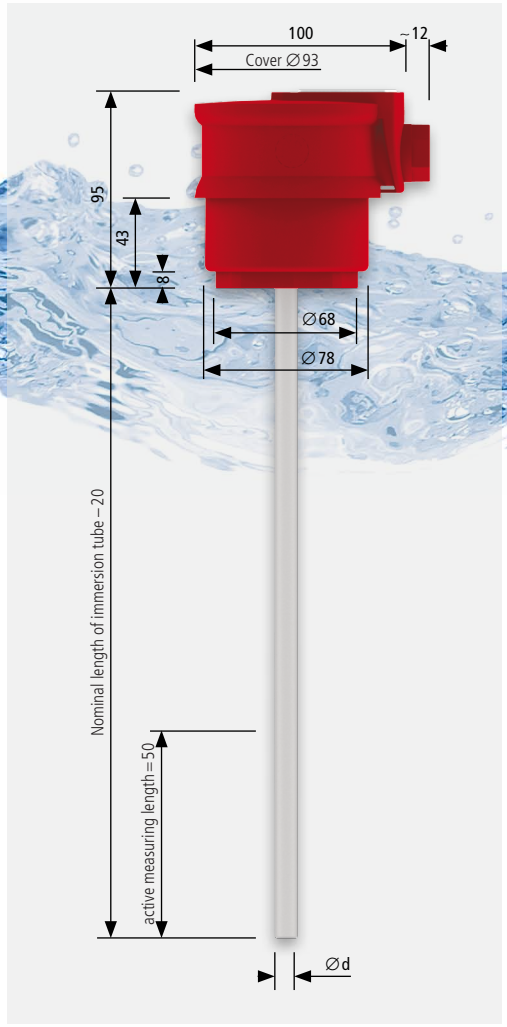
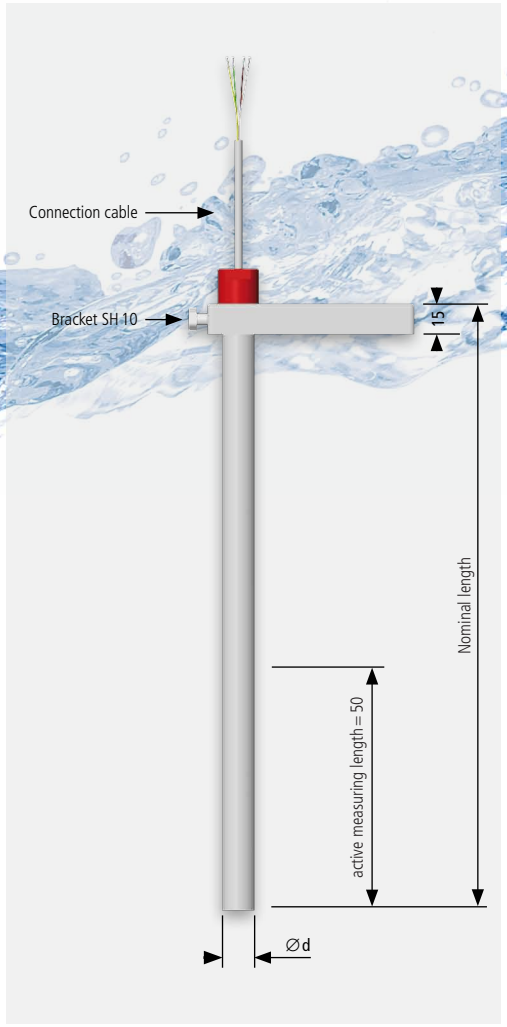
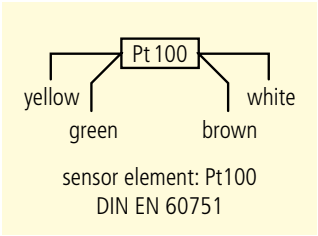


Temperature sensor with terminal casing BC



Temperature sensor in PG version with bracket SH 10



sensor element: Pt100
DIN EN 60751

LC Version

Temperature sensor with rigid immersion tube. The small terminal casing LC made of PP or LC/L made of PVDF permits connection of a cable and has the degree of protection IP 65 (jet-waterproof) to EN 60529.

BC Version

Temperature sensor with rigid immersion tube. The terminal casing BC (∅ 93 mm) made of PP permits connection of a cable and has the degree of protection IP 65 (jet-waterproof) to EN 60529. In the case of extremely high temperatures (liquid temperature > 80°C) or possible exposure to strongly oxidant chemicals (such as chrome electrolyte or HNO_3 solutions), the terminal casing BC/L made of PVDF should be used.

Connection of the cable

The cover can be unscrewed with the mounting wrench to provide access to the terminals for connection of the cable.

SOG Version

The stranded conductors of the Pt 100 element are led out openly at the end of the protective tube.

SMG 00 Version

The terminal casing MG 00 (degree of protection: IP 64) at the end of the protective tube permits easy connection of a cable.

Temperature sensors with rigid immersion tubes are available with tubes made from various materials in standard lengths of 300, 500 and 800 mm. Other lengths are possible. We can offer two different terminal casings with various sealing inserts for the connection cable. The Pt 100 elements can be replaced by the user.

Specifications of the standard materials

Immersion tube material	Code letter	∅d	Max. operating temp. (°C)
Stainless steel (Material No. 316TI)	B	11	100
Polypropylene (PP)	F	16	90
Polytetrafluorethylene (PTFE)	G	12	100
Polyvinyledene fluoride (PVDF)	L	16	100
Perfluoralkoxy (PFA)	M	6 (flexible tube)	200

PG Version

In the case of temperature sensors without a terminal casing the permanently connected cable (standard length 1.6 m) is led out of the rigid immersion tube via a cable gland (degree of protection IP 64). Other cable lengths are available. The bracket SH 10 is attached to the immersion tube and permits adjustment to any desired height of the immersion tube and easy mounting of the temperature sensor to the tank rim.

Terminal casing MG 00