

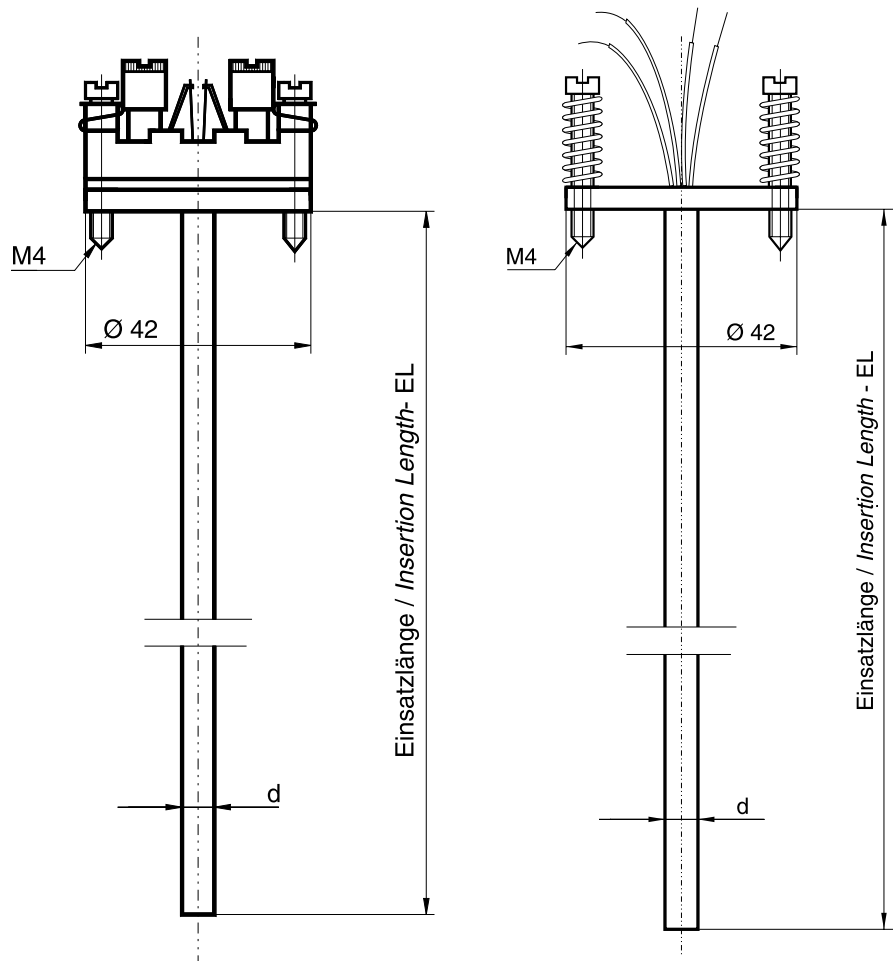
Directives for the use of Resistance thermometers and thermocouples

- The place for installation should have as less of vibration as possible.
- The place for installation should have the typical characteristic of your process.
- The active length (the temperature sensitive part) of resistance thermometers is only around 30 mm. That means that only the last 30 mm of the sensor tube "is measuring" temperature. In many media you will find a stratified diffusion of the temperature and you might measure only the temperature of one layer. For measuring the average temperature of all layers special executions are needed.
- The higher the mass of the armature is, the higher is it's heat conduction. In some small processes it might be necessary to use a very thin tube to reduce heat conduction errors and to improve reaction time.
- The reaction time of surface temperature sensors and sensors in protection tubes can be improved by the usage of a heat conducting paste.
- If the media has whether a high pressure or a high velocity of flow or aggressive chemical properties you should always use a protection tube.
- All Pfortner resistance thermometers are manufactured according to DIN IEC 751 and thermocouples are manufactured according to DIN IEC 584.
- The measurement current for resistance thermometers should not exceed 2 mA otherwise the self-heating of the platinum-chip can cause measurement errors. A measurement current of 1 mA has become a common industry standard.
- Very important for accuracy is the electrical connection of the resistance thermometer. It can be connected whether in 2, 3 or 4 wire technique. The 2-wire connection with a tuning resistor compensates a static line resistance. Temperature depending changes of line resistance will not be compensated. The 3-wire circuit compensates the line resistance and it's changes with an adequate accuracy. A requirement for this connection technique are 3 wires with the same resistance, preferentially 3 cores of the same cable. Differences in line resistance of the 3 wires will cause measurement errors. The 4-wire circuit will compensate all measurement errors caused by line resistance hundred per cent.
- For thermocouples the the cold junction compensation has a high influence on accuracy. It should be located at a place with low ambient temperature changes. If you use compensation cable you should take care that it will be installed in one piece. If this is not possible use only special clamps and connectors that will not cause parasitic thermoelectric voltage.
- Accuracy : Resistance thermometers and thermocouples are divided in accuracy classes. These classes are defined in the standards DIN IEC 751 and 584. Resistance thermometers are divided in the classes A and B and fractional amounts of B (e.g. 1/5 Cl. B). Thermocouples are divided in the classes 1,2 and 3. Theses classes are only valid for a certain temperature range.
- Maintenance : These instruments are free of maintenance. Spare parts are not needed.
- Calibration : The periods of calibration can be defined by the user. We suggest calibration periods of two years. If the user states unacceptable errors in his calibration he can shorten this period or if he states no differences in the calibrations he can extend this period. A calibration should always take place if a temperature - or a heavy mechanical shock stressed the instrument. If the values of the calibration are conforming with the requirement of the application the user has to replace the measurement insert.

The execution of measuring inserts for thermocouples is depending on the wire diameter

The clamp of the single conductor of resistance thermometer with 3-wire connection is marked red

Executions for installation of transmitters have a red wire as the single conductor



Connection schemes:

