Thermo-Sensor

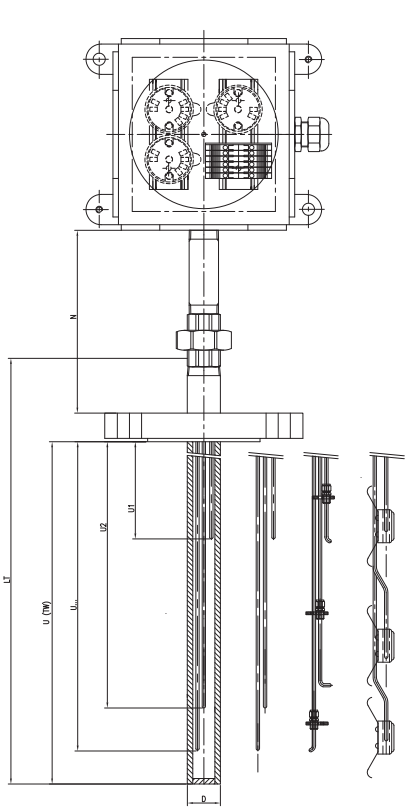
FT S 96-E-1.14

RÜEGER
www.rueger.com

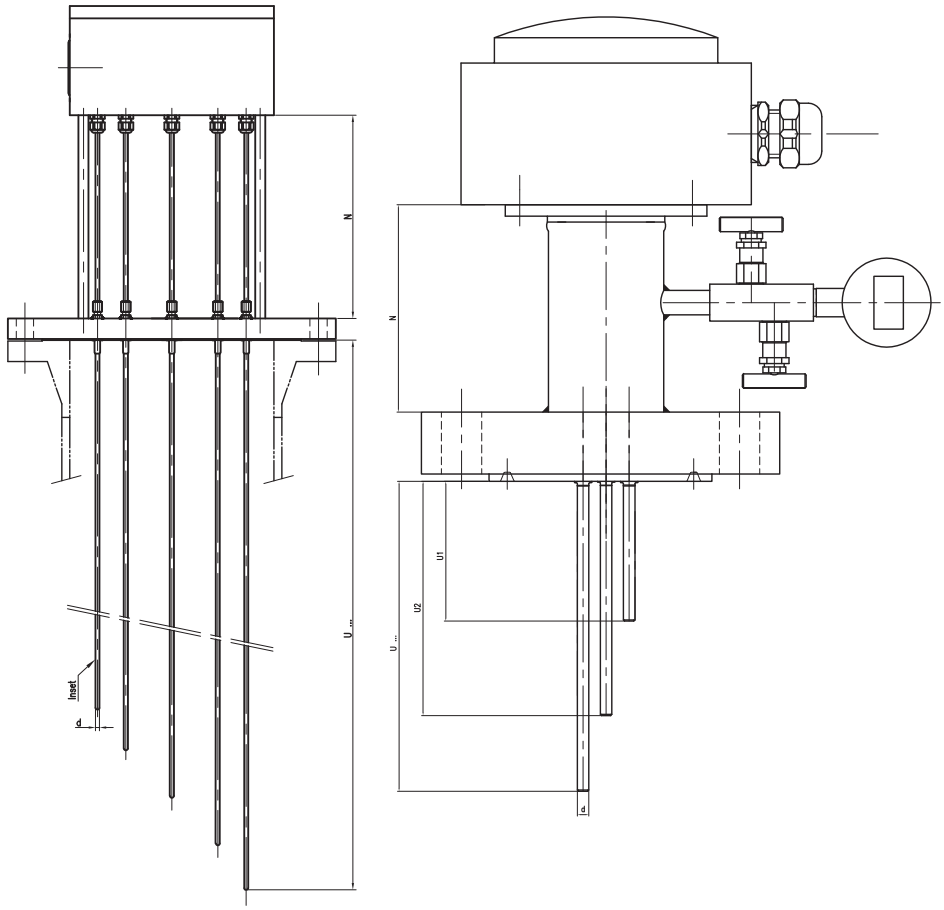
Multipoint

Type **S 96-SX**
S 96-FX

S96-SX Straight Multipoint



S96-FX Flexible Multipoint



Applications

- Mounting in chemical, petrochemical & pharmaceutical reactor or vessel.
- For wide range of diameters and lengths of insets.
- Special executions for dangerous environments certified.

User Industries

Oil & Gas
Chemical
Powergen
etc...

Description

These Rüeger «Thermo Sensor» Probes of multiple T/C or RTD sensors allows the different functionalities :

- Precise process temperature for optimal conversion.
- The measuring of catalyst bed inlet differential temperature to ensure proper distribution.
- Indicate temperature excursions in high temperature / high pressure reactors.
- Suitable for hydro-cracking operations and severe hydro-treating units.

S96-SX Straight Multipoint

There are designed to be fitted in a thermowell.
To reduce the response time the measuring points can be in contact with the thermowell wall through various options :

- Spring loaded, thermal block.
The spring allows the contact of the thermal block to the wall inside the protection tube.

- Guiding tubes.
Thermal block is welded to the wall of protection tube and to the inner guiding tube. The design allows individual replacement of sensors if required.

- Guiding disks.
Disk maintains the insets to their position in the protective tube and allows the possibility to bent the sensors to insure the contacts with the inner wall of the tube. This design uses spacer disks to guide the sensing elements into position.

- Flanged Multi-thermowell assembly / T bar.
Each thermowell is welded to the flange. The design allows individual replacement of sensors if required. The insulated extension wires are fixed on the metallic support welded to the flange.

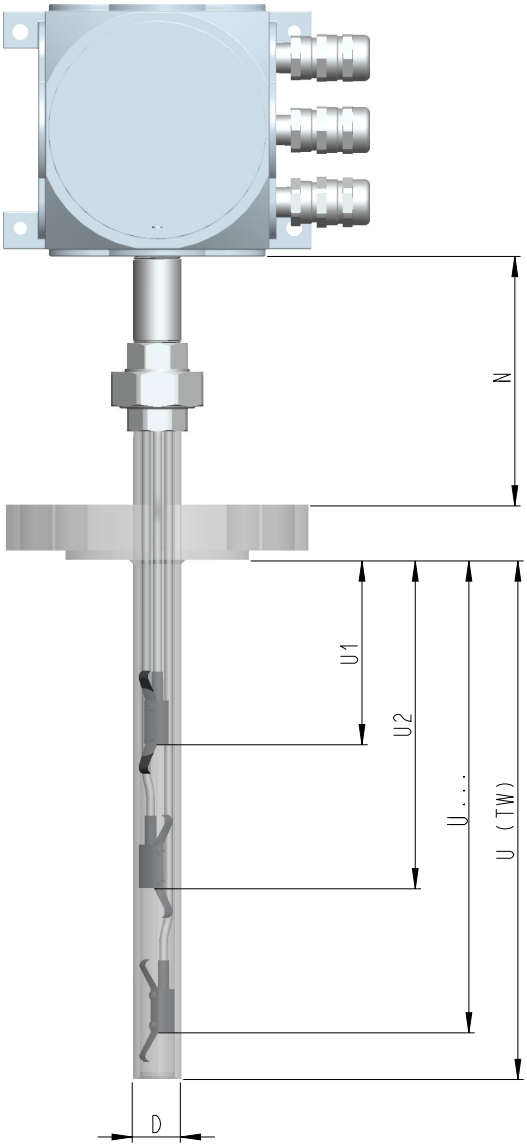
Insets:

The sensing elements incorporated in all these insets are protected by a metal sheath. They can be of 2 types: resistance temperature detectors (RTD's) or thermocouples (TC's). In each case, the sensor supplies an electrical signal corresponding to the temperature. The connection head carries a terminal block for connecting the wires.

When mounted in a thermowell, the inset may be replaced without removing the thermowell from the pipe and without any interruption of the process.

For hazardous areas, executions meeting the requirements mentioned as below are available.

EN / IEC 60079-0: «electrical apparatus for potentially explosive atmospheres (general requirements)»
EN / IEC 60079-1: «flameproof enclosure (d)»
EN / IEC 60079-11: «intrinsic safety (i)».



S-96-FX Flexible Multipoint

Rueger Flexible reactor Multipoint allows for temperature measurement monitoring a maximum of sensor points limited only by nozzle size and thermocouple sheath diameter. These points can be aligned through a single track or as individual sensors for a perfect vessel distribution. These points are cleverly placed to ensure the optimal temperature profiling.

Options:

- Safety chamber
If cracks appear under the process flange or on metallic sheaths, the leaking is contained by the safety chamber. The medium can't reach the outside environment.

- MultiOne
Compressing several individual thermocouples along the length of the same mineral insulated cable.

Insets:

The sensing elements incorporated in all these insets are protected by a metal sheath. They can be of 2 types: resistance temperature detectors (RTD's) or thermocouples (TC's). In each case, the sensor supplies an electrical signal corresponding to the temperature. The connection head carries a terminal block for connecting the wires.

Flexible for longitudinal & radial temperature measurement.
With heavy or double-wall mineral insulated cable for better resistance to process medium.
Available in different alloys to meet the specifications of the process.
Hot spot detection and reduction of channeling effect.
Designed to be routed around the inner circumference of the reactor or vessel.

For hazardous areas, executions meeting the requirements mentioned as below are available.

EN / IEC 60079-0: «electrical apparatus for potentially explosive atmospheres (general requirements)»
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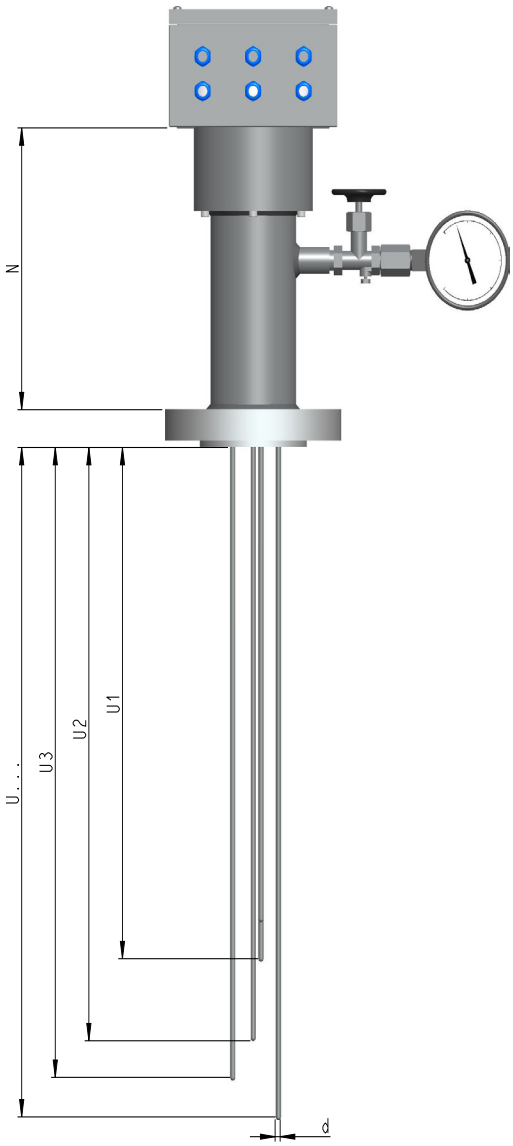


Technical data

1. Limiting temperatures (°C) for insets:

Sensors	ø 1.5 to 3.18 mm	ø 4.5 to 12.7 mm	Exi, Exd, all dia.
Pt 100 *	- 200...+ 550	- 200...+ 600	- 200...+ 500
Pt 1000	- 40...+ 400	- 40...+ 600	–
J	- 40...+ 600	- 40...+ 750	- 40...+ 500
E	- 200...+ 700	- 200...+ 800	- 200...+ 500
K, N	- 200...+ 800	- 200...+ 1000	- 200...+ 500

** Pt100 -200+850°C, Class B as option*
Other sensors diameters on request

2. Precision classes:

RTD	according to IEC 60751
class A	+/- (0.15 + 0.002 Itl)
class B	+/- (0.3 + 0.005 Itl)
class AA	+/- (0.1 + 0.0017 Itl)
TC	according to IEC 60584-2
class 1	
E	-40 ... + 800 [°C] +/- 1.5°C or +/- (0.004 Itl) (1)
J	-40 ... + 750 [°C] +/- 1.5°C or +/- (0.004 Itl) (1)
K/N	-40 ... +1000 [°C] +/- 1.5°C or +/- (0.004 Itl) (1)
class 2	
E	-40 ... + 900 [°C] +/- 2.5°C or +/- (0.0075 Itl) (1)
J	-40 ... + 750 [°C] +/- 2.5°C or +/- (0.0075 Itl) (1)
K/N	-40 ... +1200 [°C] +/- 2.5°C or +/- (0.0075Itl) (1)
class 3	
E	-200 ... + 40 [°C] +/- 2.5°C or +/- (0.015 Itl) (1)
J	n/a
K/N	-200 ... + 40 [°C] +/- 2.5°C or +/- (0.015 Itl) (1)

Itl = absolute value of measuring range
Between -130°C and -40°C, tolerances could be higher than class 3.
ISA MC96.1 on request.
(1) Highest of the two values applicable.

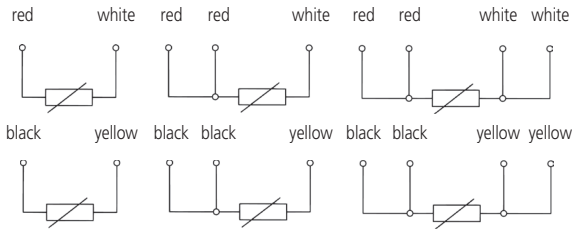
3. Ambient temperature: -40+85°C, -50 on request.

4. Inset sheath:
The sensors (RTDs or thermocouples) within the insets are embedded in a compacted MgO powder of purity over 99% and protected by a metal sheath. This sheath is free of pores, and can be bent at limited curvature.
Avoid bending metal sheath less than 50 mm from the tip.

Minimum bending radius (r) of the inset sheath
r = 5 x d (bending once only).

5. Sensitive length of inset:
For RTDs: max. 7 to 40 mm for all diameters of inset sheath.
For thermocouples: approximately equal to the external diameter of the inset sheath, but not more than 5 mm.

6. Identification of measurement circuits on terminal block and/or marking plate:
RTD:
(with color identification marking, according to IEC 60751)



Remark: "yellow" and "black" are used for double element.

Thermocouple: type of thermocouple is identified by color code.

Colors for thermocouples IEC 60584-2

Type	conductor "+"	conductor "-"
E	violet	white
J	black	white
K	green	white
N	pink	white

on request according to ISA MC 96.1

7. Resistance of insulation at +15 to +35°C:

For RTD ≥ 100 M Ω with U = 250 VDC
For TC ≥ 1 G Ω with U = 500 VDC

Sensors data for S96-SX and S96-FX:

Junction Box/Head
Material: Aluminum epoxy painting; Stainless steel; weather-proof corrosion coating: on request.
Direct or Remote mounting.
Connection output/input to suit the customer requisition.
Terminal block; Terminal strips or DIN rail: on request.
Available explosion proof, NEMA 4x or IP66 rating other execution on request.

Tests:
- Dye penetrant
- Helium
- Hydrostatic
- Radiographic or ultrasonic
- Insulation
- Sensor calibration
- Positive material identification

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