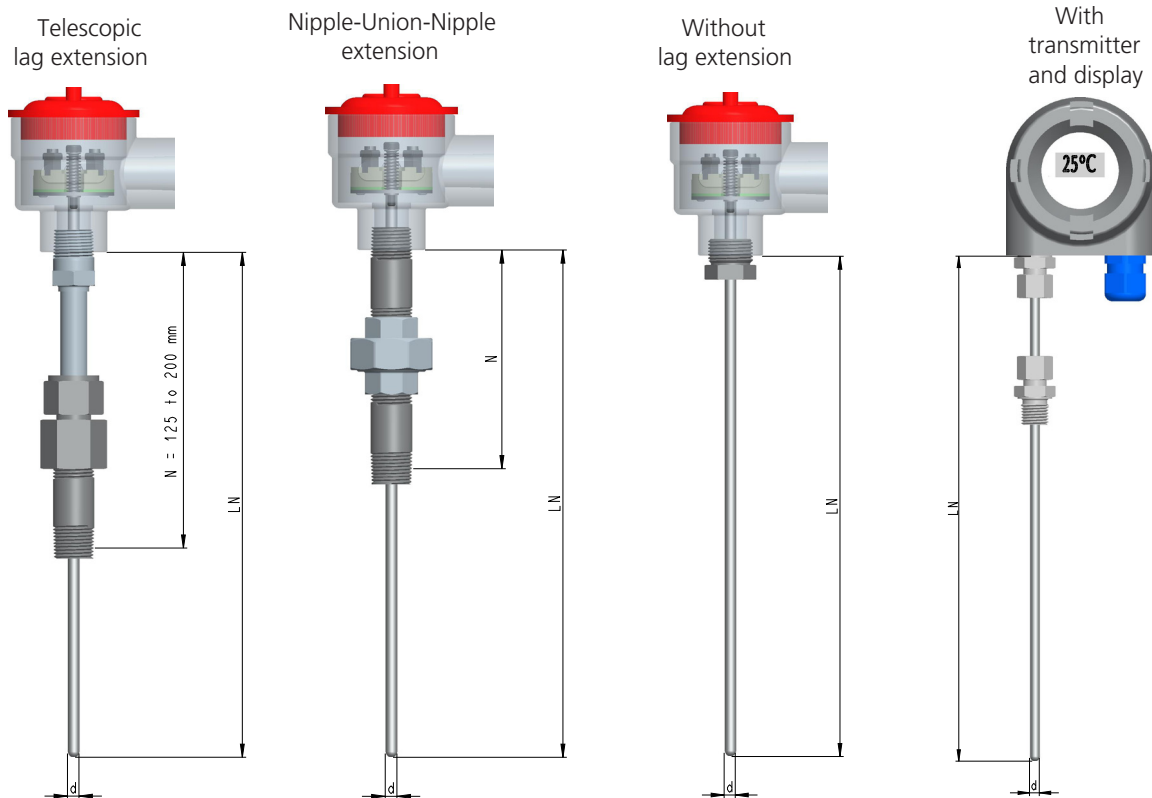


RTDs and thermocouples, insets with mineral insulation,
with / without lag extension according to ISA-dS 49.

Type **S 50**



Applications

- For mounting on pipes, vessels, etc. already fitted with thermowells.
- The bore diameter of the thermowell should be 0.5 to 1 mm greater than the inset diameter; bore depth and connections shall comply with ISA-dS 49 standard.
- Special executions for explosive environments certified. **ATEX** **IECEx** **SIL2** **INMETRO** **PG**

User Industries

Oil & Gas
Chemical
Powergen
etc...

Description

These RÜEGER "Thermo-Sensor" probes may be fitted with one or two resistance temperature detectors (RTDs) or thermocouples (TCs). Each probe consists of a temperature sensor (inset), a connection head, a lag extension and a standardized process connection with or without compression fitting.

For explosive environments, executions meeting the requirements of 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"), EN 60079-7 (increased safety "e") are available.

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, Exe 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.

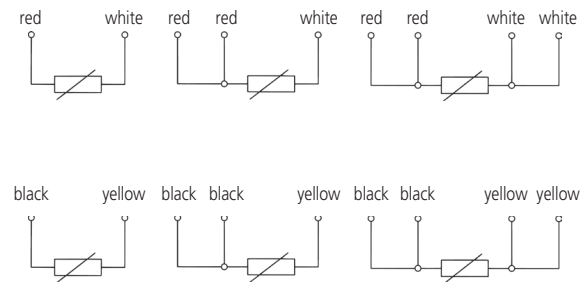
ISA MC 96.1 on request.

(1) Highest of the two values applicable.

3. 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.

4. Inset sheath:

The sensors (RTDs or TC) 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.

5. Ceramic terminal block:

Fixed to connection head by two M4 screws with springs, giving 8 to 10 mm travel. The diameter and spacing of the screws correspond to head types DIN A and DIN B.

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

For RTD $\geq 100 \text{ M}\Omega$ with U = 250 VDC
For TC $\geq 1 \text{ G}\Omega$ with U = 500 VDC

7. Sensitive length of inset:

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

8. Response time:

The values given are for insets only. This is the time by which the reaction of the inset change in temperature;
t_{0,5} time to reach 50% of its total temperature value.
t_{0,9} time to reach 90% of its total temperature value.
The response times given below are indicative only.

Response time:

Inset	in water approx. 0.2 m/s		in air approx. 1 m/s	
	t _{0.5}	t _{0.9}	t _{0.5}	t _{0.9}
RTD 3 mm dia.	1.6 s	5.5 s	25 s	86 s
TC 3 mm dia.	1.2 s	3.2 s	22 s	70 s
RTD 6 mm dia.	5 s	16 s	60 s	200 s
TC 6 mm dia.	3.5 s	10 s	55 s	170 s

9. Minimum immersion length:

Recommended minimum immersion length:

Inset	in liquid	in gas/vapour
RTD 3 mm dia.	45 mm	55 mm
TC 3 mm dia.	15 mm	25 mm
RTD 6 mm dia.	60 mm	75 mm
TC 6 mm dia.	30 mm	50 mm

10. Connection heads:

Standard execution for ambient temperatures -40+85°C,
-50°C on request.
Degree of protection: IP 54 to IP 66, according to execution.
Cable gland: to be chosen according to the cable entry.

11. Operating position:

Unrestricted, provided that the connection head is suitably remote from the heat source.

12. Lag extensions:

The length of the lag extension should be sufficient to guarantee that the ambient temperature around the connection head, transmitter and wiring does not exceed the limiting value of +85°C.

13. Standard lengths:

A length "LN" is given for a standard length of the inset. If Thermo-Sensor is installed with a thermowell, it will be necessary to add an inset length of 4 mm.

14. Thermowells:

If the dimensions of the probe are unknown, it is indispensable to indicate the following data concerning the thermowell:

- bore diameter (and any steps if present)
- bore depth
- thread size for connecting the lag extension
- required minimum length of lag extension

15. Recommendations for mounting:

The S 50 probes are designed to fit inside thermowells. Before mounting, make sure that the bore of the thermowell is clean, i.e. free of dust and dirt, swarf, oil or grease, etc. The lengths "U" and "L" take into account a 4 mm spring travel of the inset mounting. To compensate the huge assembly tolerances caused by the conical threads, the use of the telescopic lag extension could be an alternative solution.

16. Type of protection “flameproof enclosure”, for Exd execution:

The system comprises an Exd connection head, a lag extension with flame barrier and an inset with clearance according to EN / IEC 60079-1, and a certified Exd cable gland. The sensor marking plate gives information on use of the probes in explosive environments. No particular restrictions apply to the measuring circuits. The connection head is provided with ground terminals.

17. Type of protection “intrinsic safety”, for Exi execution:

The temperature sensor is fitted with one or two measuring circuits. These are tested for dielectric strength by applying 500 VAC between the circuit(s) and ground and between the measuring circuits themselves. The sensor marking plate gives information on use of the probes in intrinsic safety measuring circuits. Equipment connected on the output side of probes shall be appropriately type-approved; its power and heat loss shall meet the requirements of EN / IEC 60079-11. The connection head is provided with a screw terminal for connecting to ground.

18. Type of protection “increased safety”, for Exe execution:

The temperature sensor is fitted with one or two measuring circuits. These are tested for dielectric strength by applying 500 VAC between the circuit(s) and ground and between the measuring circuits themselves. The system is designed according to EN 60079-7. The connection head is provided with a screw terminal for connecting to ground.

19. Transmitter options, please refer to transmitter’s technical data sheet.

RÜEGER SA shall not be responsible for the consequences of any application not conforming to the regulations or recommendations concerning explosive environments.

*Modifications reserved,
All technical data serves as a guideline
and does not guarantee particular
properties to any products.*

RÜEGER



www.rueger.com www.instrugate.com

Manufacturer of Sensors and Gauges for Temperature & Pressure

RÜEGER SA

Ch. de Mongevon 9
P.O.Box 98
1023 CRISSIER 1
SWITZERLAND

Tel + 41 (0)21 637 32 32
Fax + 41 (0)21 637 32 00
E-mail info@rueger.ch

RÜEGER GmbH

Plieninger Strasse 58
70567 STUTTGART
GERMANY

Tel + 49 (0)711 16-163-0
Fax + 49 (0)711 16-16333
E-mail rgmbh@rueger.com

RÜEGER Sdn Bhd

No 22-5, Jalan Wangsa Delima 10
D'Wangsa, Wangsa Maju
53300 KUALA LUMPUR
MALAYSIA

Tel + 603 - 4142 3808
Fax + 603 - 4142 3909
E-mail sales@rueger.com.my

BEIJING RÜEGER PRECISION INSTRUMENT Co. Ltd

No. A135 Chengshou Road
Nanshanuan, Chaoyang District
100164 BEIJING, P.R. CHINA

Tel + 86 10 8767 7502 / 3379
Fax + 86 10 8761 3727
E-mail sales@bjrueger.com