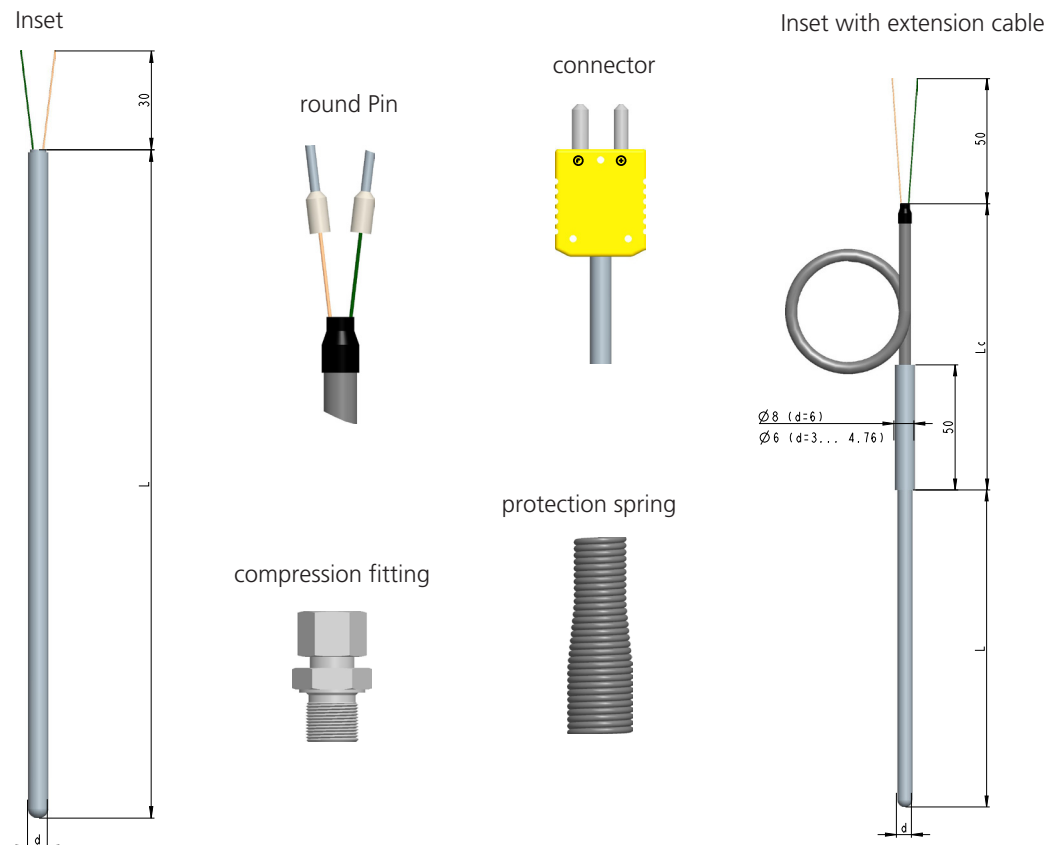


Thermocouple probes with mineral insulation, with or without extension cables, with wires terminations or connectors.

Type **S 80**



## Applications

- Flexible small size probes for machines, chemical plants etc.
- For low-pressure, low-speed fluids and measurements requiring short response time.
- For a wide range of media: vapors, gases, liquids and non-abrasive substances, provided that these are compatible with the sheath material.
- May also be fixed on solid surfaces or inserted into cavities.
- Special executions for explosive environments certified.



## Description

These RÜEGER "Thermo-Sensor" probes may be supplied with either one or two thermocouple sensors. The sensor(s) is (are) placed inside a flexible metal sheath. With or without extension cable, process connection on request.

If fitted, the extension cable (with or without protective spring and/or electromagnetic shielding) can be provided with PVC, silicone, teflon or fiberglass insulation. The soldering between the extension cable and the sheathed cable is enclosed in a sleeve.

Special executions for explosive environments, executions meeting the requirements of EN / IEC 60079-0: «electrical apparatus for potentially explosive atmospheres (general requirements)»  
EN / IEC 60079-11: «intrinsic safety (i)»  
EN 60079-7: «increased safety (e)».

## Technical data

### 1. Operating conditions:

#### Permissible temperatures (°C) at measurement point

Sensors	Ø 1 to	Ø 4.5 to	Exi, Exe
	3 mm	12.7 mm	all dia.
J	-40...+600	-40...+750	- 40...+ 500
E	-200...+700	-200...+800	- 200...+ 500
K	-200...+800	-200...+1100	- 200...+ 500

Other sensors diameters on request

### 2. Precision class:

TC	according to IEC 60584-2
class 1	
E	-40 ... + 800 [°C] +/- 1.5°C or +/- (0.004 ltl) (1)
J	-40 ... + 750 [°C] +/- 1.5°C or +/- (0.004 ltl) (1)
K/N	-40 ... +1000 [°C] +/- 1.5°C or +/- (0.004 ltl) (1)
class 2	
E	-40 ... + 900 [°C] +/- 2.5°C or +/- (0.0075 ltl) (1)
J	-40 ... + 750 [°C] +/- 2.5°C or +/- (0.0075 ltl) (1)
K/N	-40 ... +1200 [°C] +/- 2.5°C or +/- (0.0075 ltl) (1)
class 3	
E	-200 ... + 40 [°C] +/- 2.5°C or +/- (0.015 ltl) (1)
J	n/a
K/N	-200 ... + 40 [°C] +/- 2.5°C or +/- (0.015 ltl) (1)

ltl = 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. Mounting position:

Unrestricted. Usual mounting by means of a compression fitting.

### 4. Identification of measurement circuits:

#### Colors for thermocouples according to IEC 60584-2

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

ISA MC 96.1 on request.

### 5. Inset sheath:

The thermocouple sensor within the probe is embedded in a compacted MgO powder of purity over 99% and protected by a metal sheath. This sheath is poreless, and can be bent to a limited radius (see below).

Important: avoid bending the metal sheath at a point closer to the tip than 50 mm. Other executions on request.

### Minimum bending radius (r) of the inset sheath

$r = 5 \times d$  (bending once only).

### 6. Immersion length:

This is the length of probe immersed in the medium, measured from the tip. To minimize possible errors, the following minimum immersion lengths are recommended:

in liquids	40 mm + 4 x d
in gases/vapors	40 mm + 7 x d.

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

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

### 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<sub>0,5</sub> time to reach 50% of its total temperature value. t<sub>0,9</sub> time to reach 90% of its total temperature value. The response times given below are indicative only.

Sensor	in water		in air	
	approx. 0.2 m/s	approx. 1 m/s	t <sub>0.5</sub>	t <sub>0.9</sub>
TC				
1.5 mm dia.	0.2 s	0.7 s	7.7 s	25 s
3 mm dia.	1.2 s	3.2 s	22 s	70 s
4.5 mm dia.	2.5 s	6.7 s	39 s	120 s
6 mm dia.	3.5 s	10 s	55 s	170 s

The response times are for a sensor with an insulated TC.

### 9. Wire termination:

#### Permissible temperatures at joint with extension cable

(all insulation materials except PVC)

-30 ...+130 °C

### 10. Permissible ambient temperatures for extension cable:

PVC	-20 ...+105 °C
Silicone	-60 ...+180 °C
PFA (teflon)	-75 ...+240 °C
Fiberglass	-60 ...+400 °C

### 11. Temperature probes for explosive environments:

#### Type of protection "intrinsic safety", for Exi execution: Ex ia IIC T6.

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. Execution will be Exi only with enclosure of minimum IP20.

#### Type of protection "increased safety", for Exe execution: Ex e IIC T6.

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. Execution will be Exe only with enclosure of minimum IP54.

RÜEGER S.A. 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



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## Manufacturer of Sensors and Gauges for Temperature & Pressure

### RÜEGER SA

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

### RÜEGER GmbH

Plieninger Strasse 58  
70567 STUTTGART  
GERMANY

### RÜEGER Sdn Bhd

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

### BEIJING RÜEGER PRECISION INSTRUMENT Co. Ltd

No. A135 Chengshousi Road  
Nansanhuan, Chaoyang District  
100164 BEIJING, P.R. CHINA

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

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

Tel + 603 - 4142 3808  
Fax + 603 - 4142 3909  
E-mail [sales@rueger.com.my](mailto:sales@rueger.com.my)

Tel + 86 10 8767 7502 / 3379  
Fax + 86 10 8761 3727  
E-mail [sales@bjrueger.com](mailto:sales@bjrueger.com)