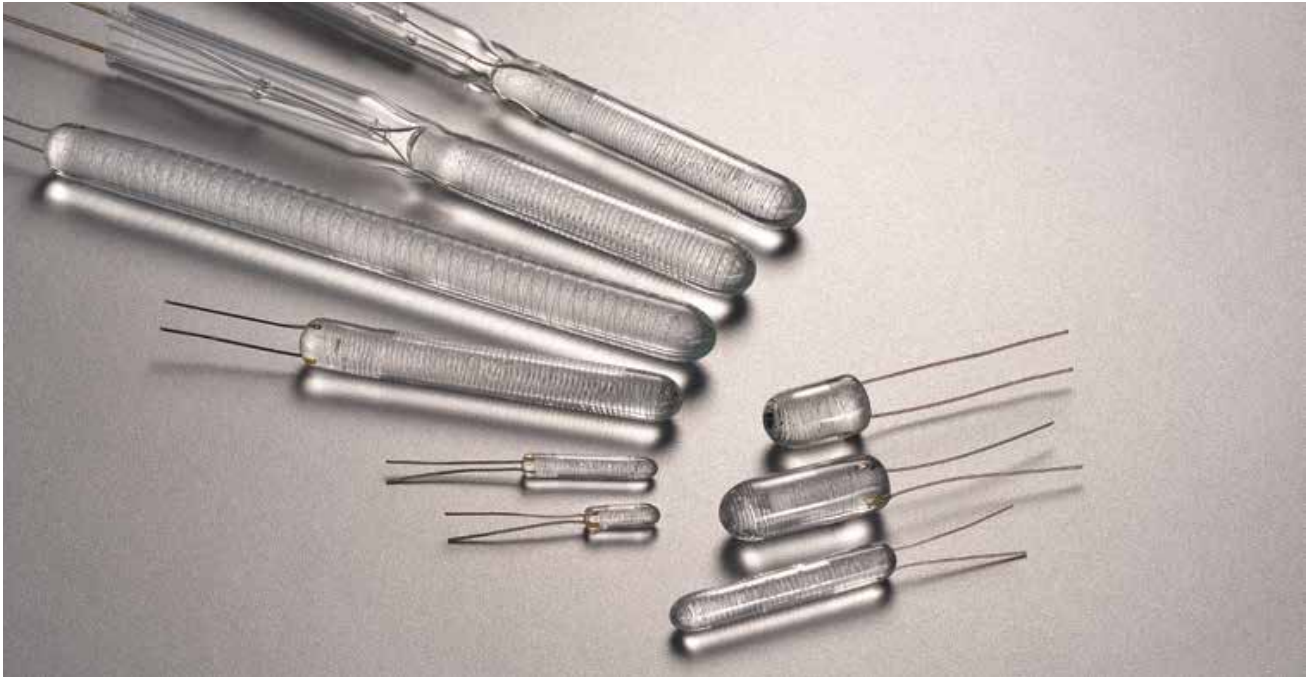


TEMPERATURFØLERE



TEMPERATUR SENSORS

PLATINUM RTDS



Platinum resistors are temperature probes; these temperature sensible resistors are mounted on the carrier body. They are installed into protection mountings, measuring inserts for protection mountings or into mineral insulated cables. RTDs are components for resistance thermometers and can not be used unprotected in general for temperature measuring. Measuring resistors detect the average values of the effecting temperature on the whole length.

BENEFITS

- High stability
- Standardized nominal values and tolerances
- Fast response time
- Different temperature coefficients
- Good vibration resistance
- Temperature range from – 200 °C to +850 °C

TEMPERATURE SENSORS

- Easy process control and optimizing
- Optimal for OEM-solutions and copious measuring points
- Wide temperatur range from – 200 °C till 850 °C
- Different interfaces and analytic software included
- Excellent Price-performance ratio

APPLICATION

- Automotive
- Household appliances
- Process technology
- Energy extraction – energy management
- Electronic
- Life Science
- Building management

CONSTRUCTION AND CHOICE OF TYPE

The RTD, made of platinum, can be constructed as a thin film or as a wire wound resistor with connection wires made of precious metals. The RTDs are vibration proof and for use under extreme working conditions.

A variety of types, which differ in measuring range, shape and number of resistors on the carrier body, is available for use.

MOUNTING

Precise measuring with RTDs demands a lot of experience at mounting and choosing the materials. If you don't have this experience we recommend the application of completed RTDs or measuring inserts.

REFERENCE TABLES

The stated general values for RTDs are according to temperatures from – 200 °C to +850 °C of DIN EN 60751: 2009-05.

TOLERANCES

The platinum RTDs are delivered in desired tolerance class.

For many applications the following special tolerances are popular and can be delivered for an extra charge.

For measuring tasks with bigger tolerances RTDs can be delivered: for example $\pm 0.45\text{ °C}$ at 0 °C or $\pm 1.5\text{ °C}$ at 0 °C .

We look forward to your inquiry. Our Technical Department will accommodate you with any questions concerning: special tolerances for example at a specific temperature or narrow temperature ranges.

RESPONSE TIME

A feature of RTDs is the very short response time.

SELF-HEATING

Like every resistor in a circuit RTDs are heated by the applied current slightly. The amount of the so called self heating error depends on electric power ($N = I^2 \times R$), the lost thermal energy a machine-aided constant „EK“ which is called self-heating coefficient.

LONG TERM STABILITY

Platinum RTDs have – compared with other temperature probes – a good long term stability at upper application limits.

DELIVERY PROGRAM

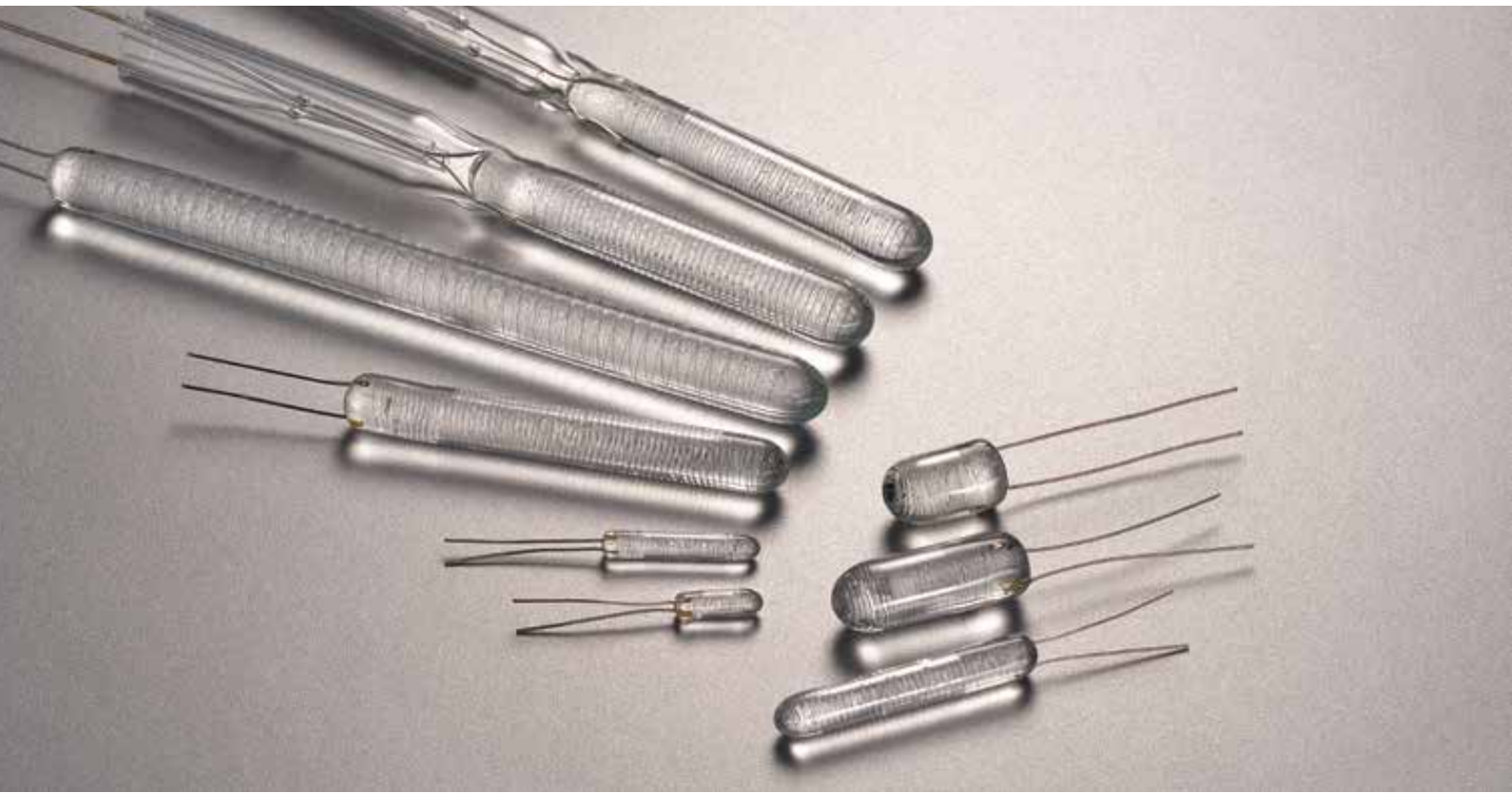
The standard types in the catalogue with their different features are often used types. They are available at short notice and at cheap prices.

RTDs can be delivered customized for special applications. The following modifications are available:

- Sizes
- Nominal resistance
- Temperature coefficient
- Length of connection wires
- Tolerances



GLASS RTDS



Glass wire wound platinum RTD elements are made by winding a bifilar platinum wire onto a glass core and then fusing the exterior with glass. They are suitable for temperatures from $-200\text{ }^{\circ}\text{C}$... $+450\text{ }^{\circ}\text{C}$. The RTDs correspond in the basic values and tolerances to **DIN EN 60751**.

The values in the table are only a selection. Other shapes and measures higher accuracy and resistance values can be delivered at request.

BENEFITS

- High vibration resistance
- Suitable for measuring with measuring current max. 10 mA (to attend self-heating)
- High thermal shock resistance
- Excellent chemical resistance

Typ <i>type</i>	Länge <i>length</i> in mm	ø diam. in mm	ø Anschluss- draht <i>connection wire diam.</i> in mm	Ansprechzeiten (1 x Pt 100) <i>response times (1 x Pt 100)</i>				Selbster- wärmung in K/mW Luft 1,0 m/s <i>self-heating air 1.0 m/s</i>
				Wasser 0,2 m/s <i>water 0.2 m/s</i>		Luft 1,0 m/s <i>air 1.0 m/s</i>		
				T 0.5	T 0.9	T 0.5	T 0.9	
HG1207	7	1.2	0.20	0.2	0.4	2	7	0.38
HG1805	5	1.8	0.25	0.2	0.8	8	30	0.36
HH1110	10	1.1	0.20	0.2	0.4	2	7	0.38
HG1310	10	1.3	0.20	0.2	0.5	3.8	12.5	0.38
HG1810*	10	1.8	0.25	0.5	1.8	9	30	0.33
HG2020*	20	2.0	0.25	0.7	2	12	38	0.25
HG2025*	25	2.0	0.25	0.13	1.2	7	23	0.25
HG2713*	13	2.7	0.25	0.5	1.6	14	45	0.23
HG2716*	16	2.7	0.25	0.5	1.5	12	45	0.20
HG3018*	18	3.0	0.25	0.3	1.8	10	34	0.17
HG3025*	25	3.0	0.25	0.7	2	8	22.5	0.1
HG3030*	30	3.0	0.30	0.2	1.8	11	35	0.2
HG3038*	38	3.0	0.30	0.7	2.5	8	28	0.1
HG4030*	30	4.0	0.30	0.7	2	8	28	0.11
HG5008*	8	5.0	0.30	0.26	3.0	25	49	0.25
HG5012*	12	5.0	0.30	0.4	3.7	20	60	0.20
HG5030*	30	5.0	0.30	0.3	4.7	23	80	0.13
HG5060	60	5.0	0.30	0.4	4.5	17	87	0.05

*2xpt100 möglich / *2xPt100 possible

The given dynamic values are maximum values. The first two digits of the classification correspond to the nominal diameter (x 0.1 mm). The following digits correspond to the nominal length in mm.

- Usual tolerances: diameter: ± 0.2 mm, length: ± 2 mm
- Characteristics acc. to DIN EN 60751 class W 01 (AA), W 0,15 (A), W 0,3 (B), W 0,6 (C)
- Connection wire: platinum sheath wire, length 10 mm
- Sensitive length ends approx. 1.0 mm before the free wire ends
- Pt-characteristics, e.g. acc. to JIS, Gost, etc. possible
- Alternative basic values (R) up to 1000 possible

Other characteristic values and dimensions on request.

Resistance per meter of the used Pt sheath wires:

Ø 0.30 mm approx. 7.0 ohm/m

Ø 0.25 mm approx. 8.5 ohm/m

Ø 0.20 mm approx. 15.0 ohm/m

These values have to be considered by the user if necessary.
The variety of types ranges from HG1207 to HG50120.

In addition, special constructional characteristics
are feasible:

- Applied connection wires
- combination of different ascents of the measuring winding
- version with glass extension tube (see figure)

The combination of these characteristics is possible upon customers request. User-specific prepackaging with silver wires or wires made from other materials as 2-, 3- or 4-wire systems is feasible. The compensation of the lead resistances in 2-wire circuit is possible within technically reasonable limits. (reference point for nominal value at lead ending)

PARTICULARITY

- Extreme shockproof
- High resistance against acids and alkalis except hydrofluoric acids

LABORATORY GLASS RTDS



PARTICULARITY

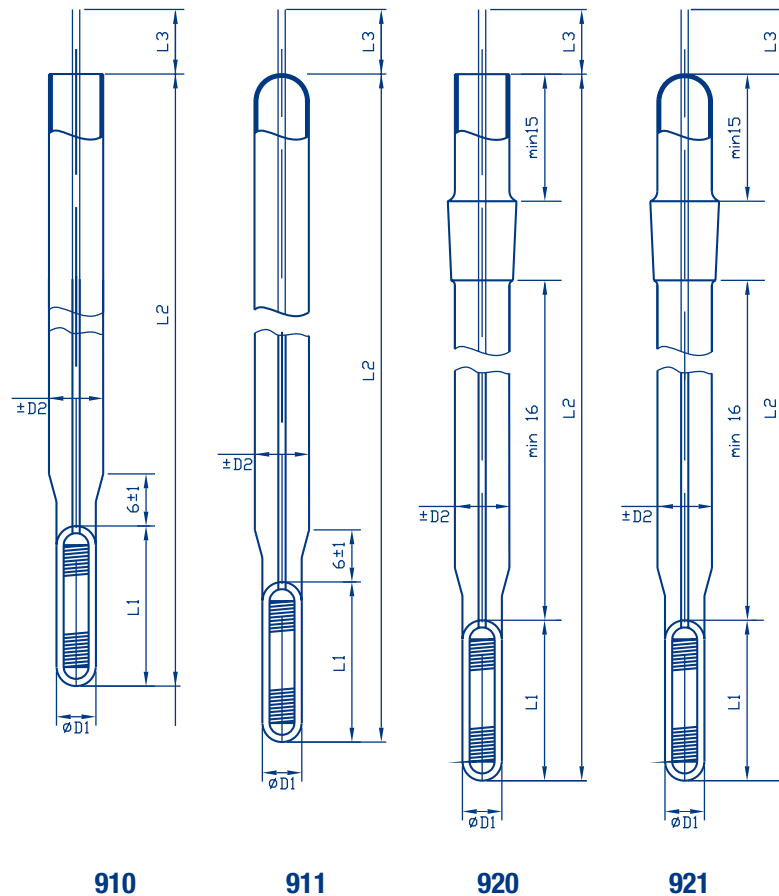
- High chemical resistance except hydrofluoric acids
- Direct use in the laboratory
- Dimensions according to customer requirements



Ausführung <i>version</i>	910 (offen/ <i>open</i>)	Normal- schliff <i>ground glass joint</i>	NS 10/19
	911 (geschlossen/ <i>closed</i>)		NS 12/21
	920 (offen/ <i>open</i>)		NS 14/23
	921 (geschlossen/ <i>closed</i>)		

Typ, Länge L2, Länge L3 und Durchmesser nach Kundenwunsch.

Type, length L2, length L3 and diameter according to customer specification.

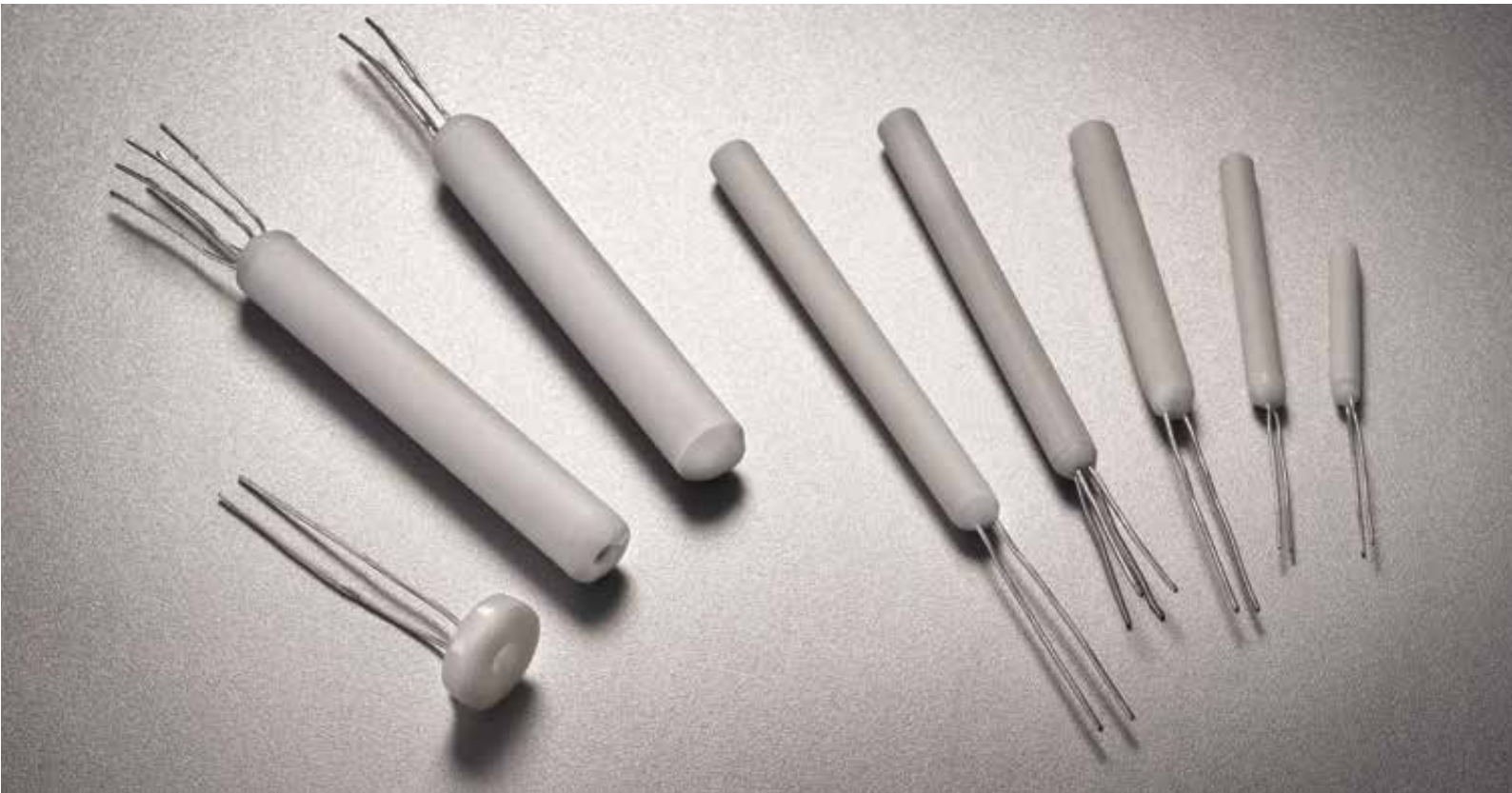


Beispiel <i>example</i>	Ausführung <i>version</i>	Typ <i>type</i>	Länge L2 <i>length L2</i>	Länge L3 <i>length L3</i>	Durchmesser D2 <i>diameter D2</i>	Normalschliff <i>ground glass joint</i>
Typenschlüssel <i>Ordering code</i>	910	HG3030	200	50	6	—
	920	HG3030	200	50	6	NS 10/19

Weitere Ausführungen: Übergangshülse mit Kabel und Stecker. *Further versions: transition sleeve with cable and plug.*

0513 Durch Irrtümer und technische Weiterentwicklungen bedingte Änderungen sind vorbehalten.
Subject to modifications arising from errors or technical advancements.

WIRE WOUND CERAMIC RTDS



Wire wound ceramic RTDs are the classical shape for the Pt 100 RTDs. The features are a wide temperature range and their robustness. The offered RTDs correspond in their basic values and tolerances to DIN EN 60751.

The temperature range is $-200\text{ }^{\circ}\text{C}$... $+850\text{ }^{\circ}\text{C}$. The values in the table are a selection. Since not all sensors are suitable for all measuring tasks, RTDs are produced according to different manufacturing methods and different sizes.

BENEFITS

Wire wound ceramic RTDs are thermal aged and that is the reason for the high long term-stability and are largely resistant to temperature shock.

The offered RTDs are basically bifilar and wound with wire. A protective varnish respectively a ceramic cylindrical protects the winding from external influences. RTDs with different resistance values can be delivered on request as well as thermal aged types for especially high stability demands.

The nominal value at 0°C is related to the standard length of the connection leads measuring 10 mm. For all other wire lengths the following resistances have to be calculated: 3.5 /m for Ø of 0.25 mm; 2.4 /m for Ø of 0.30 mm; 1.8 /m for Ø of 0.35 mm (The connection leads are made of Pt 5% Rh) sensitive length ends approx. 1.0 mm before the free wire ends.

Typ type	Länge lenght in mm	Ø diam. in mm	R ₀ Ω / 0°C
Temp. – 200°C ... +600°C			
HK4630	30 ± 2	4.6 ± 0.2	1 x 100
HK4630D	30 ± 2	4.6 ± 0.2	2 x 200
HK2830	30 ± 2	2.8 ± 0.2	1 x 100
HK2830D	30 ± 2	2.8 ± 0.2	2 x 100
HK2020	20 ± 2	2.0 ± 0.1	1 x 100
HK4830	30 ± 2	4.8 ± 0.2	3 x 100
HK2010	10 ± 2	2.0 ± 0.2	1 x 100
HK2020D	20 ± 2	2.0 ± 0.2	2 x 100
HK1612	12 ± 2	1.6 ± 0.1	1 x 100
HK3015	15 ± 2	3.0 ± 0.2	1 x 100
HK2830 JIS	30 ± 2	2.8 ± 0.2	1 x 100
HK2830D JIS	30 ± 2	2.8 ± 0.2	2 x 100
HK1620 JIS	20 ± 2	1.6 ± 0.2	1 x 100
HK1620	20 ± 2	1.6 ± 0.2	1 x 100

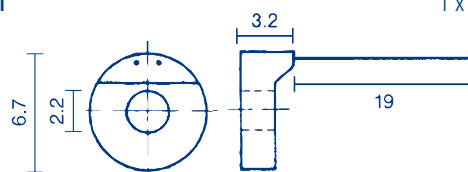


Temp. – 200°C ... +850°C			
HK3022	22 ± 2	3.0 ± 0.2	1 x 100
HK3032	32 ± 2	3.0 ± 0.2	1 x 100
HK3032D	32 ± 2	3.0 ± 0.2	2 x 100



Temp. – 50°C ... +600°C			
-------------------------	--	--	--

HKS 81 1 x 100



FOIL RTDS

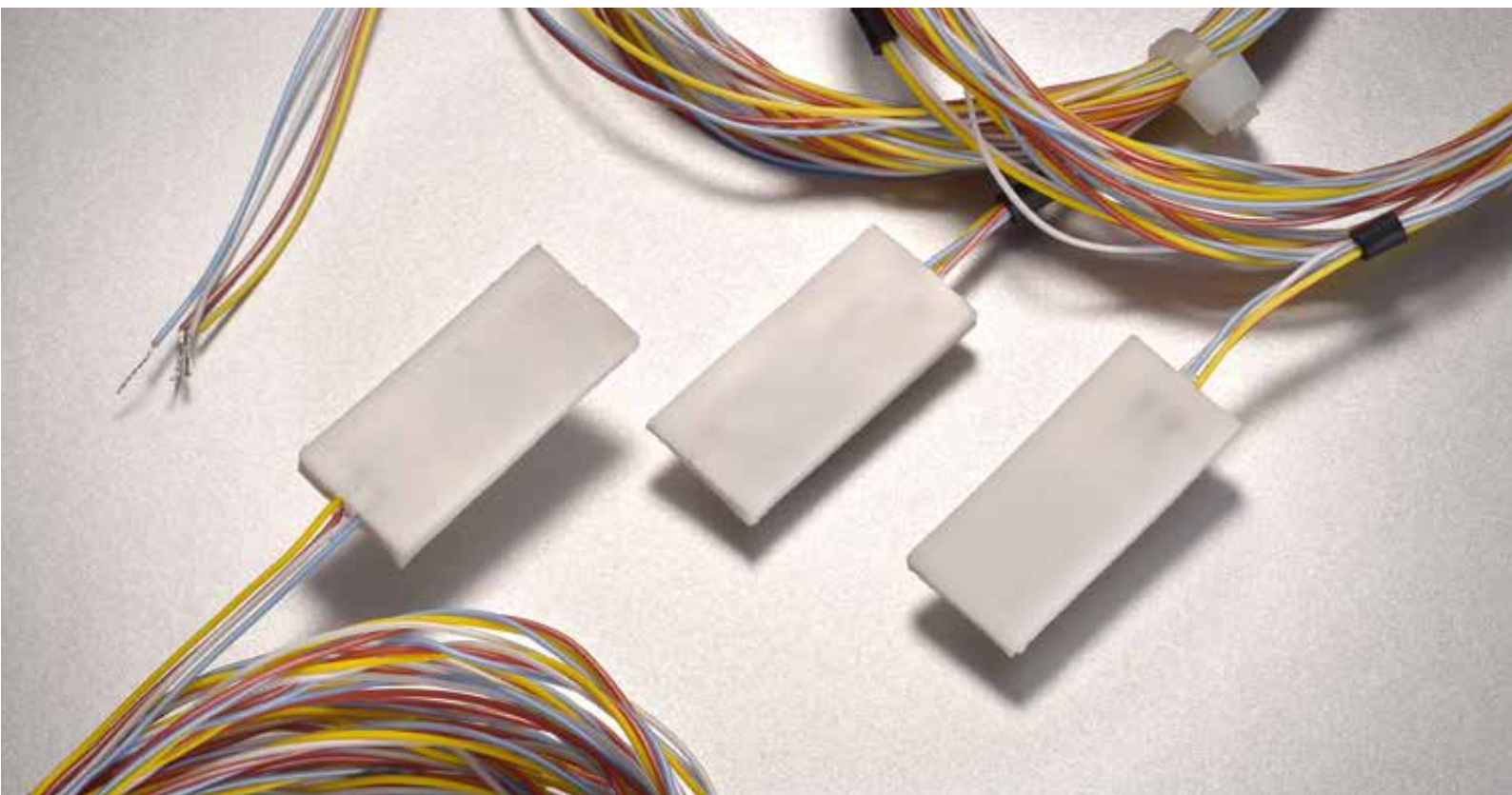


The foil RTD consists of a measuring wire loop between the two foil layers. Due to its flexibility it can be adapted to various surface forms. The small thickness of the sensor results in excellent dynamic parameters and enables the installation at places difficult to access. Other dimensions are possible.

CONSTRUCTION AND SPECIFICATION

- Measuring winding between two layers of temperatureresistant foil
- Length x width: e.g. 90 mm x 15 mm, 50 mm x 20 mm, 20 mm x 10 mm
- Mini foil RTDs 8 x 7,5 mm, bifilar wound
- Thickness: 0.13 mm
- 2-, 3- or 4-wire circuit
- Min. Bend radius about 10 mm
- temperature range: – 80°C ... +200°C
- Pt 100 acc. to DIN EN 60751
- Connection wire cross-section: 0.035 mm²
- Length of connection wires as desired

SILICONE RTDS



Due to its flexibility the sensor resistor is well suited for temperature measurements at uneven surfaces. Excellent dynamic values result from the reduced thickness of the active part of the sensor.

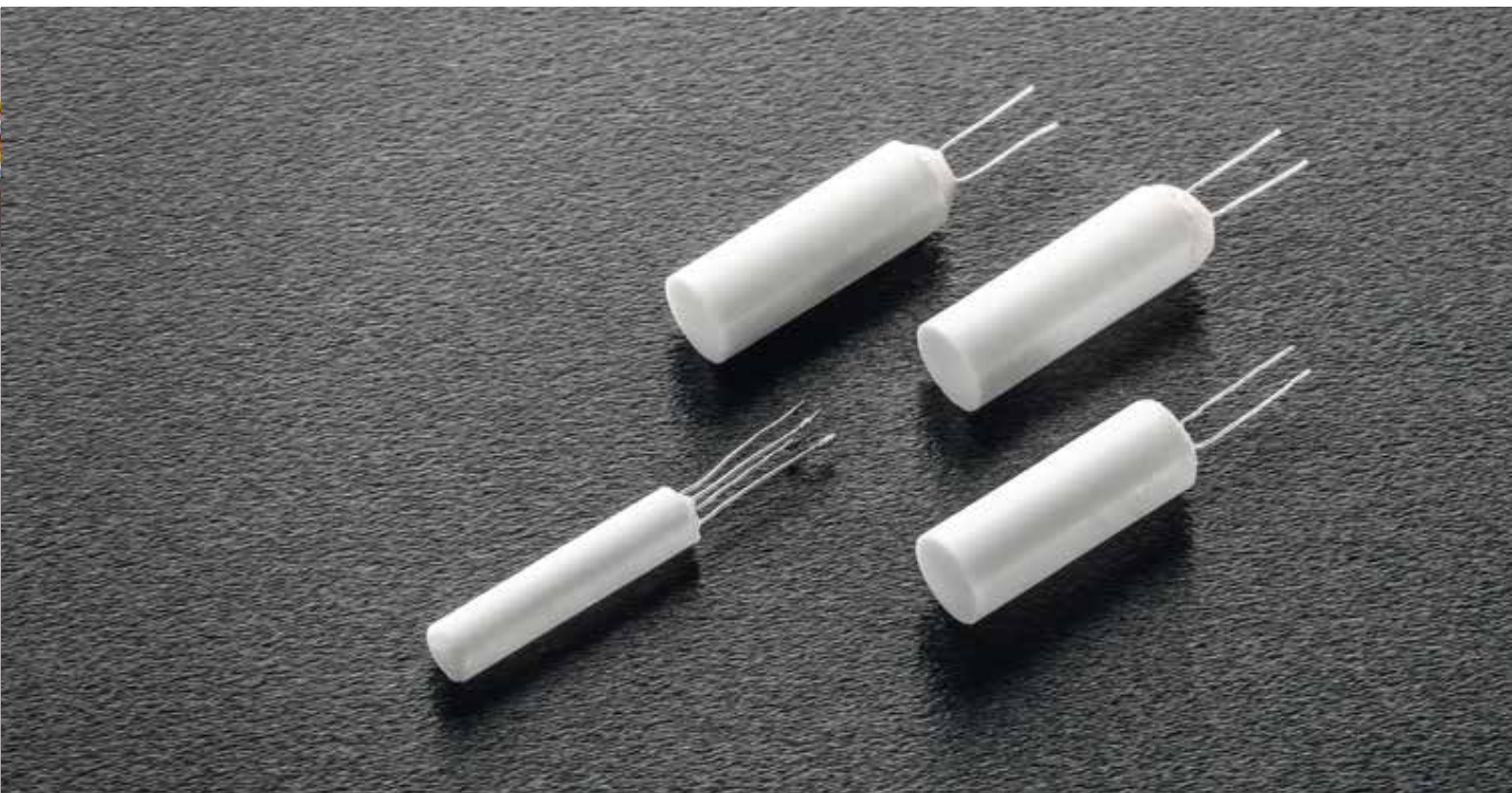
Other dimensions are possible.

CONSTRUCTION AND SPECIFICATION

- Measuring winding on a flexible winding body, silicone rubber casting
- Length x width: eg. 23 mm x 10 mm
- Thickness: in winding area 1 mm otherwise up to 2 mm
- 2-, 3- or 4-wire circuit
- Minimal bend radius about 25 mm
- Temperature range: -70°C ... 200 °C
- Pt 100 acc. to DIN EN 60751
- Connection wire cross section: 0.035 mm²
- Length of connection wires as desired

PLATINUM THIN FILM RTDS

IN A ROUND SHAPE (HOUSED IN CERAMIC TUBE)

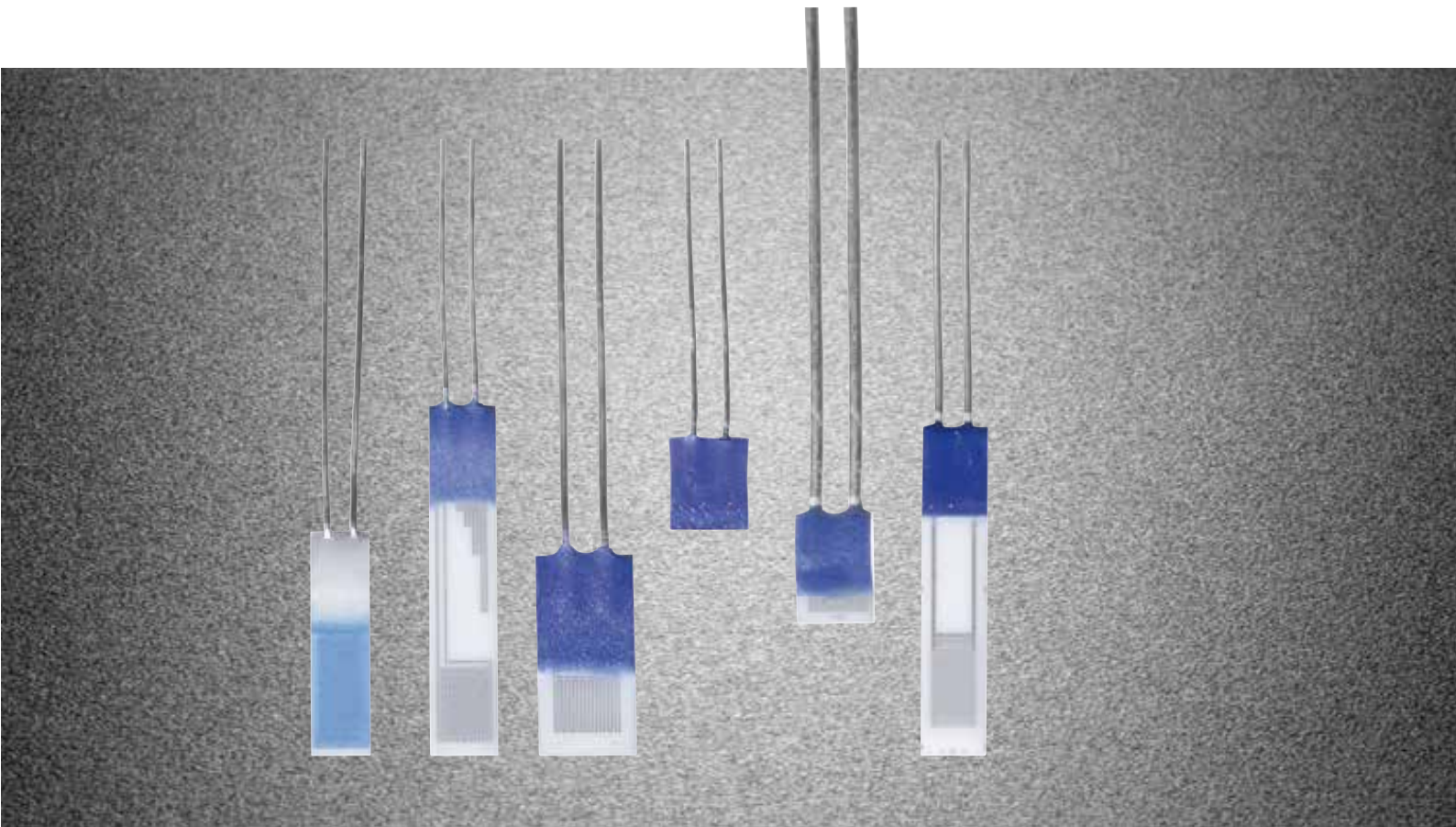


One or two film RTDs are in a ceramic blue embedded in a ceramic substance.

CONSTRUCTION AND SPECIFICATION

- For example $\varnothing 2,8 \times 15 \text{ mm}$, $\varnothing 4,5 \times 15 \text{ mm}$
- Temperature range: $-50^\circ\text{C} \dots +400^\circ\text{C}$ (+ 600°C)
- Characteristics acc. to DIN EN 60751 / tolerance class F 0,3 (K1, B)
- High diameter accuracy

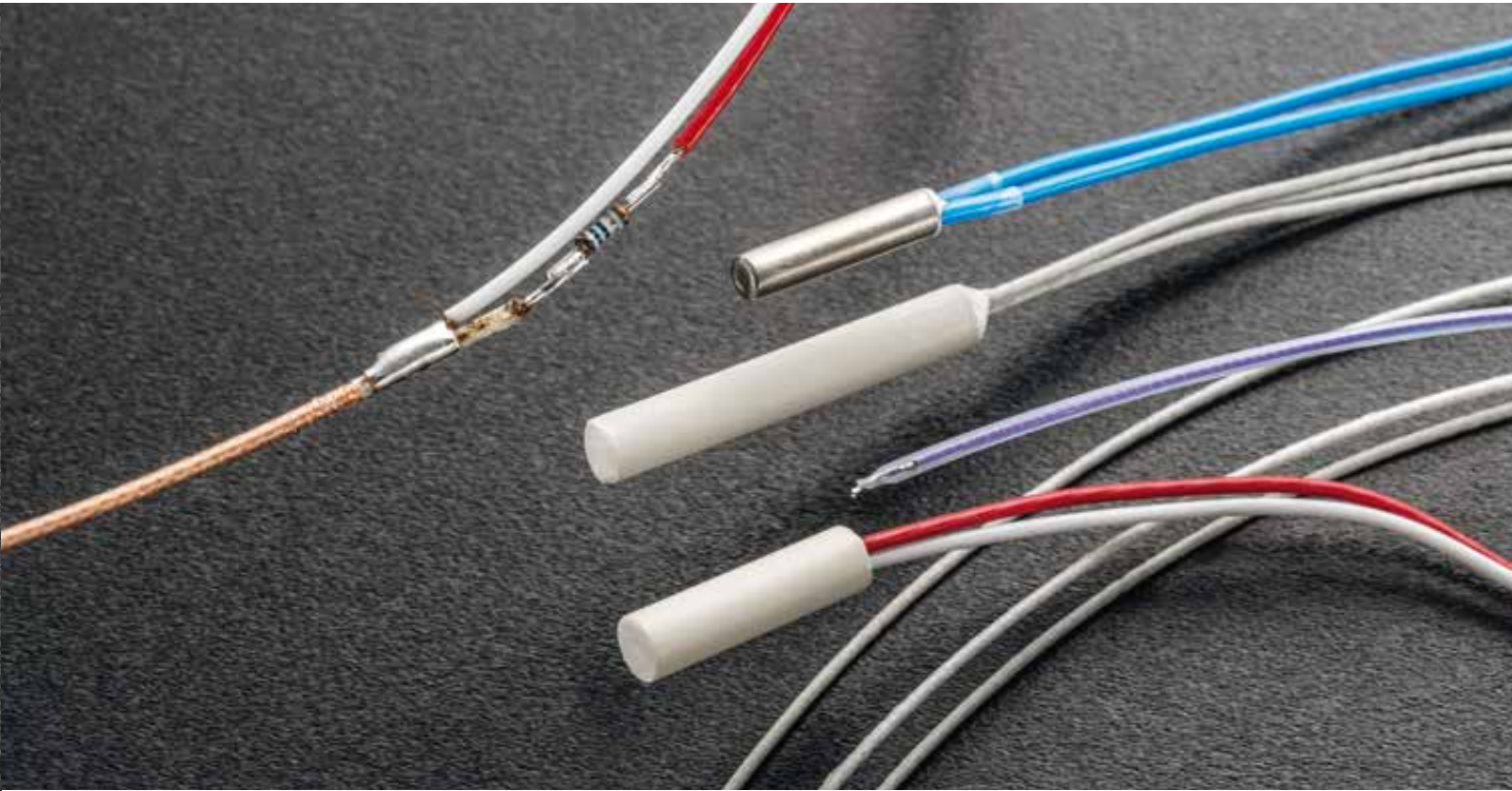
PLATINUM THIN FILM RTDS



RTDs in thin-film technology consist of an Al₂O₃ carrier body which is plated with a thin platinum film. This film is structured by laser or template so the desired nominal resistance is achieved. The platinum film is covered by a protective varnish. The connection consists mostly of Ag Pd and Ni Pt. An additional tensile strength is given by a locking paste. The offered RTDs correspond in their basic values and tolerances to **DIN EN 60751**.

Typ <i>type</i>	Länge <i>length</i> in mm	Breite <i>width</i> in mm	Anschlussdrahtlänge <i>connection wire length</i> in mm	Temperaturbereich <i>Temperature range</i>
C - 1.2 x 1.6	1.2 ±0.2	1.6 ±0.15	10	–50 °C ... +400 °C
C - 1.2 x 4	1.2 ±0.2	4.0 ±0.15	10	–70 °C ... +600 °C
C - 1.6 x 5	1.6 ±0.2	5.0 ±0.15	10	–50 °C ... +600 °C
C - 2.3 x 2	2.3 ±0.2	2.0 ±0.15	10	–50 °C ... +350 °C
C - 4.0 x 2	5.0 ±0.2	2.0 ±0.15	10	–50 °C ... +750 °C
C - 10 x 2	10.0 ±0.2	2.0 ±0.15	10	–50 °C ... +600 °C

TEMPERATURE RTDS



Continuous bifilar measuring winding with teflon shrunk-on hose
temperature range from -40°C ... $+250^{\circ}\text{C}$.

Potted RTDs can be made with the exception of the usual 10 mm
wires, even with stranded wires.

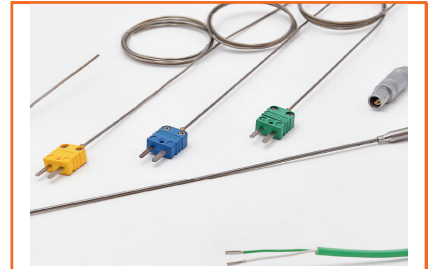
	Nennwiderstand in Ohm <i>nominal resistance in ohm</i>	Maße in mm <i>dimension in mm</i>
Nickelmesswiderstände Typenreihe S <i>Nickel RTDs type series S</i>	Ni 100	Ø 3x30; Ø 4x15
	2xNi 100	Ø 5x30; Ø 5x60
	Ni 120	Ø 5x30; Ø 5x60
	Ni 500/23 °C	Ø 4x15; Ø 5x30
	Ni 1000	Ø 4x15; Ø 5x60
Kupfermesswiderstände <i>Copper RTDs</i>	Cu 53	Ø 3x30
	Cu 250	Ø 5x30
	Cu 10/25 °C	Ø 4x15
	2xCu 56/25 °C	Ø 4x15



FØDEVARER INDUSTRI



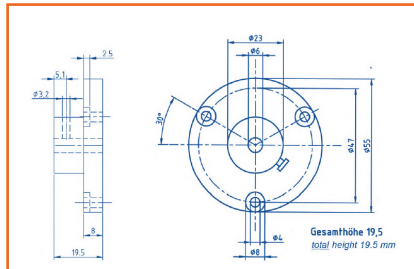
MODSTANDSFØLERE



TERMOFØLERE



ATEX TEMPERATURFØLERE



TILBEHØR



TEMPERATURFØLERE

AUTOMATIK



HVAC & BYGNINGS-AUTOMATIK



KØLEPROFILER



Ove Jensens Alle 35 F
DK-8700 Horsens
Denmark
www.newtronic.eu
www.newtronic.dk
+45 7669 7090