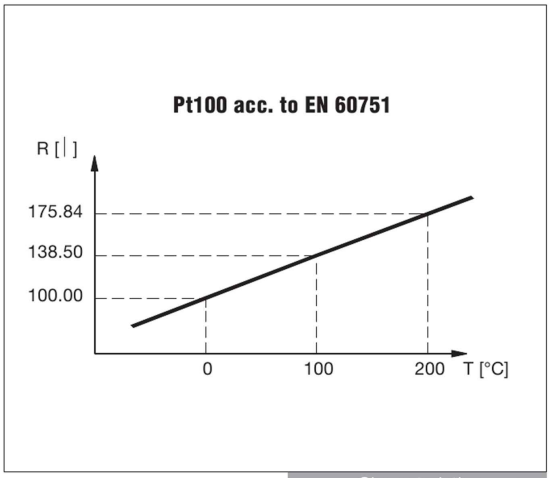
Pt100 Temperature sensors
for winding installation



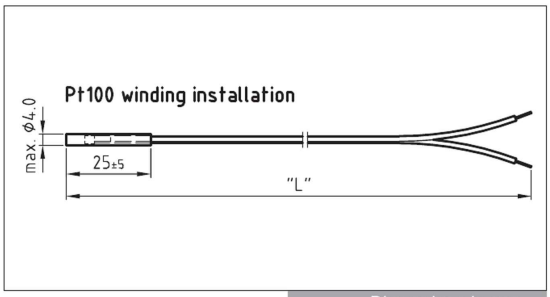
Characteristic curve

Application:

The sensors are used for measuring temperature primarily in windings of electric motors, generators and transformers. They are available in 2-wire, 3-wire and optionally in 4-wire technology. Together with appropriate control unit they provide protection against overheating or transfer and document the actual temperature value. The very low dimensions guarantee fast thermal response behaviour.

Functional description:

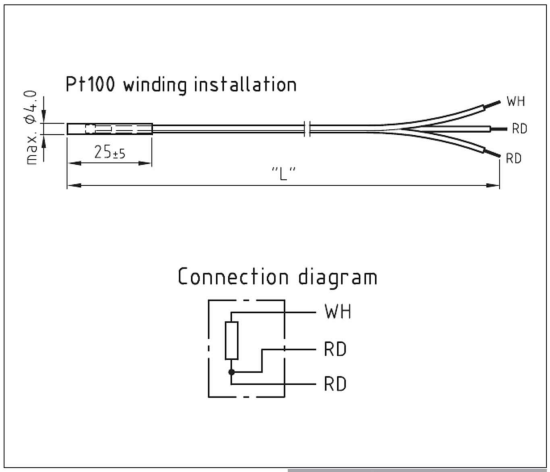
The function of the Pt temperature sensors is based on the temperature-dependent change in the electrical platinum metal resistor. The constants are defined in the international standards for Pt temperature sensors. The characteristic is almost linear and standardised according to EN 60751, this has the advantage of a standardised signal evaluation. In addition to the well-known strengths of the Pt temperature sensors with respect to long-term stability, interchangeability and accuracy, they are distinguished above all by extremely low space requirements.



Dimensions in mm

Technical data Pt100 acc. to EN 60751 Class B (sensor in installed state)

Recommended measuring current for self-heating < 0.1K	DC 1...3mA
Sensor resistance at 0°C	100 Ω ± 0.1 Ω
Change in resistance 0...100°C	0.385 Ω/K
Application temperature	-50...+200°C
Connection	PTFE-strand 0.14mm² (AWG 26)
Insulation test voltage U_{is}	AC 2.5kV
Protection class acc. to EN 60529	IP54
Bending radius	> 25mm



Dimensions in mm

Ordering information

2-wire Pt100 temperature sensor, tinned wire ends	
L = 500mm ± 10mm	**02 D 582 S21**
L = 1m ± 10mm	**02 D 582 S22**
L = 1.5m ± 20mm	**02 D 582**
L = 2m ± 20mm	**02 D 582 S23**

Ordering information

3-wire Pt100 temperature sensor, tinned wire ends	
L = 500mm ± 10mm	**02 D 583 S21**
L = 1m ± 10mm	**02 D 583 S22**
L = 1.5m ± 20mm	**02 D 583**
L = 2m ± 20mm	**02 D 583 S23**

Special designs on request

Subject to technical modifications without notice

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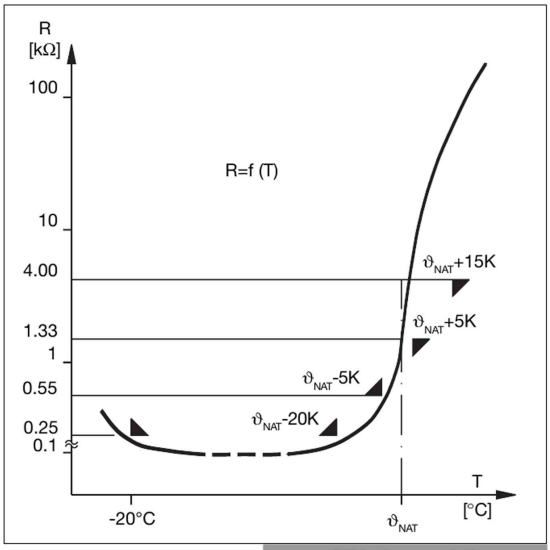
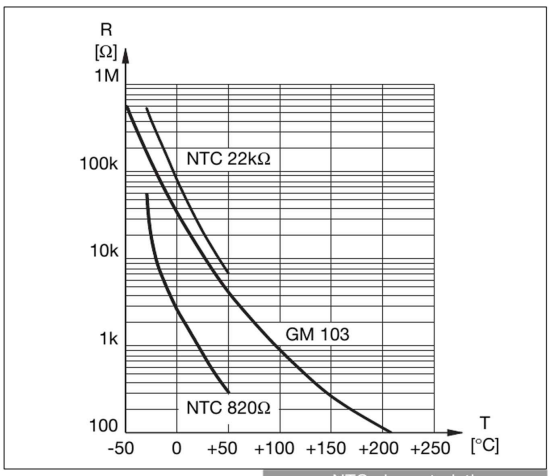
Temperature sensors

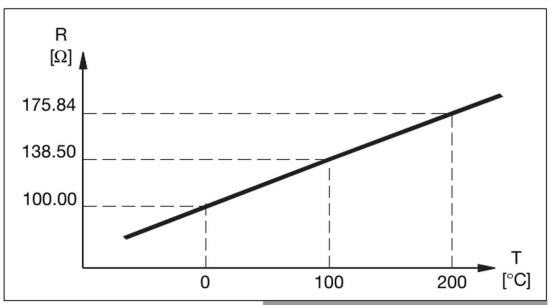
PTC, NTC, Pt100 (special designs of all sensors on request)



PTC characteristic curve acc. to DIN 44081/082



NTC characteristic curve



Pt100 characteristic curve acc. to EN 60751

Application:

PTC, NTC and Pt100 sensors are used for measuring the temperature of machines and installations. Due to the constructive design the thermal response times is short and the sensors can be easily built in.

General information on PTC thermistors:

PTC thermistors acc. to DIN 44081 (triple sensors acc. to DIN 44082) are used to protect electrical machines against thermal overload. The DIN standards ensure interchangeability. The temperature range is from 60 to 190°C. PTC thermistor beads with different rated response temperatures can be connected in series. This permits an optimal and economic thermal protection of machines and windings with different limit temperatures.

Technical data PTC

	single	triple	
Max. operating voltage	30	30	V
Rated response temperature	see ordering information		°C
Tolerance from ϑ_{NAT}	± 5	± 5	K
Reproducibility from ϑ_{NAT}	± 0.5	± 0.5	K
Resistance R_{25}	≤ 100	≤ 300	Ω
Resistance with a sensor-temperature of ϑ_{NAT} -5K	≤ 550	≤ 1650	Ω
Resistance with a sensor-temperature of ϑ_{NAT} +5K	≥ 1330	≥ 3990	Ω
Resistance with a sensor-temperature of ϑ_{NAT} +15K	≥ 4	≥ 12	kΩ
Thermal response time t_a	≤ 5	≤ 5	s
Insulation test voltage U_{is}	AC 2.5	AC 2.5	kV
Max. operating temperature	200	200	°C
Max. storage temperature	160	160	°C
Min. storage temperature	-25	-25	°C
Weight	2	3.5	g

Technical data Pt100 acc. to EN 60751 class B (built-in sensor)

Recommended max. meas. current for heat coefficient < 0.1K	DC 1...3mA
Heating coefficient	10mΩ/K
Sensor resistance at 0°C	100Ω ± 0.12Ω
Change of resistance 0...100°C	0.385Ω/K
Insulation test voltage U_{is}	AC 1.5kV

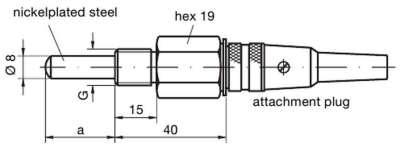
Technical data NTC (built-in sensor)

Resistance R_{25}	820Ω, 22kΩ
Insulation test voltage U_{is}	AC 1.5kV

Subject to technical modifications without notice

Temperature sensors

PTC, NTC, Pt100 (special designs of all sensors on request)

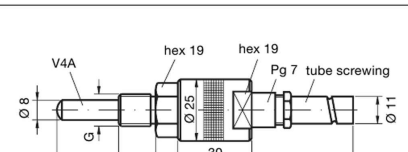


dimensions in mm

Screw-in sensor

Ordering information

Type	A
Protection class acc. to EN 60529	
- Sensor	IP65
- Connection	IP40
Available temperatures	
- PTC min. 60°C, max. 155°C	**02 D 503 S..**
- NTC max. 150°C	**02 D 631 S..**
- Pt100 max. 155°C	**02 A 315**
Thread G	G1/4“
Immersion depth a	15/25/35/40/50

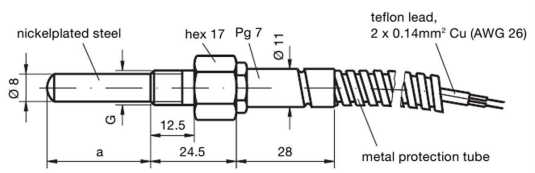


dimensions in mm

Screw-in sensor

Ordering information

Type	B
Protection class acc. to EN 60529	
- Sensor	IP65
- Connection	IP40
Available temperatures	
- PTC min. 60°C, max. 155°C	**02 D 506 S..**
- NTC max. 130°C	**02 D 625 S..**
- Pt100 max. 155°C	**02 A 302**
Thread G	G1/4“,G3/8“,M10,M12,M14x1.5
Immersion depth a	15/20/25/30/35/50

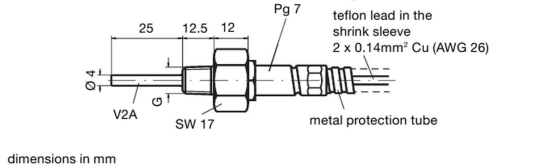


dimensions in mm

Screw-in sensor

Ordering information

Type	D
Protection class acc. to EN 60529	IP65
Available temperatures	
- PTC min. 60°C, max. 155°C	**02 D 508 S..**
- NTC max. 130°C	**02 D 628 S..**
- Pt100 max. 155°C	**02 A 318**
Thread G	G1/8“
Immersion depth a	16/25/35/50



dimensions in mm

Screw-in sensor

Ordering information

Type	K
Protection class acc. to EN 60529	IP65
Available temperatures	
- PTC min. 60°C, max. 155°C	**02 D 513 S..**
- Pt100 max. 155°C (3 wire)	**02 A 319**
Thread G	NPTF 1/8“

Subject to technical modifications without notice

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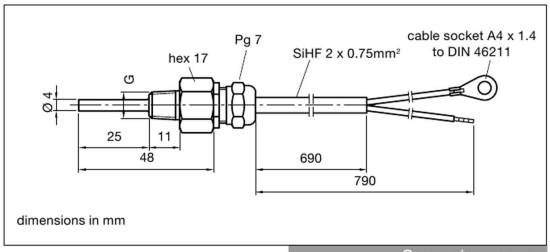
Temperature sensors

PTC, NTC, Pt100 (special designs of all sensors on request)

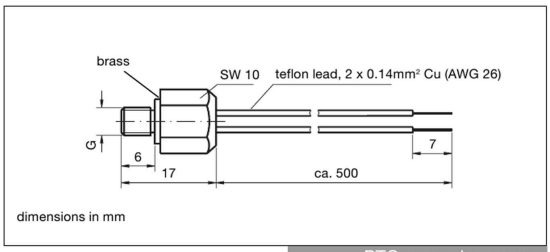


dimensions in mm

Screw-in sensor

Ordering information

Type	K
Protection class acc. to EN 60529	IP67
Available temperatures - PTC min. 60°C, max. 150°C	**02 D 512 S..**
Thread G	NPTF 1/8“

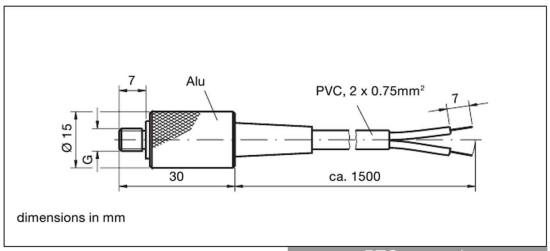


dimensions in mm

PTC screw-in sensor

Ordering information

Type	E
Protection class acc. to EN 60529	IP50
Available temperatures - PTC min. 60°C, max. 155°C	**02 D 295 S..**
Thread G	M5

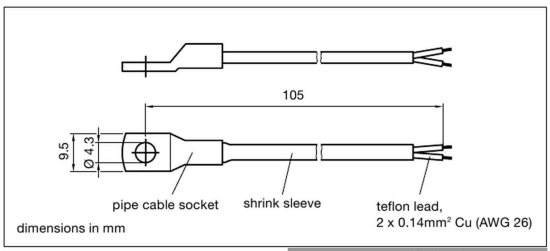


dimensions in mm

PTC screw-in sensor

Ordering information

Type	G
Protection class acc. to EN 60529	IP53
Available temperatures - PTC min. 60°C, max. 120°C	**02 D 510 S..**
Thread G	M6



dimensions in mm

PTC single sensor

Ordering information

Type	-
Protection class acc. to EN 60529	IP54
Available temperatures - PTC min. 60°C, max. 120°C	**01 D 119 S..**

Subject to technical modifications without notice

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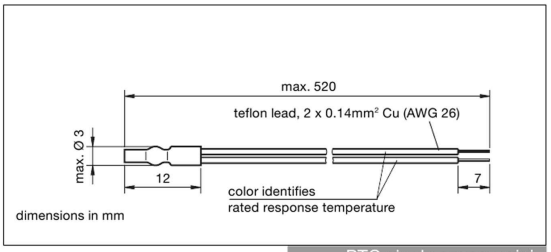
Temperature sensors

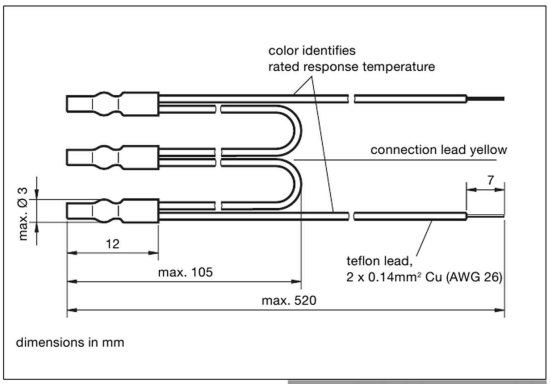
PTC, NTC, Pt100 (special designs of all sensors on request)



PTC single sensor mini

Ordering information

Type	single sensor
Protection class acc. to EN 60529	IP40
Available temperatures - PTC min. 60°C, max. 180°C	**01 D ...**

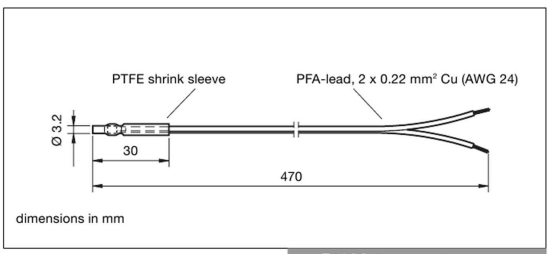


PTC triple sensor mini

Ordering information

Type	triple sensor
Protection class acc. to EN 60529	IP40
Available temperatures - PTC min. 60°C, max. 180°C	**01 D ...**

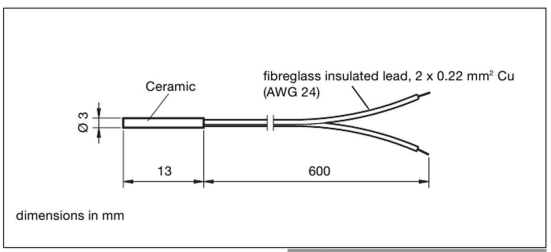
Also available as twin sensor.



Pt100 temperature sensor (hybride, shrinked)

Ordering information

Type	-
Protection class acc. to EN 60529	IP54
Temperature range - Pt100 -40...+260°C	**02 A 333**



Pt100 temperature sensor

Ordering information

Type	-
Protection class acc. to EN 60529	IP50
Temperature range - Pt100 max. 400°C	**EA11000012**

Subject to technical modifications without notice

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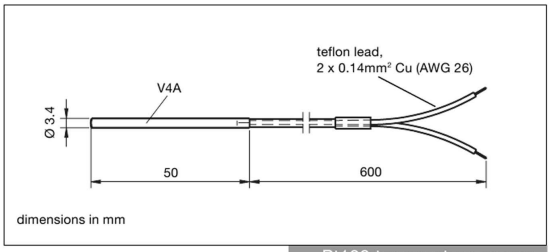
Temperature sensors

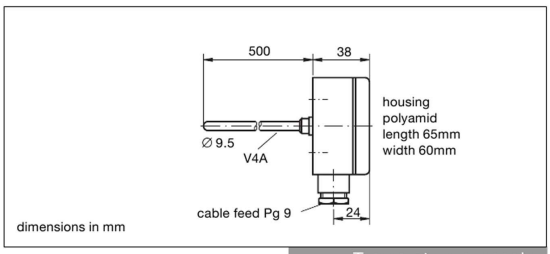
PTC, NTC, Pt100 (special designs of all sensors on request)



Pt100 temperature sensor

Ordering information

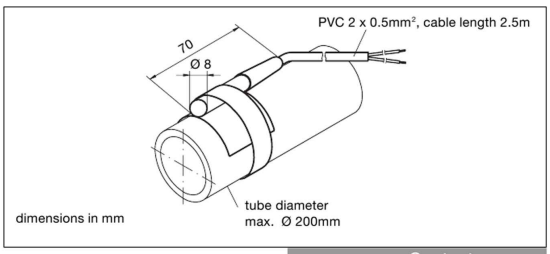
Type	-
Protection class acc. to EN 60529	IP43
Temperature range - Pt100 -50...+220°C	**02 A 309**



Temperature sensor in duct version

Ordering information

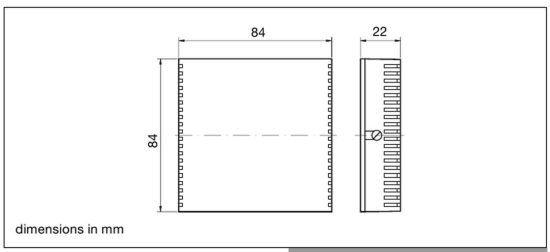
Type	-
Protection class acc. to EN 60529	
- Sensor	IP65
- Housing	IP40
Temperature range - Pt100 -20...+60°C	**02 D 655**



Contact sensor

Ordering information

Type	R
Protection class acc. to EN 60529	IP43
Weight	approx. 100g
Temperature range	
- NTC 820Ω, -20...+80°C	**02 D 637**
- NTC 22kΩ, -20...+80°C	**02 D 646**
- Pt100 -25...+150°C	**02 D 538**



Temperature sensor in a surface mounted housing

Ordering information

Type	H
Protection class acc. to EN 60529	IP20
Weight	approx. 200g
Temperature range	
- NTC 820Ω, -20...+80°C	**02 S 350 S23**
- Pt100 -20...+80°C	**02 D 541**

Subject to technical modifications without notice

KRIWAN

Temperature sensors

PTC, NTC, Pt100 (special designs of all sensors on request)

Testing of the thermal response time t_a of PTC (acc. to DIN 44080):

Temperature sensors of different construction have different response times. In order to compare the trip characteristics, the term "thermal response time t_a" was introduced. The sensor to be tested, initially at room temperature of 25°C ± 1K, is suddenly immersed in an oil bath of a temperature of ϑ_{NAT} + (20 ± 1)K. The immersion depth should be ≥ 50mm, the measuring voltage < DC 2.5V. The time is taken from immersing the sensor into the oil bath to the sensor reaching the corresponding resistance of 1330Ω. The volume of the oil bath to the volume of the sensor to be tested should be at least 1000:1. A homogeneous oil temperature is achieved by using an agitator. Due to the optimal heat transfer between oil and sensor the empirically established thermal response time may be shorter than that encountered in practise.

PTC identification and part numbers

The colour of the connection leads identifies the rated response temperature. DIN 44081/82 defines the following colour code (currently thermistors are available up to 180°C):

rated response temperature in °C	colour code outer / outer connection leads yellow / yellow	mini single sensor acc. to DIN 44081 **Part-No.**	mini triple sensor acc. to DIN 44082 **Part-No.**
60	white / grey	**01 D 116**	**01 D 456**
70	white / brown	**01 D 117**	**01 D 457**
80	white / white	**01 D 118**	**01 D 458**
90	green / green	**01 D 119**	**01 D 459**
100	red / red	**01 D 200**	**01 D 460**
110	brown / brown	**01 D 210**	**01 D 461**
120	grey / grey	**01 D 220**	**01 D 462**
130	blue / blue	**01 D 230**	**01 D 463**
140	white / blue	**01 D 240**	**01 D 468**
145	white / black	**01 D 245**	**01 D 464**
150	black / black	**01 D 250**	**01 D 469**
155	blue / black	**01 D 255**	**01 D 465**
160	blue / red	**01 D 260**	**01 D 470**
170	white / green	**01 D 270**	**01 D 466**
180	white / red	**01 D 280**	**01 D 467**