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Platinum Chip Temperature Sensors with Connection Wires to EN 60 751

- Temperature range from -70 ... +600°C
- Standardized nominal values and tolerances
- Resistance values from 20 ... 5000Ω
- Characteristic curve linearity
- Quick response behavior
- Vibration proof design
- Low price level

Introduction

The platinum chip temperature sensors are part of the category of temperature sensors manufactured in thin film technology. They are produced by JUMO under clean room conditions meeting the latest state-of-the-art. The platinum layer acting as the active layer is applied to a ceramic body in a sputter process and subsequently given a meander-structure in a lithographic process. Precise adjustment is then carried out in a laser trimming process. To protect the sensor against external influences and for insulation purposes, the platinum meander is coated with a special glass layer once the adjustment is completed. The electrical connection is made by connection wires welded onto the contact surfaces. Depending on the version, the connection wires can be of different materials and their length as well as their diameter can vary to a certain extent. An additional glass layer applied to the contact surface fixes the connection wires and also serves as a tension relief.

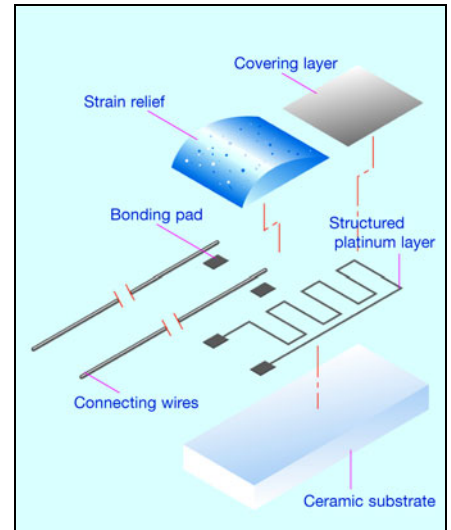
Platinum chip temperature sensors of the PCA design are available from stock in various versions as Pt 100-, Pt 500- or Pt 1000 temperature sensors. Special rated values can be manufactured on request. Platinum chip temperature sensors are also available in small sizes with high ohmic load. Their low deadweight allow very low response times. When installed as fixed units, they also provide excellent vibration resistance. The application temperature depends on the respective version and, in normal cases, ranges between -70 ... +600°C. When accepting certain rated value offsets and/or hysteresis effects occurring within specific limits, these platinum chip temperature sensors can also be used for temperatures well below -70°C.

For most temperature applications required in the market, platinum chip temperature sensors are used as an active component for temperature recording. Typical application fields are as follows: heating engineering, air conditioning technology, ventilation technology, medical and laboratory engineering, white goods, automobiles and commercial vehicles as well as mechanical and industrial engineering.

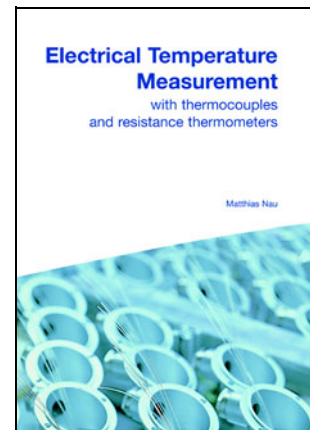
JUMO Platinum Temperature Sensors

| | |
|---|--------------------|
| Structure and application of platinum temperature sensors | Data sheet 90.6000 |
| Platinum glass temperature sensors | Data sheet 90.6021 |
| Platinum ceramic temperature sensors | Data sheet 90.6022 |
| Platinum film temperature sensors | Data sheet 90.6023 |
| Platinum glass temperature sensors with glass extension | Data sheet 90.6024 |
| Platinum chip temperature sensors with connection wires | Data sheet 90.6121 |
| Platinum chip temperature sensors on epoxy PCB | Data sheet 90.6122 |
| Platinum chip temperature sensors with connection terminals | Data sheet 90.6123 |
| Platinum chip temperature sensors of circular design | Data sheet 90.6124 |
| Platinum chip temperature sensors of SMD design | Data sheet 90.6125 |

PCA design



References



The revised version of this book was reviewed due to changed standards and further developments. The principle of the internationally approved "Guide of the expression of uncertainty in measurement" (abbreviated: GUM) ISO guide is particularly conveyed by the new chapter "Measurement uncertainty". Furthermore, a chapter concerning explosion protection for thermometers was amended with regard to the European Directive 94/9/EC in effect from the 1st of July, 2003.

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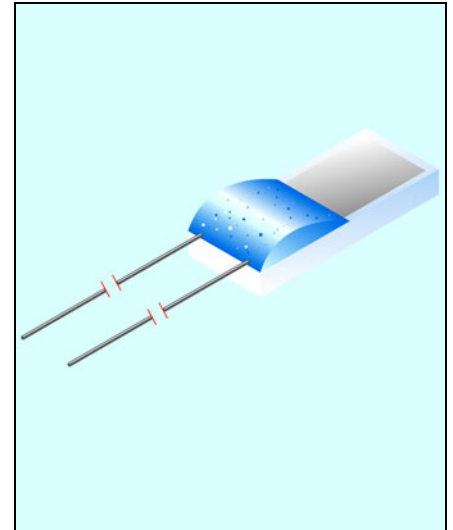


Platinum Chip Temperature Sensors with Connection Wires to EN 60 751

PCA/L design

Brief description

The platinum chip temperature sensors are based on a temperature-depending resistor, the course and admissible tolerance of which are defined in the international standard EN 60 751. They combine the favorable properties of a platinum temperature sensor with the advantages of large-scale production. They are characterized by standardization and universal interchangeability as well as high measuring accuracy, excellent long-term stability and good reproducibility of the electric properties. Large quantities required led to a notable price reduction over the last few years. For this reason, platinum chip temperature sensors are also a real alternative to the thermistors based on the semi-conductor technique. Platinum chip temperature sensors, version "L", are preferably used for the assembly of various sensors and connection cables. They are particularly suitable for soft-soldering connection. The connection wires are of pure silver and optimal for this type of connection. For this reason, the application temperature range is designed for -70 ... +250°C. The maximum temperature, however, is +350°C to allow further applications.



Temperature sensors in blister belt and bag packaging

| Temperature sensor | | | | | | Connection wire | | | | Sales No. for tolerance class | | |
|--------------------|-------------------|-----|----|-----|------|-----------------|-----------|----|-------------------------|-------------------------------|------------------------------|------------------------------|
| Type | R ₀ /Ω | B | L | H | S | Material | Dim. | L1 | R _L in mΩ/mm | 1/3 DIN B | A | B |
| PCA 1.2005.1L | 1x100 | 2.0 | 5 | 1.3 | 0.64 | Ag | 0.2 x 0.3 | 10 | 0.3 | 90/00063358T 90/00415828B | 90/00417995T 90/00415827B | 90/00063260T 90/00415826B |
| PCA 1.2005.5L | 1x500 | 2.0 | 5 | 1.3 | 0.64 | Ag | 0.2 x 0.3 | 10 | 0.3 | 90/00063359T 90/00415831B | 90/00417996T 90/00415830B | 90/00063261T 90/00415829B |
| PCA 1.2005.10L | 1x1000 | 2.0 | 5 | 1.3 | 0.64 | Ag | 0.2 x 0.3 | 15 | 0.3 | upon request | upon request | 90/00464605 |
| PCA 1.2010.1L | 1x100 | 2.0 | 10 | 1.3 | 0.64 | Ag | 0.2 x 0.3 | 10 | 0.3 | 90/00047408T 90/00415819B | 90/00062559T 90/00415818B | 90/00044789T 90/00415817B |
| PCA 1.2010.1L | 1x100 | 2.0 | 10 | 1.3 | 0.64 | Ag | 0.2 x 0.3 | 30 | 0.3 | upon request | upon request | 90/00323380T |
| PCA 1.2010.5L | 1x500 | 2.0 | 10 | 1.3 | 0.64 | Ag | 0.2 x 0.3 | 10 | 0.3 | - | - | - |
| PCA 1.2010.10L | 1x1000 | 2.0 | 10 | 1.3 | 0.64 | Ag | 0.2 x 0.3 | 10 | 0.3 | 90/00049133T 90/00415822B | upon request 90/00415821B | 90/00048147T 90/00415820B |
| PCA 1.2010.50L | 1x5000 | 2.0 | 10 | 1.3 | 0.64 | Ag | 0.2 x 0.3 | 10 | 0.3 | 90/00062567T 90/00415825B | 90/00062566T 90/00415824B | 90/00062565T 90/00415823B |
| | | | | | | | | | | upon request upon request | upon request upon request | 90/00430080T 90/00430081B |

Dimension tolerances: ΔB = ±0.2 / ΔL = ±0.5 / ΔH = ±0.2 / ΔS = ±0.1 / ΔDim. = approx. dimensions / ΔL1 = ±0.5 dimension specifications in mm.

for the definition of the tolerance classes, see data sheet 90.6000 „T“ = Bag, „B“ = Blister belt

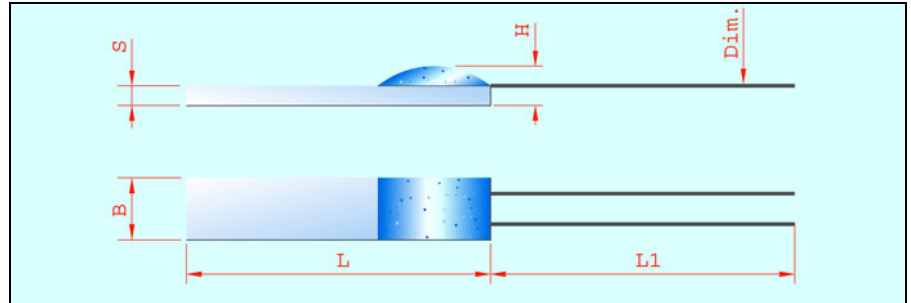
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Dimensional drawing



Technical data

| | |
|---|--|
| Standard | IEC 60 751/EN 60 751 |
| Temperature coefficient | $\alpha = 3.850 \times 10^{-3} \text{ } ^\circ\text{C}^{-1}$ (between 0 and 100 °C) |
| Temperature range | -70 ... +250 °C (+350 °C) |
| Tolerance | Temperature validity range, class 1/3 DIN B: -50 ... +200 °C Temperature validity range, class A: -70 ... +300 °C Temperature validity range, class B: -70 ... +350 °C The sensors also comply with the "new" classification F0.1, F0.15 and F0.3 |
| Measured current/maximum current | Pt 100 recommended 1.0 mA maximum 7 mA Pt 500 recommended 0.7 mA maximum 3 mA Pt 1000 recommended 0.1 mA maximum 1 mA Pt 5000 recommended 0.1 mA maximum 1 mA |
| Application conditions | Platinum chip temperature sensors must be protected when used in a humid environment or in aggressive atmospheres. Direct immersion into fluids is also not permitted. The user should check the conditions, prior to using the sensors. Please also refer to the installation instructions B 90.6121.4 "Information about the application of platinum chip temperature sensors." |
| Connecting wires | These temperature sensors are equipped with connection wires made of pure silver. The connection wires are particularly suitable for soft-soldering connections. For further assembly, avoid lateral pressure load acting on the connections. Ensure that the horizontal pull on individual wires does not exceed 5N. Avoid unnecessary bending of the connection wires because this will weaken the material and lead to cable breakage. Please also refer to point 3 "Connection techniques" in our installation instructions. Longer connection wires up to a length of 300mm (in one piece) can be optionally fitted. On request, as an alternative, extensions in any lengths or insulated strands can also be retrofitted. |
| Measuring point | The specified rated value is related to the standard connection wire length L1. The measured value is taken 2 mm in front of the open wire end. Wire length extensions could lead to resistance changes as a result of which the tolerance class can no longer be met. |
| Long-term stability | max. R ₀ drift 0.05 %/Year (for definition, see data sheet 90.6000) |
| Low-temperature application | Taking an occurring rated value drift and hysteresis effect within certain limits into account, temperature measurements are also possible up to -200 °C. Further details are available on request. |
| Insulating resistance | >10MΩ at room temperature |
| Vibration proof design | see EN 60 751, section 4.4.2 |
| Self-heating | $\Delta t = I^2 \times R \times E$ (for the definition, see data sheet 90.6000) |
| Packaging | Blister belt/bag |
| Storage | In their (standard) belt packaging, JUMO temperature sensors of the PCA/L design can be stored for at least 12 months under normal ambient conditions. Storage in an aggressive atmosphere or in corroding media as well as under high air humidity is not permitted. Due to the fact that the connection wires of this version are made of pure silver, the shelf life can be considerably extended when stored in an air-tight packaging and in a dark environment. Otherwise, silver tends to oxidize making soldering more difficult. |
| RoHS conforming | Yes |
| REACH conforming | Yes |

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Self-heating coefficients and response times

| Type | Self-heating coefficient E in K/mW | | Response times in seconds | | | |
|----------------|------------------------------------|----------------------|---------------------------|------------------|-----------------------|------------------|
| | in water (v = 0.2m/s) | in air (v = 2m/s) | in water (v = 0.4m/s) | | in air (v = 1 m/s) | |
| | | | t _{0.5} | t _{0.9} | t _{0.5} | t _{0.9} |
| PCA 1.2005.1L | 0.02 | 0.2 | 0.1 | 0.3 | 4 | 16 |
| PCA 1.2005.5L | 0.02 | 0.2 | 0.1 | 0.3 | 4 | 16 |
| PCA 1.2010.1L | 0.02 | 0.2 | 0.3 | 0.3 | 7 | 22 |
| PCA 1.2010.5L | 0.01 | 0.2 | 0.3 | 0.5 | 7 | 22 |
| PCA 1.2010.10L | 0.01 | 0.2 | 0.3 | 0.5 | 7 | 22 |
| PCA 1.2010.50L | 0.01 | 0.2 | 0.3 | 0.5 | 7 | 22 |

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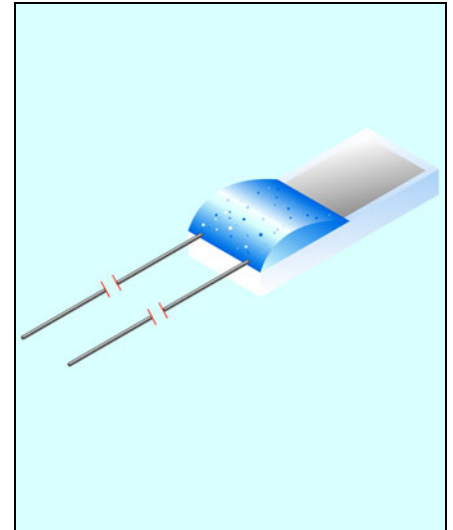


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PCA/S design

Brief description

The platinum chip temperature sensors are based on a temperature-depending resistor, the course and admissible tolerance of which are defined in the international standard EN 60 751. They combine the favorable properties of a platinum temperature sensor with the advantages of large-scale production. They are characterized by standardization and universal interchangeability as well as high measuring accuracy, excellent long-term stability and good reproducibility of the electric properties. Large quantities required led to a notable price reduction over the last few years. For this reason, platinum chip temperature sensors are also a real alternative to the thermistors based on the semi-conductor technique. Platinum chip temperature sensors, version "S", are preferably used for application temperatures exceeding 180°C. They are particularly suitable for welded, crimp or brazing connections. The connection wires are made of solid platinum wrapped wire and feature high stability. The application temperature range is between -70 ... +400°C.



Temperature sensors in blister belt and bag packaging

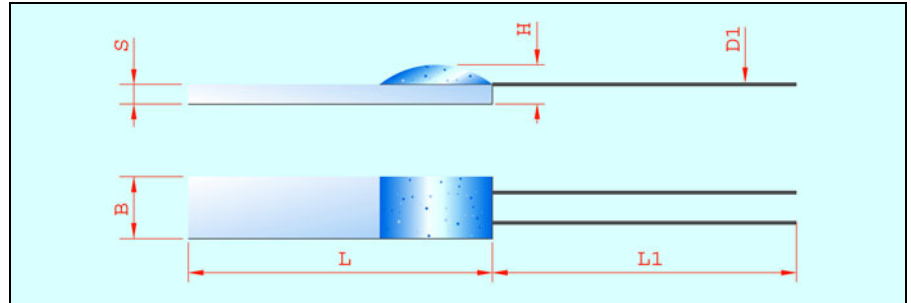
| Type | Temperature sensor | | | | | Connection wire | | | | Sales No. for tolerance class | | |
|----------------|--------------------|-----|-----|-----|------|-----------------|------|----|-------------|-------------------------------|------------------------------|------------------------------|
| | R0/W | B | L | H | S | Material | D1 | L1 | RL in mW/mm | 1/3 DIN B | A | B |
| PCA 1.2003.1S | 1x100 | 2.0 | 2.5 | 1.3 | 0.64 | Pt-Ni | 0.20 | 10 | 2.8 | 90/00358368T 90/00415816B | 90/00358365T 90/00415815B | 90/00358363T 90/00415811B |
| PCA 1.2005.1S | 1x100 | 2.0 | 5 | 1.3 | 0.64 | Pt-Ni | 0.20 | 10 | 2.8 | 90/00309664T 90/00415804B | 90/00089225T 90/00415803B | 90/00089206T 90/00415801B |
| PCA 1.2005.1S | 1x100 | 2.0 | 5 | 1.3 | 0.64 | Pt-Ni | 0.20 | 20 | 2.8 | 90/00364145T - | upon request - | 90/00357968T - |
| PCA 1.2005.5S | 1x500 | 2.0 | 5 | 1.3 | 0.64 | Pt-Ni | 0.20 | 10 | 2.8 | 90/00309666T 90/00415807B | 90/00089226T 90/00415806B | 90/00089207T 90/00415805B |
| PCA 1.2005.5S | 1x500 | 2.0 | 5 | 1.3 | 0.64 | Pt-Ni | 0.20 | 20 | 2.8 | 90/00364146T - | upon request - | 90/00357969T - |
| PCA 1.2005.10S | 1x1000 | 2.0 | 5 | 1.3 | 0.64 | Pt-Ni | 0.20 | 10 | 2.8 | 90/00358360T 90/00415810B | 90/00358359T 90/00415809B | 90/00358358T 90/00415808B |
| PCA 1.2005.10S | 1x1000 | 2.0 | 5 | 1.3 | 0.64 | Pt-Ni | 0.20 | 20 | 2.8 | upon request - | upon request - | 90/00358285T - |
| PCA 1.2010.1S | 1x100 | 2.0 | 10 | 1.3 | 0.64 | Pt-Ni | 0.20 | 10 | 2.8 | 90/00309674T 90/00415794B | 90/00089222T 90/00415793B | 90/00089203T 90/00415792B |
| PCA 1.2010.1S | 1x100 | 2.0 | 10 | 1.3 | 0.64 | Pt-Ni | 0.20 | 20 | 2.8 | upon request - | upon request - | 90/00067265T - |
| PCA 1.2010.5S | 1x500 | 2.0 | 10 | 1.3 | 0.64 | Pt-Ni | 0.20 | 10 | 2.8 | 90/00309676T 90/00415797B | 90/00089223T 90/00415796B | 90/00089204T 90/00415795B |
| PCA 1.2010.10S | 1x1000 | 2.0 | 10 | 1.3 | 0.64 | Pt-Ni | 0.20 | 10 | 2.8 | 90/00309681T 90/00415800B | 90/00089224T 90/00415799B | 90/00089205T 90/00415798B |
| PCA 1.2010.20S | 1x2000 | 2.0 | 10 | 1.3 | 0.64 | Pt-Ni | 0.20 | 10 | 2.8 | upon request upon request | upon request upon request | 90/00417435T 90/00417434B |
| PCA 1.2010.50S | 1x5000 | 2.0 | 10 | 1.3 | 0.64 | Pt-Ni | 0.20 | 10 | 2.8 | upon request upon request | upon request upon request | 90/00430079T 90/00430075B |

Dimension tolerances: $\Delta B = \pm 0.2$ / $\Delta L = \pm 0.5$ / $\Delta H = \pm 0.2$ / $\Delta S = \pm 0.1$ / $\Delta D1 = \pm 0.01$ / $\Delta L1 = \pm 0.5$
 dimension specifications in mm.

for the definition of the tolerance classes, see data sheet 90.6000
 „T“ = Bag, „B“ = Blister belt



Dimensional drawing



Technical data

| | | |
|---|---|---------------------------------|
| Standard | IEC 60 751/EN 60 751 | |
| Temperature coefficient | $\alpha = 3.850 \times 10^{-3} \text{ } ^\circ\text{C}^{-1}$ (between 0 and 100 °C) | |
| Temperature range | -70 ... +400 °C | |
| Tolerance | Temperature validity range, class 1/3 DIN B: | -50 ... +200 °C |
| | Temperature validity range, class A: | -70 ... +300 °C |
| | Temperature validity range, class B: | -70 ... +400 °C |
| | The sensors also comply with the "new" classification F0.1, F0.15 and F0.3 | |
| Measured current/maximum current | Pt 100 | recommended 1.0 mA maximum 7 mA |
| | Pt 500 | recommended 0.7 mA maximum 3 mA |
| | Pt 1000 | recommended 0.1 mA maximum 1 mA |
| | Pt 2000 | recommended 0.1 mA maximum 1 mA |
| | Pt 5000 | recommended 0.1 mA maximum 1 mA |
| Application conditions | Platinum chip temperature sensors must be protected when used in a humid environment or in aggressive atmospheres. Direct immersion into fluids is also not permitted. The user should check the conditions, prior to using the sensors. Please also refer to the installation instructions B 90.6121.4 "Information for the application of platinum chip temperature sensors." | |
| Connecting wires | These temperature sensors are equipped with connection wires made of a platinum wrapped wire with a nickel core. The connection wires are suitable for crimp, welded and brazing connections. For further assembly, avoid lateral pressure load acting on the connections. Ensure that the horizontal pull on individual wires does not exceed 10N. Avoid unnecessary bending of the connection wires because this will weaken the material and lead to cable breakage. Please also refer to point 3 "Connection techniques" in our installation instructions. Longer connection wires up to a length of 300mm (in one piece) can be optionally fitted. Extension wires made of silver or insulated strands in any lengths can also be retrofitted as an alternative. In this case, however, take into account that this may result in restrictions concerning the application temperature. | |
| Measuring point | The specified rated value is related to the standard connection wire length L1. The measured value is taken 2 mm in front of the open wire end. Wire length extensions could lead to resistance changes as a result of which the tolerance class can no longer be met. | |
| Long-term stability | max. R_0 drift 0.05 %/Year (for definition, see data sheet 90.6000) | |
| Low-temperature application | Taking an occurring rated value drift and hysteresis effect within certain limits into account, temperature measurements are also possible up to -200 °C. Further details are available on request. | |
| Insulating resistance | >10M Ω at room temperature | |
| Vibration proof design | see EN 60 751, section 4.4.2 | |
| Self-heating | $\Delta t = I^2 \times R \times E$ (for the definition, see data sheet 90.6000) | |
| Packaging | Blister belt/bag | |
| Storage | In their (standard) belt packaging, JUMO temperature sensors of the PCA/S design can be stored for at least 12 months under normal ambient conditions. Storage in an aggressive atmosphere or in corroding media as well as under high air humidity is not permitted. | |
| RoHS conforming | Yes | |
| REACH conforming | Yes | |

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Self-heating coefficients and response times

| Type | Self-heating coefficient E in K/mW | | Response time in seconds | | | |
|----------------|------------------------------------|----------------------|--------------------------|------------------|-----------------------|------------------|
| | in water (v = 0.2m/s) | in air (v = 2m/s) | in water (v = 0.4m/s) | | in air (v = 1 m/s) | |
| | | | t _{0.5} | t _{0.9} | t _{0.5} | t _{0.9} |
| PCA 1.2003.1S | 0.02 | 0.2 | 0.1 | 0.3 | 3 | 9 |
| PCA 1.2005.1S | 0.02 | 0.2 | 0.1 | 0.3 | 3 | 9 |
| PCA 1.2005.5S | 0.02 | 0.2 | 0.1 | 0.3 | 3 | 9 |
| PCA 1.2005.10S | 0.02 | 0.2 | 0.1 | 0.3 | 3 | 9 |
| PCA 1.2010.1S | 0.02 | 0.2 | 0.1 | 0.3 | 3 | 9 |
| PCA 1.2010.5S | 0.01 | 0.2 | 0.2 | 0.4 | 3 | 9 |
| PCA 1.2010.10S | 0.01 | 0.2 | 0.2 | 0.4 | 3 | 9 |
| PCA 1.2010.20S | 0.01 | 0.2 | 0.2 | 0.4 | 3 | 9 |
| PCA 1.2010.50S | 0.01 | 0.2 | 0.2 | 0.4 | 3 | 9 |

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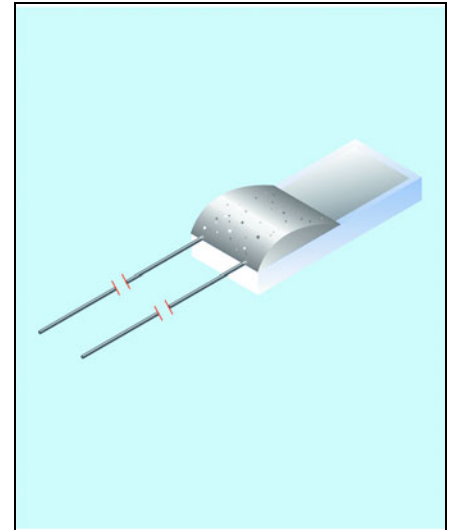
Platinum Chip Temperature Sensors with Connection Wires to EN 60 751

PCA/M design

Brief description

The platinum chip temperature sensors are based on a temperature-depending resistor, the course and admissible tolerance of which are defined in the international standard EN 60 751. They combine the favorable properties of a platinum temperature sensor with the advantages of large-scale production. They are characterized by standardization and universal interchangeability as well as high measuring accuracy, excellent long-term stability and good reproducibility of the electric properties. Large quantities required led to a notable price reduction over the last few years. For this reason, platinum chip temperature sensors are also a real alternative to the thermistors based on the semi-conductor technique.

Platinum chip temperature sensors, version "M", offer ultimate application possibilities. The temperature sensors feature a particularly wide temperature measurement range from -70 to +550°C. A wide range of different versions is already available on stock. Available miniature versions can also facilitate the assembly where only little space is available. A special coating method used for this version and allowing the unprotected application in humid ambient air is advantageous. Typical application examples include the air conditioning technology and the industrial humidity measuring technology.



Temperature sensors in blister belt and bag packaging

| Type | Temperature sensor | | | | | Connection wire | | | Sales No. for tolerance class | | | |
|----------------|--------------------|-----|-----|-----|------|-----------------|------|----|-------------------------------|------------------------------|------------------------------|------------------------------|
| | R ₀ /Ω | B | L | H | S | Material | D1 | L1 | R _L in mΩ/mm | 1/3 DIN B | A | B |
| PCA 1.1505.1M | 1x100 | 1.5 | 5 | 1.0 | 0.38 | Pt-Ni | 0.20 | 10 | 2.8 | 90/00409843T 90/00417179B | 90/00409841T 90/00417177B | 90/00409840T 90/00417178B |
| PCA 1.1505.1M | 1x100 | 1.5 | 5 | 1.0 | 0.38 | Pt-Ni | 0.20 | 15 | 2.8 | 90/00430392T 90/00430396B | 90/00430393T 90/00430394B | 90/00430391T 90/00430395B |
| PCA 1.1505.5M | 1x500 | 1.5 | 5 | 1.0 | 0.38 | Pt-Ni | 0.20 | 10 | 2.8 | 90/00409847T 90/00417185B | 90/00409845T 90/00417183B | 90/00409844T 90/00417184B |
| PCA 1.1505.10M | 1x1000 | 1.5 | 5 | 1.0 | 0.38 | Pt-Ni | 0.20 | 10 | 2.8 | 90/00409850T 90/00417182B | 90/00409849T 90/00417180B | 90/00409848T 90/00417181B |
| PCA 1.1505.10M | 1x1000 | 1.5 | 5 | 1.0 | 0.38 | Pt-Ni | 0.20 | 15 | 2.8 | upon request upon request | upon request upon request | 90/00425409T upon request |
| PCA 1.2003.1M | 1x100 | 2.0 | 2.5 | 1.3 | 0.64 | Pt-Ni | 0.20 | 13 | 2.8 | 90/00412342T 90/00415833B | 90/00412341T 90/00415834B | 90/00412318T 90/00415832B |
| PCA 1.2005.1M | 1x100 | 2.0 | 5 | 1.3 | 0.64 | Pt-Ni | 0.20 | 10 | 2.8 | 90/00387454T 90/00415836B | 90/00387455T 90/00415837B | 90/00387456T 90/00415835B |
| PCA 1.2005.5M | 1x500 | 2.0 | 5 | 1.3 | 0.64 | Pt-Ni | 0.20 | 10 | 2.8 | 90/00387453T 90/00415839B | 90/00387449T 90/00415840B | 90/00387465T 90/00415838B |
| PCA 1.2005.10M | 1x1000 | 2.0 | 5 | 1.3 | 0.64 | Pt-Ni | 0.20 | 10 | 2.8 | 90/00412308T 90/00415842B | 90/00412311T 90/00415843B | 90/00412307T 90/00415841B |
| PCA 1.2010.1M | 1x100 | 2.0 | 10 | 1.3 | 0.64 | Pt-Ni | 0.20 | 10 | 2.8 | 90/00412338T 90/00415845B | 90/00412337T 90/00415846B | 90/00412339T 90/00415844B |
| PCA 1.2010.5M | 1x500 | 2.0 | 10 | 1.3 | 0.64 | Pt-Ni | 0.20 | 10 | 2.8 | upon request upon request | upon request upon request | upon request upon request |
| PCA 1.2010.10M | 1x1000 | 2.0 | 10 | 1.3 | 0.64 | Pt-Ni | 0.20 | 10 | 2.8 | 90/00387458T 90/00415848B | 90/00387459T 90/00415849B | 90/00387460T 90/00415847B |

Dimension tolerances: ΔB = ±0.2 / ΔL = ±0.5 / ΔH = ±0.2 / ΔS = ±0.1 / ΔD1 = ±0.01 / ΔL1 = ±0.5
 dimension specifications in mm.

for the definition of the tolerance classes, see data sheet 90.6000
 „T“ = Bag, „B“ = Blister belt

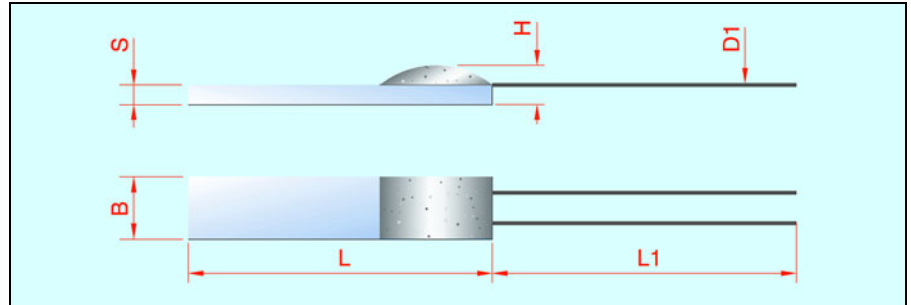
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Dimensional drawing



Technical data

| | |
|---|---|
| Standard | IEC 60 751/EN 60 751 |
| Temperature coefficient | $\alpha = 3.850 \times 10^{-3} \text{ } ^\circ\text{C}^{-1}$ (between 0 and 100 °C) |
| Temperature range | -70 ... +550 °C |
| Tolerance | Temperature validity range, class 1/3 DIN B: -50 ... +200 °C Temperature validity range, class A: -70 ... +300 °C Temperature validity range, class B: -70 ... +550 °C The sensors also comply with the "new" classification F0.1, F0.15 and F0.3 |
| Measured current/maximum current | Pt 100 recommended 1.0mA maximum 7 mA Pt 500 recommended 0.7mA maximum 3 mA Pt 1000 recommended 0.1mA maximum 1 mA |
| Application conditions | Platinum chip temperature sensors in this version must be protected when used in aggressive atmospheres. Direct immersion into fluids is also not permitted. The user should check the conditions, prior to using the sensors. Please also refer to the installation instructions B 90.6121.4 "Information for the application of platinum chip temperature sensors." |
| Connecting wires | These temperature sensors are equipped with connection wires made of a platinum wrapped wire with a nickel core. The connection wires are suitable for crimp, welded and brazing connections. For further assembly, avoid lateral pressure load acting on the connections. Ensure that the horizontal pull on individual wires does not exceed 10N. Avoid unnecessary bending of the connection wires because this will weaken the material and lead to cable breakage. Please also refer to point 3 "Connection techniques" in our installation instructions. Longer connection wires up to a length of 300mm (in one piece) can be optionally fitted. Extension wires made of silver or insulated strands in any lengths can also be retrofitted as an alternative. In this case, however, take into account that this may result in restrictions concerning the application temperature. |
| Measuring point | The specified rated value is related to the standard connection wire length L1. The measured value is taken 2 mm in front of the open wire end. Wire length extensions could lead to resistance changes as a result of which the tolerance class can no longer be met. |
| Long-term stability | max. R ₀ drift 0.05 %/Year (for definition, see data sheet 90.6000) |
| Low-temperature application | Taking an occurring rated value drift and hysteresis effect within certain limits into account, temperature measurements are also possible up to -200 °C. Further details are available on request. |
| Insulating resistance | >10MΩ at room temperature |
| Vibration proof design | see EN 60 751, section 4.4.2 |
| Self-heating | $\Delta t = I^2 \times R \times E$ (for the definition, see data sheet 90.6000) |
| Packaging | Blister belt/bag |
| Storage | In their (standard) belt packaging, JUMO temperature sensors of the PCA/M design can be stored for at least 12 months under normal ambient conditions. Storage in an aggressive atmosphere or in corroding media as well as under high air humidity is not permitted. |
| RoHS conforming | Yes |
| REACH conforming | Yes |

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Self-heating coefficients and response times

| Type | Self-heating coefficient E in K/mW | | Response time in seconds | | | |
|----------------|------------------------------------|----------------------|--------------------------|------------------|-----------------------|------------------|
| | in water (v = 0.2m/s) | in air (v = 2m/s) | in water (v = 0.4m/s) | | in air (v = 1 m/s) | |
| | | | t _{0.5} | t _{0.9} | t _{0.5} | t _{0.9} |
| PCA 1.1505.1M | 0.02 | 0.2 | 0.1 | 0.3 | 3 | 8 |
| PCA 1.1505.5M | 0.02 | 0.2 | 0.1 | 0.3 | 3 | 8 |
| PCA 1.1505.10M | 0.02 | 0.2 | 0.1 | 0.3 | 3 | 8 |
| PCA 1.2003.1M | 0.02 | 0.2 | 0.1 | 0.3 | 3 | 9 |
| PCA 1.2005.1M | 0.02 | 0.2 | 0.1 | 0.3 | 4 | 16 |
| PCA 1.2005.5M | 0.02 | 0.2 | 0.1 | 0.3 | 4 | 16 |
| PCA 1.2005.10M | 0.02 | 0.2 | 0.2 | 0.3 | 4 | 16 |
| PCA 1.2010.1M | 0.02 | 0.2 | 0.3 | 0.5 | 7 | 22 |
| PCA 1.2010.5M | 0.01 | 0.2 | 0.3 | 0.5 | 7 | 22 |
| PCA 1.2010.10M | 0.01 | 0.2 | 0.3 | 0.5 | 7 | 22 |

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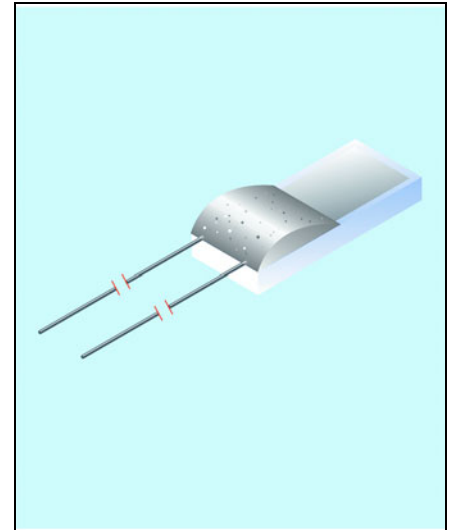
Platinum Chip Temperature Sensors with Connection Wires to EN 60 751

PCA/H design

Brief description

The platinum chip temperature sensors are based on a temperature-depending resistor, the course and admissible tolerance of which are defined in the international standard EN 60 751. They combine the favorable properties of a platinum temperature sensor with the advantages of large-scale production. They are characterized by standardization and universal interchangeability as well as high measuring accuracy, excellent long-term stability and good reproducibility of the electric properties. Large quantities required led to a notable price reduction over the last few years. For this reason, platinum chip temperature sensors are also a real alternative to the thermistors based on the semi-conductor technique.

Platinum chip temperature sensors, version "H", are preferably used for particularly high and permanently higher application temperatures. They are particularly suitable for electrical connections in melting or laser welding method as well as brazing connections. The connection wires are made of pure palladium. The application temperature range is designed from -70° to +600°C.



Temperature sensors in blister belt and bag packaging

| Type | Temperature sensor | | | | | Connection wire | | | | Sales No. for tolerance class | | |
|----------------|--------------------|-----|----|-----|------|-----------------|------|----|-------------------------|-------------------------------|------------------------------|------------------------------|
| | R ₀ /Ω | B | L | H | S | Material | D1 | L1 | R _L in mΩ/mm | 1/3 DIN B | A | B |
| PCA 1.2010.1H | 1x100 | 2.0 | 10 | 1.2 | 0.64 | Pd | 0.25 | 10 | 2.3 | 90/00343070T 90/00415851B | 90/00343069T 90/00415852B | 90/00053198T 90/00415850B |
| PCA 1.2010.5H | 1x500 | 2.0 | 10 | 1.2 | 0.64 | Pd | 0.25 | 10 | 2.3 | upon request upon request | upon request upon request | upon request upon request |
| PCA 1.2010.10H | 1x1000 | 2.0 | 10 | 1.2 | 0.64 | Pd | 0.25 | 10 | 2.3 | 90/00343065T 90/00415855B | 90/00343064T 90/00415856B | 90/00044796T 90/00415854B |

Dimension tolerances: ΔB = ±0.2 / ΔL = ±0.5 / ΔH = ±0.2 / ΔS = ±0.1 / ΔD1 = ±0.01 / ΔL1 = ±0.5
 dimension specifications in mm.

for the definition of the tolerance classes, see data sheet 90.6000
 „T“ = Bag, „B“ = Blister belt

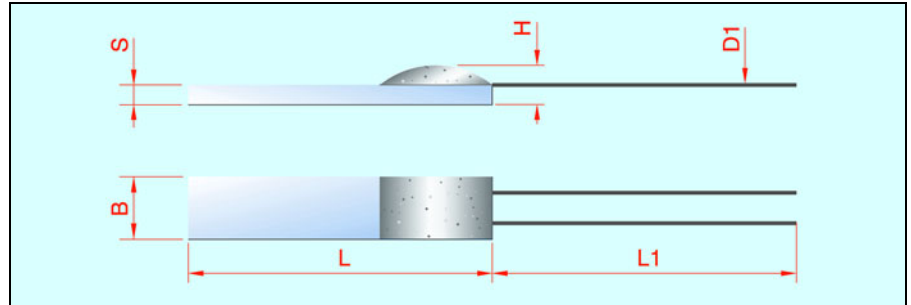
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Dimensional drawing



Technical data

| | |
|---|---|
| Standard | IEC 60 751/EN 60 751 |
| Temperature coefficient | $\alpha = 3.850 \times 10^{-3} \text{ } ^\circ\text{C}^{-1}$ (between 0 and 100 °C) |
| Temperature range | -70 ... +600 °C |
| Tolerance | Temperature validity range, class 1/3 DIN B: -50 ... +200 °C Temperature validity range, class A: -70 ... +300 °C Temperature validity range, class B: -70 ... +600 °C The sensors also comply with the "new" classification F0.1, F0.15 and F0.3 |
| Measured current/maximum current | Pt 100 recommended 1.0mA maximum 7 mA Pt 1000 recommended 0.1mA maximum 1 mA |
| Application conditions | Platinum chip temperature sensors must be protected when used in a humid environment or in aggressive atmospheres. Direct immersion into fluids is also not permitted. The user should check the conditions, prior to using the sensors. Please also refer to the installation instructions B 90.6121.4 "Information for the application of platinum chip temperature sensors." |
| Connecting wires | These temperature sensors are equipped with connection wires made of pure palladium. The connection wires are suitable for pre-melting, laser welding and brazing connections. For further assembly, avoid lateral pressure load acting on the connections. Ensure that the horizontal traction of individual wires does not exceed 6N. Avoid unnecessary bending of the connection wires because this will weaken the material and result in cable breakage. |
| Measuring point | The specified rated value is related to the standard connection wire length L1. The measured value is taken 2 mm in front of the open wire end. Wire length extensions could lead to resistance changes as a result of which the tolerance class can no longer be met. |
| Long-term stability | max. R_0 drift 0.05 %/Year (for definition, see data sheet 90.6000) |
| Low-temperature application | Taking an occurring rated value drift and hysteresis effect within certain limits into account, temperature measurements are also possible up to -200 °C. Further details are available on request. |
| Insulating resistance | >10M Ω at room temperature |
| Vibration proof design | see EN 60 751, section 4.4.2 |
| Self-heating | $\Delta t = I^2 \times R \times E$ (for the definition, see data sheet 90.6000) |
| Packaging | Blister belt/bag |
| Storage | In their (standard) belt packaging, JUMO temperature sensors of the PCA/H design can be stored for at least 12 months under normal ambient conditions. Storage in an aggressive atmosphere or in corroding media as well as under high air humidity is not permitted. |
| RoHS conforming | Yes |
| REACH conforming | Yes |

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Self-heating coefficients and response times

| Type | Self-heating coefficient E in K/mW | | Response time in seconds | | | |
|----------------|------------------------------------|----------------------|--------------------------|------------------|-----------------------|------------------|
| | in water (v = 0.2m/s) | in air (v = 2m/s) | in water (v = 0.4m/s) | | in air (v = 1 m/s) | |
| | | | t _{0.5} | t _{0.9} | t _{0.5} | t _{0.9} |
| PCA 1.2010.1H | 0.02 | 0.2 | 0.3 | 0.5 | 7 | 22 |
| PCA 1.2010.5H | 0.02 | 0.2 | 0.3 | 0.5 | 7 | 22 |
| PCA 1.2010.10H | 0.01 | 0.2 | 0.3 | 0.5 | 7 | 22 |

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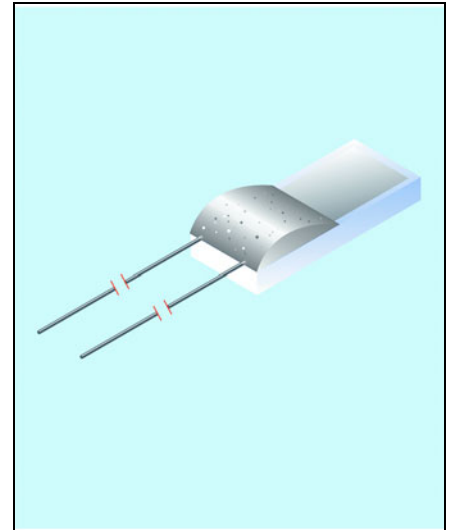


Platinum Chip Temperature Sensors with Nickel Connection Wires to EN 60 751

Brief description

The platinum chip temperature sensors are based on a temperature-depending resistor, the course and admissible tolerance of which are defined in the international standard EN 60 751. They combine the favorable properties of a platinum temperature sensor with the advantages of large-scale production. They are characterized by standardization and universal interchangeability as well as high measuring accuracy, excellent long-term stability and good reproducibility of the electric properties. Large quantities required led to a notable price reduction over the last few years. For this reason, platinum chip temperature sensors are also a real alternative to the thermistors based on the semi-conductor technique. Platinum chip temperature sensors, version "E", can be used universally and are suitable for a wide range of applications in low and higher temperature ranges up to 500°C. Short-time use of the sensor at 550°C is admissible. The metallic, bare connection wires are particularly suitable for welded, crimp or brazing connections. Soft-soldering connections are possible under certain circumstances. The application temperature range is -70 ... +500°C.

PCA/E design



Temperature sensors in bag packaging

| Type | Temperature sensor | | | | | Connection wire | | | | Sales No. for tolerance class | | |
|----------------|--------------------|-----|---|-----|------|-----------------|------|----|-------------------------|-------------------------------|--------------|--------------|
| | R ₀ /Ω | B | L | H | S | Material | D1 | L1 | R _L in mΩ/mm | 1/3 DIN B | A | B |
| PCA 1.2005.1E | 1x100 | 2.0 | 5 | 1.3 | 0.64 | Ni | 0.25 | 10 | 2.0 | 90/00524128T | 90/00524127T | 90/00524126T |
| PCA 1.2005.5E | 1x500 | 2.0 | 5 | 1.3 | 0.64 | Ni | 0.25 | 10 | 2.0 | upon request | upon request | upon request |
| PCA 1.2005.10E | 1x1000 | 2.0 | 5 | 1.3 | 0.64 | Ni | 0.25 | 10 | 2.0 | 90/00524129T | 90/00524130T | 90/00527856T |
| PCA 1.2005.10E | 1x1000 | 2.0 | 5 | 1.3 | 0.64 | Ni | 0.25 | 55 | 2.0 | upon request | upon request | 90/00517230T |

Dimension tolerances: ΔB = ±0.2 / ΔL = ±0.5 / ΔH = ±0.2 / ΔS = ±0.1 / ΔD1 = ±0.01 / ΔL1 = ±0.5
 dimension specifications in mm.

for the definition of the tolerance classes, see data sheet 90.6000
 „T“ = Bag

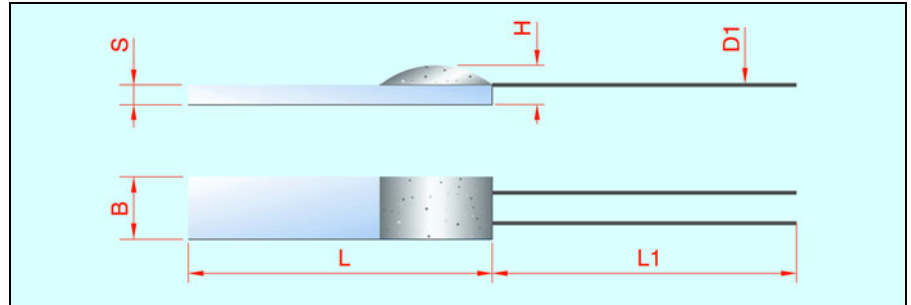
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Dimensional drawing



Technical data

| | |
|---|--|
| Standard | IEC 60 751/EN 60 751 |
| Temperature coefficient | $\alpha = 3.850 \times 10^{-3} \text{ } ^\circ\text{C}^{-1}$ (between 0 and 100 °C) |
| Temperature range | -70 ... +500 °C (short-time 550 °C) |
| Tolerance | Temperature validity range, class 1/3 DIN B: -50 ... +200 °C Temperature validity range, class A: -70 ... +300 °C Temperature validity range, class B: -70 ... +500 °C The temperature sensors also comply with the "new" classification F0.1, F0.15 and F0.3 |
| Measured current/maximum current | Pt 100 recommended 1.0 mA maximum 7 mA Pt 500 recommended 0.7 mA maximum 3 mA Pt 1000 recommended 0.1 mA maximum 1 mA |
| Application conditions | Platinum chip temperature sensors must be protected when used in aggressive atmospheres. Direct immersion into fluids is also not permitted. The user should check the conditions, prior to using the sensors. Please also refer to the installation instructions B 90.6121.4 "Information for the application of platinum chip temperature sensors." |
| Connecting wires | These temperature sensors are equipped with connection wires made of pure nickel. The connection wires are suitable for crimp, welded and soft-soldering/brazing connections. For further assembly, avoid lateral pressure load of the connections. Ensure that the horizontal pull on individual wires does not exceed 6N. Avoid unnecessary bending of the connection wires because this will weaken the material and lead to cable breakage. Please also refer to point 3 "Connection techniques" in our installation instructions. Longer connection wires up to a length of 300mm (in one piece) can be optionally fitted. Extensions wires or insulated strands in any lengths can also be fitted later as an alternative. In this case, however, take into account that this may result in restrictions concerning the application temperature. |
| Measuring point | The specified rated value is related to the standard connection wire length L1. The measured value is taken 2 mm in front of the open wire end. Wire length extensions could lead to resistance changes as a result of which the tolerance class can no longer be met. |
| Long-term stability | max. R_0 drift 0.05 %/Year (for definition, see data sheet 90.6000) |
| Low-temperature application | Taking an occurring rated value drift and hysteresis effect within certain limits into account, temperature measurements are also possible up to -200 °C. Further details are available on request. |
| Insulating resistance | >10M Ω at room temperature |
| Vibration proof design | see EN 60 751, section 4.4.2 |
| Self-heating | $\Delta t = I^2 \times R \times E$ (for the definition, see data sheet 90.6000) |
| Packaging | Blister belt/bag |
| Storage | In their (standard) belt packaging, JUMO temperature sensors of the PCA/E design can be stored for at least 12 months under normal ambient conditions. Storage in an aggressive atmosphere or in corroding media as well as under high air humidity is not permitted. |
| RoHS conforming | Yes |
| REACH conforming | Yes |

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Self-heating coefficients and response times

| Type | Self-heating coefficient E in K/mW | | Response time in seconds | | | |
|----------------|------------------------------------|----------------------|--------------------------|------------------|----------------------|------------------|
| | in water (v = 0.2m/s) | in air (v = 2m/s) | in water (v = 0.4m/s) | | in air (v = 1m/s) | |
| | | | t _{0.5} | t _{0.9} | t _{0.5} | t _{0.9} |
| PCA 1.2005.1E | 0.02 | 0.2 | 0.1 | 0.3 | 3 | 9 |
| PCA 1.2005.5E | 0.02 | 0.2 | 0.1 | 0.3 | 3 | 9 |
| PCA 1.2005.10E | 0.02 | 0.2 | 0.1 | 0.3 | 3 | 9 |