

Platinum-chip temperature sensors with connection wires according to DIN EN 60751

- For temperatures from -70 to +600 °C
- Standardized nominal values and tolerances
- Resistance values from 20 to 2000 Ω
- Linear characteristic curve
- Quick response behavior
- Good vibration resistance
- Low price level

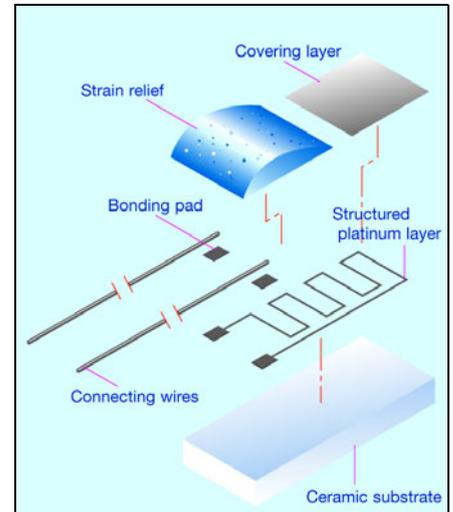
Introduction

Platinum-chip temperature sensors belong to the category of thin-film temperature sensors. They are produced by JUMO under clean room conditions using state-of-the-art technology. 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. Fine 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 adjustment is complete. The electrical connection is made by connection wires welded onto the contact surfaces. Depending on the version, the connection wires can be made of different materials, while their length and diameter can also vary to a certain extent. An additional glass layer applied to the contact surface fixes the connection wires and also serves as tension relief.

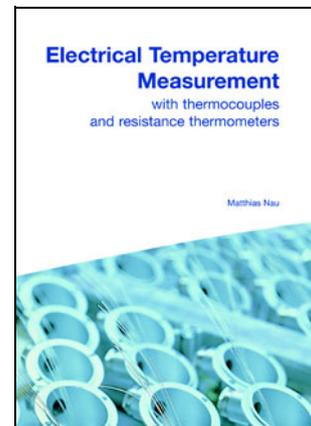
Platinum-chip temperature sensors with the PCA design type are available ex works in various versions as Pt100, Pt500, or Pt1000 temperature sensors. Special nominal values can be manufactured upon request. Platinum-chip temperature sensors are also available in small sizes with high ohmic load. Their low weight allows for very low response times. When installed as fixed units, they also provide excellent vibration resistance. The operating temperature depends on the respective version and, in normal cases, ranges from -70 to +600 °C. When accepting certain nominal 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 applications are found in the following fields of industry: heating engineering, air conditioning technology, ventilation technology, medical and laboratory engineering, white goods, automobiles and commercial vehicles, as well as mechanical and industrial engineering.

Design type PCA



Technical literature



The revised edition of this book takes into account altered standards and recent developments. In particular, the new chapter "Measurement uncertainty" incorporates the basic concept of the internationally recognized ISO guideline "Guide to the expression of uncertainty in measurement" (abbreviated: GUM). In addition, a chapter on explosion protection for thermometers has been added.

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JUMO platinum temperature sensors

Construction and application of platinum temperature sensors	Data sheet 906000
Platinum-ceramic temperature sensors	Data sheet 906022
Platinum-chip temperature sensors with connection wires	Data sheet 906121
Platinum-chip temperature sensors on an epoxy PCB	Data sheet 906122
Platinum-chip temperature sensors with terminal clamps	Data sheet 906123
Platinum-chip temperature sensors in SMD design type	Data sheet 906125

Platinum-chip temperature sensors with connection wires according to DIN EN 60751

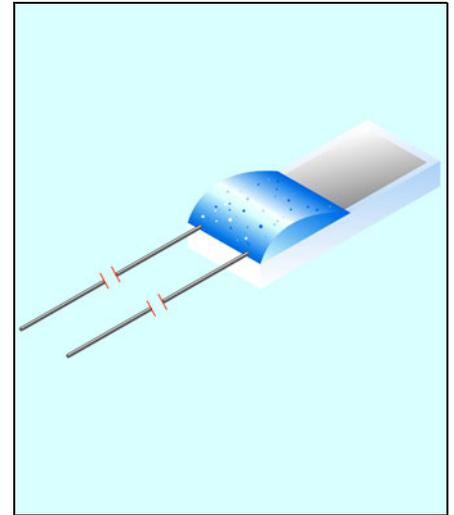
Brief description

Platinum-chip temperature sensors are based on a temperature-dependent resistor, the curve and admissible tolerance of which are defined in the international standard DIN EN 60751. They combine the favorable properties of platinum temperature sensors 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. Demand for large quantities has led to a notable price reduction over the last few years. For this reason, platinum-chip temperature sensors are also a real alternative to thermistors based on the principle of semi-conductors in terms of pricing.

The preferred application for platinum-chip temperature sensors with an "L" design is the assembly of various probes and connecting cables. They are particularly suitable for soft-soldering electrical connections. The connection wires are made of pure silver and ideal for this type of connection.

For this reason, the operating temperature range is designed for -70 to +250 °C. However, the maximum temperature is +350 °C to allow further applications.

Design type PCA/L



Item overview

Temperature sensor						Connection wire			
Type	R ₀ /Ω	W	L	H	S	Material	Dim.	L1	R _L in mΩ/mm
PCA 1.2005.1L	1×100	2	5	1.3	0.64	Ag	0.2 × 0.3	10	0.3
PCA 1.2005.5L	1×500	2	5	1.3	0.64	Ag	0.2 × 0.3	10	0.3
PCA 1.2005.10L	1×1000	2	5	1.3	0.64	Ag	0.2 × 0.3	15	0.3
PCA 1.2010.1L	1×100	2	10	1.3	0.64	Ag	0.2 × 0.3	10	0.3
PCA 1.2010.1L	1×100	2	10	1.3	0.64	Ag	0.2 × 0.3	30	0.3
PCA 1.2010.5L	1×500	2	10	1.3	0.64	Ag	0.2 × 0.3	10	0.3
PCA 1.2010.10L	1×1000	2	10	1.3	0.64	Ag	0.2 × 0.3	10	0.3

Dimension tolerances:

$\Delta W = \pm 0.2$ / $\Delta L = \pm 0.5$ / $\Delta H = \pm 0.2$ / $\Delta S = \pm 0.1$ / $\Delta \text{Dim.} = \text{approx. dimensions}$ / $\Delta L1 = \pm 0.5$

Dimensions in mm.

Part no. for tolerance class		
F0.1*	F0.15*	F0.3
(Class AA)*	(Class A)*	(Class B)
00063358F* 00415828B*	00417995F* 00415827B*	00063260F 00415826B
00063359F* 00415831B*	00417996F* 00415830B*	00063261F 00415829B
00535790B*	00535798B*	00534968B
00047408F* 00415819B*	00062559F* 00415818B*	00044789F 00415817B
Upon request -	Upon request -	00323380F -
00049133F* 00415822B*	Upon request 00415821B*	00048147F 00415820B
00062567F* 00415825B*	00062566F* 00415824B*	00062565F 00415823B

Definition of tolerance classes

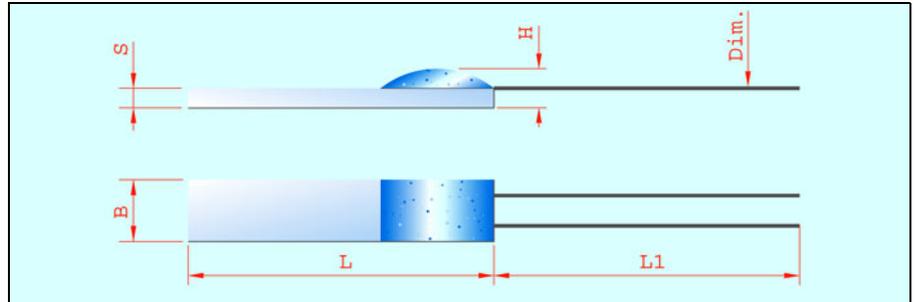
See data sheet 906000

"F" = Folding box (blister)

"B" = Blister tape (upon request)

* Tolerance class F0.1 (class AA) and F0.15 (class A) upon request. We recommend using type PCA/ET for these tolerance classes.

Dimensional drawing



Technical data for type PCA/L

Standard	DIN EN 60751:2009-05
Temperature coefficient	$\alpha = 3.850 \times 10^{-3} \text{ } ^\circ\text{C}^{-1}$ (between 0 and 100 °C)
Temperature range	-70 to +250 °C (+350 °C)
Tolerance	Temperature validity range, class F0.1 (class AA): -50 to +200 °C Temperature validity range, class F0.15 (class A): -70 to +300 °C Temperature validity range, class F0.3 (class B): -70 to +350 °C
Measuring/maximum current	Pt100 recommended 1.0 mA, maximum 7 mA Pt500 recommended 0.7 mA, maximum 3 mA Pt1000 recommended 0.1 mA, maximum 1 mA
Operating conditions	Platinum-chip temperature sensors may not be used unprotected in humid ambient conditions or corrosive atmospheres. Direct immersion into liquids is also not permitted. The user should check the conditions, prior to using the sensors. Please also refer to the installation instructions B 906121.4 "Information for the application of platinum-chip temperature sensors."
Connection 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 exerting lateral pressure loads on the connections. Ensure that the horizontal traction on individual wires does not exceed 5 N. Avoid unnecessary bending of the connection wires because this will weaken the material and lead to the connection wires breaking. Please also refer to point 3 "Connection techniques" in our installation instructions. Longer connection wires up to a length of 300 mm (in one piece) can be fitted as an option. Upon request, as an alternative, extensions in any lengths or insulated strands can also be retrofitted.
Measuring point	The specified nominal 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 906000)
Low-temperature application	Taking a nominal value drift and hysteresis effect within certain limits into account, temperature measurements are also possible up to -200 °C. Further details are available upon request.
Insulation resistance	> 10 M Ω at room temperature
Vibration resistance	See DIN EN 60751, section 4.4.2
Self-heating	$\Delta t = I^2 \times R \times E$ (see data sheet 906000 for definition)
Packaging	Standard packaging: Folding box (blister), packaging unit: 100 pieces, loose Blister tape: upon request Cardboard box: temperature sensors with connection wires > 30 mm
Storage	In the standard or belt packaging option, JUMO temperature sensors in design type PCA/L 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 in this version are made of pure silver, the shelf life can be considerably extended when stored in air-tight packaging and in a dark environment. Otherwise, silver tends to tarnish, making soldering more difficult.
RoHS compliant	Yes
REACH compliant	Yes

Self-heating coefficients and response times for type PCA/L

Type	Self-heating coefficient E in K/mW		Response times in seconds			
	In water (v = 0.2 m/s)	In air (v = 2 m/s)	In water (v = 0.4 m/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 1.2005.10L	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

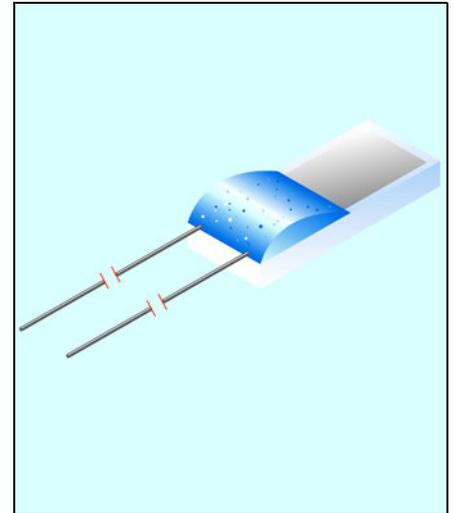
Platinum-chip temperature sensors with connection wires according to DIN EN 60751

Brief description

Platinum-chip temperature sensors are based on a temperature-dependent resistor, the curve and admissible tolerance of which are defined in the international standard DIN EN 60751. They combine the favorable properties of platinum temperature sensors 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. Demand for large quantities has led to a notable price reduction over the last few years. For this reason, platinum-chip temperature sensors are also a real alternative to thermistors based on the principle of semi-conductors in terms of pricing.

The preferred application for platinum-chip temperature sensors in version "S" are temperatures exceeding 180 °C. They are particularly suitable for welded, crimp, or brazing electrical connections. The connection wires are made of solid platinum wrapped wire and feature high stability. The operating temperature range is -70 to +400 °C.

Design type PCA/S



Item overview

Temperature sensor						Connection wire				Part no. for tolerance class		
Type	R ₀ /Ω	W	L	H	S	Material	D1	L1	R _L in mΩ/mm	F0.1 (Class AA)	F0.15 (Class A)	F0.3 (Class B)
PCA 1.1204.1S	1×100	1.2	4.0	1.1	0.38	Pt-Ni	0.20	10	2.8	00315094F	00308627F	00351341F
PCA 1.1204.10S	1×1000	1.2	4.0	1.1	0.38	Pt-Ni	0.20	10	2.8	Upon request	Upon request	00351343F
PCA 1.2003.1S	1×100	2.0	2.5	1.3	0.64	Pt-Ni	0.20	10	2.8	00358368F 00415816B	00358365F 00415815B	00358363F 00415811B
PCA 1.2005.1S	1×100	2.0	5.0	1.3	0.64	Pt-Ni	0.20	10	2.8	00309664F 00415804B	00089225F 00415803B	00089206F 00415801B
PCA 1.2005.1S	1×100	2.0	5.0	1.3	0.64	Pt-Ni	0.20	20	2.8	00364145F	Upon request	00357968F
PCA 1.2005.5S	1×500	2.0	5.0	1.3	0.64	Pt-Ni	0.20	10	2.8	-	-	-
PCA 1.2005.5S	1×500	2.0	5.0	1.3	0.64	Pt-Ni	0.20	20	2.8	00309666F 00415807B	00089226F 00415806B	00089207F 00415805B
PCA 1.2005.10S	1×1000	2.0	5.0	1.3	0.64	Pt-Ni	0.20	10	2.8	00364146F	Upon request	00357969F
PCA 1.2005.10S	1×1000	2.0	5.0	1.3	0.64	Pt-Ni	0.20	20	2.8	-	-	-
PCA 1.2010.1S	1×100	2.0	10	1.3	0.64	Pt-Ni	0.20	10	2.8	00358360F 00415810B	00358359F 00415809B	00358358F 00415808B
PCA 1.2010.1S	1×100	2.0	10	1.3	0.64	Pt-Ni	0.20	20	2.8	Upon request	Upon request	00358285F
PCA 1.2010.5S	1×500	2.0	10	1.3	0.64	Pt-Ni	0.20	10	2.8	-	-	-
PCA 1.2010.10S	1×1000	2.0	10	1.3	0.64	Pt-Ni	0.20	10	2.8	00309674F 00415794B	00089222F 00415793B	00089203F 00415792B
PCA 1.2010.20S	1×2000	2.0	10	1.3	0.64	Pt-Ni	0.20	10	2.8	Upon request	Upon request	00067265F
										-	-	-
PCA 1.2010.5S	1×500	2.0	10	1.3	0.64	Pt-Ni	0.20	10	2.8	00309676F 00415797B	00089223F 00415796B	00089204F 00415795B
PCA 1.2010.10S	1×1000	2.0	10	1.3	0.64	Pt-Ni	0.20	10	2.8	00309681F 00415800B	00089224F 00415799B	00089205F 00415798B
PCA 1.2010.20S	1×2000	2.0	10	1.3	0.64	Pt-Ni	0.20	10	2.8	Upon request	Upon request	00417435F
										Upon request	Upon request	00417434B

Dimension tolerances:

$\Delta W = \pm 0.2$ / $\Delta L = \pm 0.5$ / $\Delta H = \pm 0.2$ / $\Delta S = \pm 0.1$ / $\Delta D1 = \pm 0.01$ / $\Delta L1 = \pm 0.5$

Dimensions in mm.

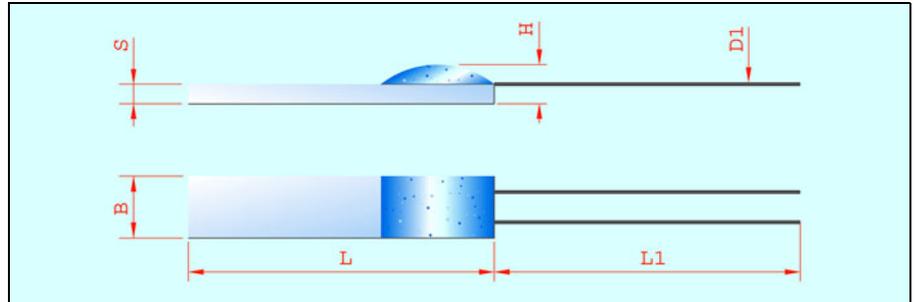
Definition of tolerance classes

See data sheet 906000

"F" = Folding box (blister)

"B" = Blister tape (upon request)

Dimensional drawing



Technical data for type PCA/S

Standard	DIN EN 60751:2009-05
Temperature coefficient	$\alpha = 3.850 \times 10^{-3} \text{ } ^\circ\text{C}^{-1}$ (between 0 and 100 °C)
Temperature range	-70 to +400 °C
Tolerance	Temperature validity range, class F0.1 (class AA): -50 to +200 °C Temperature validity range, class F0.15 (class A): -70 to +300 °C Temperature validity range, class F0.3 (class B): -70 to +400 °C
Measuring/maximum current	Pt100 recommended 1.0 mA, maximum 7 mA Pt500 recommended 0.7 mA, maximum 3 mA Pt1000 recommended 0.1 mA, maximum 1 mA Pt2000 recommended 0.1 mA, maximum 1 mA
Operating conditions	Platinum-chip temperature sensors may not be used unprotected in humid ambient conditions or corrosive atmospheres. Direct immersion into liquids is also not permitted. The user should check the conditions, prior to using the sensors. Please also refer to the installation instructions B 906121.4 "Information for the application of platinum-chip temperature sensors."
Connection 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 electrical connections. For further assembly, avoid exerting lateral pressure loads on the connections. Ensure that the horizontal traction on individual wires does not exceed 10 N. Avoid unnecessary bending of the connection wires because this will weaken the material and lead to the connection wires breaking. Please also refer to point 3 "Connection techniques" in our installation instructions. Longer connection wires up to a length of 300 mm (in one piece) can be fitted as an option. 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 operating temperature.
Measuring point	The specified nominal 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 906000)
Low-temperature application	Taking a nominal value drift and hysteresis effect within certain limits into account, temperature measurements are also possible up to -200 °C. Further details are available upon request.
Insulation resistance	> 10 MΩ at room temperature
Vibration resistance	See DIN EN 60751, section 4.4.2
Self-heating	$\Delta t = I^2 \times R \times E$ (see data sheet 906000 for definition)
Packaging	Standard packaging: Folding box (blister), packaging unit: 100 pieces, loose Blister tape: upon request Cardboard box: temperature sensors with connection wires > 30 mm
Storage	In the standard or belt packaging option, JUMO temperature sensors in design type PCA/S 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 compliant	Yes
REACH compliant	Yes

Self-heating coefficients and response times for type PCA/S

Type	Self-heating coefficient E in K/mW		Response times in seconds			
	Water (v = 0.2 m/s)	Air (v = 2 m/s)	In water (v = 0.4 m/s)		In air (v = 1 m/s)	
			t _{0.5}	t _{0.9}	t _{0.5}	t _{0.9}
PCA 1.1204.1S	0.02	0.2	0.1	0.3	3	9
PCA 1.1204.10S	0.02	0.2	0.1	0.3	3	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

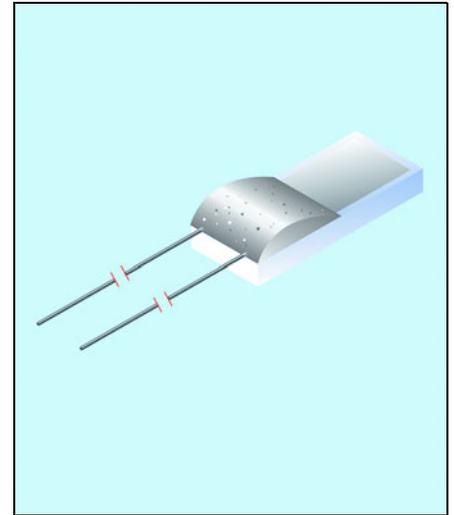
Platinum-chip temperature sensors with connection wires according to DIN EN 60751

Design type PCA/M

Brief description

Platinum-chip temperature sensors are based on a temperature-dependent resistor, the curve and admissible tolerance of which are defined in the international standard DIN EN 60751. They combine the favorable properties of platinum temperature sensors 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. Demand for large quantities has led to a notable price reduction over the last few years. For this reason, platinum-chip temperature sensors are also a real alternative to thermistors based on the principle of semi-conductors in terms of pricing.

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



Item overview

Temperature sensor						Connection wire				Part no. for tolerance class		
Type	R ₀ /Ω	W	L	H	S	Material	D1	L1	R _L in mΩ/mm	F0.1	F0.15	F0.3
PCA 1.1505.1M	1×100	1.5	5.0	1.0	0.38	Pt-Ni	0.20	10	2.8	(Class AA) 00409843F 00417179B	(Class A) 00409841F 00417177B	(Class B) 00409840F 00417178B
PCA 1.1505.1M	1×100	1.5	5.0	1.0	0.38	Pt-Ni	0.20	15	2.8	00430392F 00430396B	00430393F 00430394B	00430391F 00430395B
PCA 1.1505.5M	1×500	1.5	5.0	1.0	0.38	Pt-Ni	0.20	10	2.8	00409847F 00417185B	00409845F 00417183B	00409844F 00417184B
PCA 1.1505.10M	1×1000	1.5	5.0	1.0	0.38	Pt-Ni	0.20	10	2.8	00409850F 00417182B	00409849F 00417180B	00409848F 00417181B
PCA 1.1505.10M	1×1000	1.5	5.0	1.0	0.38	Pt-Ni	0.20	15	2.8	00625678F Upon request	00625677F Upon request	00425409F Upon request
PCA 1.2003.1M	1×100	2.0	2.5	1.3	0.64	Pt-Ni	0.20	10	2.8	00526951F	00489996F	00489994F
PCA 1.2003.1M	1×100	2.0	2.5	1.3	0.64	Pt-Ni	0.20	13	2.8	00412342F 00415833B	00412341F 00415834B	00412318F 00415832B
PCA 1.2003.10M	1×1000	2.0	2.5	1.3	0.64	Pt-Ni	0.20	10	2.8	00623370F	00623367F	00592065F
PCA 1.2005.1M	1×100	2.0	5.0	1.3	0.64	Pt-Ni	0.20	10	2.8	00387454F 00415836B	00387455F 00415837B	00387456F 00415835B
PCA 1.2005.5M	1×500	2.0	5.0	1.3	0.64	Pt-Ni	0.20	10	2.8	00387453F 00415839B	00387449F 00415840B	00387465F 00415838B
PCA 1.2005.10M	1×1000	2.0	5.0	1.3	0.64	Pt-Ni	0.20	10	2.8	00412308F 00415842B	00412311F 00415843B	00412307F 00415841B
PCA 1.2010.1M	1×100	2.0	10	1.3	0.64	Pt-Ni	0.20	10	2.8	00412338F 00415845B	00412337F 00415846B	00412339F 00415844B
PCA 1.2010.5M	1×500	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	1×1000	2.0	10	1.3	0.64	Pt-Ni	0.20	10	2.8	00387458F 00415848B	00387459F 00415849B	00387460F 00415847B

Dimension tolerances:

$$\Delta W = \pm 0.2 / \Delta L = \pm 0.5 / \Delta H = \pm 0.2 / \Delta S = \pm 0.1 / \Delta D1 = \pm 0.01 / \Delta L1 = \pm 0.5$$

Dimensions in mm.

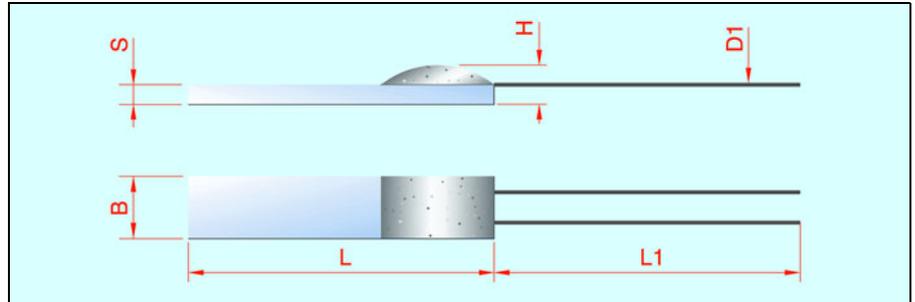
Definition of tolerance classes

See data sheet 906000

"F" = Folding box (blister)

"B" = Blister tape (upon request)

Dimensional drawing



Technical data for type PCA/M

Standard	DIN EN 60751:2009-05
Temperature coefficient	$\alpha = 3.850 \times 10^{-3} \text{ } ^\circ\text{C}^{-1}$ (between 0 and 100 °C)
Temperature range	-70 to +550 °C
Tolerance	Temperature validity range, class F0.1 (class AA): -50 to +200 °C Temperature validity range, class F0.15 (class A): -70 to +300 °C Temperature validity range, class F0.3 (class B): -70 to +550 °C
Measuring/maximum current	Pt100 recommended 1.0 mA, maximum 7 mA Pt500 recommended 0.7 mA, maximum 3 mA Pt1000 recommended 0.1 mA, maximum 1 mA
Operating conditions	Platinum-chip temperature sensors may not be used unprotected in humid ambient conditions or corrosive atmospheres. Direct immersion into liquids is also not permitted. The user should check the conditions, prior to using the sensors. Please also refer to the installation instructions B 906121.4 "Information for the application of platinum-chip temperature sensors."
Connection 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 electrical connections. For further assembly, avoid exerting lateral pressure loads on the connections. Ensure that the horizontal traction on individual wires does not exceed 10 N. Avoid unnecessary bending of the connection wires because this will weaken the material and lead to the connection wires breaking. Please also refer to point 3 "Connection techniques" in our installation instructions. Longer connection wires up to a length of 300 mm (in one piece) can be fitted as an option. 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 operating temperature.
Measuring point	The specified nominal 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 906000)
Low-temperature application	Taking a nominal value drift and hysteresis effect within certain limits into account, temperature measurements are also possible up to -200 °C. Further details are available upon request.
Insulation resistance	> 10 MΩ at room temperature
Vibration resistance	See DIN EN 60751, section 4.4.2
Self-heating	$\Delta t = I^2 \times R \times E$ (see data sheet 906000 for definition)
Packaging	Standard packaging: Folding box (blister), packaging unit: 100 pieces, loose Blister tape: upon request Cardboard box: temperature sensors with connection wires > 30 mm
Storage	In the standard or belt packaging option, JUMO temperature sensors in design type PCA/M 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 compliant	Yes
REACH compliant	Yes

Self-heating coefficients and response times for type PCA/M

Type	Self-heating coefficient E in K/mW		Response times in seconds			
	Water (v = 0.2 m/s)	Air (v = 2 m/s)	In water (v = 0.4 m/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 1.2003.10M	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

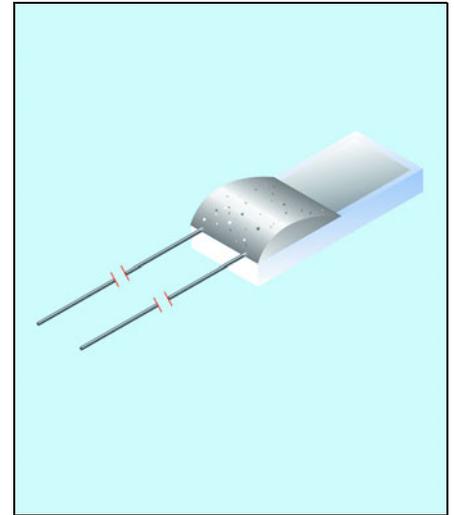
Platinum-chip temperature sensors with connection wires according to DIN EN 60751

Design type PCA/H

Brief description

Platinum-chip temperature sensors are based on a temperature-dependent resistor, the curve and admissible tolerance of which are defined in the international standard DIN EN 60751. They combine the favorable properties of platinum temperature sensors 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. Demand for large quantities has led to a notable price reduction over the last few years. For this reason, platinum-chip temperature sensors are also a real alternative to thermistors based on the principle of semi-conductors in terms of pricing.

The preferred application for platinum-chip temperature sensors in version "H" are particularly high and permanently high operating temperatures. They are suitable for electrical connections using melting or laser welding techniques as well as brazing connections. The connection wires are made of pure palladium. The operating temperature range is designed for -70 to +600 °C.



Item overview

Temperature sensor						Connection wire			
Type	R ₀ /Ω	W	L	H	S	Material	D1	L1	R _L in mΩ/mm
PCA 1.2010.1H	1×100	2	10	1.2	0.64	Pd	0.25	10	2.3
PCA 1.2010.5H	1×500	2	10	1.2	0.64	Pd	0.25	10	2.3
PCA 1.2010.10H	1×1000	2	10	1.2	0.64	Pd	0.25	10	2.3

Dimension tolerances:

$\Delta W = \pm 0.2 / \Delta L = \pm 0.5 / \Delta H = \pm 0.2 / \Delta S = \pm 0.1 / \Delta D1 = \pm 0.01 / \Delta L1 = \pm 0.5$

Dimensions in mm.

Part no. for tolerance class		
F0.1	F0.15	F0.3
(Class AA)	(Class A)	(Class B)
00343070F	00343069F	00053198F
00415851B	00415852B	00415850B
Upon request	Upon request	Upon request
Upon request	Upon request	Upon request
00343065F	00343064F	00044796F
00415855B	00415856B	00415854B

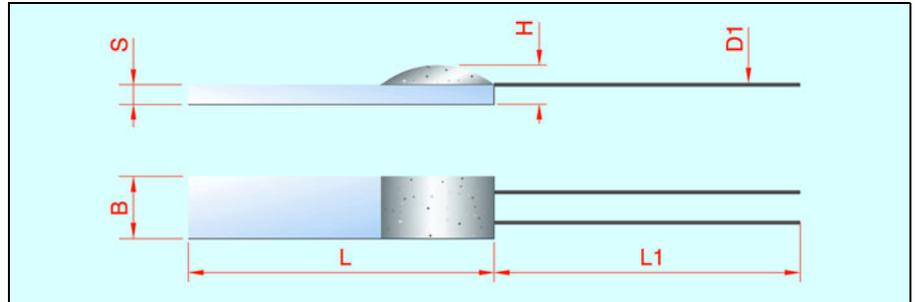
Definition of tolerance classes

See data sheet 906000

"F" = Folding box (blister)

"B" = Blister tape (upon request)

Dimensional drawing



Technical data for type PCA/H

Standard	DIN EN 60751:2009-05
Temperature coefficient	$\alpha = 3.850 \times 10^{-3} \text{ } ^\circ\text{C}^{-1}$ (between 0 and 100 °C)
Temperature range	-70 to +600 °C
Tolerance	Temperature validity range, class F0.1 (class AA): -50 to +200 °C Temperature validity range, class F0.15 (class A): -70 to +300 °C Temperature validity range, class F0.3 (class B): -70 to +600 °C
Measuring/maximum current	Pt100 recommended 1.0 mA, maximum 7 mA Pt1000 recommended 0.1 mA, maximum 1 mA
Operating conditions	Platinum-chip temperature sensors may not be used unprotected in humid ambient conditions or corrosive atmospheres. Direct immersion into liquids is also not permitted. The user should check the conditions, prior to using the sensors. Please also refer to the installation instructions B 906121.4 "Information for the application of platinum-chip temperature sensors."
Connection wires	These temperature sensors are equipped with connection wires made of pure palladium. The connection wires are suitable for melting, laser welding, and brazing connections. For further assembly, avoid exerting lateral pressure loads on the connections. Ensure that the horizontal traction on individual wires does not exceed 6 N. Avoid unnecessary bending of the connection wires because this will weaken the material and lead to the connection wires breaking.
Measuring point	The specified nominal 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 906000)
Low-temperature application	Taking a nominal value drift and hysteresis effect within certain limits into account, temperature measurements are also possible up to -200 °C. Further details are available upon request.
Insulation resistance	> 10 MΩ at room temperature
Vibration resistance	See DIN EN 60751, section 4.4.2
Self-heating	$\Delta t = I^2 \times R \times E$ (see data sheet 906000 for definition)
Packaging	Standard packaging: Folding box (blister), packaging unit: 100 pieces, loose Blister tape: upon request Cardboard box: temperature sensors with connection wires > 30 mm
Storage	In the standard or belt packaging option, JUMO temperature sensors in design type PCA/H 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 compliant	Yes
REACH compliant	Yes

Self-heating coefficients and response times for type PCA/H

Type	Self-heating coefficient E in K/mW		Response times in seconds			
	Water (v = 0.2 m/s)	Air (v = 2 m/s)	In water (v = 0.4 m/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

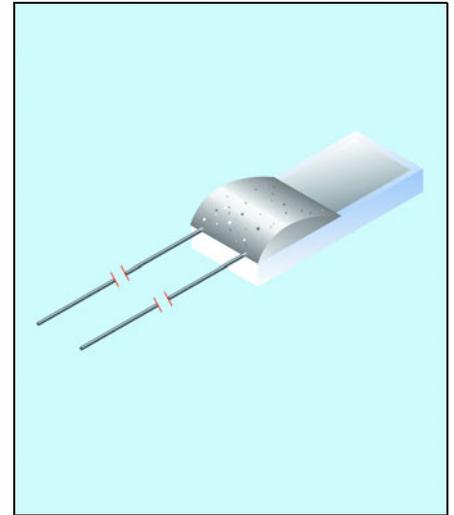
Platinum-chip temperature sensors with nickel connection wires according to DIN EN 60751

Brief description

Platinum-chip temperature sensors are based on a temperature-dependent resistor, the curve and admissible tolerance of which are defined in the international standard DIN EN 60751. They combine the favorable properties of platinum temperature sensors 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. Demand for large quantities has led to a notable price reduction over the last few years. For this reason, platinum-chip temperature sensors are also a real alternative to thermistors based on the principle of semi-conductors in terms of pricing.

Platinum-chip temperature sensors in 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-term use of the sensors at up to 550 °C is admissible. The metallicly bare connection wires are particularly suitable for welded or brazing electrical connections. Soft-soldering connections are possible under certain circumstances. The operating temperature range is -70 to +500 °C.

Design type PCA/E



Item overview

Temperature sensor						Connection wire				Part no. for tolerance class			
Type	R ₀ /Ω	W	L	H	S	Material	D1	L1	R _L in mΩ/mm	F0.1 (Class AA)	F0.15 (Class A)	F0.3 (Class B)	F0.6 (Class 2B)
PCA 1.1505.1E	1×100	1.5	5.0	1.0	0.38	Ni	0.20	10	2.5	00623306F	00623291F	00622624F	Upon request
PCA 1.2003.1E	1×100	2.0	2.5	1.3	0.64	Ni	0.25	10	2.0	00596146F	00596145F	00596142F	Upon request
PCA 1.2003.1E	1×100	2.0	2.5	1.3	0.64	Ni	0.25	75	2.0	Upon request	Upon request	00592657P	Upon request
PCA 1.2005.1E	1×100	2.0	5.0	1.3	0.64	Ni	0.25	10	2.0	00524128F	00524127F	00524126F	00588807O
PCA 1.2005.1E	1×100	2.0	5.0	1.3	0.64	Ni	0.25	55	2.0	Upon request	Upon request	00579512P	
PCA 1.2005.5E	1×500	2.0	5.0	1.3	0.64	Ni	0.25	10	2.0	Upon request	Upon request	Upon request	Upon request
PCA 1.2005.10E	1×1000	2.0	5.0	1.3	0.64	Ni	0.25	10	2.0	00524129F	00524130F	00527856F	Upon request
PCA 1.2005.10E	1×1000	2.0	5.0	1.3	0.64	Ni	0.25	55	2.0	Upon request	Upon request	00517230P	Upon request

Dimension tolerances:

$\Delta W = \pm 0.2$ / $\Delta L = \pm 0.5$ / $\Delta H = \pm 0.2$ / $\Delta S = \pm 0.1$ / $\Delta D1 = \pm 0.01$ / $\Delta L1 = \pm 0.5$

Dimensions in mm.

Definition of tolerance classes

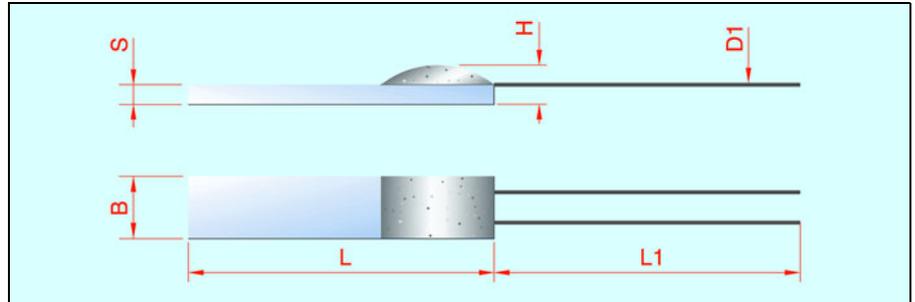
See data sheet 906000

"F" = Folding box (blister)

"O" = On tape (on foil)

"P" = Cardboard box for sensors with connection wires > 30 mm

Dimensional drawing



Technical data for type PCA/E

Standard	DIN EN 60751:2009-05
Temperature coefficient	$\alpha = 3.850 \times 10^{-3} \text{ } ^\circ\text{C}^{-1}$ (between 0 and 100 °C)
Temperature range	-70 to +500 °C (temporarily 550 °C)
Tolerance	Temperature validity range, class F0.1 (class AA): -50 to +200 °C Temperature validity range, class F0.15 (class A): -70 to +300 °C Temperature validity range, class F0.3 (class B): -70 to +500 °C Temperature validity range, class F0.6 (class 2B): -70 to +500 °C
Measuring/maximum current	Pt100 recommended 1.0 mA, maximum 7 mA Pt500 recommended 0.7 mA, maximum 3 mA Pt1000 recommended 0.1 mA, maximum 1 mA
Operating conditions	Platinum-chip temperature sensors may not be used unprotected in humid ambient conditions or corrosive atmospheres. Direct immersion into liquids is also not permitted. The user should check the conditions, prior to using the sensors. Please also refer to the installation instructions B 906121.4 "Information for the application of platinum-chip temperature sensors."
Connection wires	These temperature sensors are equipped with connection wires made of pure nickel. The connection wires are suitable for welded and soft-soldering/brazing connections. For further assembly, avoid exerting lateral pressure loads on the connections. Ensure that the horizontal traction on individual wires does not exceed 6 N. Avoid unnecessary bending of the connection wires because this will weaken the material and lead to the connection wires breaking. Please also refer to point 3 "Connection techniques" in our installation instructions. Longer connection wires up to a length of 300 mm (in one piece) can be fitted as an option. Extension 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 operating temperature.
Measuring point	The specified nominal 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 906000)
Low-temperature application	Taking a nominal value drift and hysteresis effect within certain limits into account, temperature measurements are also possible up to -200 °C. Further details are available upon request.
Insulation resistance	> 10 MΩ at room temperature
Vibration resistance	See DIN EN 60751, section 4.4.2
Self-heating	$\Delta t = I^2 \times R \times E$ (see data sheet 906000 for definition)
Packaging	Standard packaging: Folding box (blister), packaging unit: 100 pieces, loose Blister tape: upon request Cardboard box: temperature sensors with connection wires > 30 mm On tape (on foil): upon request, over- or under-delivery ±3 %
Storage	In the standard or belt packaging option, JUMO temperature sensors in design type PCA/E 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 compliant	Yes
REACH compliant	Yes

Self-heating coefficients and response times for type PCA/E

Type	Self-heating coefficient E in K/mW		Response times in seconds			
	Water (v = 0.2 m/s)	Air (v = 2 m/s)	In water (v = 0.4 m/s)		In air (v = 1 m/s)	
			t _{0.5}	t _{0.9}	t _{0.5}	t _{0.9}
PCA 1.1505.1E	0.02	0.2	0.1	0.3	3	8
PCA 1.2003.1E	0.02	0.2	0.1	0.3	3	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

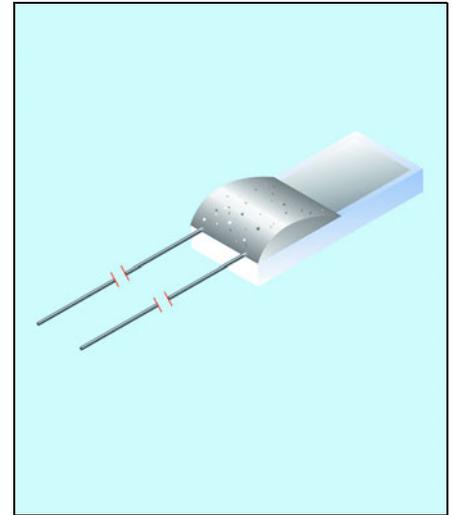
Platinum-chip temperature sensors with nickel connection wires (tin-plated) according to DIN EN 60751

Brief description

Platinum-chip temperature sensors are based on a temperature-dependent resistor, the curve and admissible tolerance of which are defined in the international standard DIN EN 60751. They combine the favorable properties of platinum temperature sensors 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. Demand for large quantities has led to a notable price reduction over the last few years. For this reason, platinum-chip temperature sensors are also a real alternative to thermistors based on the principle of semi-conductors in terms of pricing.

Platinum-chip temperature sensors in version "ET" can be used universally and are suitable for a wide range of applications in low and higher temperature ranges up to 500 °C. Short-term use of the sensors at up to 550 °C is admissible. The tin-plated connection wires are particularly suitable for soft-soldering electrical connections. The operating temperature range is -70 to +500 °C.

Design type PCA/ET



Item overview

Temperature sensor						Connection wire				
Type	R ₀ /Ω	W	L	H	S	Material	D1	L1	L2	R _L in mΩ/mm
PCA 1.1505.1ET	1×100	1.5	5	1.0	0.38	Ni	0.20	10	7	2
PCA 1.1505.10ET	1×1000	1.5	5	1.0	0.38	Ni	0.20	10	7	2
PCA 1.2005.1ET	1×100	2.0	5	1.3	0.64	Ni	0.25	10	7	2
PCA 1.2005.10ET	1×1000	2.0	5	1.3	0.64	Ni	0.25	10	7	2

Dimension tolerances:

$\Delta W = \pm 0.2$ / $\Delta L = \pm 0.5$ / $\Delta H = \pm 0.2$ / $\Delta S = \pm 0.1$ / $\Delta D1 = \pm 0.01$ / $\Delta L1 = \pm 0.5$ / $\Delta L2 = -0/+3$ mm

Dimensions in mm.

Part no. for tolerance class			
F0.1	F0.15	F0.3	F0.6
(Class AA)	(Class A)	(Class B)	(Class 2B)
00642841F	00642839F	00642817F	00614587O
00642886F	00642883F	00642842F	Upon request
00604449F	00604441F	00603419F	Upon request
00642808F	00603418F	00603416F	00597200O

Definition of tolerance classes

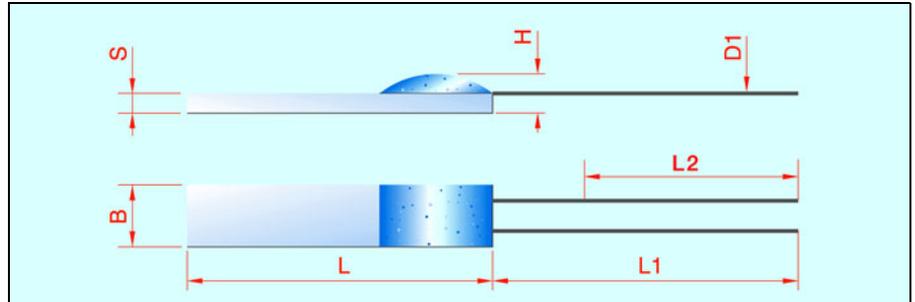
See data sheet 906000

"F" = Folding box (blister)

"B" = Blister tape

"O" = On tape (on foil)

Dimensional drawing



Technical data for type PCA/ET

Standard	DIN EN 60751:2009
Temperature coefficient	$\alpha = 3.850 \times 10^{-3} \text{ } ^\circ\text{C}^{-1}$ (between 0 and 100 °C)
Temperature range	-70 to +500 °C (temporarily 550 °C)
Tolerance	Temperature validity range, class F0.1 (class AA): -50 to +200 °C Temperature validity range, class F0.15 (class A): -70 to +300 °C Temperature validity range, class F0.3 (class B): -70 to +500 °C Temperature validity range, class F0.6 (class 2B): -70 to +500 °C
Measuring/maximum current	Pt100 recommended 1.0 mA, maximum 7 mA Pt500 recommended 0.7 mA, maximum 3 mA Pt1000 recommended 0.1 mA, maximum 1 mA
Operating conditions	Platinum-chip temperature sensors may not be used unprotected in humid ambient conditions or corrosive atmospheres. Direct immersion into liquids is also not permitted. The user should check the conditions, prior to using the sensors. Please also refer to the installation instructions B 906121.4 "Information for the application of platinum-chip temperature sensors."
Connection wires	These temperature sensors are equipped with connection wires made of pure nickel. The connection wires are suitable for soft-soldering connections. For further assembly, avoid exerting lateral pressure loads on the connections. Ensure that the horizontal traction on individual wires does not exceed 6 N. Avoid unnecessary bending of the connection wires because this will weaken the material and lead to the connection wires breaking. Please also refer to point 3 "Connection techniques" in our installation instructions. Longer connection wires up to a length of 300 mm (in one piece) can be fitted as an option. Extension 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 operating temperature. Due to the soft-soldering connection, this part of the connection wires is designed for a maximum of +150 °C.
Measuring point	The specified nominal 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 906000)
Low-temperature application	Taking a nominal value drift and hysteresis effect within certain limits into account, temperature measurements are also possible up to -200 °C. Further details are available upon request.
Insulation resistance	> 10 M Ω at room temperature
Vibration resistance	See DIN EN 60751, section 4.4.2
Self-heating	$\Delta t = I^2 \times R \times E$ (see data sheet 906000 for definition)
Packaging	Standard packaging: Folding box (blister), packaging unit: 100 pieces, loose Blister tape: upon request Cardboard box: temperature sensors with connection wires > 30 mm On tape (on foil): upon request, over- or under-delivery ± 3 %
Storage	In the standard or belt packaging option, JUMO temperature sensors in design type PCA/ET 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 compliant	Yes
REACH compliant	Yes

Self-heating coefficients and response times for type PCA/ET

Type	Self-heating coefficient E in K/mW		Response times in seconds			
	Water (v = 0.2 m/s)	Air (v = 2 m/s)	In water (v = 0.4 m/s)		In air (v = 1 m/s)	
			t _{0.5}	t _{0.9}	t _{0.5}	t _{0.9}
PCA 1.1505.1ET	0.02	0.2	0.1	0.3	3	8
PCA 1.1505.10ET	0.02	0.2	0.1	0.3	3	8
PCA 1.2005.1ET	0.02	0.2	0.1	0.3	3	9
PCA 1.2005.10ET	0.02	0.2	0.1	0.3	3	9