JUMO GmbH & Co. KG
Delivery address: Mackenrodtstraße 14,
36039 Fulda, Germany
Postal address: 36035 Fulda, Germany
Phone: +49 661 6003-0
Fax: +49 661 6003-607
e-mail: mail@jumo.net
Internet: www.jumo.net

JUMO Instrument Co. Ltd.
JUMO House
Temple Bank, Riverway
Harlow, Essex CM20 2DY, UK
Phone: +44 1279 635533
Fax: +44 1279 635262
e-mail: sales@jumo.co.uk
Internet: www.jumo.co.uk

JUMO Process Control, Inc.
8 Technology Boulevard
Canastota, NY 13032, USA
Phone: 315-697-JUMO
1-800-554-JUMO
Fax: 315-697-5867
e-mail: info@jumo.us
Internet: www.jumo.us

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**

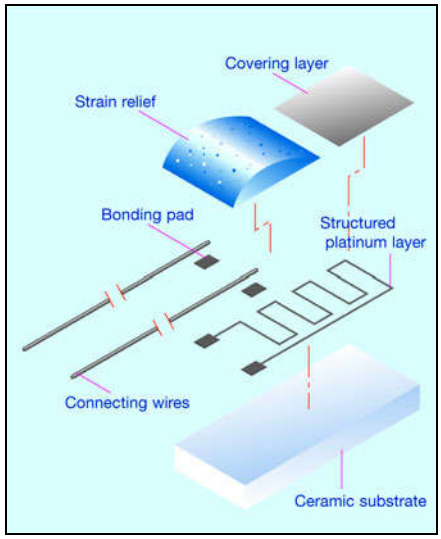
Introduction

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.

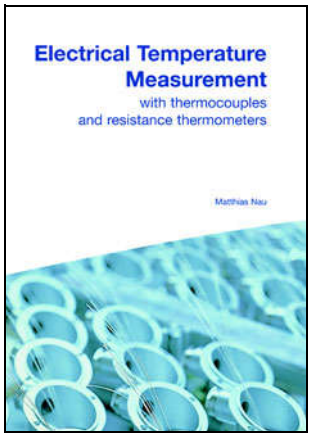
JUMO Platinum Temperature Sensors

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.

August 2002
Publication FAS 146
Sales No. 90/00085081
ISBN: 3-935742-07-X

JUMO GmbH & Co. KG
Delivery address: Mackenrodtstraße 14,
36039 Fulda, Germany
Postal address: 36035 Fulda, Germany
Phone: +49 661 6003-0
Fax: +49 661 6003-607
e-mail: mail@jumo.net
Internet: www.jumo.net

JUMO Instrument Co. Ltd.
JUMO House
Temple Bank, Riverway
Harlow, Essex CM20 2DY, UK
Phone: +44 1279 635533
Fax: +44 1279 635262
e-mail: sales@jumo.co.uk
Internet: www.jumo.co.uk

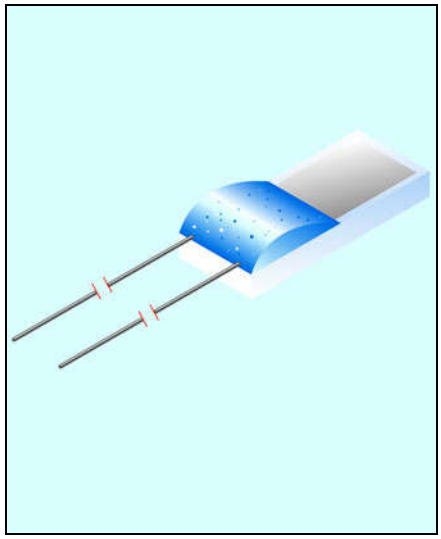
JUMO Process Control, Inc.
8 Technology Boulevard
Canastota, NY 13032, USA
Phone: 315-697-JUMO
1-800-554-JUMO
Fax: 315-697-5867
e-mail: info@jumo.us
Internet: www.jumo.us

Platinum Chip Temperature Sensors with 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 "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.

PCA/L design



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	90/00049133T 90/00415822B	upon request 90/00415821B	90/00048147T 90/00415820B
PCA 1.2010.10L	1x1000	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
PCA 1.2010.50L	1x5000	2.0	10	1.3	0.64	Ag	0.2 x 0.3	10	0.3	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.

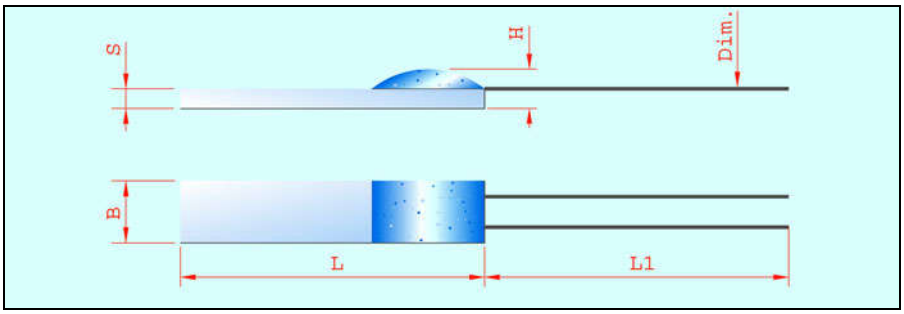
for the definition of the tolerance classes, see data sheet 90.6000
„T“ = Bag, „B“ = Blister belt

JUMO GmbH & Co. KG
Delivery address: Mackenrodtstraße 14,
36039 Fulda, Germany
Postal address: 36035 Fulda, Germany
Phone: +49 661 6003-0
Fax: +49 661 6003-607
e-mail: mail@jumo.net
Internet: www.jumo.net

JUMO Instrument Co. Ltd.
JUMO House
Temple Bank, Riverway
Harlow, Essex CM20 2DY, UK
Phone: +44 1279 635533
Fax: +44 1279 635262
e-mail: sales@jumo.co.uk
Internet: www.jumo.co.uk

JUMO Process Control, Inc.
8 Technology Boulevard
Canastota, NY 13032, USA
Phone: 315-697-JUMO
1-800-554-JUMO
Fax: 315-697-5867
e-mail: info@jumo.us
Internet: www.jumo.us

Dimensional drawing



Technical data

Standard	IEC 60 751/EN 60 751
Temperature coefficient	α = 3.850 x 10^{-3} °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 5 N. 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 300 mm (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	>10 MΩ 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

JUMO GmbH & Co. KG
Delivery address: Mackenrodtstraße 14,
36039 Fulda, Germany
Postal address: 36035 Fulda, Germany
Phone: +49 661 6003-0
Fax: +49 661 6003-607
e-mail: mail@jumo.net
Internet: www.jumo.net

JUMO Instrument Co. Ltd.
JUMO House
Temple Bank, Riverway
Harlow, Essex CM20 2DY, UK
Phone: +44 1279 635533
Fax: +44 1279 635262
e-mail: sales@jumo.co.uk
Internet: www.jumo.co.uk

JUMO Process Control, Inc.
8 Technology Boulevard
Canastota, NY 13032, USA
Phone: 315-697-JUMO
1-800-554-JUMO
Fax: 315-697-5867
e-mail: info@jumo.us
Internet: www.jumo.us

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 = 1m/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

JUMO GmbH & Co. KG
Delivery address: Mackenrodtstraße 14,
36039 Fulda, Germany
Postal address: 36035 Fulda, Germany
Phone: +49 661 6003-0
Fax: +49 661 6003-607
e-mail: mail@jumo.net
Internet: www.jumo.net

JUMO Instrument Co. Ltd.
JUMO House
Temple Bank, Riverway
Harlow, Essex CM20 2DY, UK
Phone: +44 1279 635533
Fax: +44 1279 635262
e-mail: sales@jumo.co.uk
Internet: www.jumo.co.uk

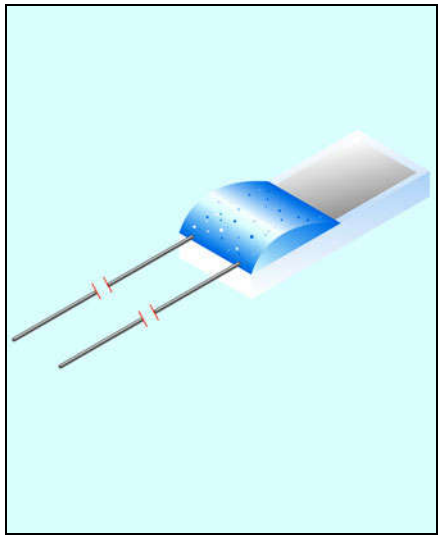
JUMO Process Control, Inc.
8 Technology Boulevard
Canastota, NY 13032, USA
Phone: 315-697-JUMO
1-800-554-JUMO
Fax: 315-697-5867
e-mail: info@jumo.us
Internet: www.jumo.us

Platinum Chip Temperature Sensors with 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 "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.

PCA/S design



Temperature sensors in blister belt and bag packaging

Temperature sensor						Connection wire				Sales No. for tolerance class		
Type	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: ΔB = ±0.2 / ΔL = ±0.5 / ΔH = ±0.2 / ΔS = ±0.1 / ΔD1 = ±0.01 / ΔL1 = ±0.5
dimension specifications in mm.

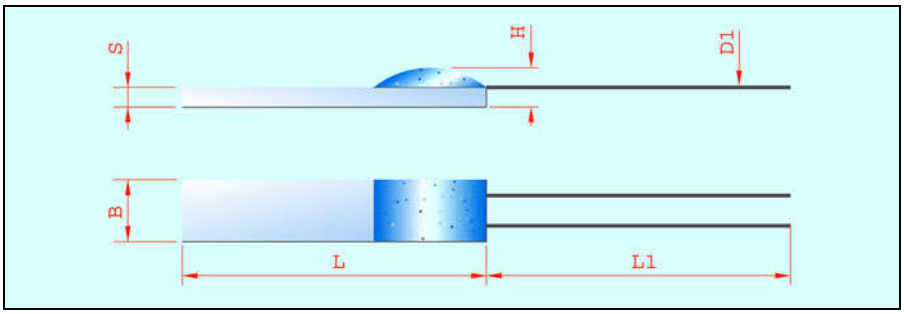
for the definition of the tolerance classes, see data sheet 90.6000
„T“ = Bag, „B“ = Blister belt

JUMO GmbH & Co. KG
Delivery address: Mackenrodtstraße 14,
36039 Fulda, Germany
Postal address: 36035 Fulda, Germany
Phone: +49 661 6003-0
Fax: +49 661 6003-607
e-mail: mail@jumo.net
Internet: www.jumo.net

JUMO Instrument Co. Ltd.
JUMO House
Temple Bank, Riverway
Harlow, Essex CM20 2DY, UK
Phone: +44 1279 635533
Fax: +44 1279 635262
e-mail: sales@jumo.co.uk
Internet: www.jumo.co.uk

JUMO Process Control, Inc.
8 Technology Boulevard
Canastota, NY 13032, USA
Phone: 315-697-JUMO
1-800-554-JUMO
Fax: 315-697-5867
e-mail: info@jumo.us
Internet: www.jumo.us

Dimensional drawing



Technical data

Standard	IEC 60 751/EN 60 751
Temperature coefficient	α = 3.850 x 10^{-3} °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 10 N. 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 300 mm (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	>10 MΩ 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

JUMO GmbH & Co. KG
Delivery address: Mackenrodtstraße 14,
36039 Fulda, Germany
Postal address: 36035 Fulda, Germany
Phone: +49 661 6003-0
Fax: +49 661 6003-607
e-mail: mail@jumo.net
Internet: www.jumo.net

JUMO Instrument Co. Ltd.
JUMO House
Temple Bank, Riverway
Harlow, Essex CM20 2DY, UK
Phone: +44 1279 635533
Fax: +44 1279 635262
e-mail: sales@jumo.co.uk
Internet: www.jumo.co.uk

JUMO Process Control, Inc.
8 Technology Boulevard
Canastota, NY 13032, USA
Phone: 315-697-JUMO
1-800-554-JUMO
Fax: 315-697-5867
e-mail: info@jumo.us
Internet: www.jumo.us

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 1.2003.1S	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

JUMO GmbH & Co. KG
Delivery address: Mackenrodtstraße 14,
36039 Fulda, Germany
Postal address: 36035 Fulda, Germany
Phone: +49 661 6003-0
Fax: +49 661 6003-607
e-mail: mail@jumo.net
Internet: www.jumo.net

JUMO Instrument Co. Ltd.
JUMO House
Temple Bank, Riverway
Harlow, Essex CM20 2DY, UK
Phone: +44 1279 635533
Fax: +44 1279 635262
e-mail: sales@jumo.co.uk
Internet: www.jumo.co.uk

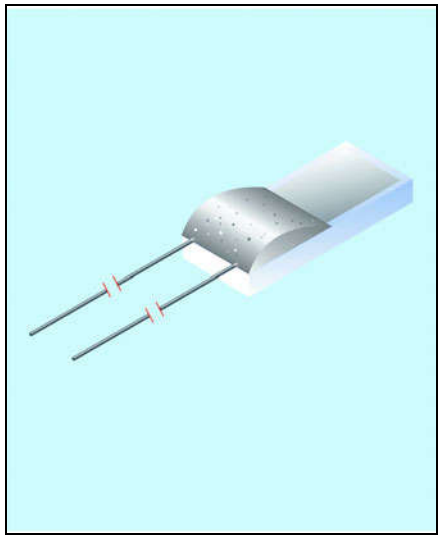
JUMO Process Control, Inc.
8 Technology Boulevard
Canastota, NY 13032, USA
Phone: 315-697-JUMO
1-800-554-JUMO
Fax: 315-697-5867
e-mail: info@jumo.us
Internet: www.jumo.us

Platinum Chip Temperature Sensors with 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 "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.

PCA/M design



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	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.

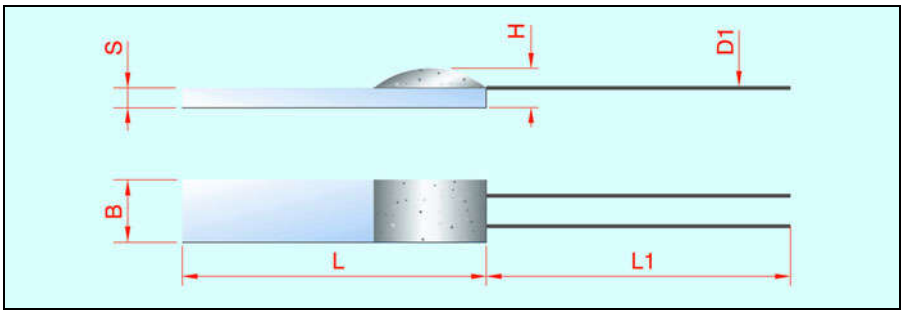
for the definition of the tolerance classes, see data sheet 90.6000
„T“ = Bag, „B“ = Blister belt

JUMO GmbH & Co. KG
Delivery address: Mackenrodtstraße 14,
36039 Fulda, Germany
Postal address: 36035 Fulda, Germany
Phone: +49 661 6003-0
Fax: +49 661 6003-607
e-mail: mail@jumo.net
Internet: www.jumo.net

JUMO Instrument Co. Ltd.
JUMO House
Temple Bank, Riverway
Harlow, Essex CM20 2DY, UK
Phone: +44 1279 635533
Fax: +44 1279 635262
e-mail: sales@jumo.co.uk
Internet: www.jumo.co.uk

JUMO Process Control, Inc.
8 Technology Boulevard
Canastota, NY 13032, USA
Phone: 315-697-JUMO
1-800-554-JUMO
Fax: 315-697-5867
e-mail: info@jumo.us
Internet: www.jumo.us

Dimensional drawing



Technical data

Standard	IEC 60 751/EN 60 751
Temperature coefficient	α = 3.850 x 10^{-3} °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 1.0 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 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 10 N. 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 300 mm (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	>10 MΩ at room temperature
Vibration proof design	see EN 60 751, section 4.4.2
Self-heating	$\Delta t = I^2$ x R x 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

JUMO GmbH & Co. KG
Delivery address: Mackenrodtstraße 14,
36039 Fulda, Germany
Postal address: 36035 Fulda, Germany
Phone: +49 661 6003-0
Fax: +49 661 6003-607
e-mail: mail@jumo.net
Internet: www.jumo.net

JUMO Instrument Co. Ltd.
JUMO House
Temple Bank, Riverway
Harlow, Essex CM20 2DY, UK
Phone: +44 1279 635533
Fax: +44 1279 635262
e-mail: sales@jumo.co.uk
Internet: www.jumo.co.uk

JUMO Process Control, Inc.
8 Technology Boulevard
Canastota, NY 13032, USA
Phone: 315-697-JUMO
1-800-554-JUMO
Fax: 315-697-5867
e-mail: info@jumo.us
Internet: www.jumo.us

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 1.1505.1M	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

JUMO GmbH & Co. KG
Delivery address: Mackenrodtstraße 14,
36039 Fulda, Germany
Postal address: 36035 Fulda, Germany
Phone: +49 661 6003-0
Fax: +49 661 6003-607
e-mail: mail@jumo.net
Internet: www.jumo.net

JUMO Instrument Co. Ltd.
JUMO House
Temple Bank, Riverway
Harlow, Essex CM20 2DY, UK
Phone: +44 1279 635533
Fax: +44 1279 635262
e-mail: sales@jumo.co.uk
Internet: www.jumo.co.uk

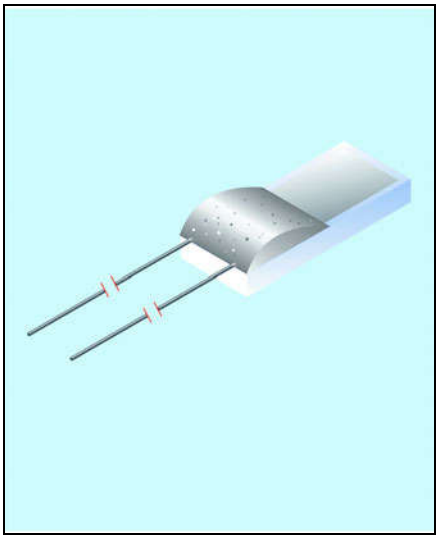
JUMO Process Control, Inc.
8 Technology Boulevard
Canastota, NY 13032, USA
Phone: 315-697-JUMO
1-800-554-JUMO
Fax: 315-697-5867
e-mail: info@jumo.us
Internet: www.jumo.us

Platinum Chip Temperature Sensors with 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 "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.

PCA/H design



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	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.

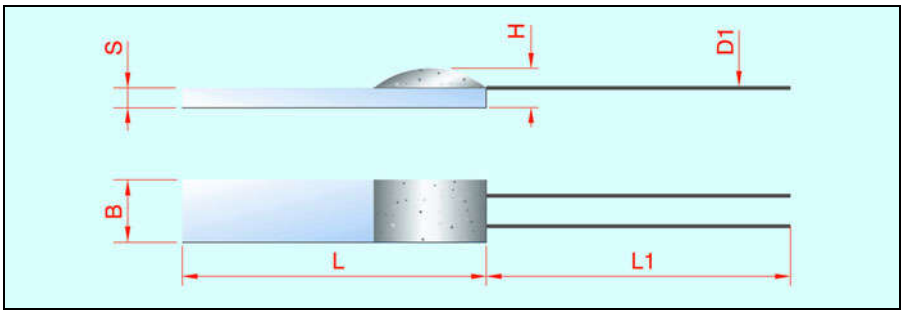
for the definition of the tolerance classes, see data sheet 90.6000
„T“ = Bag, „B“ = Blister belt

JUMO GmbH & Co. KG
Delivery address: Mackenrodtstraße 14,
36039 Fulda, Germany
Postal address: 36035 Fulda, Germany
Phone: +49 661 6003-0
Fax: +49 661 6003-607
e-mail: mail@jumo.net
Internet: www.jumo.net

JUMO Instrument Co. Ltd.
JUMO House
Temple Bank, Riverway
Harlow, Essex CM20 2DY, UK
Phone: +44 1279 635533
Fax: +44 1279 635262
e-mail: sales@jumo.co.uk
Internet: www.jumo.co.uk

JUMO Process Control, Inc.
8 Technology Boulevard
Canastota, NY 13032, USA
Phone: 315-697-JUMO
1-800-554-JUMO
Fax: 315-697-5867
e-mail: info@jumo.us
Internet: www.jumo.us

Dimensional drawing



Technical data

Standard	IEC 60 751/EN 60 751
Temperature coefficient	α = 3.850 x 10^{-3} °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 1.0 mA maximum 7 mA Pt 1000 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 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	>10 MΩ 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

JUMO GmbH & Co. KG
Delivery address: Mackenrodtstraße 14,
36039 Fulda, Germany
Postal address: 36035 Fulda, Germany
Phone: +49 661 6003-0
Fax: +49 661 6003-607
e-mail: mail@jumo.net
Internet: www.jumo.net

JUMO Instrument Co. Ltd.
JUMO House
Temple Bank, Riverway
Harlow, Essex CM20 2DY, UK
Phone: +44 1279 635533
Fax: +44 1279 635262
e-mail: sales@jumo.co.uk
Internet: www.jumo.co.uk

JUMO Process Control, Inc.
8 Technology Boulevard
Canastota, NY 13032, USA
Phone: 315-697-JUMO
1-800-554-JUMO
Fax: 315-697-5867
e-mail: info@jumo.us
Internet: www.jumo.us

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 1.2010.1H	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

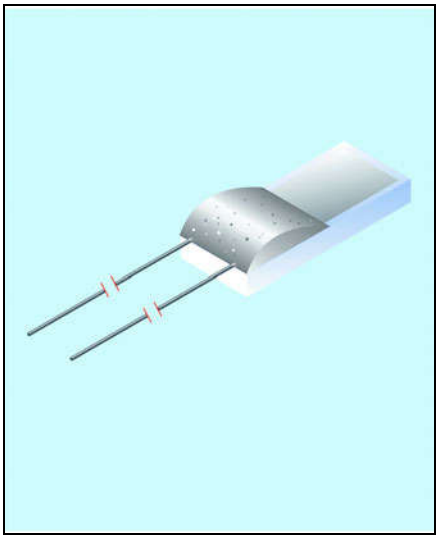
JUMO GmbH & Co. KG
Delivery address: Mackenrodtstraße 14,
36039 Fulda, Germany
Postal address: 36035 Fulda, Germany
Phone: +49 661 6003-0
Fax: +49 661 6003-607
e-mail: mail@jumo.net
Internet: www.jumo.net

JUMO Instrument Co. Ltd.
JUMO House
Temple Bank, Riverway
Harlow, Essex CM20 2DY, UK
Phone: +44 1279 635533
Fax: +44 1279 635262
e-mail: sales@jumo.co.uk
Internet: www.jumo.co.uk

JUMO Process Control, Inc.
8 Technology Boulevard
Canastota, NY 13032, USA
Phone: 315-697-JUMO
1-800-554-JUMO
Fax: 315-697-5867
e-mail: info@jumo.us
Internet: www.jumo.us

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

PCA/E 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 "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.

Temperature sensors in bag packaging

Temperature sensor						Connection wire				Sales No. for tolerance class		
Type	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.

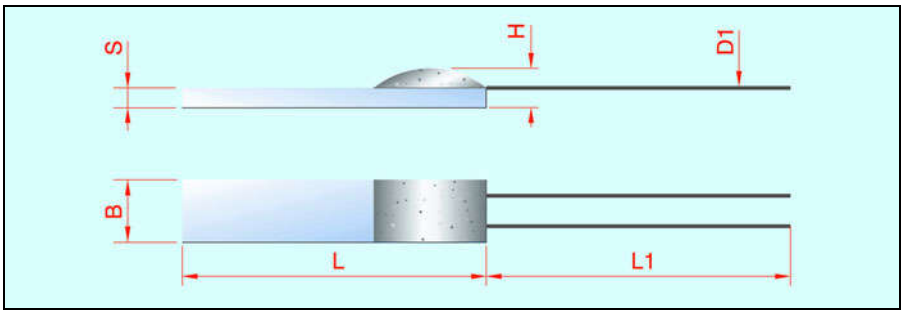
for the definition of the tolerance classes, see data sheet 90.6000
„T“ = Bag

JUMO GmbH & Co. KG
Delivery address: Mackenrodtstraße 14,
36039 Fulda, Germany
Postal address: 36035 Fulda, Germany
Phone: +49 661 6003-0
Fax: +49 661 6003-607
e-mail: mail@jumo.net
Internet: www.jumo.net

JUMO Instrument Co. Ltd.
JUMO House
Temple Bank, Riverway
Harlow, Essex CM20 2DY, UK
Phone: +44 1279 635533
Fax: +44 1279 635262
e-mail: sales@jumo.co.uk
Internet: www.jumo.co.uk

JUMO Process Control, Inc.
8 Technology Boulevard
Canastota, NY 13032, USA
Phone: 315-697-JUMO
1-800-554-JUMO
Fax: 315-697-5867
e-mail: info@jumo.us
Internet: www.jumo.us

Dimensional drawing



Technical data

Standard	IEC 60 751/EN 60 751
Temperature coefficient	α = 3.850 x 10^{-3} °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 6 N. 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 300 mm (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	>10 MΩ 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

JUMO GmbH & Co. KG
Delivery address: Mackenrodtstraße 14,
36039 Fulda, Germany
Postal address: 36035 Fulda, Germany
Phone: +49 661 6003-0
Fax: +49 661 6003-607
e-mail: mail@jumo.net
Internet: www.jumo.net

JUMO Instrument Co. Ltd.
JUMO House
Temple Bank, Riverway
Harlow, Essex CM20 2DY, UK
Phone: +44 1279 635533
Fax: +44 1279 635262
e-mail: sales@jumo.co.uk
Internet: www.jumo.co.uk

JUMO Process Control, Inc.
8 Technology Boulevard
Canastota, NY 13032, USA
Phone: 315-697-JUMO
1-800-554-JUMO
Fax: 315-697-5867
e-mail: info@jumo.us
Internet: www.jumo.us

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