



Platinum-glass temperature sensors with glass extension to EN 60 751

- for temperatures from -200 to +400 °C
- standardized nominal values and tolerances
- as single or twin temperature sensor
- suitable for measurements under highly humid ambient conditions
- can be used directly in many liquids
- glass extensions to customer specification

Introduction

Temperature sensors with glass extension are fabricated from platinum glass temperature sensors specified to EN 60 751.

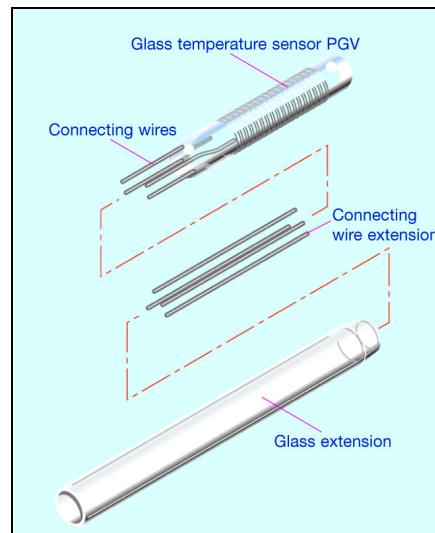
They are based on the platinum-glass temperature sensors, PG or PGL style, to data sheet 90.6021. These are then extended by fusing on glass tubes in a wide variety of sizes.

Depending on the specific measurement task, such glass extensions can also be supplied with a standard ground joint, diameter graduations, or even as angled variants. The electrical connection can be implemented in two-, three- or four-wire technique, according to choice. Furthermore, internal insulation through additional glass tubes, ceramic tubes or tubing can also be provided.

As an option, it is also possible to fabricate JUMO platinum-glass temperature sensors with glass extension into laboratory resistance thermometers. According to choice, the electrical connection is made through a variety of connector systems (e. g. Lemos), but variants with attached connecting cable can also be implemented.

As a specialist for manufacturing a wide product spectrum, JUMO is in the position to provide solutions to many customer-specific applications. Our experts at JUMO, who can draw on decades of experience to assure a high quality standard, will be happy to advise you on your particular application. We shall be pleased to make you an offer on request.

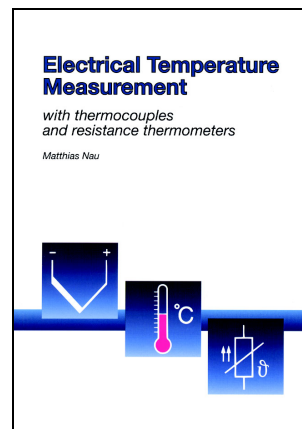
PGV style



JUMO platinum temperature sensors

Construction 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-foil temperature sensors	Data Sheet 90.6023
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Platinum-chip temperature sensors on epoxy card	Data Sheet 90.6122
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Platinum-chip temperature sensors in cylindrical style	Data Sheet 90.6124
Platinum-chip temperature sensors in SMD style	Data Sheet 90.6125

Technical publication



This revised edition takes account of altered standards and recent developments. 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, the chapter on explosion protection for thermometers has been updated in view of the European Directive 94/9/EC, which has been in force since 1st July 2003.

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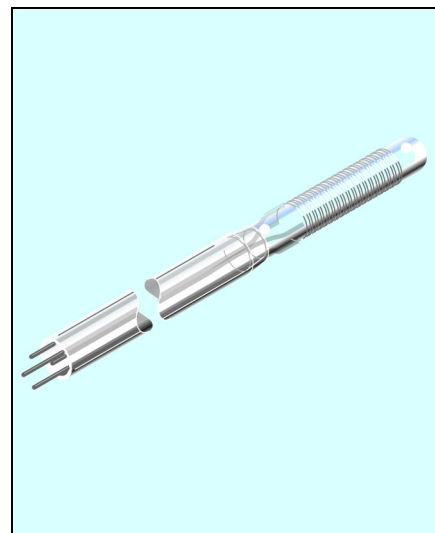


Platinum-glass temperature sensors with glass extension to EN 60 751

PGV style

Brief description

Electrical glass thermometers for laboratory or laboratory equipment applications frequently have to meet high demands. For such tasks, JUMO offers a range of products to meet most requirements. Using the table below, many different versions can be conceived to cover the most common applications. There is a choice of different sizes of platinum-glass temperature sensors as well as of possible glass extensions. Different reference values, single or dual elements and the possibility of choosing between different tolerance classes complete the product spectrum. All platinum-glass temperature sensors and glass extensions are made of a special AR glass and exhibit excellent chemical resistance. In addition, the glass provides a high degree of insulation and moisture protection. Furthermore, JUMO temperature sensors with glass extension can be used directly in corrosive or polluted media (e. g. caustic solutions). These temperature sensors also lend themselves ideally to use in areas where the highest level of cleanliness and sterility is required. The operating temperature ranges from -200 to +400 °C. The main application areas include analytical and laboratory technology, HVAC engineering and industrial humidity measurement.



Temperature sensors in cardboard box packaging

Temperature sensor				Glass extension*		Wire extension			Connection**
Type	R ₀ /Ω	D	L	Material	D2 Graduation	Material	D1	R _L in mΩ/mm	Connection circuit
PG 1.1720.1	1x 100	1.7	20	AR glass	1.9 / 2 / 2.5	Ag	0.3	0.26	2-, 3- or 4-wire
PG 1.1810.1	1x 100	1.8	10	AR glass	1.9 / 2 / 2.5	Ag	0.3	0.26	2-, 3- or 4-wire
PG 1.2010.1	1x 100	2.0	10	AR glass	2 / 2.5	Ag	0.3	0.26	2-, 3- or 4-wire
PG 1.2812.1	1x 100	2.8	12	AR glass	3.1 / 3.5 / 3.8 / 4.1 / 4.25	Ag	0.3	0.26	2-, 3- or 4-wire
PG 1.2830.1	1x 100	2.8	30	AR glass	3.1 / 3.5 / 3.8 / 4.1 / 4.25	Ag	0.5	0.10	2-, 3- or 4-wire
PG 1.3812.1	1x 100	3.8	12	AR glass	3.5 / 3.8 / 4.1 / 4.25 / 4.4 / 4.6 / 5 / 6	Ag	0.5	0.10	2-, 3- or 4-wire
PG 1.3830.1	1x 100	3.8	30	AR glass	3.5 / 3.8 / 4.1 / 4.25 / 4.4 / 4.6 / 5 / 6	Ag	0.5	0.10	2-, 3- or 4-wire
PG 1.4512.1	1x 100	4.5	12	AR glass	3.5 / 3.8 / 4.1 / 4.25 / 4.4 / 4.6 / 5 / 6 / 7 / 8 / 9 / 10 > 20.0	Ag	0.5	0.10	2-, 3- or 4-wire
PG 1.4825.1	1x 100	4.8	25	AR glass	5 / 6 / 7 / 8	Ag	0.5	0.10	2-, 3- or 4-wire
PG 1.3830.5	1x 500	3.8	30	AR glass	3.5 / 3.8 / 4.1 / 4.25 / 4.4 / 4.6 / 5 / 6	Ag	0.5	0.10	2-, 3- or 4-wire
PG 1.2828.10	1x 1000	2.8	28	AR glass	3.1 / 3.5 / 3.8 / 4.1 / 4.25	Ag	0.5	0.10	2-, 3- or 4-wire
PGL 1.3530.1	1x 100	3.8	20	AR glass	3.5 / 3.8 / 4.1 / 4.25 / 4.4 / 4.6 / 5 / 6 / 7 / 8	Ag	0.5	0.10	2-, 3- or 4-wire
PGL 1.4825.1	1x 100	4.5	20	AR glass	4.4 / 4.6 / 5 / 6 / 7 / 8 / 9 / 10 > 20.0	Ag	0.5	0.10	2-, 3- or 4-wire
PGL 1.4845.1	1x 100	4.5	35	AR glass	4.4 / 4.6 / 5 / 6 / 7 / 8 / 9 / 10 > 20.0	Ag	0.5	0.10	2-, 3- or 4-wire
PGL 1.4855.5	1x 500	4.5	45	AR glass	4.4 / 4.6 / 5 / 6 / 7 / 8 / 9 / 10 > 20.0	Ag	0.5	0.10	2-, 3- or 4-wire
PG 2.2525.1	2x 100	2.5	25	AR glass	2.5 / 3.1 / 3.5	Ag	0.3	0.26	2-, 3- or 4-wire
PGL 2.3535.1	2x 100	3.5	35	AR glass	3.5 / 3.8 / 4.1 / 4.25 / 4.4 / 4.6 / 5 / 6 / 7 / 8	Ag	0.3	0.26	2-, 3- or 4-wire
PGL 2.4830.1	2x 100	4.5	20	AR glass	4.4 / 4.6 / 5 / 6 / 7 / 8 / 9 / 10 > 20.0	Ag	0.5	0.10	2-, 3- or 4-wire
PGL 2.4845.1	2x 100	4.5	35	AR glass	4.4 / 4.6 / 5 / 6 / 7 / 8 / 9 / 10 > 20.0	Ag	0.5	0.10	2-, 3- or 4-wire

Dim. tolerances: ΔD ≤ 4.5±0.1 / ΔD > 4.5±0.2 / ΔL = approx. dimensions / ΔD1 = ±0.02 / ΔD2 = ±0.2 / ΔGL = ±1.0 / Δinternal insulation = approx. dimensions

For a definition of the tolerance classes, see Data Sheet 90.6000

Dimensions in mm.

* The overall length GL of an extended temperature sensor can be freely defined within certain limits.

** Restrictions on the circuit type are possible, depending on the constructional size and type of insulation (option).

The length L1 of the protruding connection wires (and of the optional internal insulation) can also be freely defined.

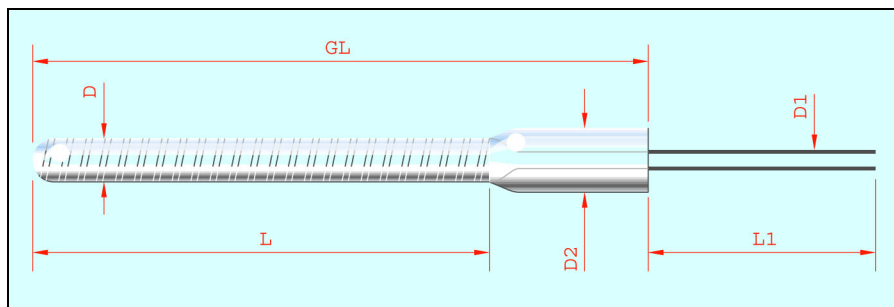
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Dimensional drawing



Technical data

Standard	EN 60 751	
Temperature coefficient	$\alpha = 3.850 \times 10^{-3} \text{ } ^\circ\text{C}^{-1}$ (between 0 and 100 °C)	
Temperature range	-200 to +400 °C (with a pure glass version) Temperature restrictions due to insulation and add-on parts are possible.	
Tolerance	Temperature validity range Class 1/3 DIN B:	- 70 to +250 °C
	Temperature validity range Class A:	-200 to +400 °C
	Temperature validity range Class B:	-200 to +400 °C
DKD (German Calibration Service) calibration	We recommend a DKD calibration for high accuracy requirements (see Data Sheet 90.2721 for further information).	
Measuring current	Pt100	recommended: 1.0 mA
	Pt500	recommended: 0.7 mA
	Pt1000	recommended: 0.1 mA
Maximum current	Pt100	10 mA
	Pt500	5 mA
	Pt1000	3 mA
Operating conditions	Platinum-glass temperature sensors with glass extension are suitable for the unprotected application under highly humid ambient conditions and for direct measurements in liquid media (e. g. caustic solutions.) However, the medium to be measured must not form a chemical bond with the glass (qualification by the user).	
Chemical resistance	Water resistance class (ISO 719) HGB 3 Acidity class (DIN 12 116) Class S1 Caustic solution class (ISO 695) Class A2	
Connecting wires	The connecting wires of a platinum-glass temperature sensor that is used for the particular glass extension consist of Pt-NiFe wire. As a rule, these are then extended by fusing on silver wires using a special procedure. The wire extension can be implemented in 2-, 3- or 4-wire circuit.	
Measurement point	The nominal value specified refers to the standard connecting wire length L1 of the platinum-glass temperature sensor (not extended). The measurement is acquired 2mm from the open end of the wire. The wire extensions by means of a silver wire (Ag) in 2-wire circuit may result in minor changes in resistance (R_L , see table). We recommend the use of a 3- or 4-wire circuit connection, whenever this is technically feasible.	
Long-term stability	max. R_0 drift 0.03%/year (see Data Sheet 90.6000 for definitions)	
Internal insulation	The connecting wires on extended platinum-glass temperature sensors can optionally be insulated. Insulation options are: fiber glass tubing, teflon tubing, glass tubes and ceramic sleeves. Please note that this may reduce the temperature range.	
Fits	As an option, glass extensions with a standard ground joint to DIN 10 242 can also be supplied on request.	

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Connection types Platinum-glass temperature sensors with glass extension can also be reworked as laboratory resistance thermometers. For this purpose, various connections consisting of a PVC, silicone or PTFE connecting cable as well as a variety of connectors, for example Lemos, can be implemented.

Insulation resistance >100MΩ at room temperature

Vibration strength moderate, correct and cautious handling is absolutely essential

Self-heating For values, please refer to our Data Sheet 90.6021 "Platinum-glass temperature sensors". However, please take into account that these values are only guide values. Values may shift as a result of the particular extension and changes in mass.

Packaging Cardboard box with foam padding

Storage In the standard packaging, JUMO temperature sensors, PGV style, can be stored indefinitely under normal ambient conditions. It is not permissible to store the temperature sensors in aggressive atmospheres or corrosive media.