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# Platinum-foil temperature sensors to EN 60 751

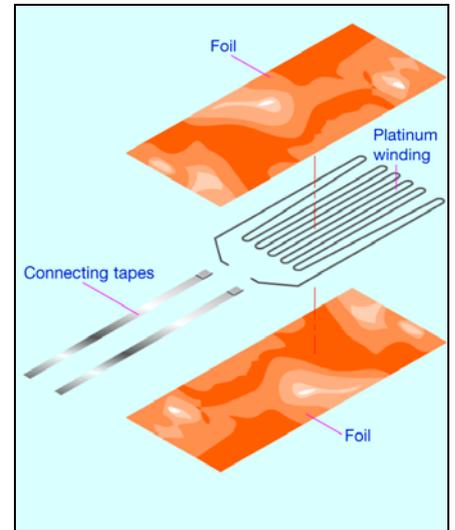
- for temperatures from -80 to +180°C
- standardized nominal value and tolerance
- small thickness, just 0.3mm
- for surface measurements
- withstands voltages up to 3kV

## Introduction

Like glass or ceramic temperature sensors, platinum-foil temperature sensors also belong to the category of wirewound styles. A winding of solid platinum wire is embedded between two self-adhesive polyimide foils. The platinum winding is calibrated through the adjustment of the winding length, before the foils are joined. The electrical characteristics conform to EN 60 751. Two nickel tapes are taken out to form the connection. The foil temperature sensor is designed for application at temperatures from -80 to +180°C.

JUMO platinum-foil temperature sensors are especially suitable for measurements on flat or slightly curved surfaces. Furthermore, their flexibility and small thickness enable measurements at sites that are difficult to access. Thanks to their low intrinsic mass and relatively large surface area, these foil temperature sensors achieve fast response.

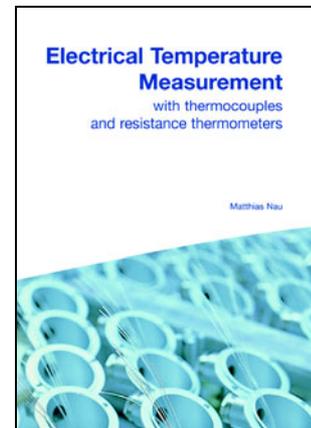
## PF style



## 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
Platinum-glass temperature sensors with glass extension	Data Sheet 90.6024
Platinum-chip temperature sensors with connecting wires	Data Sheet 90.6121
Platinum-chip temperature sensors on epoxy card	Data Sheet 90.6122
Platinum-chip temperature sensors with terminal clamps	Data Sheet 90.6123
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-foil temperature sensors to EN 60 751

## PF style

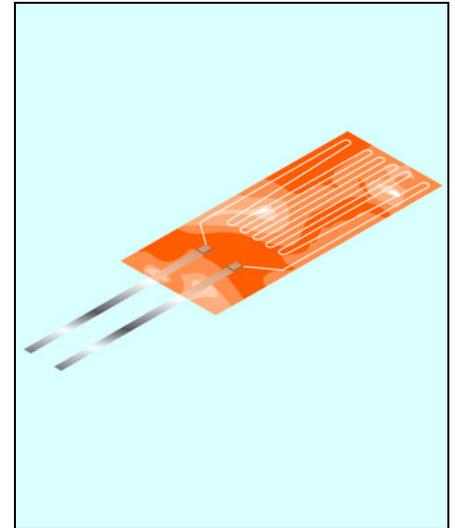
### Brief description

Platinum-foil temperature sensors are mainly used for surface temperature measurement. The flexibility of the polyimide foil and the small thickness of just 0.3mm also enable installation at sites that are difficult to access. In addition, owing to this flexibility, the temperature sensors can be adapted to curved surfaces such as pipes, radiators or various tools.

Thanks to the low intrinsic mass of the temperature sensor and the relatively large surface area, fast response can be achieved. Two bare nickel tapes are taken out to form the electrical connection.

The application temperature ranges from -80 to +180°C.

Special variants with teflon-insulated stranded connection wires, which can be attached at a later time by means of solder links, are available on request.



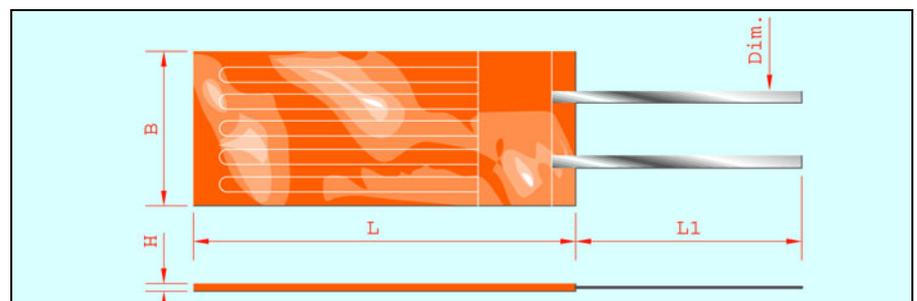
## Temperature sensors in plastic box or cardboard box packaging

Temperature sensor					Connecting wire				Sales No. for tolerance class		
Type	R <sub>0</sub> /Ω	W	L	H	Material	Dim.	L1	R <sub>L</sub> in mΩ/mm	1/3 DIN B	A	B
PF 1.2150.1	1x100	21	50	0.3	Ni	1.4 x 0.07	30	10	-	-	90/00055524

Dim. tolerances: ΔL = +2/-1 / ΔB = ±0.5 / ΔH = ±0.05 / ΔL1 = ±5  
 Dimensions in mm.

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

### Dimensional drawing



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## Technical data

<b>Standard</b>	EN 60 751
<b>Temperature coefficient</b>	$\alpha = 3.850 \times 10^{-3} \text{ } ^\circ\text{C}^{-1}$ (between 0 and 100°C)
<b>Temperature range</b>	-80 to +180°C
<b>Tolerance</b>	Temperature validity range Class B: -80 to +180°C
<b>Measuring current</b>	recommended: 1.0mA
<b>Maximum current</b>	7mA (note self-heating)
<b>Operating conditions</b>	Suitable for measurements on flat or slightly curved surfaces. For stability reasons, the minimum bending radius must not be less than 15mm. In addition, the foil sensor may only be bent transverse to the longitudinal direction. Any commercially available glue that bonds with polyimide and is suitable for the corresponding operating temperature may be used. The foil temperature sensor must not be used for direct measurements in liquids.
<b>Foil specifications</b>	0.07 mm thick polyimide foil with one-sided adhesive film on silicone basis, color: amber Electric strength 3000 V; Flame retardance w / UL 510 standard UL approval listed under OANZ2, file E20392
<b>Connecting wires</b>	The connecting wires are made of 30mm long nickel tapes. The connections must not be subjected to tension, either longitudinally or at an angle. Any unnecessary bending must be avoided as this may result in material fatigue and a connection tape break.
<b>Measurement point</b>	2mm from the end of the wire; the specified nominal value refers to the standard connecting wire length L1. The measurement is acquired 2mm from the wire end. Any alteration of the wire length will result in resistance changes.
<b>Long-term stability</b>	typical $R_0$ drift $\leq 0.1\%$ /year (see Data Sheet 90.6000 for definitions)
<b>Insulation resistance</b>	10M $\Omega$ at room temperature
<b>Self-heating</b>	$\Delta t = I^2 \times R \times E$ (see Data Sheet 90.6000 for definitions)
<b>Packaging</b>	in units of <10 items: in plastic box with foam padding in units of >10 items: in cardboard box with foam padding
<b>Storage</b>	In the standard packaging, JUMO foil temperature sensors, PF style, can be stored for at least 12 months under normal ambient conditions. It is not permissible to store the sensors in aggressive atmospheres, corrosive media, or in high humidity.

## Self-heating coefficients and response times

Type	Self-heating coefficient E in °C/mW		Response times in seconds			
	in water (v = 0.2m/sec)	in air (v = 2m/sec)	in water (v = 0.4 m/sec)		in air (v = 1 m/sec)	
			t <sub>0.5</sub>	t <sub>0.9</sub>	t <sub>0.5</sub>	t <sub>0.9</sub>
PF 1.2150.1	0.005	0.05	0.1	0.3	3	5