



Test equipment for temperature and its traceability

- Pt100 precision resistance thermometer
- calibrated temperature measuring system with precision indicator
- DKD calibration provided as a service
- calibration range -80 to +1100°C

Raised quality expectations, improved measurement techniques, as well as quality assurance systems, such as ISO 9000, have all led to increased demands on the documentation of processes and the monitoring of measuring equipment.

Precision platinum resistance thermometers are the preferred choice for use as factory standards. They are employed for monitoring all temperature probes used in industry, building technology and quality assurance.

In conjunction with the precision indicator (temperature measuring system), the temperatures measured can be read off directly and transmitted online via the RS232 interface. The optional SmartGraph software enables the creation of tables and graphs, and the processing of the data in other Windows applications for documentation purposes.

The central issue for all instruments is the traceability of the measurement results to national standards. DKD-certified test equipment is recognized, without any further specification, as an instrument of traceability within Europe and in many non-European countries. As a service, calibration of existing test equipment can be provided at any time.



Technical data

Precision resistance thermometer

Measuring insert

Pt100 ceramic temperature sensor to EN 60 751, Class A

Temperatures

-50 to +250°C, -200 to +450°C

Protection tube

stainless steel 1.4541, 3mm and 4.5mm dia.

Protection

IP65

Connection

4-pole Lemos coupling, size 1, 4-wire circuit, 1.5m silicone-insulated connecting cable with mating plug is included in delivery, ambient temperature -30 to +150°C

Response times: (in water with 0.4 m/sec and air with 3 m/sec)

3 mm dia.:	water	$t_{0.5} = 1.3 \text{ sec,}$	$t_{0.9} = 4.0 \text{ sec}$
	air	$t_{0.5} = 14 \text{ sec,}$	$t_{0.9} = 41 \text{ sec}$
4.5 mm dia.:	water	$t_{0.5} = 3.5 \text{ sec,}$	$t_{0.9} = 9.0 \text{ sec}$
	air	$t_{0.5} = 31.5 \text{ sec,}$	$t_{0.9} = 89.0 \text{ sec}$

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Precision indicator

Description

These universal process-led indicators are distinguished by their supreme accuracy, and are therefore ideally suited for measurement tasks where the highest level of accuracy is required. Applications are frequently found in the areas of quality assurance, production, maintenance and servicing, as well as in HVAC and environmental engineering. As a standard feature, all instrument versions have an electrically isolated RS232 PC interface, which enables the online documentation of the measured values. The measurement data can be processed by using the optional SmartGraph Windows software.

Product features

- integrated calibration function for easy compensation of probe tolerances
- 1-point, 2-point or 3-point calibration selectable
- electrically isolated RS232 interface
- Windows evaluation software available as an option (see SmartGraph accessory pack)
- large LC display with bargraph trend display
- storage of MAX, MIN, HOLD and average values
- differential temperature display on 2-channel instruments, both values can be displayed simultaneously
- operation off mains supply possible
- Pt100 input in 4-wire circuit, thermocouple inputs to EN 60 584
- measurement channels can be freely assigned

Versions:

902721/20	Pt100, thermocouple type J, K, L, N, R, S, T 1-channel; resolution 0.1°C
902721/25	Pt100, thermocouple type J, K, L, N, R, S, T 2-channel; resolution 0.1°C
902721/30	Pt100, thermocouple type J, K, L, N, R, S, T, 1-channel; resolution 0.01°C from -200 to +200°C, otherwise 0.1°C
902721/35	Pt100, thermocouple type J, K, L, N, R, S, T 2-channel; resolution 0.01°C from -200 to +200°C, otherwise 0.1°C

Note

The precision indicators (Pt100 only) are also optionally available in Ex design (see extra code).

Ranges

-200 to +850°C (Pt100), thermocouples to EN 60 584

Accuracy

Version 90.2721/20...25: with Pt100	±0.1°C from -100 to +200°C, remaining range: 0.1 % of measured value
with thermocouple type R, S	±0.1°C + 0.1 % of measured value
with thermocouple type K, J, L, N, T	±0.3°C from 0 to 200°C, ±1.0°C up to 1000°C, remaining range: ±1.5°C of measured value
Version 902721/30...35: with Pt100	±0.03°C from -100 to +150°C, ±0.05°C from -200 to +200°C, remaining range: 0.1 % of measured value
with thermocouple type R, S	±0.1°C + 0.1 % of measured value
with thermocouple type K, J, L, N, T	±0.3°C from 0 to 200°C, ±1.0°C up to 1000°C, remaining range: ±1.5°C of measured value

Display

2-line LC display with bargraph trend display

Housing

ABS plastic, dimensions 200mm x 85mm x 40mm (L x W x H)

Weight

approx. 300g

Permissible operating temperature

0 to 40°C

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SmartGraph

Documentation and evaluation software with mains supply adapter for stationary operation

This accessory pack offers a wide range of facilities for online documentation and processing of the measured values under Windows (95/98/2000/XP/NT). It can be usefully applied wherever measurement data have to be frequently documented and compared. In addition, it permits efficient management of the precision resistance thermometers and their calibration numbers.

A special interface adapter cable provides the physical connection between the indicator and the PC. The measurement data can be conveniently shown as graphs or tables and analyzed. The number of measurement channels and graphics windows can be freely selected. Data can be printed out on any installed Windows printer.

The delivery package also contains a mains supply adapter, to enable continuous operation without the inconvenience of having to change batteries.

Calibration services

The **Calibration Laboratory for Temperature (DKD-K 09501) at JUMO** has been accredited by the Physikalisch-Technische Bundesanstalt (PTB) since 1992. The latest accreditation entitles the calibration laboratory to issue calibration certificates for the calibration objects and measurement ranges that are listed below.

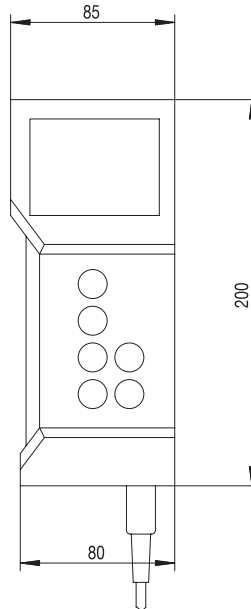
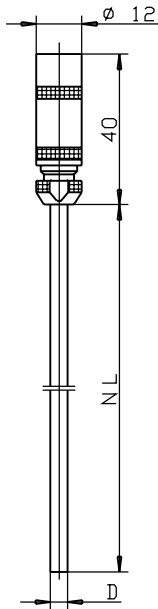
When considering the smallest measurement uncertainty, it must be taken into account that the given tolerance values relate to the measurement setup. Details in the calibration certificate may therefore show larger measurement uncertainties. The values are the result of stability tests performed on the calibration objects concerned.

Object for calibration	Measurement range	Measurement uncertainty
- resistance thermometers, - direct-reading electronic thermometers (temperature measuring system), - data loggers	0.01°C -80 to 0°C >0 to 90°C >90 to 300°C	0.005°C 0.015°C 0.010°C 0.015°C
- thermocouples	-80 to +200°C >200 to 300°C	0.2°C 0.3°C
- noble metal thermocouples	>300 to 1100°C	1.0°C
- base metal thermocouples, - direct-reading electronic thermometers	>300 to 1100°C	1.5°C
- resistance thermometers <u>with transmitter</u> , - direct-reading electronic thermometers, <u>with transmitter</u>	-80 to 0°C >0 to 90°C >90 to 300°C	0.045°C 0.040°C 0.045°C
- temperature block calibrators	30 to 133°C >133 to 660°C >660 to 1100°C	0.2°C 0.0015°C x (t) 2.5°C

Extended possibilities through factory calibration are available on request!

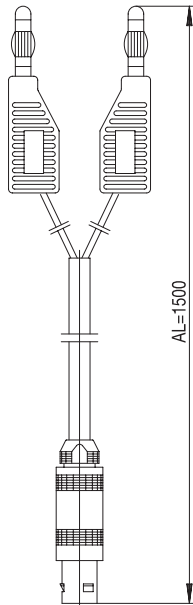


Dimensions

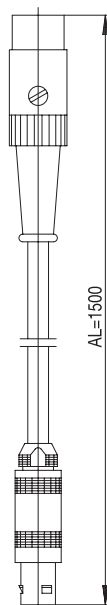


Precision resistance thermometer
Type 902721/10
Type 902721/15

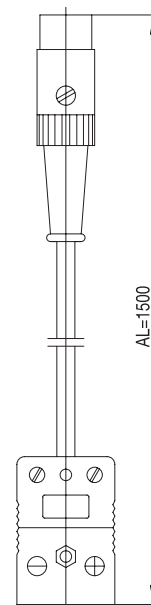
Precision indicator
Type 902721/20
Type 902721/25
Type 902721/30
Type 902721/35



Connecting cable for precision resistance thermometer



Connecting cable for temperature measuring system for Pt100



Connecting cable for temperature measuring system for thermocouples (NiCr-Ni)

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Order details: Precision resistance thermometer

		(1) Basic version	
	902721/10	Precision resistance thermometer to EN 60 751 Pt100 4-wire / Lemosa connector / connecting cable / -50 to +250°C	
	902721/15	Precision resistance thermometer to EN 60 751 Pt100 4-wire / Lemosa connector / connecting cable / -200 to +450°C	
		(2) Protection tube diameter D in mm	
x	x	3	3mm
x	x	4.5	4.5mm
		(3) Fitting length EL in mm	
x		200	200mm
x	x	300	300mm
	x	400	400mm
		(4) Packaging	
x	x	10	in twist-pack
x	x	11	in wooden case (EL ≤ 300mm only)
		(5) Extra codes	
x	x	000	no extra code
x	x	774	DKD calibration (standard, with table of resistance values)**
x	x	775	DKD calibration (as service, specify calibration points in plain text)



Order code (1) - (2) - (3) - (4) / (5) , ...
Order example 902721/10 - 3 - 200 - 10 / 775, -10, 0, +25°C¹

1. List extra codes in sequence, separated by commas.

Note

** With extra code “standard calibration”, the temperatures 0, 100 and 200°C are used as calibration points. Other or additional calibration points can optionally be selected under extra code 775.

Temperature probe connection

A silicone-insulated connecting cable, 1.5m long, is included in the delivery.

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Order details: Temperature measuring system

				(1) Basic version, indicator	
				902721/20	Precision indicator P600 1-channel / resolution 0.1°C / -200 to +850°C Pt100, thermocouples: type K, J, L, N, R, S, T
				902721/25	Precision indicator P605 2-channel / resolution 0.1°C / -200 to +850°C Pt100, thermocouples: type K, J, L, N, R, S, T
				902721/30	Precision indicator P650 1-channel / resolution 0.01°C / 0.1°C / -200 to +850°C Pt100, thermocouples: type K, J, L, N, R, S, T
				902721/35	Precision indicator P655 2-channel / resolution 0.01°C / 0.1°C / -200 to +850°C Pt100, thermocouples: type K, J, L, N, R, S, T
				(2) Operating temperature in °C, temperature probe	
x	x	x	x	135	-200 to +450°C (precision resistance thermometer)
x	x	x	x	150	-200 to +600°C (resistance thermometer), version 902221/20 ...
x	x	x	x	185	-200 to +1200°C (thermocouples), version 901221/20-1043 ...
x	x	x	x	385	-50 to +250°C (precision resistance thermometer)
x	x	x	x	415	-50 to +600°C (resistance thermometer), version 902221/20 ...
				(3) Protection tube diameter D in mm, temperature probe	
x	x	x	x	3	3mm
x	x	x	x	4.5	4.5mm
x	x	x	x	...	please specify in plain text (only with (2) selection 150, 180 and 415)*
				(4) Fitting length EL in mm, temperature probe	
x	x	x	x	200	200mm (only with (2) selection 385)
x	x	x	x	300	300mm
x	x	x	x	400	400mm (only with (2) selection 135)
x	x	x	x	...	please specify in plain text (in 50mm steps, only with (2) selection 150, 180 and 415)*
				(5) Number of temperature probes	
x	x	x	x	...	please specify in plain text
				(6) Extra codes	
x	x	x	x	000	no extra code
x	x	x	x	346	SmartGraph accessory pack
x	x	x	x	362	indicator Pt100, Ex version (II 2 G EEx ib II B T4)
x	x	x	x	773	DKD calibration (standard, display values only)**
x	x	x	x	774	DKD calibration (standard, with table of resistance values)**
x	x	x	x	775	DKD calibration (as service, specify calibration points in plain text)
x	x	x	x	779	9V mains supply adapter
x	x	x	x	782	service case (plastic) with foam rubber padding

Order code (1) - (2) - (3) - (4) - (5) / (6), ...
 Order example 902721/35 - 135 - 3 - 200 - 2 / 775, -40, 0, 100°C¹

1. List extra codes in sequence, separated by commas.

Note

* Please choose the version that fits your requirements from the corresponding data sheets 90.1221 and 90.2221, and enter fitting length and protection tube diameter in your order details.

** With extra code "standard calibration", the temperatures 0, 100 and 200°C are used as calibration points. Other or additional calibration points can optionally be selected under extra code 775.

Temperature probe connection

Depending on the number of temperature probes (5), a silicone-insulated connecting cable, 1.5m long, is included in the delivery.

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Order details: Calibration as a service

		(1) Type of calibration	
		902721/50	DKD calibration
		902721/55	factory calibration
		(2) Calibration object	
x	x	1	resistance thermometer/thermocouple/temperature measuring system
x	x	2	data logger/temperature measuring system (display values only)
x		3	temperature block calibrator
		(3) Calibration points/temperatures	
x	x	...	please specify in plain text

Order code		(1)	-	(2)	-	(3)
Order example		902721/50	-	1	-	+25, +50, +100°C ¹

Note

The prices listed in the Price Sheet for calibration objects are prices for individual items. An increased number of test specimens or calibration points will reduce the costs considerably. Additional special conditions apply to recalibrations. Price details on request!

1. List extra codes "Calibration points/temperatures" in sequence, separated by commas.