

High Precision Digital Thermometer/Data Logger

For Thermocouple and RTD Sensors with USB Port



DP9602 Series



DP9602 shown smaller than actual size.

- ✓ Reference Standard Thermometer for Pt100 and Thermocouple Sensors
- ✓ High Accuracy $\pm 0.01^{\circ}\text{C}$ Pt100, $\pm 0.18^{\circ}\text{C}$ Thermocouple
- ✓ $\pm 0.025^{\circ}\text{C}$ System Accuracy with Pt100 (Based on DP9600-SYS-CAL)
- ✓ Alpha Numeric Display
- ✓ User Selectable Resolution, $0.001/0.01^{\circ}\text{C}$ for Pt100 Inputs
- ✓ Data Logging
- ✓ Measures Pt100 and Thermocouples J, K, T, E, R, S, B and N
- ✓ Readout Directly in $^{\circ}\text{C}$, $^{\circ}\text{F}$, K, Ω or mV
- ✓ Channel A, B or A-B Reading Including Dissimilar Sensor Types
- ✓ USB Serial Communications
- ✓ USB Flash Drive Port
- ✓ Supplied with PC Software
- ✓ Programmable Analog Retransmission Output
- ✓ Rechargeable Lithium Ion Battery/ Mains Powered

The DP9602 provides precise platinum resistance thermometer temperature measurement and logging for exacting applications in both laboratory and site locations. It is an exceptionally accurate and stable

digital thermometer particularly suitable for use with thermal calibration baths as a reference standard.

The DP9602 is fully characterised for Pt100 sensors and all major thermocouples J, K, N, T, E, R, S and B. Exceptionally stable automatic cold junction compensation with a rejection of 100:1 is incorporated for thermocouple ranges. Alternatively, external or manual referencing can be selected as required.

Applications include medical, pharmaceutical, food, environmental testing, R&D and educational establishments.

Displayed values and user information are indicated on a bright clear LED screen with diffused backlighting. Data can be displayed in $^{\circ}\text{C}$, $^{\circ}\text{F}$, K, Ω as required; nine front panel push keys, the only user controls, are used in conjunction with the display screen. It is this arrangement which makes for very simple and "friendly" operation. There are four input ports, two for thermocouples and two for 3- or 4-wire Pt100 sensors; the instrument automatically recognises 3- or 4-wire configurations. The DP9602 can accept two Pt100 sensors and/or two thermocouples of similar or different types. The measured temperature can be displayed directly from one of the inputs or differentially between similar or different inputs. Differential temperature and the two individual channel temperatures are displayed simultaneously.

All four inputs can be scanned and values logged according to parameters set up by the user in the PC software; the instrument incorporates a real-time clock and on-board memory. A flash drive USB port is provided to allow data to be stored and/or exported. PC software running in Windows® is provided as standard; it allows programming of custom calibration, remote control and measure and logging functions.

Specifications

Inputs/Ranges/Sensors

Type: Pt100 to IEC 751 (ITS 90 refers) -200 to 850°C (-328 to 1562°F) $R_0 = 100\Omega$ 3- or 4-wire connection with automatic recognition (with manual override) thermocouples to IEC 584 No isolation exists between inputs

Types:

- S:** -50 to 1768°C (-58 to 3214°F)
- R:** -42 to 1766°C (-43.6 to 3211°F)
- B:** 254 to 1818°C (489 to 3304°F)
- J:** -200 to 1200°C (-328 to 2192°F)
- K:** -195 to 1370°C (-319 to 2498°F)
- E:** -190 to 995°C (-310 to 1823°F)
- N:** -160 to 1300°C (-256 to 2372°F)
- T:** -193 to 399°C (-315 to 750°F)

Overall: Pt100

Accuracy: $\pm 0.01^\circ\text{C} \pm 0.0005\%$ of span

Thermocouples J, K, T, E, N: $\pm 0.2^\circ\text{C}$ from -50 to 700°C (-58 to 1292°F), $\pm 0.4^\circ\text{C}$ from -200 to -50°C (-328 to -58°F), $\pm 0.4^\circ\text{C}$ from 700°C (1292°F) to full scale

Thermocouples R, S, B: $\pm 0.3^\circ\text{C}$ from 850°C (1562°F) to full scale, $\pm 0.4^\circ\text{C}$ below 850°C (1562°F), $\pm 0.7^\circ\text{C}$ below 0°C (32°F)

Note: Type B not characterized below 200°C (392°F).

Linearisation Conformity:

- Pt100:** Better than $\pm 0.01^\circ\text{C}$
- Thermocouples:** $\pm 0.05^\circ\text{C}$ base metal (-200°C to span) $\pm 0.1^\circ\text{C}$ noble metal above 200°C

Note: Performance of ADC ($0.5\mu\text{V}$ resolution) is superior to published thermocouple table best resolution of $1\mu\text{V}$.

Stability (vs Ambient Temperature):

Pt100: Better than 0.0025°C per 1°C ambient change

Thermocouples:

- Zero:** Negligible drift excluding CJC effect
- Scale:** $< \pm 0.1^\circ\text{C}$ in 15°C

Warm-Up: Negligible under normal ambient conditions; allow 5 to 10 minutes for full stability unless stored at low temperature, then 30 minutes minimum

Cold Junction Compensation: Automatic on all thermocouple ranges; better than $\pm 1^\circ\text{C}$ maximum shift for $\pm 10^\circ\text{C}$ ambient variation (100:1) or external via Pt100 on channel A or B or manual input of CJ temperature value

Pt100 Sensor Current: 0.5 mA

Resolution of Data Display: Pt100 0.01/0.001 user select for °C, K and Ω

Variable Filter: Sampling rate selectable between 4 and 64 (measurements averaged per reading)

Thermocouples: 0.1°C all ranges

Measurement Units: °C, °F, K, Ω or mV as applicable to sensor

Measurement Modes: A, B or A-B; any combination of sensor types

Custom Calibration: Up to 10 calibration values can be allocated to Pt100 input A & B and to thermocouples input A & B; values are retained in non-volatile memory until replaced by user; alternatively, for Pt100 inputs ITS 90 or IPTS 68 coefficients can be used for custom calibration

Smart Sensor Connection: Pt100 inputs only; correction values stored in connector

Null Function: Corrects differential temperature readout between two sensors to zero

Sensor Lead:

- Pt100:** Resistance 5Ω each lead maximum
- Thermocouples:** 300Ω loop total

Logging: 8000 readings

Supply: Internal lithium Ion rechargeable batteries; mains 90 to 260V 50/60 Hz universal adaptor included; battery charge life up to 12 hours with full charge

Series Mode Rejection: 60 dB @ 50 Hz (50 mV RMS applied)

Common Mode Rejection: 30V RMS applied between input and earth produces no measurable effect

Display: 128 x 64 pixel OLED with diffused backlighting; wide viewing angle, high contrast (adjustable)

Front Panel Controls: 9 membrane push-keys to control all instrument functions

Mechanical/Case: Metal benchtop case/adjustable tilt

Dimensions Overall: 190 W x 70 H x 250 mm D (7.5 x 2.75 x 9.85")

Weight: 3 kg (6.61 lb) approx

Input Connections: 2 x Pt100 via D type connectors
2 x thermocouple via standard sockets

USB Serial Communications: Isolated, 38400 Baud, 8 data, no parity, 1 stop bit; remote control and measure

PC Software (Standard): Supplied as standard on CD ROM; remote control and measure; log readings to file/download to PC/programming corrections

Analog Output (Standard): User programmable, 0 to 1 Vdc

Precision Pt100 Probes: 304 stainless steel probes, 6 mm Dia. with 2 m (6.6') screened PTFE lead and Pt100 probes and connector

DP9600-L250: 250 mm (9.85") L, -50 to 250°C (-58 to 482°F)

DP9600-H450: 350 mm (13.75") L, -50 to 450°C (-58 to 842°F)



OMEGACARESM extended warranty program is available for models shown on this page. Ask your sales representative for full details when placing an order. OMEGACARESM covers parts, labor and equivalent loaners.

To Order Visit omega.com/dp9602 for Pricing and Details

Model No.	Description
DP9602	High precision digital RTD/thermocouple thermometer/data logger with USB port

Accessories

Model No.	Description
DP9600-L250	Precision Pt100 RTD probe, -50 to 250°C, 250 mm
DP9600-H450	Precision Pt100 RTD probe, -50 to 450°C, 350 mm
DP9600-INSTRUMENT-CAL	Calibration for instrument alone (no NIST, UKAS calibration)
DP9600-SYS-CAL	Calibration of instrument and sensor together at five points (UKAS calibration)
DP9600-SYS-COR-CAL	Calibration of instrument and sensor together at five points, after initial calibration of sensor only and programming of corrections (UKAS calibration)
DP9600-TBLK4	Terminal block for connection of 3- or 4-wire Pt100s

Comes complete with software, power adaptor, 9-pin connector and operator's manual.

Ordering Example: DP9602, high precision digital RTD/thermocouple thermometer, DP9600-SYS-CAL, UKAS system calibration, and DP9600-H450 probe.

OCW-2, OMEGACARESM extends standard 1-year warranty to a total of 3 years.