



DDM 1000

Precision thermometer for laboratory and quality assurance

The DDM 1000 is designed for precise temperature measurements as demanded in calibration-laboratory use and quality assurance. The accuracy is adapted to the uncertainties of fix-point-cells for precise sensor calibrations. Pt-10-, Pt-25- and Pt-100-Sensors can be used at the same time. The resolution of up to 0,02 mK often is needed in physical and chemical laboratories.

Principles of operation

Resistance measurement is performed using the principle of switched direct currents. This avoids the effect of thermo-voltage on the measurement values and the typical problems of AC-based measuring instruments, i.e. parasitic capacitance and inductance.

Using a new and protected analogue to digital conversion method, fast measurements can be made with high accuracy.

At accuracies in the range of mK even small currents can cause significant self-heating. These self-heating errors can be compensated easily by using a second current, which causes $\frac{1}{2}$ power in the sensor ($\sqrt{2}$ -function).

The DDM 1000 gives uncertainties of 5 mK without external standards to ensure precise measurements even over long time periods. For improved accuracies the DDM 1000 can be

- **Accuracy: 0,1 mK**
- **Resolution: 0,02 mK**
- **Range: -220 °C to +1200 °C**
- **Pt100, -25 and Pt10-Sensors**
- **User defined coefficients for ITS 90 and EN60751**
- **Fast measurements: up to 8/s**
- **Excellent long-time stability**
- **Compensation of self heating error**
- **No impairment of the measurement results through parasitic thermovoltage**
- **Extendable up to 81 channels**
- **True 4-wire-technique with Lemo-plugs**
- **High EMC**
- **High data reliability in terms of sensor coefficients**

adjusted against external standard resistors. Therefore only one internal standard resistor of 100 ohms is used. A special method of automatic self-adjustment ensures the high linearity and avoids even small aging effects.

In the DDM 1000 the manufacturer sets the coefficients of standard sensors according to EN 60751 and ITS 90. In case other sensor coefficients have to be input, both data security and user-friendliness are most important. The key-pad input of sensor specific coefficients (up to 12 coefficients for ITS 90-sensors) often proves to be quite laborious. Apart from that – in doing so - only a limited data security can be guaranteed. For these reasons sensor specific coefficients for the DDM 1000 are established with the help of easy-to-use software on the PC. Doing so, automatic plausibility checks are carried out to avoid almost any mistakes. Afterwards the sensor data is transmitted from the PC into the DDM 1000. Thus special coefficients of new precision sensors only have to be input once by the user.

To avoid oscillations caused by harmonic voltages the DDM 1000 locks it's self to the mains frequency at every restart. It is protected against transients of several kV on the power supply. Electrostatic discharges of more than 10kV to the sensor plugs and the other connectors will not damage the DDM 1000.

