Dostmann electronic GmbH, Zum Ottersberg 12, 97877 Wertheim, Telefon 09342 308-911, Telefax 09342 308-94

- **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**
- **Extensible up to 81 measuring channels**
- **True 4-wire-technique with Lemo-plugs**
- **High EMC**
- **High data reliability in terms of sensor coefficients**

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 heigh 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 ½ power in the sensor (√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 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.

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Technical Data

All specifications are based on a rated operating voltage of 230V, 50 Hz and an ambient Temperature of 23 °C.

DDM 1000 (common data):

Channels:	2 (expandable up to 81 channels)		
Sensors:	Pt-100 **and** Pt-25 **and** Pt-10 (at the same time), true 4-wire		
Connectors:	Lemo 1S		
Measuring time:	approx. 1 s per channel, approx. 0,1 s per channel with reduced resolution		
Range:	-220 °C to 962 °C (Pt-10: -100 °C to 1200 °C)		
Resolution:	0,1 mK		
Accuracy:	Pt-25 and Pt100:	-50°C to 250°C:	5 mK
		other temperatures:	10 mK
	Pt-10:		25 mK
Long-term-stability:	5 mK/year, 10 mK in 3 years (smaller with external standard resistors)		
Display:	illuminated LCD, 2 lines of 16 characters each, character height 9 mm		
Units:	°C, °F, K, ohms		
Interface:	RS-232, electrically isolated form the measuring instrument		
Operation:	Menu-guided via built-in keyboard, alternatively from a PC		
Memory:	128 kB (optionally 512 kB)		
Power supply:	230 V, 50 Hz or 115 V, 60 Hz ca. 15 VA		
Dimensions:	300 x 160 x 300 (BxHxT in mm)		
Gewicht:	approx. 9.5 kg		

The both ranges (Pt-25 and Pt-100 / normal and height resolution) might be trimmed to different standard resistors. Doing so a better accuracy at the triple point of water can be reached. The following data require only one standard resistor of 100 ohms.

DDM 1000 CP **(improved resolution, only Pt100-sensors)**

Height resolution range:

Range:	-220 °C to +250 °C		
Resolution (1σ):	0 °C:	0,02 mK	

Current: approx. 1,0 mA switched DC current

DDM 1000 HL **(with self adjustment of linearity and feature of adjustment to external standard resistors)**

*Accuracy:	(Pt-10-sensors should be used in the Pt-25-range)		
	Pt-100:	0°C:	0,2 mK
		-100 °C to 430 °C:	0,5 mK
		others:	1 mK
	Pt-25:	-100 °C to 430 °C:	1 mK
		others:	1 mK
	Pt-10:		2,5 mK

Current: approx. 0,5 mA switched DC current (approx. 1mA for Pt-25 and Pt-10)

Stability-stability: The part of the DDM 1000 it's self is negligible when trimming to external resistors

DDM 1000 HRL **(with self adjustment of linearity and feature of adjustment to external standard resistors, improved resolution)**

Normal range: Pt100-sensors: see DDM 1000 HL. (Pt-10 and Pt-25 in height resolution range)

High-resolution range:

Current:	approx. 1 mA, switched DC current		
Ranges:	Pt-100:	-220 °C to +250 °C	
	Pt-10 and Pt-25:	-100 °C to 1200 °C	
Resolution (1 σ):	Pt100:	0°C:	0,02 mK
		others:	0,05 mK.
	Pt-10 and -25:	0,1 mK (0,2mK with Pt10)	
*Accuracy:	Pt-100:	0°C:	0,1 mK
		others:	0,3 mK
	Pt-25:	-100 °C to 962 °C:	1 mK
		others:	1,5 mK
	Pt-10:		2,5 mK

Longterm-stability: The part of the DDM 1000 it's self is negligible when trimming to external resistors

* Under the direct influence of modulated HF-disturbances (e.g. Handy) the measuring inputs errors of 10 mK might occur. The accuracy does not include the errors of external standard resistors and probes.

Technical data are subject to change without notice!

Accessories

- Automatic multiplexers (with 8, 16 or 32 channels)
- PC-Software
- Analogue output
- Temperature probes
- Memory expansion