

## DTM 3000 DIGITAL THERMOMETER FOR THERMOCOUPLE SENSORS OPERATING INSTRUCTIONS

The Series 3000 digital thermometer, controlled by a microcontroller, stands out in terms of high accuracy, low power consumption, simplicity of operation, and low weight.

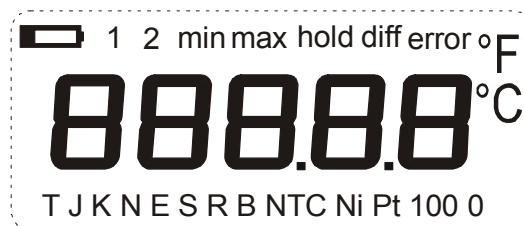
The unit provides rapid high-precision measurements over a wide temperature range. Many parameters can be individually adjusted via the serial interface. A large choice of sensors allows its application to a very wide variety of measurement tasks.

### TECHNICAL DATA

Measurement range:	Type K -200..1370°C Type S 0..1760°C Type T -200.. 400°C Type J -200..1200°C Type B 300..1820°C Type N -260..1300°C	set by the manufacturer
Resolution:	0.1°C/1°C	can be configured via software
Measurement accuracy:	0.5% FS	
Measurement rate:	maximum 4/s	can be configured via software
Battery:	9V-block 6F22	
Battery life:	>500 hours at 1 per sec	
Sensor:	thermocouples type S,K,T,J,B,N	
Functions:	Min/Max, Hold	
Interface:	USB	cable and software must be obtained separately
Cold-junction compensation:	intern	
Sensor connection:	miniature thermocouple socket	

### DESCRIPTION OF THE UNIT

Figure 1  
 Symbols in the LCD display



The unit is switched on by actuating the on/off button. First of all a segment check is carried out for approx. 2 secs. Here the display must look like Figure 1. If segments are missing or the display appears to be very weak the battery should firstly be checked. If this is OK, the unit should be sent to the manufacturer for inspection. During this period of time a self-test is carried out in the unit. If a defective function is detected, an error number appears in the display. If the test has been completed successfully, the current measured value is displayed. The following error messages can occur:

- Err1 upper limit of measurement range exceeded
- Err2 lower limit of measurement range not reached
- Err4 battery flat

## BUTTON ASSIGNMENTS

The maximum and minimum measured values for a measurement period can be retrieved using the **max/min button**. When the max/min button is actuated firstly the max symbol and the maximum measured value appear in the display. With a further actuation the minimum value and the min symbol appear. Alternation between these two states can be carried out as often as required. If during measurement the maximum possible measured value is exceeded (Err1), then the maximum possible measured value is displayed. If the measurement moves out of range at the bottom end (Err2) the minimum possible measured value is displayed. If the button is pressed for approx 3 seconds, the memory is cleared. 0.00 appears on the display as confirmation of this. If no button is actuated for approx 5 seconds the unit program reverts into the normal measuring mode.

The **hold button** enables the measured value to be frozen. This is useful if measurements are being taken at locations where full attention must be paid to the measurement site. This function is also useful for temperature comparisons over longer time periods.

The unit is switched on by actuating the **on/off button**. When the unit is switched off the max/min store is deleted. All other settings are retained.

## BATTERY MANAGEMENT

Attention is drawn to a flat battery in 2 stages. If the battery symbol appears on the display the battery should be replaced soon. However, measurements can still be made, and the accuracy of these is still guaranteed. If the battery voltage drops further, Err4 appears on the display. Measurements are then no longer possible and the battery must be replaced as a matter of urgency. The battery compartment is located on the rear face of the housing. It is opened by pressing lightly with the thumbs on the hatched surface and pulling the flap rearward.

## INTERFACE

The unit uses an USB interface as standard. The software enables the display and storage of measured values and in addition certain parameters can be adjusted. Graphical presentations of temperatures over time and imports of values into Excel<sup>®</sup> are also possible.

## SENSORS

A large number of sensors are available for the DTM3000. If a particularly complicated measurement problem arises, we would be happy to produce a sensor to your requirements at an attractive price. You can find a selection of sensors on our Internet site ([www.lkmelectronic.de](http://www.lkmelectronic.de)).

## ADVICE REGARDING ACCURATE MEASUREMENTS

Thermocouples stand out for simplicity assembly, robustness and high measurement cruise.

But the accuracy is lower than the accuracy of pt100 elements.

In fact of the cold-junction compensation (Seebeck-effect) they become more mistakes too.

In the event of extreme temperature changes (e.g. moving from a warm room into a cold environment) a thermocouple hand unit should be allowed to acclimatise for app. 10 minutes to ensure accurate measurements. For surface measurements there are special sensor designs.

**The unit should be checked every 2 years. To satisfy this requirement we are happy to provide you with an inexpensive works calibration certificate.**

## POSSIBLE FAULTS

Symptoms	Possible cause
Error1 even with sensor connected at room temperature	Sensor fracture
Err2 always displayed.	Short circuit in cable or connector
Display value is too low and has severe oscillations	Moisture has penetrated into the sensor or the unit
Showing temperature change in one direction in face of constant measuring point temperature	Unit is not enough acclimatise, wait app. 10 min, till the showed temperature get in one direction constant

