



Instruction Manual

123-8772

THERMOMETER & CALIBRATOR

EN



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1. FEATURES

- * 2 instruments in 1: Type K thermometer & type K thermocouple calibrator ".
- * Precision calibrator for type K thermometers and process devices.
- * Wide range : -199°C to 1230°C (-325°F to 2246°F).
- * Microprocessor circuit assures high accuracy and provides special functions and features.
- * Incorporates a high precision temperature linearity compensation circuit.
- * $^{\circ}\text{C}/^{\circ}\text{F}$ selectable including data hold for temperature measurements.
- * $^{\circ}\text{C}$ & $^{\circ}\text{F}$ select by the front button for the temperature calibrator.
- * Thermocouple sensor for Temp. measurement, fast response time.
- * RS 232 PC serial computer interface.
- * Temp. measuring input to meet any standard type K (NiCr–NiAl) probe.
- * Fitted with standard type K input measuring socket.
- * Super large LCD display, easy reading.
- * Operates from 006P DC 9V battery.
- * Designed and manufactured using high quality and reliable components. Outer case constructed using ligh weight, high impact resistant ABS.

2. SPECIFICATIONS

2-1 General Specifications

Circuit	Custom one-chip of microprocessor LSI with thermocouple linearity correction circuit.	
Display	14.8 mm (0.58") digit size. Super large LCD display with annunciator.	
Function	<i>2 in 1 :</i> Type k thermometer, Type k thermocouple calibrator.	
Range	<i>Measure :</i> -199.9°C to 1230°C / - 327°F to 2246°F.	
	<i>Calibrator</i> -199.9°C to 1230°C / - 327°F to 2246°F.	
Polarity	' - ' indicates negative polarity.	
Thermometer	Sensor	Thermocouple K
	Type	(NiCr-NiAl).
	Input Impedance	10 Mega ohm.
Sampling	Approx. 1 second.	
Data Output	RS 232 PC serial computer interface.	
Over input indication	Indication of " - - - - ".	
Operating Temperature	0 °C to 50 °C (32 °F to 122 °F).	
Operating Humidity	Less than 80% RH.	
Power Supply	006P DC 9V, MN1604/PP3 battery or equivalent. <i>Heavy duty or Alkaline type.</i>	
Power Current	Approx. DC 9 mA.	
Weight	280 g/0.62 LB (included battery).	

Size	185 x 78 x 38 mm (7.3 x 3.0 x 1.5 inch).
Accessories Included	Instruction Manual 1 PC. Dual type k plug cable, DUK-02.....1 PC.
Optional Accessories (Please ref. page 9)	* Temperature probe, TP-01, TP-02A, TP-03, TP-04. * Carrying case, CA-03, CA-04. * Software, SW-U801-WIN. * RS232 cable, UPCB-01. * USB cable, USB-01.

2-2 Electrical Specifications (23± 5 °C)

Type K thermocouple Calibrator

	Calibrator Range	Resolution	Accuracy
°C	-199.9 °C to -100.1 °C	0.1 °C	± (1 % + 1 °C)
	-100.0 °C to 999.9 °C	0.1 °C	± (0.5 % + 1 °C)
	1000 °C to 1230 °C	1 °C	
°F	-327 °F to -200 °F	1 °F	± (1 % + 2 °F)
	-199.9 °F to -148.1 °F	0.1 °F	
	-148.0 °F to 999.9 °F	0.1 °F	± (0.5 % + 2 °F)
	1000 °F to 2246 °F	1 °F	

Thermometer, measure

	Thermometer Range	Resolution	Accuracy
°C	-199.9 °C to -100.1 °C	0.1 °C	± (1 % + 1 °C)
	-100.0 °C to 999.9 °C	0.1 °C	± (0.5 % + 1 °C)
	1000 °C to 1230 °C	1 °C	
°F	-327 °F to -200 °F	1 °F	± (1 % + 2 °F)
	-199.9 °F to -148.1 °F	0.1 °F	
	-148.0 °F to 999.9 °F	0.1 °F	± (0.5 % + 2 °F)
	1000 °F to 2246 °F	1 °F	

The accuracy specification of thermometer applies only to the instrument itself and allowance must be made for limits of error permitted in thermocouple.

Remark :

*** The above Spec. are tested under the environment RF Field Strength less than 3 V/M & frequency less than the 30 MHz only.**

3. FRONT PANEL DESCRIPTION

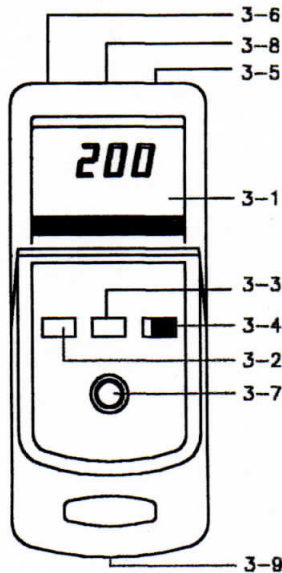


Fig. 1

- 3-1 Display**
- 3-2 Hold Button**
- 3-3 °C/ °F Button**
- 3-4 OFF/MEASURE/CALIBRATION Switch**
- 3-5 Calibration Output Terminal**
- 3-6 Measurement Socket**
- 3-7 Calibration Adjust Knob**
- 3-8 RS-232 Output Terminal**
- 3-9 Battery Cover/Compartment**

4. TEMPERATURE MEASURING PROCEDURE

- 1) Slide the " OFF/MEASURE/CALIBRATION Switch " (3-4, Fig. 1) to the " MEASURE " position.
- 2) Select the desired unit of measurement (°C or °F) using the °C/°F Button " (3-3, Fig. 1). The LCD will display the selected unit.
- 3) Insert one type K thermocouple probe into the " Measurement Socket " (3-6, Fig. 1). The LCD will display the temperature measured by the connected probe.
- 4) To hold a displayed measurement press the "HOLD button" (3-2, Fig. 1). The LCD will display the held value and the "DH" annunciator will appear. To release the hold function and resume normal measurements press the " Hold button" again, the "DH" annunciator will disappear.

Temperature Measuring Consideration :

- a) *When connecting a probe plug to the " Measurement socket" (3-6, Fig. 1) ensure that correct polarity is observed.*
- b) *After the probe plug has been connected to the instrument, or probes are interchanged, the probe plug must be permitted to stabilise to the same temperature as the socket in order to ensure the greatest accuracy. This is because the socket is connected to the instrument's cold junction compensation device. The period of stabilisation should only last for a few minutes and applies only if the probe plug has previously been exposed to a differing ambient temperature.*

5. CALIBRATION PROCEDURE

- 1) Slide the " OFF/MEASURE/CALIBRATION Switch " (3-4, Fig. 1) to the " CALIBRATION " position.
- 2) Determine temperature unit to $^{\circ}\text{C}$ or $^{\circ}\text{F}$ by pushing the " $^{\circ}\text{C}/^{\circ}\text{F}$ Button " (3-3, Fig. 1). The LCD will show the unit of " $^{\circ}\text{C}$ " or " $^{\circ}\text{F}$ ".
- 3) Prepare the optional " Dual type k plug cable ". One plug insert into the " Calibration Output Terminal " (3-5, Fig. 1), the other plug insert to the calibrated thermometer. Please refer Fig. 2.

Consideration :

When insert the plug should taking care to observe the correct polarity.

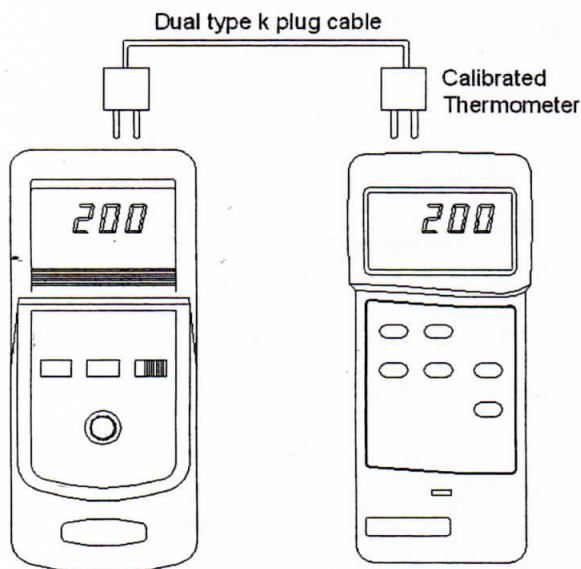


Fig. 2

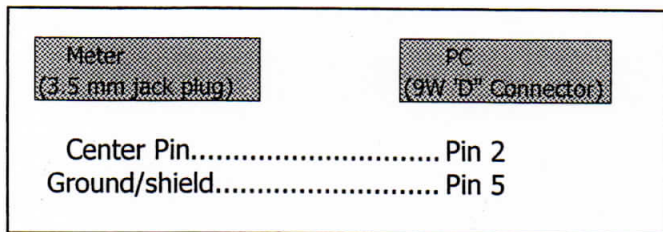
- 4) Adjust " Calibration Adjust Knob " (3-7, Fig. 1), the calibrator will generate the " simulation type K thermocouple signal " according the display value & engage to the calibrated thermometer.

6. RS232 PC INTERFACE

The instrument features an RS232 output via 3.5 mm Terminal (3-8, Fig. 1).

The connector output is a 16 digit data stream which can be utilized to the user's specific application.

An RS232 lead with the following connection will be required to link the instrument with the PC serial input.



The 16 digit data stream will be displayed in the following format :

D15 D14 D13 D12 D11 D10 D9 D8 D7 D6 D5 D4 D3 D2 D1 D0

Each digit indicates the following status :

D0	End Word		
D1 to D4	Upper Display reading, D1=LSD, D4=MSD		
D5 to D8	Lower Display reading, D5=LSD, D8=MSD		
D9	Decimal Point(DP) for Upper display. 0 = No DP, 1= 1 DP, 2 = 2 DP, 3 = 3 DP		
D10	Decimal Point (DP) for lower display 0 = No DP, 1= 1 DP, 2 = 2 DP, 3 = 3 DP		
D11 & D12	Anunuciator for Upper Display		
	00 =No Symbol	07 = mg/L	14 =mS
	01 =C	08 = m/s	15 =Lux
	02 =F	09 = Knots	16 =Ft-cd
	03 = %	10 = Km/h	17 =dB
	04 = % RH	11 = Ft/min	18 =mV
	05 = % PH	12 = mile/h	
	06 = % O ₂	13 = uS	
D13	Anunuciator for Lower Display		
	0 =No Symbol	1 =C	2 = F
D14	Reading Polarity for the Display		
	0 = Both upper & lower display value are "+".		
	1 = Upper "-", Lower "+".		
	2 = Upper "+", Lower "-".		
3 = Both upper & lower display value are "-".			
D15	Start Word		

7. BATTERY REPLACEMENT

- 1) When "LBT" appears in the left corner of the LCD the battery voltage has fallen below 6.5V – 7.5V. The instrument may still operate within the specified accuracies for several hours, but the battery should be replaced as soon as possible to guarantee the greatest accuracy.

- 2) Slide the " Battery Cover " (3-9, Fig. 1) away from the instrument and remove the battery.
- 3) Replace with 9V battery (heavy duty type) and replace the cover.
- 4) Make sure the battery cover is secured properly after battery replacement.

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