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# **1. FEATURES**

- \* Type J/K/R/E/T thermocouple thermometer.
- \* Thermocouple probe accept 5 different types : type K, type J, type R, type T, type E.
- \* Microcomputer circuit with excellent performance.
- \* Wide temperature measuring range.
- \* Build in  $^\circ\!\mathrm{C}\,$  &  $^\circ\!\mathrm{F}\,$  select button on the front panel.
- \* 0.1 degree resolution for type K/J/T/E.
- \* Data hold function for storing the desired value .
- \* Memory function to record the maximum & minimum reading.
- \* Build in a REL button, useful for relative measurement.
- \* Sensor select button on the front panel, easy to change different type probe.
- \* RS 232 data output, easy to connect with computer.
- \* Optional data acquisition software for data record.
- \* Auto power off saves battery life.
- \* Built-in low battery indicator.
- \* Heavy duty & compact housing case with stand.
- \* Powered by 006P DC 9V battery.

# 2. SPECIFICATIONS

#### 2-1 General Specifications

Display	51 mm x 32 mm supper large LCD display,	
	15 mm ( 0.6" ) digit size.	
Sensor	Thermocouple probe	
Туре	@ Thermocouple type K	
	@ Thermocouple type J	
	@ Thermocouple type T	
	@ Thermocouple type E	
	@ Thermocouple type R	
Functions	$^\circ\!\mathrm{C}$ , $^\circ\!\mathrm{F}$ , Data hold, Memory ( Max., Min. ),	
	Relative measurement,	
Resolution	0.1 degree or 1 degree.	
Circuit	Exclusive microcomputer circuit, the	
	software build in linearity correction function	
	instead of the traditional hardware circuit.	
Probe Input	Thermocouple probe :	
Socket	Standard 2 pin thermocouple socket.	
Sampling Time	Approx. 1 second.	
Hold Function	To freeze the display reading value.	
Memory Recall	Memorize the Maximum, Minimum	
	reading.	
Offset	Available for thermocouple thermometer,	
Adjustment	adjustment by pushing button on front panel.	
Over Indication	Show " ".	
Data Output	RS232 PC serial interface.	

Power Supply	DC 1.5 V battery ( UM4, AAA ) x 6 PCs,	
	or equivalent.	
Power	Approx. DC 11 mA.	
Consumption		
Operating	0 to 50 °C (32 to 122 °F).	
Temperature		
Operating	Less than 80% RH.	
Humidity		
Size	174 x 68 x 42 mm (6.9 x 2.7 x 1.7 inch).	
Weight	280 g/0.62 LB.	
Standard	Operational manual 1 PC.	
Accessory		
Optional	* Thermocouple couple (Type K) probe :	
& accessories	Model : TP-01, TP-02A, TP-03, TP-04.	
Temp. Probe	* Soft Carrying case, CA-05A	
(Refer to	* RS232 cable, UPCB-02	
page 13 )	* USB cable, USB-01	
	* Data Acquisition software,	
	* SW-801-WIN	

#### 2-2 Electrical Specifications

Sensor	Reso-	Range	Accuracy
Туре	lution		
Туре К	0.1 ℃	-50.0 to 1300.0 °C	± (0.2 % + 0.5 °C )
		-50.1 to -100.0 °C	± ( 0.2 % + 1 °C )
	0.1 °F	-58.0 to 2372.0 °F	± (0.2 % + 1 °F )
		-58.1 to -148.0 °F	± (0.2 % + 1.8 °F)
Type J	0.1 °C	-50.0 to 1150.0 °C	± (0.2 % + 0.5 °C )
		-50.1 to -100.0 °C	± (0.2 % + 1 °C )
	0.1 °F	-58.0 to 2102.0 °F	± (0.2 % + 1 °F )
		-58.1 to -148.0 °F	± (0.2 % + 1.8 °F)
Туре Т	0.1 ℃	-50.0 to 400.0 °C	± (0.2 % + 0.5 °C )
		-50.1 to -100.0 °C	± ( 0.2 % + 1 °C )
	0.1 °F	-58.0 to 752.0 °F	± ( 0.2 % + 1 °F )
		-58.1 to -148.0 °F	± (0.2 % + 1.8 °F)
Type E	0.1 °C	-50.0 to 900.0 °C	± (0.2 % + 0.8 °C )
		-50.1 to -100.0 °C	± ( 0.2 % + 1 °C )
	0.1 °F	-58.0 to 1652.0 °F	± (0.2 % + 1.5 °F )
		-58.1 to -148.0 °F	± (0.2 % + 1.8 °F)
Type R	1 °C	0 to 600 °C	± (1% + 5°C)
		601 to 1700 ℃	± (1.5 % + 5 °C )
	1 °F	<b>32 to 1112</b> °F	± (1% + 10°F)
		1113 to 3092 °F	± (1.5 % + 10 °F )

Remark :

a. Accuracy value is specified for the meter only.

- b. Accuracy is tested under the ambient temperature within  $23 \pm 5$ °C.
- *c. Linearity Correction : Memorize the thermocouple's curve into the intelligent CPU circuit,*



## 4. THERMOCOUPLE (Type K/J/T/E/R) MEASURING PROCEDURE

#### 4-1 Measuring Procedures

- 1) Power on the meter by pressing the "Power Button " (3-2, Fig. 1).
- Select the sensor type (Type K/J/T/E/R) by pressing " Sensor Button " (3-5, Fig. 1). The display will show the symbol of K, J, R, E, T.
- 3) Insert the Temp. probe plug into the "Thermocouple Input Socket " (3-10, Fig. 1).
- 4) Select the "  $^\circ\!C$  " "  $^\circ\!F$  " display unit by pressing "  $^\circ\!C/^\circ\!F$  Button " ( 3-7, Fig. 1 ).
- 5) Display will show the temperature reading that measured from the probe.

#### 4-2 Offset Value Adjustment

Caused by the environment temperature change or other reasons.... The measuring value may drift few degrees (1, 2 or 3 degrees).

If users found that the measuring values exist little deviation especially when measuring the low temperature, the offset value adjustment procedures are necessarily to be proceeded.

# The offset value adjustment procedures are as following :

- Power on the meter by pressing the "Power Button " ( 3-2, Fig. 1 ).
- 2) Select the sensor type ( Type K/J/T/E/R ) by pressing " Sensor Button " ( 3-5, Fig. 1 ).



Then release all buttons, the smaller digits display (right bottom corner of LCD) will disappear, the offset value adjustment procedures are completely finished.



#### 4-3 Measuring Consideration

- 1) When insert the probe plug into the Temp. input socket, please make sure the polarity correct.
- 2) The temperature difference between thermocouple probe and thermometer will cause an inaccurate measuring result. Therefore, for the best measuring and accuracy performance of a thermocouple thermometer, whenever change a probe or plug a new probe in the thermometer, thermal equivalent between probe plug and meter's input socket is a necessary condition. Thermal equivalent procedure may take few minutes and apply only when the probe has been exposed to an ambient temperature different from the thermometer.

# 5. DATA HOLD, RECORD, RELATIVE, and AUTO POWER OFF DISABLE

#### 5-1 Data Hold

- During the measurement, pressing the "Hold Button " (3-3, Fig. 1) will hold the measured value & the LCD will show "HOLD " symbol.
- 2) Press the "Hold Button " again to exit the data hold function.

#### 5-2 Data Record (Maximum, Minimum reading)

- The DATA RECORD function displays the maximum and minimum readings. To start the DATA RECORD function by pressing the "REC Button " (3-4, Fig. 1) once. "REC " symbol will appear on the LCD display.
- 2) When the " REC " symbol on the display :
  - (a) Press the "REC Button " (3-4, Fig. 1) once, the "Max " symbol along with the maximum value will appear on the display.
  - (b) Press the "REC Button " again, the " Min " symbol along with the minimum value will appear on the display.
  - (c) To exit the memory record function, press the" REC Button " for 2 seconds at least and then the display will revert to the current reading.

#### 5-3 Relative measurement

- During the measurement, the circuit will memorize the last measured value by pressing the "REL Button " (3-6, Fig. 1) at once, display will show zero value & a "REL " symbol appear on the LCD.
- 2) The new measured Temp. values will deduct above memorized " Last measured value " automatically.
- It will cancel the relative measurement function if the " REL Button " by pressed again and at same time the " REL " marker will disappear.

#### Considering :

When meter in the "Data Hold "& "Data Record " condition, the Relative function can't be activated.

#### 5-4 Auto Power Off disable

The instrument build-in " Auto Power off " in order to prolong battery life. The meter will switch off automatically if none of the buttons are pressed for approx. 10 minutes.

" Auto Power Off " function is inactive only when execute the " Data Record " procedures ( refer to 5-2, page 9 ).

# **6. BATTERY REPLACEMENT**

- When the left top corner of LCD display show
   " \_\_\_\_\_ ", it is necessary to replace the
   battery. However within specification
   measurement may still be made for several
   hours after low battery indicator appears.
- 2) Open the "Battery Cover " (3-9, Fig. 1) away from the instrument by loosing the "Battery Cover Screws " (3-12, Fig. 1) and remove the batteries.
- 3) Replace the batteries (DC 1.5V, UM4/AAA type, 6 PCs) and reinstate the cover.
  \* Please make attention the polarity of the battery.
- 4) Make sure the battery cover is secured after changing the battery.

# 7. RS232 PC SERIAL 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 by the user for specific application.

A 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 indicate the following status :

D15	Start Word		
D14	4		
D13	1		
D12, D11	Annunciator for Display		
	$^{\circ}C = 01$ $^{\circ}F = 02$		
D10	Polarity		
	0 = Positive 1 = Negative		
D9	Decimal Point(DP), position from right to the left		
	0 = No DP, 1= 1 DP, 2 = 2 DP, 3 = 3 DP		
D0	End Word		
D8 to D1	Display reading, D1 = LSD, D8 = MSD		
	For example :		
	If the display reading is 1234, then D8 to D1 is :		
	00001234		
D0	End Word		

### RS232 setting

Baud rate	9600
Parity	No parity
Data bit no.	8 Data bits
Stop bit	1 Stop bit

# 8. OPTIONAL ACCESSORIES & PROBES

Thermocouple	Model : TP-01	
Probe	* Measure Rage : -40 $^\circ\!\mathrm{C}$ to 250 $^\circ\!\mathrm{C}$ , -40 $^\circ\!\mathrm{F}$	
(ТуреК)	to 482 °F.	
	* Ultra fast response naked-bead	
	thermocouple, general purpose	
	application.	
Thermocouple	Model : TP-02A	
Probe	* Measure Range : -50 $^\circ\!\mathrm{C}$ to 900 $^\circ\!\mathrm{C}$ , -50 $^\circ\!\mathrm{F}$	
(ТуреК)	to 1650 °F.	
	* Dimension: 10 cm tube, 3.2 mm Dia.	
Thermocouple	Model : TP-04	
Probe	* Measure Range : -50 $^\circ\!\mathrm{C}$ to 400 $^\circ\!\mathrm{C}$ , -50 $^\circ\!\mathrm{F}$	
(ТуреК)	to 752 °F.	
Surface Probe	* Dimension: 10 cm tube, 8 mm Dia.	
Thermocouple	Model : TP-03	
Probe	* Measure Range : -50 $^\circ\!\mathrm{C}$ to 1200 $^\circ\!\mathrm{C}$ ,	
	-50°F to 2200 °F.	
(ТуреК)	* Size : Temp. sensing head - 15 mm Dia.	
	Probe length : 120 mm.	
RS232 cable	Model : UPCB-02	
	* RS232 cable for connecting between the	
	meter & the computer ( COM port )	
USB cable	Model : USB-01	
	* RS232 cable for connecting between the	
	meter & the computer ( USB port ).	
Software	Model : SW-U801-WIN, Windows version.	
	* Software apply as the performance of data	
	logging system & data recorder	
Carrying Case	Model : CA-05A, soft carrying case.	
Carrying Case	Model : CA-06, Hard carrying case.	

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