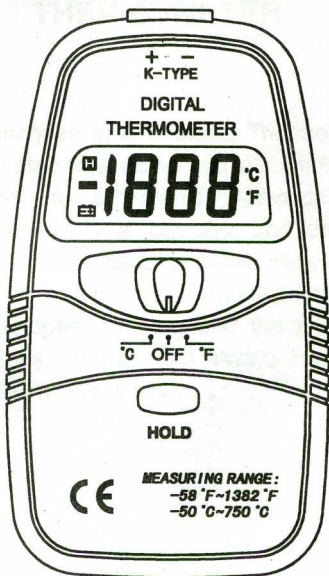


# OPERATOR'S INSTRUCTION MANUAL



## DIGITAL THERMOMETER

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# **DIGITAL THERMOMETER**

Your purchase of this Digital Thermometer marks a step forward for you into the field of precision measurements. Although this Thermometer is a complex and delicate instrument, its ruggedness will allow many years of use if proper operating techniques are developed. Please read the following instructions carefully and always keep this manual within easy reach.

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# **USER'S MANUAL**

## **CONTENTS**

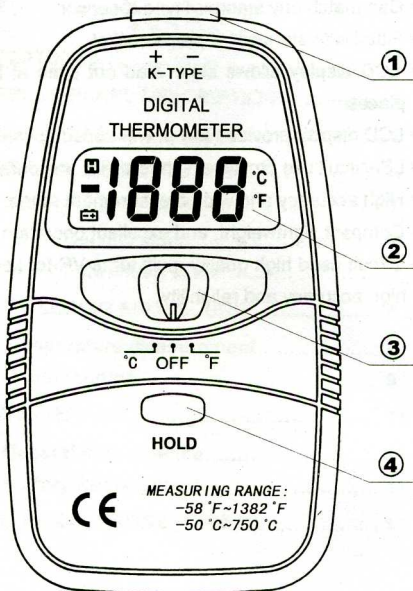
<b>1. FEATURES .....</b>	<b>3</b>
<b>2. FRONT PANEL DESCRIPTION.....</b>	<b>4</b>
<b>3.SPECIFICATIONS.....</b>	<b>5</b>
<b>3-1 Technical Specifications.....</b>	<b>5</b>
<b>3-2 General Specifications.....</b>	<b>7</b>
<b>3-2-1 Celsius scale .....</b>	<b>7</b>
<b>3-2-2 Fahrenheit scale.....</b>	<b>7</b>
<b>4. MEASURING PROCEDURE.....</b>	<b>8</b>
<b>4-1 Temperature Measurement.....</b>	<b>8</b>
<b>4-2 Consideration.....</b>	<b>9</b>
<b>5. MAINTENANCE.....</b>	<b>11</b>
<b>5-1 General maintenance.....</b>	<b>11</b>
<b>5-2 Battery Replacement.....</b>	<b>11</b>
<b>6. OPTIONAL PROBE (TYPE K).....</b>	<b>12</b>

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## 1. FEATURES

- \* Can match any standard type K-sensor.
- \* Fitted with standard K probe socket.
- \* LCD display allows clear read out even at bright places.
- \* LCD display provides low power consumption.
- \* LSI-circuit use provides high reliability and durability.
- \* High accuracy and wide measurement range.
- \* Compact, lightweight, and excellent operation.
- \* Circuit used high quality multi turns VR for keeping high accuracy and reliability.

## 2. FRONT PANEL DESCRIPTION



- 
- ① Thermocouple input socket
  - ② LCD display
  - ③ Function switch
  - ④ HOLD key

### **3. SPECIFICATIONS**

#### **3-1 General Specification**

- **Environment Conditions:**

Operating Temperature:

0°C to 40°C ≤ 80% RH, non-condensing

Storage Temperature:

-10°C to 60°C ≤ 70% RH, battery removed


- Operating principle: dual slop integration
- Sample Rate: 2 times/sec for digital data
- Display:
  - 3 1/2 digits LCD Display with max. Reading 1999,
  - Automatic indication of functions.
- Polarity indication: "-" displayed automatically.
- Open-circuit Sensor indicator:
  - LCD will display "1" when sensor is open-circuit.

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- **Power Supply:**

DC 9V battery (NEDA 1604 6F22 006P).

- **Low Battery Indicator:**

The " " is displayed when the battery is under the proper operation range

- **Impedance:** 10M  $\Omega$

- **Dimension:** 125.5(L) $\times$ 72(W) $\times$ 27(H)mm

- **Weight:** 145g approx. (battery included)

- **TP-01 Thermocouple Probe:**

The sensor supplied with the instrument is an ultra-fast response naked-bead thermocouple TP-01 suitable for many applications but with a maximum operating temperature of 250°C/482°F (300°C/572°F short-term).

- **Accessories:** TP-01 Thermocouple Probe with plug,  
Instruction manual, Carrying case

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## 3-2 Technical Specification

Measurement Range:

-50°C to 750°C; -50°F to 1382°F

Sensor Type: K type thermocouple

Resolution: 1°C or 1°F

Accuracy:

$\pm$ (% of reading + number of digits) at 18°C to 28°C  
(64°F to 82°F) with relative humidity to 80%.

### 3-2-1 Celsius scale

Range	accuracy
0°C to 500°C	$\pm(0.75\%+2^{\circ}\text{C})$
500°C to 750°C	$\pm(1\%+3^{\circ}\text{C})$
0°C to -20°C	typ. $\pm 3^{\circ}\text{C}$
-20°C to -40°C	typ. $\pm 5^{\circ}\text{C}$
-40°C to -50°C	typ. $\pm 6^{\circ}\text{C}$

### 3-2-2 Fahrenheit scale

Range	accuracy
32°F to 932°F	$\pm(0.75\%+4^{\circ}\text{F})$
932°F to 1382°F	$\pm(1\%+5^{\circ}\text{F})$
32°F to -4°F	typ. $\pm 4^{\circ}\text{F}$
-4°F to -58°F	typ. $\pm 7^{\circ}\text{F}$

\*typ.(typically): means almost units within such accuracy.



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## **4. MEASURING PROCEDURE**

### **4-1 Temperature Measurement**

For measurement of high temperatures, surfaces, semi-solids, liquids etc., a range of hand-held probes is available (such as TP-02A...) or, if required, any suitable probe of the K type can be used.

- Insert the sensor plug into the socket at top edge of the instrument, taking care to observe the correct polarity.
- Select the °C/°F function desired.
- Use the sensing point of thermocouple to measure the surface to be measure.
- Read the stable reading.
- Hold the value, if necessary, by pressing the hold key. A second short press returns the instrument to normal mode.

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## 4-2 Consideration

When the sensor is first plugged into the thermometer, or if the sensor is changed, the plug must be allowed to stabilize at the temperature of the socket, which is in thermal contact with the cold junction compensation device, for greatest accuracy is to be achieved. This will only take a couple of minutes and only applies if the sensor plug has previously been exposed to an ambient temperature different to that of the thermometer.

Note that in common with other thermocouple thermometers the accuracy specification applies only to the instrument itself and allowance must be made for limits of error permitted in thermocouple. The relevant specifications and respective limits for K type thermocouples are:

DIN 43710

Measurement Temp.	Allowable Error
0°C TO 400°C	±3%
400 TO 1100°C	±0.75%

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**JIS C1602-1981**

Measurement Temp.	Class	Allowable Error
$>0^{\circ}\text{C}<1000^{\circ}\text{C}$	0.4	$\pm 1.5^{\circ}\text{C}$ or $\pm 0.4\%$ of Measured Temp.
$>0^{\circ}\text{C}<1200^{\circ}\text{C}$	0.75	$\pm 2.5^{\circ}\text{C}$ or $\pm 0.75\%$ of Measured Temp.
$>-200^{\circ}\text{C}<0^{\circ}\text{C}$	1.5	$\pm 2.5^{\circ}\text{C}$ or $\pm 1.5\%$ of Measured Temp.

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## **5. MAINTENANCE**


### **5-1 General maintenance**

- To keep the instrument clean, wipe the case with a dry cloth and detergent, do not use abrasives or solvents.
- Any adjustment maintenance and repair shall be by a skilled person about temperature technology.

To maintain a thermocouple in good condition, shall observe the following items.

- Avoid excess bending.
- Don't overheat the thermocouple.
- Avoid chemical reactions that can damage the thermocouple.

### **5-2 Battery Replacement**

- When the battery voltage drop below proper operation range the  symbol will appear on the LCD display and the battery need to be replaced..
- Slide the battery cover away from the instrument and remove the battery.
- Replace with 9V battery and reinstall the cover

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## 6. OPTIONAL PROBE (TYPE K)

TP-02A (optional):

Measure Range:  $-50^{\circ}\text{C}$  to  $900^{\circ}\text{C}$  ( $-50^{\circ}\text{F}$  to  $1650^{\circ}\text{F}$ ).

Dimension: 10cm tube, 3.2mm diameter.

TP-03 (optional):

Measure Range:  $-50^{\circ}\text{C}$  to  $1200^{\circ}\text{C}$  ( $-50^{\circ}\text{F}$  to  $2200^{\circ}\text{F}$ ).

Dimension: 10cm tube, 8mm diameter.



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