OPERATING INSTRUCTIONS
MODEL 502 $C\epsilon$
K/J THERMOMETER

K/J THERMOMETER

Main Display

Second Display

Third Display

1 — (power)
2 — °C/°F
3 — HOLD
5
4 — T1T2 / T1−T2
5 — K/J
6 — MIN / MAX
8 — Sec. / Minu.
7 — REL
9 — SET
11
10 — T1T2 / T1−T2
0 — K/J
ENTER — Hi/Lo LIMITS
12

(SECOND DISPLAY)

THERMOCOUPLE	RANGE
J–TYPE (IRON–CONSTANTAN)	−200°C − 1050°C −328°F − 1922°F
K–TYPE (CHROMEL–ALUMEL)	−200°C − 1370°C −328°F − 2498°F

According to temperature standard ITS−90
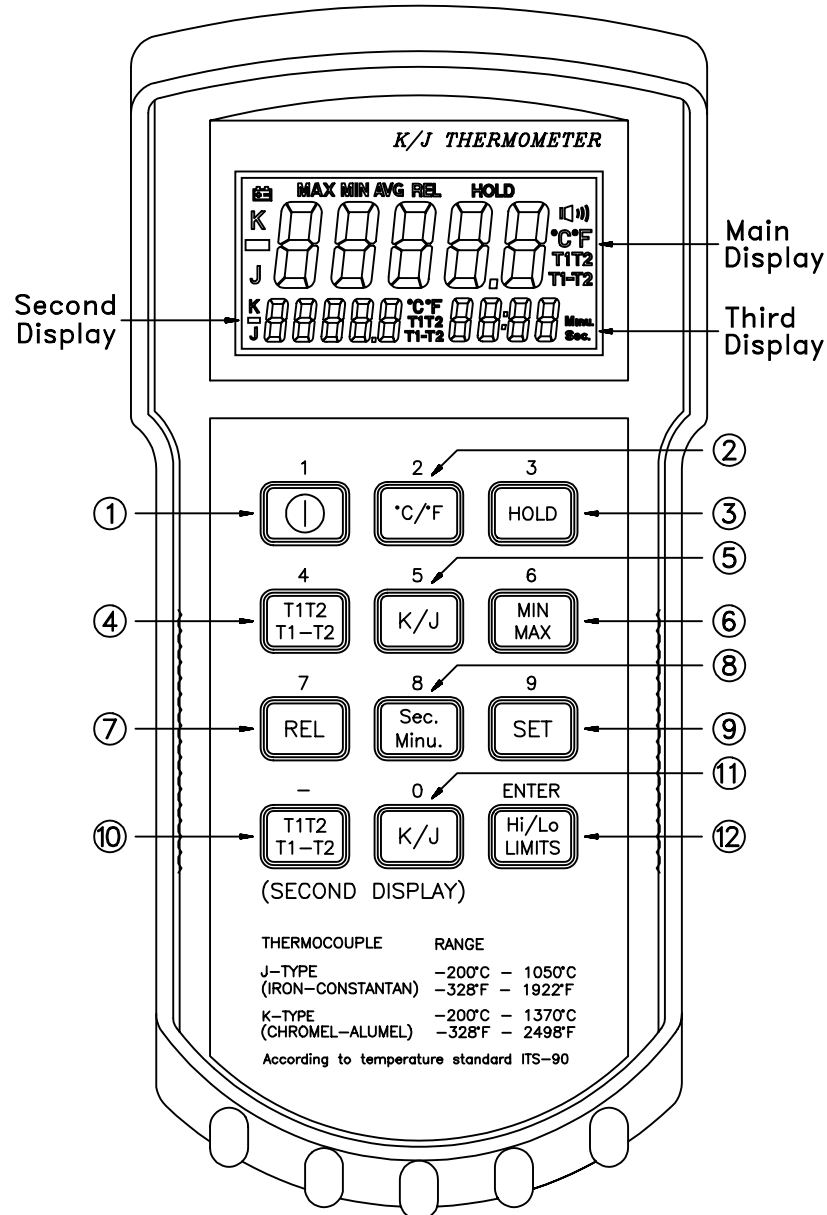
INTRODUCTION

This instrument is a 4½ digit, compact-sized portable digital thermometer designed to use external K-type and J-type thermocouples as temperature sensor. Temperature indication follows Reference Temperature/Voltage Tables (N.I.S.T. Monograph 175 Revised to ITS-90) for K-type and J-type thermocouples. Two K-type thermocouple are supplied with the thermometer.

SAFETY INFORMATION

It is recommended that you read the safety and operation instructions before using the thermometer.

> **WARNING**
> To avoid electrical shock, do not use this instrument when working voltages at the measurement surface over 24V AC or DC.

> **WARNING**
> To avoid damage or burns, do not make temperature measurement in microwave ovens.

> **CAUTION**
> Repeated sharp flexing can break the thermocouple leads. To prolong lead life, avoid sharp bends in the leads, especially near the connector.

Input Connector:
Accepts standard miniature thermocouple connectors (flat blades spaced 7.9mm, center to center).

ENVIRONMENTAL

Ambient Operating Ranges:
0°C to 50°C (32°F to 122°F) < 70% R.H.
Storage Temperature:
-20°C to 60°C (-4°F to 140°F) < 80% R.H.

GENERAL

Display:
4½ digit liquid crystal display (LCD) with maximum reading of 19999
Overload: "----.-" is display.
Battery:
Standard 9V battery (NEDA 1604, IEC 6F22 006P)
Battery Life:
160 hours typical with carbon zinc battery
Auto power off: The meter key switch inactive for more than 30 minutes, press power key to resume operation.
Dimensions:
192mm(H) x 91mm(W) x 52.5mm(D)
Weight: 365g
Supplied Wire:
4 feet type "K" thermocouple bead wire (teflon tape insulated). Maximum insulation temperature 260°C (500°F). Wire accuracy ± 2.2°C or ± 0.75% of reading (whichever is greater) from 0°C to 800°C.

SPECIFICATIONS
ELECTRICAL

Temperature Scale: Celsius or Fahrenheit user-selectable
Measurement Range:
J-TYPE -200°C to 1050°C, (-328°F to 1922°F)
K-TYPE -200°C to 1370°C, (-328°F to 2498°F)
Resolution: 0.1°C or 0.2°F
Accuracy:
Accuracy is specified for operating temperatures over the range of 18°C to 28°C (64°F to 82°F), for 1 year, not including thermocouple error.
± (0.05% rdg + 0.3°C) -50°C to 1370°C
± (0.05% rdg + 0.7°C) -50°C to -200°C
± (0.05% rdg + 0.6°F) -58°F to 2498°F
± (0.05% rdg + 1.4°F) -58°F to -328°F
Temperature Coefficient:
0.1 times the applicable accuracy specification per °C from 0°C to 18°C and 28°C to 50°C (32°F to 64°F and 82°F to 122°F).
Input Protection:
24V dc or 24V ac rms maximum input voltage on any combination of input pins.
Maximum Differential Common Mode Voltage (Maximum Voltage between T1 and T2 during measurement):
1volt.
Reading Rate: one time per second.

OPERATING INSTRUCTIONS

① ① Power Switch

The ① key turns the thermometer on or off. In the data SET mode, can not power off, must leave data SET mode then power off.

APO function mode

Pressing ① power key > 3 seconds to disable auto-power function, and the display shows "APO OFF".

② °C/°F Selecting the Temperature Scale

Readings are dual displayed in either degrees Celsius(°C) or degrees Fahrenheit(°F). When the thermometer is turned on, it is set to the temperature scale that was in use when the thermometer was last turned off. To change the temperature scale, press the °C/°F key.

③ HOLD Mode (only Main display)

Pressing the HOLD key to enter the Data Hold mode, the "HOLD" annunciator is displayed. When HOLD mode is selected, the thermometer held the present readings and stops all further measurements.
Pressing the HOLD key again to cancel HOLD mode causing thermometer to resume taking measurements. In the MIN/MAX recording mode, press HOLD key to stop the recording. Press HOLD key again to resume recording. (Previously recorded reading are not erased).

④ T1 T2/T1-T2 Main display Input Selection
The input selection indicates which input is selected for main display; T1 thermocouple, T2 thermocouple or the difference between the two thermocouples (T1-T2), when the thermometer is turned on, it is set to T1,
When main display input selected T1, then T1 input can select alternate of thermocouple by pressing K/J key switch.

⑤ K/J T1 Input Thermocouple Type Select (Main display)
The K/J key switch the T1 input selects the K-type or J-type thermocouple as input, when main display input selected T1.
When the thermometer is turned on, it is set to the type selected that was in use when the thermometer was last turned off.

⑥ MIN MAX with Time record Mode (only Main display)
Press MIN MAX key to enter the MIN MAX Recording mode, (displays the Maximum reading with time, Minimum reading with time and Average reading stored in record mode). In the this mode the automatic power-off feature is disabled and ① key, °C/°F key, REL key, SET key, Hi/Lo Limits key and main display T1 T2 T1-T2 key, K/J key are disabled.
The beeper emits a tone when a new minimum or maximum value is recorded.

Push MIN MAX key to cycle through the MAX, MIN and AVG readings.

If an overload is recorded, the averaging function is stopped.

In the this mode, press HOLD key to stop the recording of readings, all values are frozen, press again to restart recording.

To prevent accidental loss of MIN, MAX and AVG data, in this mode can only be cancelled by pressing and hold down the MIN MAX key for 2 seconds to exit and erased recorded readings.

⑦ REL Relative mode (only Main display)
Pressing REL key to enter the Relative mode, zero the display, and store the displayed Reading as a reference value and annunciator REL is displayed. Press REL key again to exit the relative mode.
The relative value can also be entered by the user. (See "SET mode" later in this manual.)
When the desired Relative value has been entered, press REL key to enter the Relative mode, press SET key use set Relative value as a reference value. Press REL key again to exit the relative mode.
In the Relative mode, the value (can not $> \pm 3000.0$ counts) shown on the LCD is always the difference between the stored reference and the present reading.

⑧ Sec. Minu. Selecting the Time scale
Reading the third displayed (Time) in either second or minute. When the thermometer turned on, it is set to second. To change the Time scale, press sec. Minu. key. Maximum Time reading is 100 hours. If 100 hours is exceeded, reset Time to zero and restart.

⑨ SET mode (Relative value set, Time set and Hi/Lo Limits value set)
1. Press SET key to enter Relative valuse SET mode (Press ENTER key can escape relative valuse set mode), REL set mode. $= = = = .=$ is displayed in main display.
Relative value is entered via overlay numbers, then press overlay ENTER key, stored the relative value, enter Time set mode.

2. Time set mode, (Press ENTER key can escape Time set mode) $= .= = = : = =$ is displayed in second and third display. Time (hours, minutes, seconds) value is entered via overlay numbers, then press overlay ENTER key. Time start from set time value, enter Hi/Lo Limits value set mode.

3. Hi Limit value set mode, ◀)) is displayed (Press ENTER key can escape Hi Limit value set mode), $= = = = .=$ is displayed in main display, Hi Limit value is entered via overlay numbers, then press overlay ENTER key, stored the Hi Limit value, enter Lo Limit value set mode (Press ENTER key can escape Lo Limit value set mode). $= = = = .=$ is displayed in main display, Lo Limit value is entered via overlay numbers, then press overlay ENTER key, stored the Lo Limit value and exit SET mode.

4. When the thermometer is turned on. The Relative set value and Hi/Lo Limits set value that was in use when thermometer was last turned off set values.

⑩ T1/T2 T1-T2 second display Input Selection
The input selection indicates which input is selected for second display; T1 thermocouple, T2 thermocouple or the difference between the two thermocouples (T1-T2), when the thermometer is turn on, it is set to T2 input can select alternate of thermocouple by second display K/J key switch.

⑪ K/J T2 Input thermocouple type select (second display)
The K/J key switch the T2 input selects the K-type or J-type thermocouple as input, when second display input selected T2.
When the thermometer is turned on, it is set to the type selected that was in use when the thermometer was last turned off.

⑫ Hi/Lo Limits mode (only Main display)
Press Hi/Lo Limits key to enter the Hi/Lo Limits comparative mode, ◀)) is displayed, when input temperature value exceed Hi or Lo Limits value. The beeper emits a continuity pulse tone. Press Hi/Lo Limits key again to exit the Hi/Lo Limits mode.

OPERATOR MAINTENANCE

> **WARNING**
> To avoid possible electrical shock, disconnect the thermocouple connectors from the thermometer before removing the cover.

Battery Replacement
Power is supplied by a 9 volt "transistor" battery. (NEDA 1604, IEC 6F22). The "▭" appears on the LCD display when replacement is needed. To replace the battery, remove the two screws from the back of the meter and lift off the battery cover. Remove the battery from battery contacts.