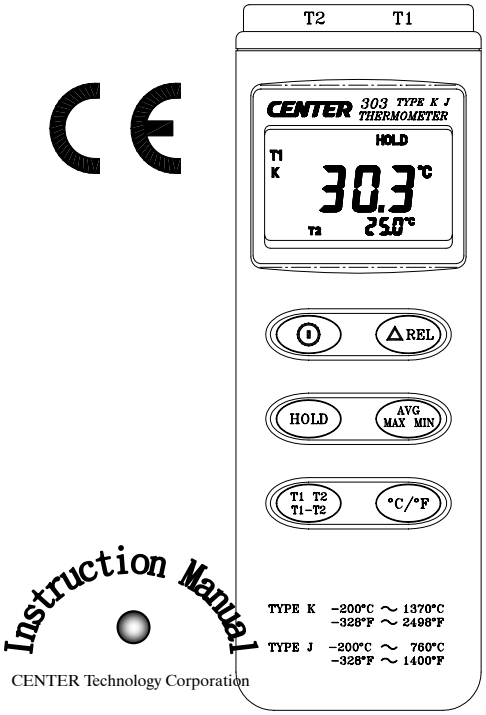
# CENTER® 303

## TYPE K J THERMOMETER




Instruction Manual

CENTER Technology Corporation

# Instruction Manual

TYPE K J THERMOMETER

CE

303-01 AUG. 2005

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## *I. Introduction:*

This instrument is a digital thermometer for use with any K-type and J-type thermocouple as temperature sensor.

Temperature indication follows National Bureau of Standards and IEC584 temperature/voltage table for K-type and J-type thermocouples.

## *II. Specifications:*

**Numerical Display:**

4 digital liquid crystal display

**Measurement Range:**

K-Type -200℃ ~ 1370℃
-328℉ ~ 2498℉

J-Type -200℃ ~ 760℃
-328℉ ~ 1400℉

**Resolution:**

K-Type:
-200°C~ 800°C 0.1°C; 800°C ~1370°C 1°C
-328°F~ 1000°F 0.1°F; else 1°F

J-Type:
-200°C~ 600°C 0.1°C; 600°C ~760°C 1°C
-328°F~ 1000°F 0.1°F; else 1°F

**Maximum Voltage at Thermocouple Input:**

60V DC, or 24Vrms AC

**Environmental:**

❑ Operating Temperature and Humidity:
0°C ~50°C (32°F ~ 122°F) ; 0 ~ 80% RH

❑ Storage Temperature and Humidity:
-10°C to 60°C (14°F ~ 140°F); 0 ~ 80% RH

❑ Altitude up to 2000 meters.

**Accuracy: at ( 23 ± 5°C )**

| Range | Accuracy |
|---|---|
| K-Type -200°C ~ 1370°C | ±(0.1% reading + 0.7°C) |
| J-Type -2000°C ~ 760°C | ±(0.1% reading + 0.7°C) |
| K-Type -328°F ~ 2498°F | ±(0.1% reading + 1.4°F) |
| J-Type -328°F ~ 1400°F | ±(0.1% reading + 1.4°F) |

For T1-T2 Measurement, the accuracy is

±( 0.2% T1-T2 reading + 1.7°C) or

±( 0.2% T1-T2 reading + 3.4°F)

**Temperature Coefficient:**

For ambient temperatures from 0°C ~ 18°C and 28°C ~ 50°C, for each °C ambient below 18°C or above 28°C add the following tolerance into the accuracy spec.

0.01% of reading + 0.03°C ( 0.01% of reading + 0.06°F )

**Note:**

The basic accuracy Specification does not include the error of the probe please refer to the probe accuracy specification for additional details.

**Sample Rate:**2.5 times per second

**Dimension:** 184x64x30mm

**Weight:** 210g Approx.(7.4oz)

**Accessory:**

K Type Bead Probe, Battery, Carrying Case, Instruction Menu.

**Option:**

Soft Ware Package ( Program, RS232 Connection Cable) , AC Adapter.

**Power requirement:**

9 Volt Battery, NEDA 1604 or JIS 006P or IEC6F22

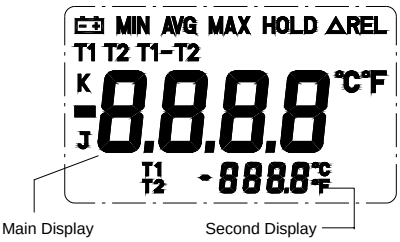
**Battery Life:**

Approx. 100hrs with alkaline battery

**AC Adapter:**

9VDC ±15%  100mA ; Plug Diameter: 3.5x1.35mm

## *III. Symbol Definition and Button Location:*




**-** :This indicates that the minus temperature is sensed.

**°C °F** :Centigrade and Fahrenheit indication.

**K J** :Thermocouple Type Indication

**HOLD** :This indicates that the display data is being hold.

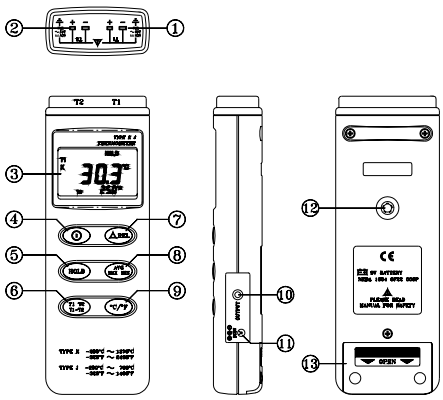
**MAX** :The Maximum value is now being displayed

**MIN** :The Minimum value is now being displayed

**AVG** :The Average value is now being displayed.

**△REL** :The reading is now under Relative Mode.

:The Battery is not sufficient for proper operation.




① T1 K J type temperature sensor connector
② T2 K J type temperature sensor connector
③ LCD display
④ ON/OFF button
⑤ HOLD button
⑥ T1,T2,T1-T2 control button
⑦ Relative readout button
⑧ MAX MIN Average control button
⑨ °C, °F control button
⑩ Digital output connector
⑪ AC power adapter connector
⑫ Tripod connector
⑬ Battery cabinet cover

## *IV. Operation Instructions :*

**4.1 Power-Up**

Press the ⏻ key to turn the thermometer On or OFF.

**4.2 Connection the Thermocouples**

For measurement, plug the thermocouple into the input connectors.

**4.3 Selecting the Temperature Scale**

When the meter was first power on, the default scale setting is set at Celsius (°C) scale. The user may change it to Fahrenheit (°F) by pressing " **°C/°F** " button and vice versa to Celsius.

**4.4 Selecting the Thermocouple Type**

By default, when the meter is powered on, it is K-Type, One may press and hold "**°C/°F**" button and then power on the meter, then it will change to J-Type.

**4.5 Data-Hold Operation**

The user may hold the present reading and keep it on the display by pressing the "**HOLD**" button. When the held data is no longer needed, one may release the data-hold operation by pressing "**HOLD**" button again.

When the meter is under Data Hold operation, the **"△REL"**, AVG MAX MIN and " **°C/°F** " button are disabled.

**4.6 T1,T2,T1-T2 Display Control:**

One may select T1,T2 or T1-T2 to show on the main display by pressing T1 T2 T1-T2 button. When T1 or T2 is select to show on the main display, the other temperature will be shown on the second display. When one select T1-T2 to show on the main display,

T1 and T2 will be shown on the second display alternately.

**4.7 Relative Operation for Main Display:**

When one press the "△**REL**" button, the meter will memorize the present reading and the difference between the new reading and the memorized data will be shown on the display. Press the "△**REL**" button again to exit the Relative operation.

**4.8 MAX/MIN/AVG Operation for Main Display:**

When one press the AVG MAX MIN button the meter will enter

the MAX/MIN mode. Under this mode the maximum value, minimum value and average value of latest 4 data is kept in the memory simultaneously and updated with every new data.

When the MAX symbol is display, the Maximum is shown on the display.

Press AVG MAX MIN again, then the NIN symbol is on the display and also the minimum reading.

Press AVG MAX MIN again, the AVG symbol is on the display and also the average reading.

Press AVG MAX MIN again, MAX, MIN and AVG will blink together. This means that all these data is updated in the memory and the reading is the present temperature.

One may press AVG MAX MIN to circulate the display mode among these options.

When the meter is under AVG MAX MIN operation, "△**REL**" and " **°C/°F** " are disabled.

To exit the MAX/MIN mode, one may press and hold AVG MAX MIN for two seconds.

**4.9 Auto Power Off:**

By default, when the meter is powered on, it is under auto power off mode. The meter will power itself off after 30 minutes if no key operation or RS232 communication. Key combination at power on or RS232 communication can disable auto power off.

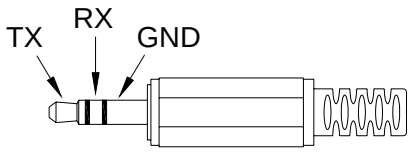
One may press and hold "**HOLD**" button and then power on the meter and there will be two successive beeps to indicate that auto power off is disabled.

**4.10 Low Battery Condition**

When the battery voltage is under proper operation requirement, the symbol will show on the LCD and the battery need to be replaced with new one.

**4.11 Digital Output:**

The Digital Output is a 9600bps N 81 serial interface.
The RX is a 5V normal high input port.
The TX is a 5V normal high output port.
The command of Digital Output is list below.



| RS232 command | Function | Remarks |
|---|---|---|
| K(ASC 4BH) | Ask for model No. | Send 4 bytes |
| H(ASC 48H) | Hold button | |
| M(ASC 4DH) | AVG/MAX/MIN button | |
| N(ASC 4EH) | Exit AVG/MAX/MIN mode | |
| R(ASC 52H) | REL button | |
| C(ASC 43H) | ℃/℉ button | |
| A(ASC 41H) | Inquire all encoded data | Send encoded 8 byte |

- **Command K:**

  Return 4 bytes. For example, when sends command "K" to meter, it will return "3","0","3", ASCII(13) . (0x13) represent T1,- 199.9°C, The total byte number should be 7+1+7+1+5+chr(13)=22Bytes

- **Command H:**

  Equivalent to one pushing on the HOLD button.

- **Command M:**

  Equivalent to one pushing on the HOLD AVG/MAX/ MIN button and no message is returned.

- **Command R:**

  Equivalent to one pushing on the REL button and no message is returned.

- **Command C:**

  Equivalent to one pushing on the ℃/℉ button and no message is returned.

• **Command A:**

***1nd BYTE:***

The first byte is the start byte , it value is 2.

***2nd BYTE:***

| bit7 | bit6 | bit5 | bit4 | bit3 | bit2 | bit1 | bit0 |
|---|---|---|---|---|---|---|---|
| C/F | Low Bat | Hold | REL | K/J | MAX/AVG/MIN | | |

bit 2 bit 1 bit0

0 0 0 →normal mode

0 0 1 →MAXIMUN mode

0 1 0 →MINIMUN mode

1 0 0 →AVG mode

1 1 1 →calculate MAX/MIN/AVG in back-ground and lcd "MAX""AVG""MIN" will flash.

bit3:1→0→K TYPE 1→J TYPE

bit4:1→REL

bit5:1- HOLD 0→not HOLD

bit6:1→LOW BATTERY 0→BATTERY NORMAL

bit7:1→℃ 0→℉

***3nd BYTE:***

| bit7 | bit6 | bit5 | bit4 | bit3 | bit2 | bit1 | bit0 |
|---|---|---|---|---|---|---|---|
| | | point | minus | OL | point | minus | OL |

bit0:1→main window value is OL 0→not OL

bit1:1→main window value is minus, 0→main window value is plus.

bit2:1→4th byte and 5th byte represent #### 0→4th byte and 5th byte represent ###.#

bit3:1→sub window value is OL  0→not OL

bit4:1→sub window value is minus, 0→sub window value is plus.

bit5:1→6th byte and 7th byte represent ####  0→6th byte and 7th byte represent ###.#

bit7 bit6:

00→Main window is T1-T2,sub window is T1

01→Main window is T1-T2, sub window is T2

10→Main window is T1, sub window is T2

11→Main window is T2, sub window is T1

***4th BYTE:*** first two BCD code of main window value.

***5th BYTE:*** last two BCD code of main window value

***6th BYTE:*** first two BCD code of sub window value.

***7th BYTE:*** last two BCD code of sub window value.

***8th BYTE:*** The last byte is the end byte , it value is 3, first and last byte are used to check frame error.



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