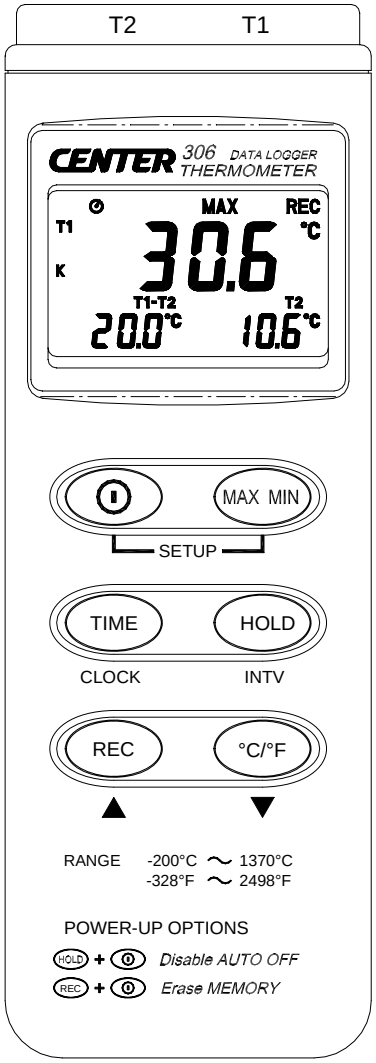
Instruction Manual

SE-305

CENTER® 306 Datalogger

THERMOMETER



CE

CONTENTS

TITLE *PAGE*

I. Introduction:

This instrument is a digital thermometer for use with any K-type thermocouple as temperature sensor. Temperature indication follows National Bureau of Standards and IEC584 temperature/voltage table for K-type thermocouples. Its internal memory can keep up to 16312 records.(note1.) It uses RS232 interface to perform bi-directional communication with PC.

II. Specifications:

Numerical Display: 4 digital Liquid Crystal Display

Measurement Range: -200°C ~ 1370°C -328°F ~ 2498°F

Resolution: -200°C~ 200°C 0.1°C; 200°C ~1370°C 1°C
-200°F~ 200°F 0.1°F; else 1°F

Input Protection 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
-200°C ~ 200°C	±(0.2% reading + 1°C)
200°C ~ 400°C	±(0.5% reading + 1°C)
400°C~1370°C	±(0.2% reading + 1°C)
-328°F ~ -200°F	±(0.5% reading + 2°F)
-200°F ~ 200°F	±(0.2% reading + 2°F)
200°F ~ 2498°F	±(0.3% reading + 2°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: 1.25 times per second

Dimension: 184x64x30mm

Weight: 210g Approx.

Accessory: K Type Bead Probe, Battery, Carrying Case, Instruction Menu, Soft Ware Package (Program, RS232 Connection Cable)

Power requirement: 9 Volt Battery

Battery Life: Approx. 100hrs with alkaline battery

AC Adapter: 9VDC ±15% 100mA

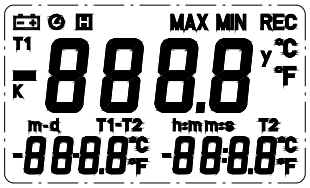
Plug Diameter: 3.5mmx1.35mm

Option : AC Adapter

note1:

Every time you press "REC" button to start recording data and press "REC" button again to stop recording, there will be a data set in memory, you can store as many data sets as you want until memory is full.

III. Symbol Definition and Button Location:



▬ : This indicates that the minus temperature is sensed.

℃℉ : Centigrade and Fahrenheit indication.

K : Thermocouple Type Indication

MAX : The Maximum value is now being displayed

MIN : The Minimum value is now being displayed

⏲ : This indicates auto power off is enabled.

H : This indicates that the display data is being held.

m-d : it indicates the value below is month and day

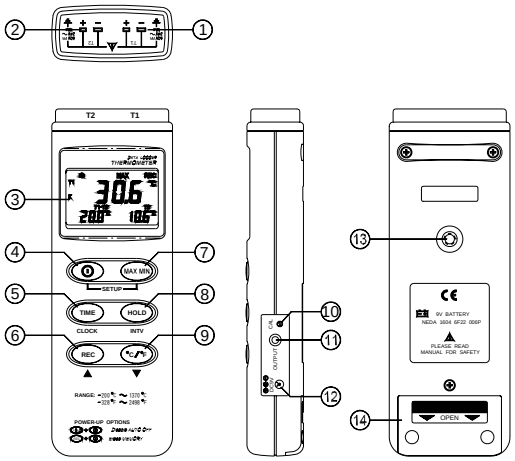
h:m : it indicates the value below is hour and minute

m:s : it indicates the value below is minute and second

y : it indicates year is displayed in the main window.

🔋 : The Battery is not sufficient for proper operation.

REC : This indicates that the tester is recording. If it blinks, it indicates the memory is full.



Button Location:

① K type temperature sensor T1 input connector
② K type temperature sensor T2 input LCD display
③ ON/OFF button
④ Time display button
⑤ Record button
⑥ MAX MIN function control button
⑦ HOLD button
⑧ °C, °F control button
⑨ Offset calibration screw
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 power button to turn the thermometer ON or OFF.
When the user powers on, the LCD will show how much memory space is available to use.

For example: It indicates that there are 16,000 records memory space available.

4.2 Connection the Thermocouples

For measurement, plug the thermocouple into the input connectors.

4.3 Selecting the Temperature Scale

When the meter is first powered 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. Next time you power on, the scale setting will be the same as which when you powerd off last time.

4.4 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 **"TIME", "MAX MIN"** and " **°C/°F** " button are disabled. (when you press "**TIME**" ,**" °C/°F "** and **"max min"** button in HOLD mode, there will be two continuous beeps)

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

4.5 DataLogger:

When one presses the "REC" button, the meter will start recording, and pressing the "REC" button again will stop recording, If you want to clear the memory, power off the meter, then press and hold "REC" button and then press power button and hold at least 2 seconds, then release all buttons ,then LCD will show "CLR" to clear the memory.

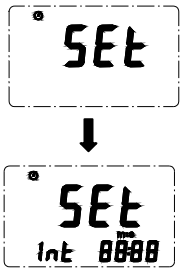
4.6 Clock Setup :

1: press and hold "MAX MIN" button and then power on the meter:

2: press "**TIME**"(clock):

3: press "REC" ▲ or "**°C/°F"** ▼ to increase or decrease number, press "**TIME**"(clock) to adjust next item. The adjusting order is year→month→day→hour→minute, then press "**TIME**" (clock) to finish adjusting. If you want abort during a setup process, press power button to cancel.

4.7 Recording Interval Setup :



1: press and hold “MAX MIN” button and then power on the meter:

2: press “HOLD"(INTV)

3: press "REC" ▲ or '**°C/°F"** ▼ to increase or decrease number, press “HOLD" (INTV) to adjust next item, then press “HOLD” (INTV) to finish. If you want abort during a setup process, press power button to cancel.

4.8 Time Operation:

When pressing the “**TIME**” button, the LCD will display time , it will show year on top of the LCD, show month and day on the left bottom of the LCD, show hour and minute on the right bottom of the LCD. Press "**TIME**" button or any other button will exit this mode. This operation will not interrupt the recording and "MAX MIN" operation.

4.9 MAX/MIN Operation:

When pressing the "MAX MIN" button the meter will enter the MAX/MIN mode. Under this mode the maximum value, minimum value is kept in the memory simultaneously and updated with every new sample of data.

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

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

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

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

When the meter is under "MAX MIN" operation and **“ °C/°F ”** button are disabled.(when you press **“ °C/°F ”** button in "MAX MIN" mode, there will be two continuous beep)

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

4.10 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 and no RS232 communication and no recording. combination at power on 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 and the will not show up.

4.11 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.

4.12 Calibration Point:

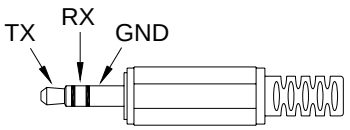
input	Adjust VR	tolerance
0 °C	VR1	± 0.1 °C
190 °C	VR2	± 0.1 °C
1000 °C	VR3	± 1 °C
1900 °F	VR4	± 1 °F

P.S

Normally, performing offset Calibration with thermal stabled ice water through VR1 will give a very good calibration result.

4.13 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.	Return 4 bytes
A(ASC 41H)	Inquire all encoded data	Return encoded 10 byte
H(ASC 48H)	Hold button	
M(ASC 4DH)	MAX/MIN button	
N(ASC 4EH)	Exit MAX/MIN mode	
T(ASC 52H)	TIME button	
C(ASC 43H)	C/F button	
U(ASC 55H)	Dump all memory of thermometer	return 32768 bytes
P(ASC 50H)	Load recorded data	

- **Command K:**
  Return 4 bytes. For example, when sending command "K" to the meter, it will return "3","0","6", ASCII(13) .
- **Command U:**
  Return 32768 bytes .
- **Command P:**
  Instead of returning all 32768 bytes, it only return recorded data .
- **Command H:**
  Equivalent to one pushing on the HOLD button and no message is returned.
- **Command M:**
  Equivalent to one pushing on the MAX/MIN button and no message is returned.
- **Command N:**
  Equivalent to one pushing and hold the MAX/MIN button for two seconds to exit MAX/MIN mode.
- **Command T:**
  Equivalent to one pushing on the TIME button and no message is returned.
- **Command C:**
  Equivalent to one pushing on the °C/°F 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		TIME	MAX/MIN		REC

bit 0: 1→recording mode, 0→not recording

bit 2 bit 1

0 0 →normal mode
0 1 →MAXIMUM mode
1 0 →MINIMUM mode
1 1 →calculate MAX/MIN in background mode .

bit3: 1→Indicates the LCD is displaying time.
bit4: no use
bit5: 1→HOLD, 0→not HOLD
bit6: 1→LOW BATTERY , 0→BATTERY NORMAL
bit7: 1→°C 0→°F

3th BYTE:

bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
Auto Power Off	memory full	resolution	sign	OL	resolution	sign	OL

bit0: 1→T1 is OL, 0→not OL
bit1: 1→T1 value is minus, 0→T1 value is plus.
bit2: 1→4th byte and 5th byte represent #### , 0→4th byte and 5th byte represent ###.#
bit3: 1→T2 is OL, 0→not OL
bit4: 1→T2 value is minus, 0→T2 value is plus.
bit5: 1→8th byte and 9th byte represent #### , 0→8th byte and 9th byte represent ###.#
bit6: 1→Memory is full. 0→Memory is not full.
bit7: 1→Auto power off enabled. 0→Auto power off disabled.

4th BYTE: first two BCD code of T1 value.

5th BYTE:last two BCD code of T1 value

6th BYTE:
If bit3 of ***2nd BYTE*** =0 : first two BCD code of T1-T2 value.
If bit3 of ***2nd BYTE*** =1 : two BCD code of month.

7th BYTE:
If bit3 of ***2nd BYTE*** =0 : last two BCD code of T1-T2 value.
If bit3 of ***2nd BYTE*** =1 : two BCD code of day.

8th BYTE:
If bit3 of ***2nd BYTE*** =0 : first two BCD code of T2 value.
If bit3 of ***2nd BYTE*** =1 : two BCD code of hour.

9th BYTE:
If bit3 of ***2nd BYTE*** =0 : last two BCD code of T2 value.
If bit3 of ***2nd BYTE*** =1 : two BCD code of minute.

10th BYTE: end byte, it value is 3, 1nd and 10th are used to check frame error.

Appendix: Thermo couple probe specification

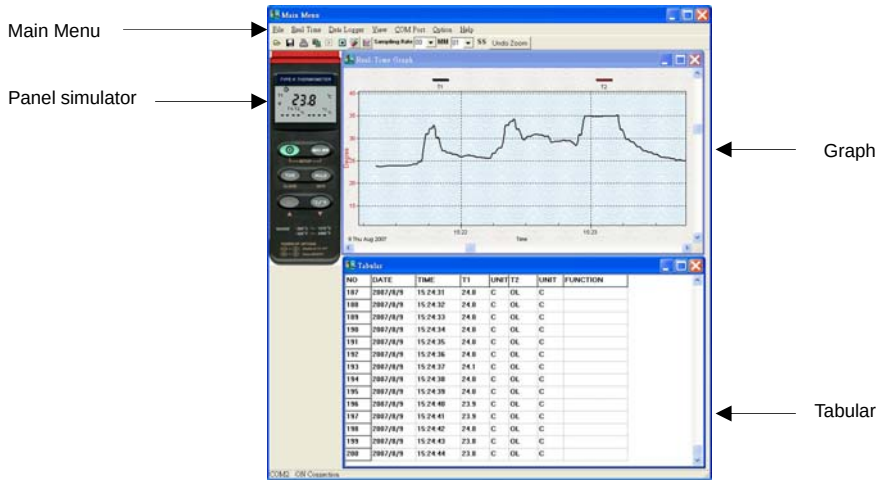
Model	Range	Tolerances	Description
TP-K01 Bead probe	-50℃ to 200℃ -58℉ to 392℉	±2.2℃ or ±0.75% (±3.6℉ or ±0.75%)	with Teflon tape insulation Maximum insulating temperature : 260℃

TP-K01:
probe for general condition measurements, especially for complex and hard to reach places.

V. Setup SE305 (Thermo DataLogger)—RS232 interface software:

- **The SE305 package contains:**
  1.One setup CD.
  2.Custom designed RS232 cable for SE305
- **System Required:**
  Windows 98/ NT 4.0/ NT2000/ XP / VISTA.
- **Minimum Hardware Required:**
  486-100 MHz PC compatible , 16 MB RAM ;
  At least 5 MB hard disk space available to install SE305 program. Recommended display resolution is 800X600.
- **Install SE305:**
  1.We recommend close all other application before installing SE305.
  2.Insert the SE305 CD-ROM into your CD drive. The SE305 installer should start automatically. If it does not, you can start it by running SETUP.EXE from the root drive of the CD-ROM.
  3.When installation is complete, it will copy SE305.exe(executable file) and help file to your hard disk(default is c:\program files\ SE305)
  4.For other operation instruction, please refer to the on-line help while executing ***SE305***.

Main Menu



File | Open- Retrieve files from the disk.
Save - Save the active window (when the caption bar is highlighted) data to the disk.
Print - Print the data of the active window (graph or list).
Printer Setup - Select printer.
File | Exit: Terminates SE305 program.

View | Control Panel:
By opening the Panel Window, the user can control meter via the button in this window.

View | Real-Time Graph:
Open Real-Time Graph display to graph the present data.

Real Time | Run - Start collecting real time data .
Stop - Stop collecting real time data .

DataLogger:
By opening the DataLogger Window, the user can load recorded data of meter to PC in this window.

ComPort: Select the port manually.

Option: | Range : Change the Y axis extention.
Graph Customization : Graph Customization.

For more operation instruction, please refer to the online help while executing SE305.

CENTER® CENTER TECHNOLOGY CORP.

4 / F NO. 415, Jung-Jeng Rd., 238 Shu-Lin Chien, Taipei, Taiwan
E-Mail : center@centertek.com
http : / / www.centertek.com

306-03