CENTER® 309 Datalogger

THERMOMETER

| T1 | T2 | T3 | T4 |

CENTER *309 DATA LOGGER THERMOMETER*

⏻	T1 °C	T3 °C
	100.0	**100.0**
	T2 °C	T4 °C
	100.0	**100.0**
K		**HOLD**

☀

| ⓞ | **T1-T2** |

└─ **SETUP** ─┘

| **HOLD** | **MAX MIN** |

CLOCK   **INTV**

| **REC** | **°C / °F** |

▲   ▼

RANGE   −200°C ∼ 1370 °C
            −328°F ∼ 2498°F

POWER-UP OPTIONS
(HOLD) + (ⓞ)   *Disable AUTO OFF*
(REC) + (ⓞ)   *Erase MEMORY*

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CONTENTS

I. Introduction:

This instrument is a four channel 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. It internal memory can keep up to 16,000 records per channel. (note1.) It uses RS232 interface to perform bi-directional communication with PC.

II. Specifications:

Numerical Display: 4 digital Liquid Crystal Display per channel.

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.

Electromagnetic Compatibility: Total accuracy = specified accuracy ±2°C(3.6°F)

Sample Rate: 3 seconds per period

Dimension: 184x64x30mm

Weight: 250g Approx.

Accessory: K Type Bead Probex 2, Battery, Carrying Case, Instruction Menu, Software program, RS-232 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.

°C°F : 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.

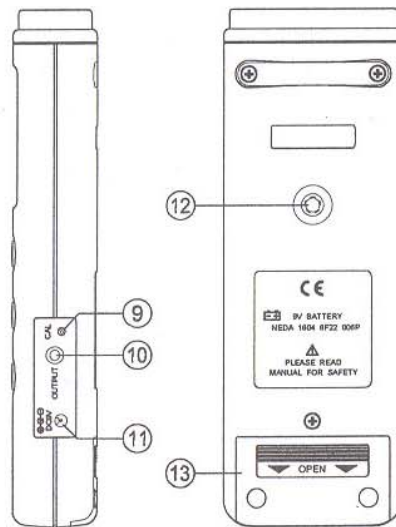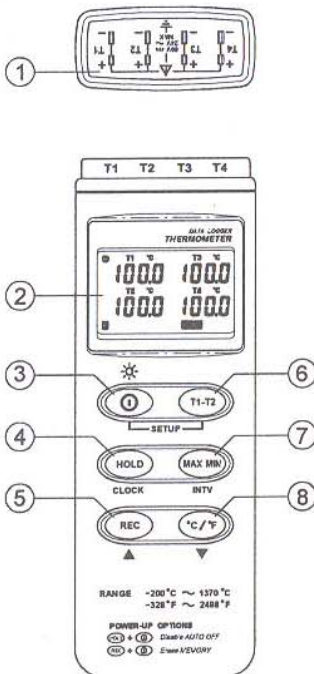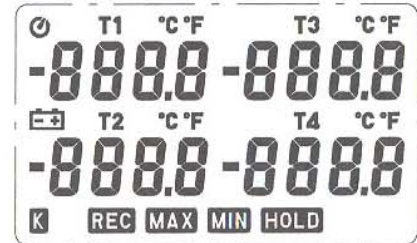**HOLD** : This indicates that the display data is being held.

▭ : The Battery is not sufficient for proper operation.

T1,T2,T3,T4 : It indicates the value below is T1, T2, T3, T4 Temperature sensor.

⌂-⌂ : It indicates the value below is T1-T2 sensor.

△REL : The reading is now under relative mode.

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 to T4 input connector
② LCD display
③ ON/OFF & Backlight button
④ Hold button
⑤ Record button
⑥ T1-T2 button
⑦ MAX MIN function control 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 & Turn ON/OFF backlight

The ⊙ key turns the Thermometer ON or OFF and backlight ON & OFF.

Press it once to turn on the Thermometer.

Press it again for moment to turn ON or OFF backlight.

Press and hold this button 3 second to turn OFF the power.

4.2 Connection the Thermocouples

For measurement, plug the thermocouple into the input connectors.

4.3 Selecting the Temperature Scale

When the meter was powered on, the user may change it to Fahrenheit (°F) by pressing " °C/°F " button and vice versa to Celsius.

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 **"MAX MIN"**,**"T1-T2"** and **"°C/°F"** button are disabled. (when you press " °C/°F ", **"T1-T2"** and **"MAX MIN"** button in HOLD mode, there will be two continuous beeps)

4.5 T1-T2 Operation:

When this button is pushed, "*1 – 2*" will be shown on the upper right hand side LCD display to indicate that the tester is under T1 minus T2 mode. The temperature difference is shown on the right hand side display as shown in Fig.

4.6 Record and Erase memory Operation:

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 5 seconds, then LCD will show "CLR" "SURE 5", then release all buttons to clear the memory.

4.7 Clock Setup :

1: press and hold "T1-T2" button and then power on the meter:

2: press "HOLD"(clock):

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

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4.8 Recording Interval Setup :

```
SEt
```

⬇

```
SEt
Int 000 1
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1: press and hold "T1-T2" button and then power on the meter:

2: press "MAXMIN"(INTV)

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

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 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:

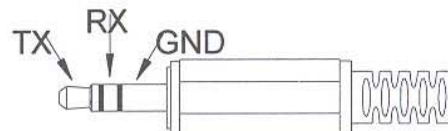| input	Adjust VR	tolerance
0 °C	VR1	± 0.1 °C
190 °C	VR2	± 0.1 °C
1000 °C	VR3	± 1 °C
1900 °F	VR4	± 1 °F

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.

TX RX GND

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TestLink SE309 Software

Introduction

Tutorial - Quick Start
Main Menu
DataLogger(only for model with DATA LOGGER)
Graph
Frequently Asked Question

Main Menu

File Real Time Data Logger View Window Help

File | Oepn- 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 acitve window(graph or list).

Printer Setup - Select printer.

File | Exit: Terminates TestLink 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.

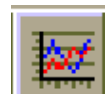**Real Time Data | Run -** Start collecting real time data .

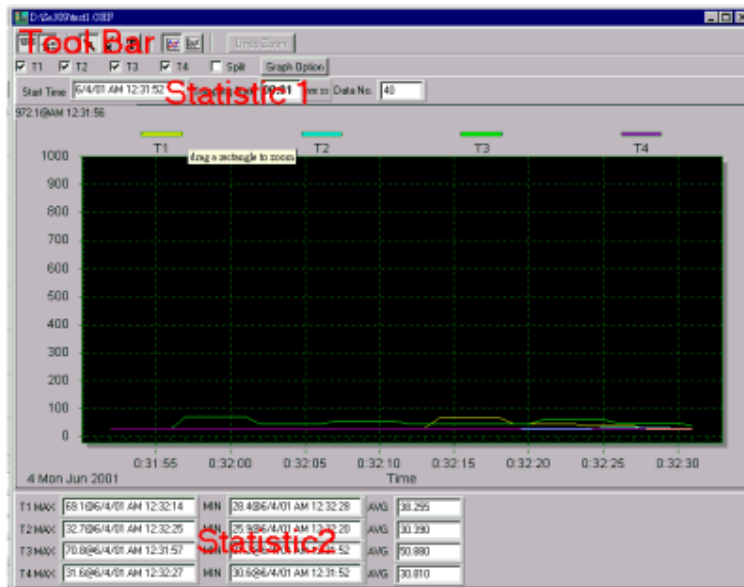**Stop -** Stop collecting real time data .

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

Output To Graph - Graphing tabular data .

Graph

Tool Bar

 - **Display or hide Statistic1.**

 - **Display or hide Statistic2.**

 - **Normal cursor.**

 - When selected, the mouse cursor will become a cross sign when moving to the graph, click on the graph to mark a cross sign on the graph. This is available only when "Split " option is unchecked. And all the mark you make will exist with T1.
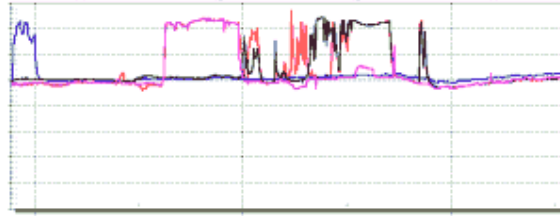
 -When selected, the mouse cursor will become a "I" sign when moving to the graph, click on the graph to annotate.This is available only when "Split " option is unchecked. And all the text you make will exist with T1.

 - **Seperate the four channel.**
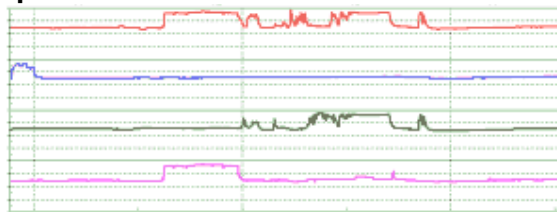
 - **Combine the four channel.**

Graph Option -**Graph Customization**

Y Axis -**Change the Y axis extention**

Note:When the Split is unchecked, graph will use T1 as the Y axis display range .

Undo Zoom **To Undo the Zoom**
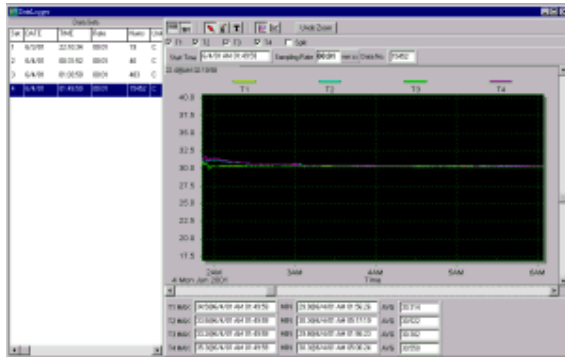You can Zoom this graph by using mouse:
To Zoom:
1. Press the left mouse button and drag the cursor to select the new extents.
2. Release the mouse button.

You can choose channel number showing in the graph.
　　a.Click "Graph Option" to call Customization dialog.
　　b.Select Subsets tab.
　　c.Select a single channel or multiselect(hold Ctrl key, use mouse to choose) channels .

DataLogger

When you have 4 Channel Thermometer Data Logger meter connected to PC and select "DataLogger" from main menu or click from tool bar to load recoreded data from the meter and there will be a progress indicator to show the loading progress.if error occurs, just click "DataLogger" again.

After the data was loaded, the left hand side will show how many data sets were loaded and detail infomation for each data set (start data, start time, recording rate and record numbers).

for examples:

| Set	DATE	TIME	Rate	Nums
1	1999/7/25	PM 01:24:52	00:02	10
2	1999/7/25	PM 01:25:38	00:02	5142
3	1999/7/25	PM 09:29:08	00:02	21
4	1999/7/25	PM 09:32:04	00:02	3
5	1999/7/25	PM 09:32:09	00:02	1
6	1999/7/25	PM 09:32:14	00:02	9
7	1999/7/25	PM 10:03:43	00:02	1896
8	1999/7/25	PM 11:06:57	00:02	3
9	1999/7/25	PM 11:49:47	00:02	9086

It will transfer first data set to grah and tabule on the right hand side every time after you load recorded data from the Sound Level Meter and you can click at any data set to change the set for graph.

On the right hand side is the waveform graph and statistic of the data set you choose. In reference to graph, see Graph

Tutorial - Quick Start to Use TestLink SE309

1.Recording real time data in waveform.

1.Power on the 4 Channel Thermometer first and connect it to a PC RS-232 serial port wit the cable(SE-300),
2.Start SE309 program.
3.If the connection is successful the panel will display the same value as the 4 Channel Thermometer. If fail to connect the meter with PC, it will display "No Connection" on the panel window in TestLink Se309.
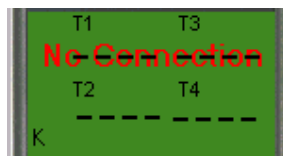

4.Select sampling rate from Real-Time Graph window

note:If PC speed is slow , select sampling rate above 1 second. And if it is going to sample a large amount data(more than 5000), at least 64 mega bytes ram is recommended to keep PC running in good performance working well.

5.When the connection is successful , click to start recording real time data and there will be a waveform on the Real Time Graph Window.
6.Click to start recording .

2.How to save the recorded real time data to a file ?

1.Click the graph window you want to save and the graph window will become active , then choose File | Save from main menu or click from the tool bar .
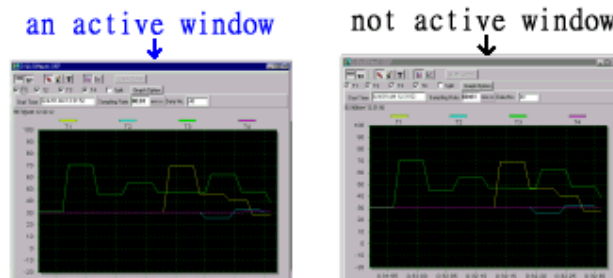
2. There will be a save dialog window for you to choose the file name and file type to save.There are three types of file name you can choose, binary file(*.ghf), text file(*.txt) and EXCEL format file(*.csv). The *.ghf file use much fewer disk space to save the data than the other two file format, but it can only be used in TestLink SE309. Text file can be opened by TestLink SE309 and any other word processor program like word, notepad etc. EXCEL format file can be opened by TestLink SE309 and Microsoft EXCEL.

Frequently Asked Question

1.I had connected 4 Channel Thermometer to PC serial port and turned meter power on, but it still show "NO CONNECTION".
Answer: It could be that all serial port are occupied by other application, close all other application . If it still don't work. Restart your computer and run TestLink SE309 again. When program start, it will search automatically from COM1 to COM4 to check connected 4 Channel Thermometer. You can check the connection status from main window like the figure below, for example,the graph below means Com1, Com2 and Com4 are available to this PC and 4 Channel Thermometer is connected to Com2. You can manually change to another COM port when you find out that program can not find the correct COM port which 4 Channel Thermometer is connected to.
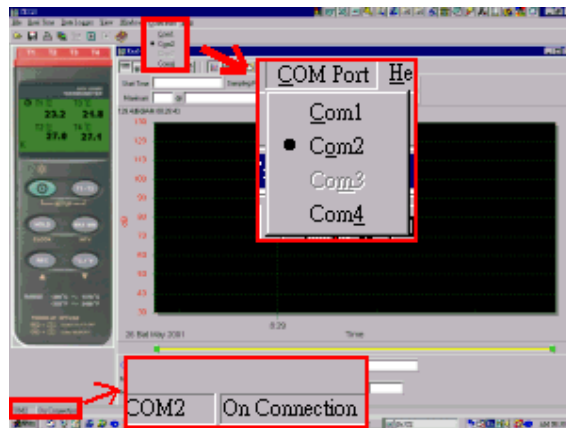
2. How can I save the graph to a file which can be used in EXCEL ?
Answer: When you save a graph to a file , the default file format is "*.ghf" and you can select *.csv to save files. CSV is an EXCEL file format.You can open it in EXCEL.
(note. If decimal separator is comma in your country, this file format will be disabled, because .CSV file also use comma to be data separator. for example 78,6 will become 78 and 6 in EXCEL)

3.How to uninstall TestLink SE309 ?
Answer: Uninstall TestLink SE309 by launching the Add/Remove Programs applet out of the Control Panel, highlighting the SE309, and clicking on the Add/Remove... push button, then it will remove the SE309 folder and files from your computer.

4.Why loading data fail?
Answer: This might cause by the slow respond from some of the notebook PC system.

5.How to zoom the graph?
Answer: Press the left mouse button and drag the cursor to select the new extents,then release the mouse button.

6.When I setup the real time sampling with a fast rate(eg. 1 sec), Some of the sampling data might be lost.
Answer: THis might be caused by slow response time of the PC interface. For better result, the user may close the panel window .

(note. If decimal separator is comma in your country, this file format will be disabled, because .CSV file also use comma to be data separator. for example 78,6 will become 78 and 6 in EXCEL)
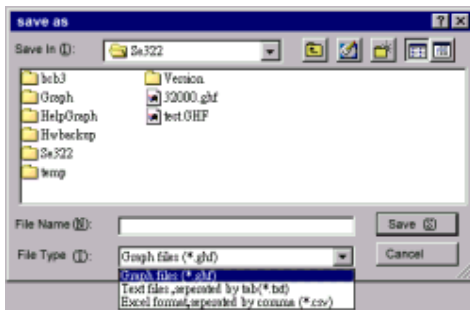
3.How to load the recorded data from the memory of 4 Channel Thermometer and save it to a file ?
(Only for the model with Data Logger)

1. Power on the 4 Channel Thermometer.
2. Press the REC button of the meter to start recording data .
3. After a while, press REC button again to stop recording data.
4. Connect the Sound Level Meter to PC
5. Start SE309 program.

6. Choose Data Logger from main menu or click   from tool bar.

 7.In reference to Data Logger , see DataLogger

(note. If decimal separator is comma in your country, this file format will be disabled, because .CSV file also use comma to be data separator. for example 78,6 will become 78 and 6 in EXCEL)

CENTER 304/309 Four Channels Thermometer

In some applications, the temperature is concerned at more than two points. This is why we provide the four channel model thermometer 304 and 309. The operation interface is intuitive and all the temperature data are shown on the LCD at the same time so that no extra step for the user to get the reading.

LED Back Light

FEATURES:

- Auto Range
- Four Channel Input
- Four Channel Display
- Wide Measuring Range (304)
- With Window Software (309)
- RS-232 Interface
- 16,000 Records Data Logger each channel (309)
- Resolution 0.1°C, 0.1°F

SPECIFICATIONS

Range	K type: -200 ~ 1370°C; -328 ~ 2498°F
Accuracy	±0.3% + 1°C, ±0.3% + 2°F
Resolution	0.1°C; 0.1°F
Input Protection	60V DC or 24Vrms AC Maximum
Operation Temp	0°C ~ 50°C (< 80%RH)
Storage Temp	-20°C ~ 60°C (< 70%RH)
Battery	9V battery
Dimensions	184x64x30 mm
Weight	Approx.220g

STANDARD ACCESSORIES

Model	Battery	Operation Manual	Carrying Case	Temperature Probe	RS-232 Cable	Software
CENTER304	●	●	●	TP-K01 X 2PCS	Option	Option
CENTER309	●	●	●	TP-K01 X 2PCS	●	●

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