

Digital Thermometer (Type K, J)

Instruction Manual

TC-3200

Thank you for purchasing our Digital Thermometer. Please read this instruction manual carefully before using to ensure the correct usage of this device. Please keep this instruction manual for future reference.

ATTENTION Please note that misuse of this device may lead to injury to the user or damage to the device. Please observe all safety precautions and warnings in this instruction manual.

Customer Service
LINE SEIKI CO., LTD.
 Address: 37-7 Chuo-cho, 2-Chome Meguro-ku, Tokyo 152-0001 Japan
 Contact : Tel: +81-3-37165151 Fax: +81-3-37104552
 E-mail : webtrade@line.co.jp
 Web : http://www.lineseiki.com

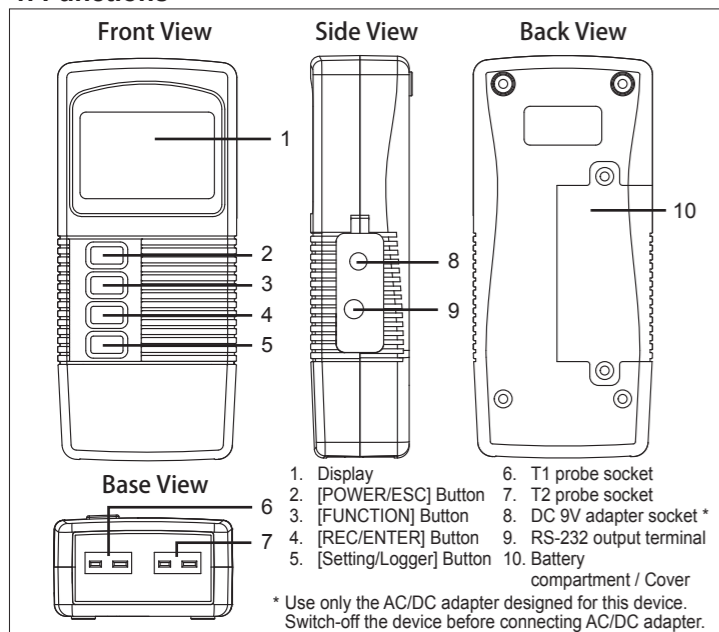
Safety Precautions

For safe usage of this device, please observe all statements regarding precautions and warnings in this instruction manual.

ATTENTION

- 1. Operation**
 - Do not use this device near machines that emit strong electromagnetic fields or objects that store static electricity.
 - Do not drop or subject this device to strong impact.
 - Do not use or store this device where it will be exposed to water or in places with wet conditions.
 - Do not use or store this device where it can be exposed to direct sunlight, dust, high temperature and high humidity.
 - See the battery case markings to ensure that the battery is properly installed.
 - For accurate measurements, do not subject this device in measuring sudden change of temperatures.
 - Remove the battery when the device will not be used for a long period of time.
 - Do not attempt to disassemble or modify this device.
- 2. Thermocouple Probe**
 - Do not measure beyond the temperature limits of the thermocouple probe being used.
 - Do not use thermocouple probe in places where presence of electric shock is suspected.
 - Avoid using the thermocouple probe to measure materials that may cause rust or corrosion. If used, wipe the thermocouple probe with a dry clean cloth after every use.
 - Do not attempt to disassemble or bend the miniature connector of the thermocouple probe.
 - Avoid bending, dropping or hitting the thermocouple probe, even when not in use.
 - When measuring surfaces, make sure that the thermocouple probe is in contact with the surface perpendicularly to record accurate measurements.
 - In measuring surfaces of non-metallic materials, transfer of heat takes longer than normal, therefore, make measurement time longer to get.

1. Functions



2. Measuring Procedure

Default settings:
 * Type K measurement
 * Auto power off.
 * The sampling time of data logger function is 2 seconds.

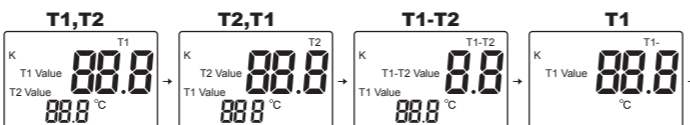
1. Main Display
2. Sub Display
3. Thermocouple type
4. Measurement Type
5. Data Hold
6. Data Record
7. Recording Data MAX/MIN
8. Low battery

- 1) Insert the Battery into the Battery Box. (Refer to section 7. Battery Replacement).
- 2) Insert the thermocouple probe into the "T1 probe socket".
- 3) Press the [POWER/ESC] Button to switch-on the device.
- 4) Engage the thermocouple probe to the object to be measured.
- 5) The temperature reading will then be shown on the main display.
- 6) Press the [POWER/ESC] Button to switch-off the device.

3. Functions Operation

a. Dual Channels Measurement

- 1) The dual channels measurement is available when two thermocouple probes are inserted into both the "T1 probe socket" and "T2 probe socket".
 - 2) The display type will be switching in order while the [FUNCTION] button is pressed for at least 2 seconds.
- * The type (K type or J type) of thermocouple probe inserted into the sockets should be common.



b. Data Hold

- 1) During the measurement, press the [FUNCTION] button to hold the last measured value on the display. The display will also show the "HOLD" symbol.
- 2) Press the [FUNCTION] button again to exit the Data Hold function.

c. Data Record (Max., Min. reading)

- 1) To start recording the measurement data, press the [REC/ENTER] button once. The display will show the "REC" symbol.
- 2) While the "REC" symbol is on display, press the [REC/ENTER] button once to display the Maximum measured data recorded. The "MAX" symbol will also appear on the display. Press the [REC/ENTER] button once again to display the Minimum measured data recorded. The "MIN" symbol will appear on the display. To view back "Max"/("Min") measured data, press [REC/ENTER] button alternately.
- 3) To exit the Data Record function, press the [REC/ENTER] button for at least 2 seconds.

d. Data Logger

- 1) Press the [REC/ENTER] Button once to start recording the measurement data. The display will show the "REC" symbol.
 - 2) When sampling time is selected from 1, 2, 5, 10, 30, 60, 600, 1800 or 3600 seconds, Press the [Setting/Logger] Button once to start the Data Logger function. The REC symbol will flash with beep per sampling time period and save the data into the memory. When 0 second is selected as sampling time, the data will be saved one time into the memory each time the [Setting/Logger] Button is pressed. The "REC" symbol will flash with beep at the same time the [Setting/Logger] button is pressed.
 - 3) While the Data Logger function is executed, press the [Setting/Logger] Button once to stop the data logger function. The "REC" symbol will stop flashing. Press the [Setting/Logger] Button once again to start the Data Logger function again.
 - 4) To exit Data Record function, press the [REC/ENTER] button for at least 2 seconds.
- <Memory full>
 The Data Logger function can save 1,600 measurement data. If the "FULL" symbol appears with flashing on the display while the Data Logger function is executed, it indicate the memory data is already over 1,600 and the memory is full.

e. Data Sending

- 1) To send the data out from the device, exit the Data Hold function and the Data Record function first.
- 2) Press the [POWER/ESC] Button for at least 5 seconds until the sub display shows "rs232". The main display will show the total data logger number saved into the memory.

- 3) Connect the device to PC with USB cable.
- 4) Press the [POWER/ESC] Button once. The sub display will show "Send" and the storage data will be sent out from the "RS-232 output terminal". A more detailed procedure can be found in the manual of data acquisition software (sold separately).
- 5) Press the [FUNCTION] Button to exit the Data Sending function.

f. Advanced Setting Procedure

- 1) Before executing Advanced Setting Procedure, exit the Data Hold function and the Data Record function.
- 2) Press the [Setting/Logger] Button for at least five seconds to enter the Advanced Setting Procedure.
- 3) Setting items are switched each time the [Setting/Logger] Button is pressed.
 - K / J...Thermocouple type selection**
OFF...Auto power On/Off selection
SP-t...Data logger sampling time selection
SPACE...Show the balance data number in the memory
CLr...Clear the existing stored data from the memory
 - Thermocouple type selection**
 Press the [FUNCTION] button to select "K" or "J". After selecting the desired value (K or J), press the [REC/ENTER] Button to save the setting. Press the [Setting/Logger] Button to skip the setting of this item.
 - Auto power On/Off**
 Press the [FUNCTION] button to select "YES" or "no". The sub display will show "OFF". After selecting the desired value (YES or no), press the [REC/ENTER] Button to save the setting. Press the [Setting/Logger] Button to skip the setting of this item.
 - Data logger sampling time**
 Press the [FUNCTION] button to select 0, 1, 2, 5, 10, 30, 60, 600, 1800, 3600 seconds. The sub display will show "SP-t". After selecting the desired value, press the [REC/ENTER] button to save the setting. Press the [Setting/Logger] Button to skip the setting of this item.
 - Show the balance data number in the memory**
 The main display will show the balance data numbers in the memory. The sub display will show "SPACE". Press the [REC/ENTER] Button or [Setting/Logger] Button to go to the next item.
 - Clear the existing stored data from the memory**
 To clear the existing stored data from the memory, press the [FUNCTION] button to select "YES" or "no". The sub display will show "CLr". If "YES" is selected and the [REC/ENTER] Button is pressed again, the memory will be cleared exactly. Press the [Setting/Logger] Button to skip the setting of this item.
 - 9) When the sub display shows "End", please just press the [POWER/ESC] button to finish the Advanced Setting Procedure.

g. Auto Power Off

The device automatically switch off if "Yes" is selected in Advanced Setting Procedure and none of the buttons are pressed for approximately 10 minutes. The Auto Power Off function is disabled automatically while following functions are executed. [Data Record / Data Logger / Data Sending / Advanced Setting Procedure]

4. Cleaning

- 1) Wipe off dust, and other dirt on the unit using a dry cloth.

Caution

Please do not wipe the unit with benzene or thinner, this may cause the unit to easily break and produce white marks on the chasis.

5. General Specifications

Main Unit	
Model	TC-3200
No. Of Input	2 (T1, T2 / T2, T1 / T1 - T2 / T1 Only)
Sensor Type	Thermocouple Probe Type K,J
Measuring Range	K : -199.9 - +1300.0°C J : -199.9 - +1100.0°C
Sampling Time Of Display	Approx. 1 second.
Sampling Time Of Data Logger	Auto : 1, 2, 5, 10, 30, 60, 600, 1800, 3600 seconds. Manual : Push the data logger button once will save data one time.
Functions	Dual Channel Measurement, Data Hold, Max/Min, Auto Power Off, Data Record(1,600-point)
Display	LCD:44mm x 28mm Digit Size:Main 14mm, Sub 7mm
Error	Over Indication or Not connected probe
Sensor Connector	Miniature Thermocouple Connector x 2
Data Output	RS-232 Serial Interface
Power Supply	006P (DC9V) battery x 1 pc.
Battery Life	Approx. 87Hours.
Current Consumption	Approx. 5.5mA
Operating Temp./humidity	0 - 50°C, 80%RH max
Dimensions/weight	Dimensions:135(H)x60(W)x33(D)mm Weight:Approx. 196g (including batteries)
Contents	Instruction Manual, 006P battery x 1pc.
Compliance	CE, RoHS

Accuracy

Sensor Type	Resolution	Measuring Range	Accuracy
Type K	0.1°C	-199.9 - -50.1°C -50.0 - +1300.0°C	±(0.4%+1°C) ±(0.4%+0.8°C)
Type J	0.1°C	-199.9 - -50.1°C -50.0 - +1100.0°C	±(0.4%+1°C) ±(0.4%+0.8°C)

* Temperature Conditions : 23±5°C environment testing.

6. RS-232 PC Serial Interface

The temperature measurements and measured data graph can be checked and viewed through the computer through the RS-232 output option in the unit.

Communication Setting

Baud Rate	9600	Data bit	8 bit
Parity	None	Stop bit	1 bit

Communication Format

D15	STX(ASCII Code)
D14	4(Fixed)
D13	When send the upper display data = 1 When send the lower display data = 2
D12 D11	Annunciator for Display °C=01
D10	Polarity 0=Positive, 1=Negative
D9	Decimal Point(DP), position from right to the left 0=No DP, 1=1DP, 2=2DP, 3=3DP
D8 - D1	Display reading D8=MSD, D1=LSD (Ex : If the display reading is 1234, then D8 to D1 is : 00001234)
D0	CR(ASCII Code)

For Example: HEX

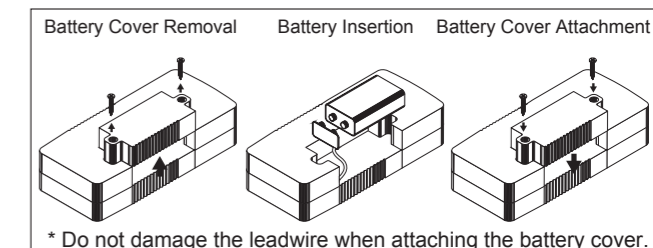
02	34	31	30	31	30	31	30	30	30	30	32	34	32	0d		
↓																
D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0	
		upper:1	°C	+	DP	Display (value)										
		lower:2														
STX	4	1	0	1	0	1	0	0	0	0	0	2	4	2	CR	

* The Output and Display change timing are in real-time.

7. Battery Replacement

- 1) When the Low Battery indicator appears on the display, it is necessary to replace the battery to maintain accurate readings.
- 2) Remove the battery cover as shown below.
- 3) Replace the battery with a new one and position the new battery correctly inside the device's battery compartment.
- 4) Attach the battery cover.

* The unit cannot measure accurately after low battery indicator is displayed. Please replace the battery immediately.



8. Storage

For proper storage, avoid places where the device can be exposed to direct sunlight, high humidity, high temperature, vibration and shock, dust, rust, corrosion, etc. Remove batteries if the device will not be used for a long period of time.

9. Accessories (Sold Separately)

- Thermocouple Probes (Please refer to the catalog of Thermocouple Probes.)
- Real-time Measurement Software : U801
- Logger Software : DL2005
- USB Cable : USB-01
- AC/DC Adapter : ZTC9021