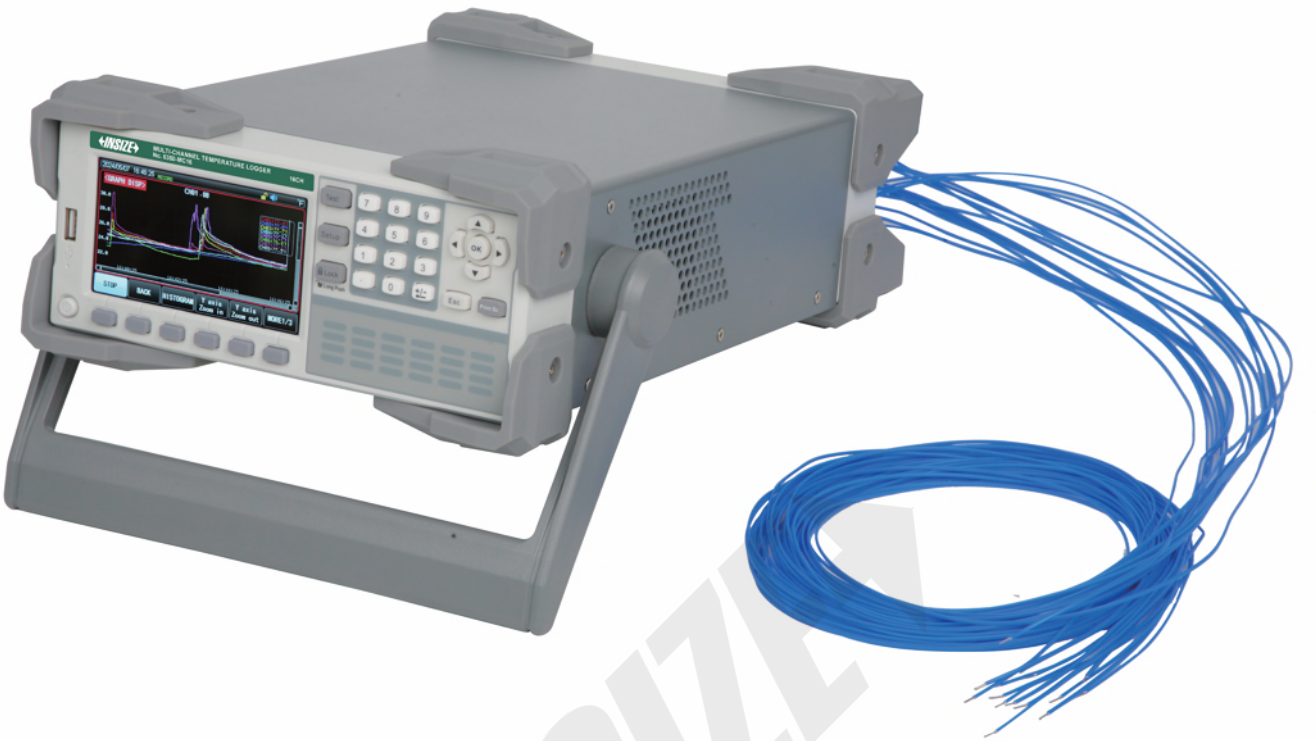


0350-MC SERIES
MULTI-CHANNEL TEMPERATURE LOGGERS
OPERATION MANUAL

PLEASE SCAN QR CODE TO WATCH THE OPERATION VIDEO OF PRODUCTS.

VIDEO

INSIZE

Foreword

Dear Users,

Hello! Thank you for choosing this brand new INSIZE instrument. In order to use this instrument safely and correctly, please read this manual thoroughly, especially the Safety Requirements part.

After reading this manual, it is recommended to keep the manual at an easily accessible place, preferably close to the device, for future reference.

1. Introduction

This manual includes safety requirements, installment and the operation of series multi-channel temperature tester.

2. Safety Requirements

This section contains information and warnings that must be followed to keep the instrument operating under safety conditions. In addition, user should also follow the common safety procedures.

Safety Precautions	
Warning	Please follow the following guidelines to avoid possible electric shock and risk to personal safety.
	Users must follow the following conventional safety precautions in operation, service and maintenance of this device. INSIZE will not be liable for any personal safety and property loss caused by the user's failure to follow the following safety precautions. This device is designed for professional users and responsible organizations for measurement purposes. Do not use this device in any way not specified by the manufacturer. This device is only for indoor use unless otherwise specified in the product manual.
Safety Statement	
Warning	"Warning" indicates the presence of a hazard. It reminds users to pay attention to a certain operation process, operation method or similar. Personal injury or death may occur if the rules in the "Warning" statement are not properly executed or observed. Do

	not proceed to the next step until you fully understand and meet the conditions stated in the "Warning" statement.
Caution	"Caution" indicates the presence of a hazard. It reminds users to pay attention to a certain operation process, operation method or similar. Product damage or loss of important data may occur if the rules in the "Caution" statement are not properly executed or observed. Do not proceed to the next step until you fully understand and meet the conditions stated in the "Caution" statement.
Note	"Note" indicates important information. It reminds users to pay attention to procedures, methods and conditions, etc. The contents of the "Note" should be highlighted if necessary.

Safety Sign		
	Danger	It indicates possible danger of electric shock, which may cause personal injury or death.
	Warning	It indicates that you should be careful to avoid personal injury or product damage.
	Caution	It indicates possible danger, which may cause damage to this device or other equipment if you fail to follow a certain procedure or condition. If the "Caution" sign is present, all conditions must be met before you proceed to operation.
	Note	It indicates potential problems, which may cause failure of this device if you fail to follow a certain procedure or condition. If the "Note" sign is present, all conditions must be met before this device will function properly.
	AC	Alternating current of device. Please check the region's voltage range.
	DC	Direct current device. Please check the region's voltage range.
	Grounding	Frame and chassis grounding terminal
	Grounding	Protective grounding terminal
	OFF	Main power off
	ON	Main power on
	Power Supply	Standby power supply: when the power switch is turned off, this device is not completely disconnected from the AC power supply.
CAT I		Secondary electrical circuit connected to wall sockets through transformers or similar equipment, such as electronic instruments and electronic equipment; electronic equipment with protective measures, and any high-voltage and low-voltage circuits, such as the copier in the office.

CAT II		Primary electrical circuit of the electrical equipment connected to the indoor socket via the power cord, such as mobile tools, home appliances, etc. Household appliances, portable tools (e.g. electric drill), household sockets, sockets more than 10 meters away from CAT III circuit or sockets more than 20 meters away from CAT IV circuit.
CAT III		Primary circuit of large equipment directly connected to the distribution board and circuit between the distribution board and the socket (three-phase distributor circuit includes a single commercial lighting circuit). Fixed equipment, such as multi-phase motor and multi-phase fuse box; lighting equipment and lines inside large buildings; machine tools and power distribution boards at industrial sites (workshops).
CAT IV		Three-phase public power unit and outdoor power supply line equipment. Equipment designed to "initial connection", such as power distribution system of power station, power instrument, front-end overload protection, and any outdoor transmission line.
	Waste	This product complies with the marking requirements of WEEE Directive (2002/96/EC). This additional label indicates that this electrical / electronic product must not be discarded in household waste.
	EFUP	This environment-friendly use period (EFUP) mark indicates that dangerous or toxic substances will not leak or cause damage within this indicated time period. The environment-friendly use period of this product is 40 years, during which it can be used safely. Upon expiration of this period, it should enter the recycling system.
Safety Requirements		
Warning		
Preparation before use		Please connect this device to AC power supply with the power cable provided. The AC input voltage of the line reaches the rated value of this device. See the product manual for specific rated value. The line voltage switch of this device matches the line voltage; The line voltage of the line fuse of this device is correct.
Check all terminal rated values		Please check all rated values and marking instructions on the product to avoid fire and impact of excessive current. Please consult the product manual for detailed rated values before connection.
Use the power cord properly		You can only use the special power cord for the instrument approved by the local and state standards. Please check whether the insulation

	layer of the cord is damaged or the cord is exposed, and test whether the cord is conductive. If the cord is damaged, please replace it before using the instrument.
Instrument Grounding	To avoid electric shock, the grounding conductor must be connected to the ground. This product is grounded through the grounding conductor of the power supply. Please be sure to ground this product before it is powered on.
AC power supply	Please use the AC power supply specified for this device. Please use the power cord approved by your country and confirm that the insulation layer is not damaged.
Electrostatic prevention	This device may be damaged by static electricity, so it should be tested in the anti-static area if possible. Before the power cable is connected to this device, the internal and external conductors should be grounded briefly to release static electricity. The protection grade of this device is 4 kV for contact discharge and 8 kV for air discharge.
Measurement accessories	Measurement accessories are of lower class, which are definitely not applicable to main power supply measurement, CAT II, CAT III or CAT IV circuit measurement.
Use the input / output port of this device properly	Please use the input / output ports provided by this device in a properly manner. Do not load any input signal at the output port of this device. Do not load any signal that does not reach the rated value at the input port of this device. The probe or other connection accessories should be effectively grounded to avoid product damage or abnormal function. Please refer to the product manual for the rated value of the input / output port of this device.
Power fuse	Please use power fuse of specified specification. If the fuse needs to be replaced, it must be replaced with another one that meets the specified specifications by the maintenance personnel authorized by INSIZE.
Disassembly and cleaning	There are no components available to operators inside. Do not remove the protective cover. Maintenance must be carried out by qualified personnel.
Service environment	This device should be used indoors in a clean and dry environment with ambient temperature from 0℃ to 40℃. Do not use this device in explosive, dusty or humid air.
Do not operate in humid environment	Do not use this device in a humid environment to avoid the risk of internal short circuit or electric shock.
Do not operate in flammable and explosive environment	Do not use this device in a flammable and explosive environment to avoid product damage or personal injury.
Caution	
Abnormality	If this device may be faulty, please contact the authorized maintenance personnel of INSIZE for testing. Any maintenance,

	adjustment or parts replacement must be done by the relevant personnel of INSIZE.
Cooling	Do not block the ventilation holes at the side and back of this device; Do not allow any external objects to enter this device via ventilation holes; Please ensure adequate ventilation, and leave a gap of at least 15 cm on both sides, front and back of this device.
Safe transportation	Please transport this device safely to prevent it from sliding, which may damage the buttons, knobs or interfaces on the instrument panel.
Proper ventilation	Poor ventilation will cause the device temperature to rise, thus causing damage to this device. Please keep proper ventilation during use, and regularly check the vents and fans.
Keep clean and dry	Please take actions to avoid dust or moisture in the air affecting the performance of this device. Please keep the product surface clean and dry.
Note	
Calibration	The recommended calibration period is one year. Calibration should only be carried out by qualified personnel.

3. Product Overview

0350-MC SERIES multi-channel temperature tester includes four models , which respectively corresponding to 8, 16, 32 and 48 channels. User can purchase the temperature tester according to their needs.

0350-MC SERIES adopts 4.3 inch LCD and support J, K, T, E, S, N, B, R thermocouple input. Multi-channel temperature data can be collected at the same time, with intuitive numerical reading, histogram and curve chart display, so that user can read the parameter with multiple modes or save the data in USB. The instrument has the alarm for over upper/lower limit and communication transmission function. Its perfect function and performance can meet the needs of production, laboratory and R&D measurements.

The instrument is equipped with RS232C interface, data acquisition, analysis and printing can be realized through the standard computer software. The instrument supports real-time storage of sampling data. User can calibrate data of each channel independently.It widely used in lighting appliances, electric tools, household appliances, electric motors, electric heating appliances, medicine, petroleum, chemical, metallurgy, electric power industries and scientific research institutions in the field of production lines, laboratories, quality control departments.

3.1 Specifications and Functions

Item	Description
Display	Direct numerical reading
	Curve chart
	Histogram
Measurement	Thermocouple type: J, K, T, E, S, N, B, R
	Test Range: -150.0℃~1800.0℃ (the range wil change with different thermocouple model)
	Resolution: 0.01
	Number of channel: 8~48 (channel is configured according to different model)
	Test speed: Slow, Fast
Main Functions	Sorting: built-in sorting data can set the upper/lower limit for the temperature of each channel
	Beep: alarm for over the upper/lower limit
	Calibration: user can set calibration for the data of each channel
	Lock key
	Print screen key
Storage	FAT: user can creat the file with the suffixal【.csv】and save the data of each channel into USB (not support mobile hard disk)
Interface	RS232C communication interface
	LAN communication interface
Remote Control	Baud rate supports up to 115200bps and compatiable with SCPI protocol and ASCII transmission
System Setup	Chinese, English
	Date, time and key sound
Environmental Temperature	Temperature: 15℃~35℃, humidity <80%RH
	Operating: temperature 10℃~40℃, humidity 10~90%RH
	Storage temperature 0℃~50℃, humidity 10~90%RH
Size	370mm*260mm*100mm
Weight	3.6kg (net weight)

3.2 Accuracy of Instrument

The accuracy of cold junction compensation is ±0.5℃.

The measurement accuracy of different thermocouple is shown as the following table.

The measurement accuracy divides into three parts: cold junction compensation, the

measurement accuracy of the instrument (it is different when using different thermocouple) and the measurement accuracy of thermocouple.

The measurement accuracy of thermocouple is subject to the standard of manufacturer.

Sensor Model	Temperature (℃)	Accuracy (℃)
Type T thermocouple	-150℃-0℃	±1.0℃
	0℃-400℃	±0.8℃
Type K thermocouple	-100℃-0℃	±1.2℃
	0℃-1350℃	±0.8℃
Type J thermocouple	-100℃-0℃	±1.0℃
	0℃-1200℃	±0.7℃
Type N thermocouple	-100℃-0℃	±1.5℃
	0℃-1300℃	±0.9℃
Type E thermocouple	-100℃-0℃	±0.9℃
	0℃-850℃	±0.7℃
Type S thermocouple	0℃-100℃	±4.5℃
	100℃-300℃	±3.0℃
	300℃-1750℃	±2.2℃
Type R thermocouple	0℃-100℃	±4.5℃
	100℃-300℃	±3.0℃
	300℃-1750℃	±2.2℃
Type B thermocouple	600℃-800℃	±5.5℃
	800℃-1000℃	±3.8℃
	1000℃-800℃	±2.5℃

3.3 Main Characteristics

- 4.3 inch true color LCD
- Wide range of adaptability, supports Type K/N/E/J/T/R/S/B thermocouple
- Measurement range: -150℃—1800℃
- The main parameters of the temperature test are displayed in 6 digits, and the resolution is 0.01℃.
- Two scanning rate: fast (according to different model), slow
- Automatic detection of open-circuit thermocouple
- Direct numerical value reading, histogram and curve chart display mode.
- Cold junction compensation
- 16G USB and USB HOST interface, USB storage
- File management can keep the current setup of the instrument.
- The instrument is equipped with Type K thermocouple test line 2 meters, it can measure the temperature range -20℃—200℃.
- Alarm for over upper/lower limit. Alert for reading changing of over-limit. The upper limit and lower limit of temperature data in each channel can be set.
- RS-232C, LAN, DC24V external power supply interface. Supports SCPI and MODBUS RTU protocol.
- It suitable for standard 2U cabinet.

4. Panel Overview

4.1 Front Panel

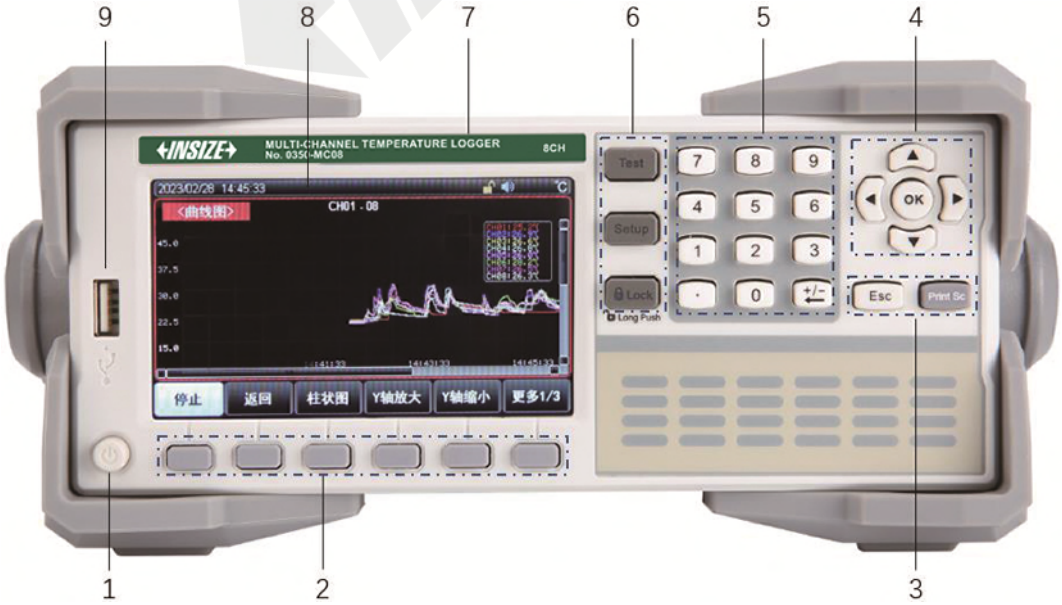


Figure 4-1 Front Panel

No.	Picture	Description
1		Power supply switch (slight touch); The indicator is yellow when power is ON. The indicator is red when power is OFF.
2		Functional key
3		Exit key for cancel/return
		Press this key to capture screenshot and save in USB when USB inserts in the instrument.
4		Arrow key is used to move the cursor
		Enter key is used to confirm the input value.
5		Numeric keypad is used to input numerical value; The add, subtract, delete key is used to add, subtract, and delete.
6		Test key is used to display the test result.
		Setup key is used to set the measurement parameter
		Lock key is used to invalidate the key. Long press 1s to unlock the key.
7		Emblem
8		USB interface
9		4.3 inch LCD

Table 4-1 Interface Display and Symbol

Symbol	Description
	USB is insert the instrument and it can save the data or capature the screnshot to save.
	Key sound is enabled.
	Comparator is enabled.
	Unlock the key
	Lan interface
℃, K, ℉	The unit of the current temperature
	Blinking character indicates the instrument is data acquiring.

4.2 Rear Panel

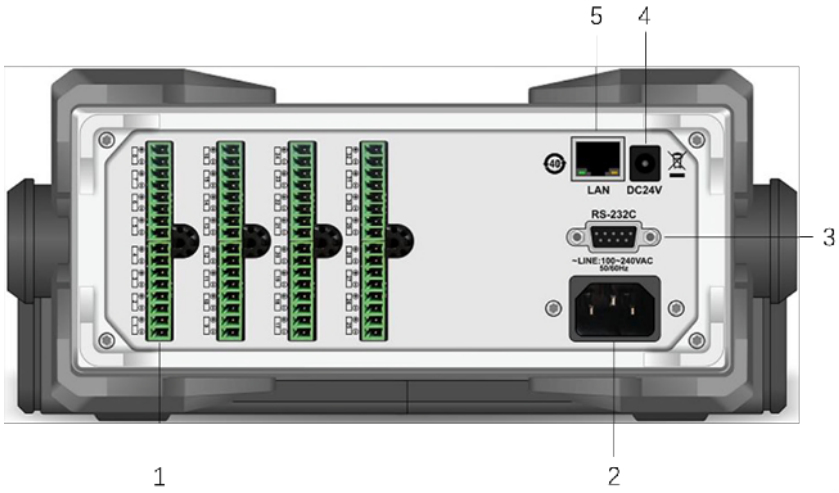


Figure 4-2 Rear Panel

No.	Description
1	Data acquisition module 0350-MC SERIES is equipped with data acquisition module1/2/4/6
2	AC power socket (not contain fuse) the fuse is inside the instrument
3	RS232C communication interface
4	DC 24V power supply interface
5	LAN communication interface

5. Inspection and Installation

5.1 Packing List

Before using the instrument,

1. Check the appearance whether is damaged or scratched;
2. Check the packing list if has loss.

If the product is damaged or accessory is missing, please contact INSIZE sales department or distributor.

Article	Quantity	Remarks
Multi-channel Temperature Tester	1 pcs	The actual model is subject to the order.
Power Line	3 pcs	Chinese, English, Brazilian power cord
16G USB	1 pc	

8-channel Temperature Test Module	Match with model	0350-MC SERIES is respectively equipped with 1/2/4/6 group.
RS232C Communication line	1 pc	
Network cable	1 pc	

5.2 Power Requirements

0350-MC SERIES multi-channel temperature tester can only be used under the power conditions as the following.
Voltage: 100V-240VAC
Frequency: 50/60Hz
Power: the maximum 10VA

Warning: To prevent electric shock, please make sure that the power line is securely connect to the ground.

5.3 Operation Environment

0350-MC SERIES multi-channel temperature tester can only be used under the environmental conditions as the following.
Temperature: 10℃~40℃

Humidity: 10~90%RH

Altitude: 0~2000 meters

5.4 Cleaning

To prevent electric shock, unplug the power line before cleaning.
Use clean cloth with slight water to wipe outer shell and panel and keep it dry. Don't let water enters the instrument.
Do not clean the external of the instrument.

Caution: Do not use solvent (alcohol or gasoline) to clean instrument.

5.5 Handle

Handle is adjustable and can adjust to four positions, hold two sides of the handle to pull or

rotate as shown in the following figure.

Figure 5-1 Original Position

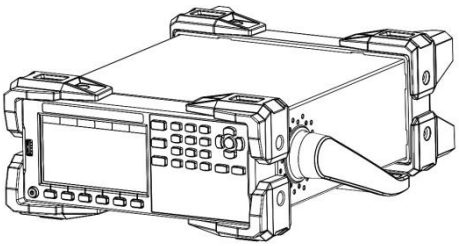


Figure 5-2 Test Position

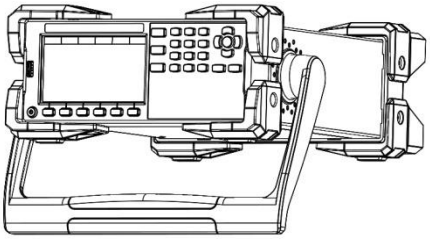


Figure 5-3 Remove Handle

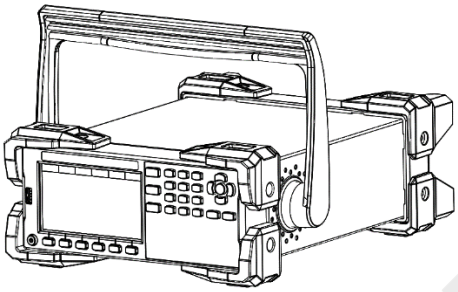
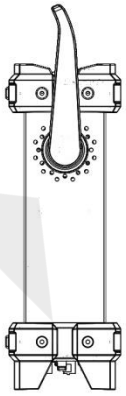


Figure 5-4 Lift Position



6. Measurement Preparation

6.1 Power On

Connecting standard power line to make sure that the instrument is power on normally.

Power supply switch in the lower left on the panel, it is a slight electronic switch. Indicator is yellow, indicating that the power of the instrument is enabled.

After confirming that the instrument is powered on, please turn off the power button. At this time, the power indicator will appear red.

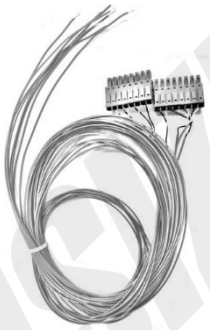
Warning: Please make sure that the power voltage is matched with supply voltage. Otherwise, the instrument may burnout.
The main power plug must connect to the power socket with protective grounding.
Do not use the wire board without protective grounding.

6.2 Test Line and Installation

The instrument is equipped with Type K thermocouple test line as shown in Figure 6-1 8-channel test module. Each 8-channel temperature test module includes 8 test line, so that it can measure the temperature of 8 channels at the same time. Type and specification of test module is as follows.

- Type and name: 8-channel test module
- Type K thermocouple
- Length: 2 meters×8
- Temperature range of Type K test line: -20~200℃
- Accuracy: ±1.5℃

Figure 6-1 8-channel Test Module



Note: Please make sure that the temperature of DUT is within the range of the test line before connecting the test probe to DUT.

Test module

0350-MC is respectively equipped with 1/2/4/6 group.

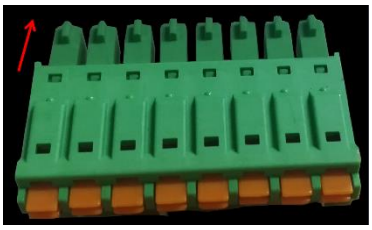
Installation Steps

Ensure that the power of the instrument is shunt down before connecting the test line to the port of data acquisition module at the rear.

1. As shown in Figure 6-2, place the test line interface face up and keep it with the data acquisition module port of the instrument on same level.
2. As shown in Figure 6-3, plug test line into eight slots of the instrument.
3. Other channel is connecting as the same way.

Figure 6-2 Data Acquisition Module Port of Instrument

Figure 6-3 Test Line Port



Caution: The isolation voltage between channels is 350V DC and 230V AC.

6.3 Channel Indentifier

The product is equipped with paster to distinguish different channels with the channel number 01, 02...etc. Users can stick them on different test lines according to their needs, as shown in the figure.In order to better distinguish the matching relationship between the measurement object and the channel number of the instrument.

Figure 6-4 Channel number of each channel in the acquisition module of the temperature tester, take 0350-MC32 SERIES as an example.

Data acquisition module in the first row on the left, it corresponds to CH01, CH02, CH03...CH08 from down to up.

Data acquisition module in the second row on the left, it corresponds to CH09, CH10, CH11...CH16 from down to up.

Data acquisition module in the third row on the left, it corresponds to CH17, CH18, CH19...CH08 from down to up.

Data acquisition module in the fourth row on the left, it corresponds to CH25, CH26, CH27...CH32 from down to up.

Data acquisition module in the fourth row on the left, it corresponds to CH25, CH26, CH27...CH32 from down to up.

Data acquisition module in the fifth row on the left, it corresponds to CH33, CH34, CH35...CH40 from down to up.

Data acquisition module in the sixth row on the left, it corresponds to CH41, CH42, CH43...CH48 from down to up.

Data acquisition module of other Instruments are sorted in the same way.

Figure 6-4 0350-MC32 Channel Number in Acquisition Module of Temperature Tester

6.4 USB

Instrument is equipped with an 16G USB, USB recording function is only valid in <Test>, <Histogram> and <Curve Chart> page.

Before starting data collection, insert USB into instrument interface and wait the instrument indentify USB and then press start key, data will be record in file RECORD .

Curve chart and histogram can refer to section 4.5.

It is recommended to use brand USB to avoid the problem of incompatible identification. The format and capacity of the USB can be referred to FAT, FAT32 and EXFAT, with the maximum capacity of 128G.

6.5 Operation Guide

This section is to describe how to use multi-channel temperature test to measure DUT. It is necessary to make full preparation before testing according to the actual situation.

- Connect the power line correctly.
- Turn on the switch of the instrument, the screen will light up. Check the contact lines of each temperature are connected well. Starts to data acquisition, if the connection is wrong then no temperature display on this connection line; if the connection is normal, temperature will display (environment temperature).

- Insert USB into port of the instrument.
- Select the test part and fix the cloth point of temperature connection line with glue. The cloth point must be attached to the test surface to avoid effect the value precision. User can use the channel identification sticker to distinguish different test lines.
- Starting to test DUT after cloth point of each part is all fixed. Do not move DUT and the instrument during the test, so as not to effect the accuracy.
- After the test is completed, remove the test connection line and pull out USB.
- Arrange the instrument and line, then turn off the power supply.

7. <Test>

7.1 Numerical Reading

Press【Test】on the panel to enter <Test> page.

Note: If user need to record the data, please insert USB into the port of the instrument befor data acquisition. Start the test after USB is identified.

Display mode: numerical reading, curve chart, histogram

Numerical reading is the best way to read one or more channel values at some point. Press【Start】key, the instrument will start data acquisition. A green flashing cursor at the top of the screen indicates that the data is being collected, test values will show with green color as shown in Figure 7-1. Press【Stop】key to terminate data acquisition.

Figure 7-1 Temperature Numerical Reading

Check test data of other channel by page switching or up/down key

During data acquisition, user can set the following parameters based on your own needs.

- Different font:【Zoom+/-】Key is used to switch the font size. Every time you press 【Zoom+/-】

or【OK】key at the bottom of the screen, the screen display will increasing or decreasing 8 or 16 channel's data. User can set front size by your own needs.

- Page switching: Switch to different channel display, the current page and total pages will displayed at the bottom of the screen. If there are multiple pages, press【Page switching】at the bottom of the screen or up and down key to switch to different channel display pages.

7.2 Curve Chart

Curve chart is the direct way to read temperature trends, as shown in Figure 7-2.

Figure 7-2 Curve Chart

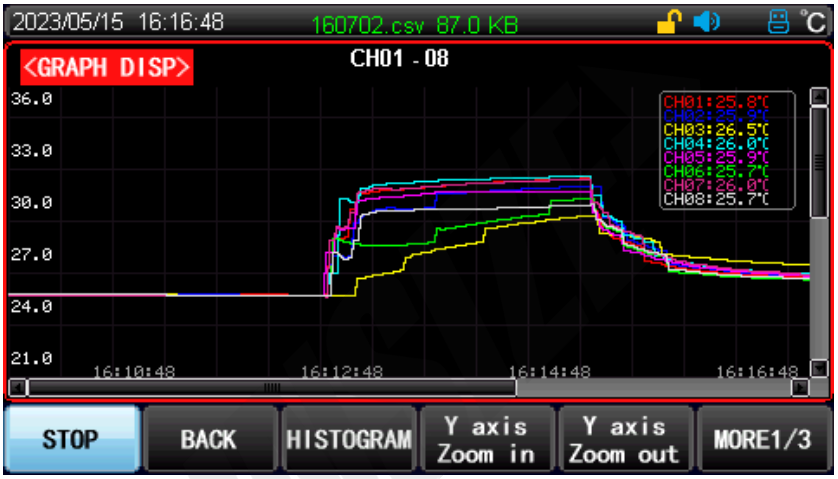
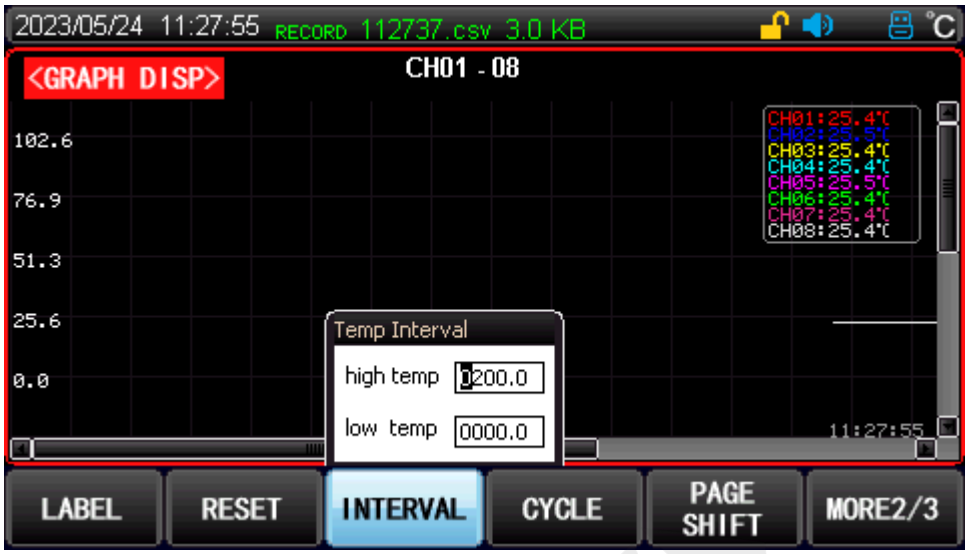


Figure 7-2 curve chart is an example of the temperature changing with time of CH01~CH0. The horizontal axis represents time and the vertical axis represents temperature. The vertical axis range is based on the set of high and low temperature. You can evaluate object temperature before test to narrow the range of vertical axis graph.

The vertical axis range can be set according to the upper/lower limit of curve in【Y axis zoom out】and【Y axis zoom in】key at the bottom of the screen or set by【Interval】key. Before entering the curve test, the approximate temperature range of DUT can be roughly evaluated by using【Y axis zoom out】and【Y axis zoom in】key. And then use【Interval】key to zoom in the temperature range in Y axis of curve.

7.2.1 Upper/Lower Limit of Curve Chart

Figure 7-3 Upper/Lower Limit of Curve Chart



Setup Steps

1) Press【More 1/3】to enter next page.

2) As shown in Figure 7-3， press【Interval】key at the bottom of screen, input the high temp by using numeric keypad and press【OK】key to confirm, the cursor jumps to enter the low temp and press the【OK】key to confirm the setting. If the high temp is incorrectly set to less than the low temp, the input is invalid and exits. It should be re-enter. If DUT temperature range is 20~40℃, then the low temp can be set to 20℃ and the high temp sets to 40℃.

3) Set the data display cycle, the range can be set 500ms~2mins. After pressing【Cycle】key at the bottom of the screen, select the desired data display speed by using up and down key, and press【OK】key to confirm after the setting is completed. The instrument starts data acquisition and records the temperature curve changes in real time. In slow rate, 0.5s is not available.

4) Storage duration of historical curve data (72 hours/board card).

7.2.2 Display Setup of Curve Chart

Functional key of curve chart

Functional Key	Description
Stop	Stop data acquisition

Back	Return to numerical display of channel
Histogram	Enter histogram interface
Y axis zoom in	Zoom in temperature range of curve
Y axis zoom out	Zoom out temperature range of curve
X axis zoom in	Increase the span of time axis
X axis zoom out	Decrease the span of time axis, the minimum scale value is 1
Label	Show/Hide the switch of curve chart on the right side
Reset	Delete curve data and restore the curve chart to the default
Interval	Set temperature range
Cycle	Set sampling cycle of temperature (0.5s can not be set when in low speed)
Page Shift	The current page can only display the curve of 8 channels, press this key to switch to show the curve of other channels
More	Show more functional key
Up key	Move up temperature axis of the curve
Down Key	Move down temperature axis of the curve
Left Key	Move time axis of the curve to the left
Right Key	Move time axis of the curve to the right

7.3 Histogram

Histogram is used to direct observe the temperature values of multiple channels in the same group and can compare the temperature percentage of 8 channels in the same group.

Column percentage of 8 channels =

$$\frac{\text{Actual temperature value}}{\text{The maximum of test absoulte value in the same group of modules}}$$

Figure 7-4 Histogram of CH01-CH08 (All temperature >0)

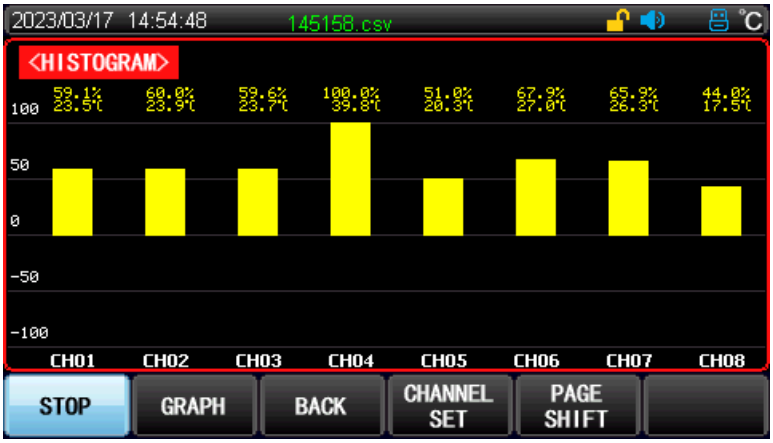


Figure 7-5 Histogram of CH01-CH08 (All temperature >0)

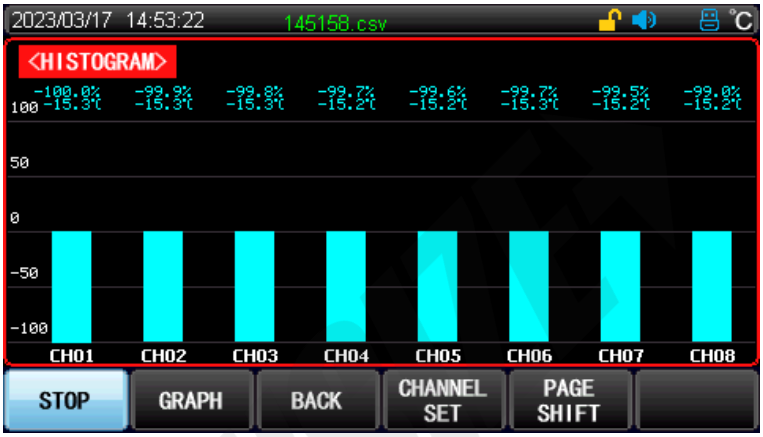


Figure 7-6 Histogram of CH01-CH08 (Temperature value has positive and negative)

System will adjust the cloumn move to up or down according to the positive or negative temperature value of the channel. If the test module is not connected, it will not be displayed.

7.4 USB Data Record

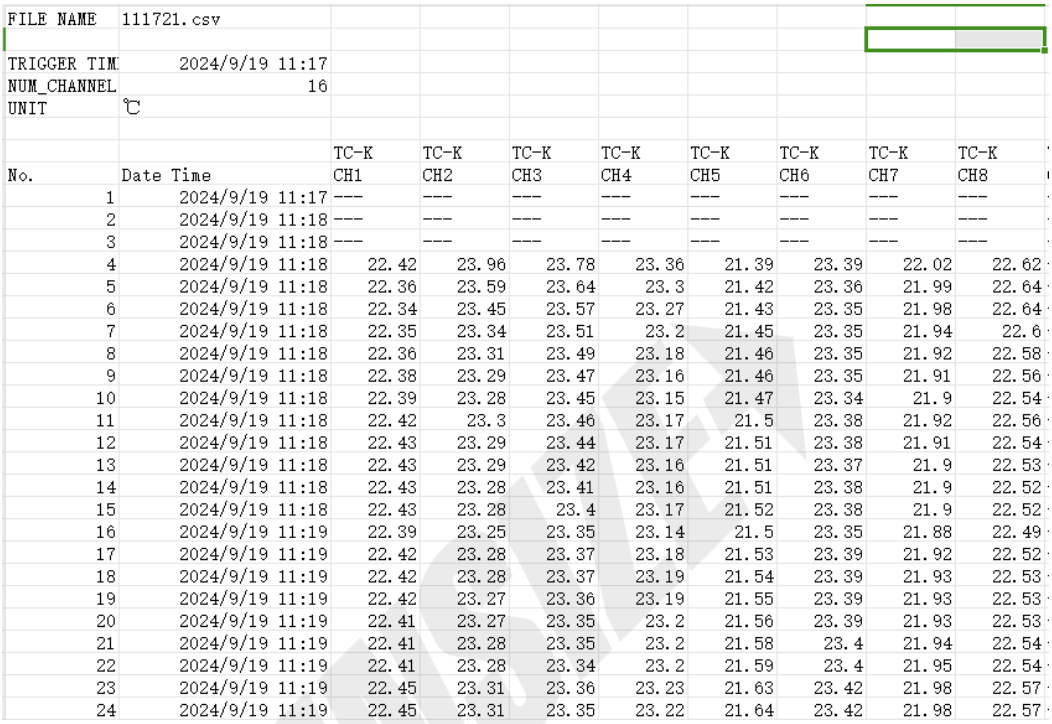
USB recording function is only valid in <Test>, <Histogram> and <Curve Chart> page.

Data record time is subject to the internal clock of the instrument. When the internal clock stops working, the data record will also be stopped. If the internal clock does not work, that indicates the internal battery should be replaced. It is recommend to return the instrument to the factory to replace

the battery.

As shown in Figure 7-7, the file includes two parts the instrument information (file name, time, and channel number) and channel temperature (temperature unit, time, channel type and the measurement value of each channel).

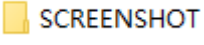
Figure 7-7 Screenshot of Data Record



FILE NAME	111721.csv								
TRIGGER TIM	2024/9/19 11:17								
NUM_CHANNEL	16								
UNIT	℃								
		TC-K	TC-K	TC-K	TC-K	TC-K	TC-K	TC-K	TC-K
No.	Date Time	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
1	2024/9/19 11:17	---	---	---	---	---	---	---	---
2	2024/9/19 11:18	---	---	---	---	---	---	---	---
3	2024/9/19 11:18	---	---	---	---	---	---	---	---
4	2024/9/19 11:18	22.42	23.96	23.78	23.36	21.39	23.39	22.02	22.62
5	2024/9/19 11:18	22.36	23.59	23.64	23.3	21.42	23.36	21.99	22.64
6	2024/9/19 11:18	22.34	23.45	23.57	23.27	21.43	23.35	21.98	22.64
7	2024/9/19 11:18	22.35	23.34	23.51	23.2	21.45	23.35	21.94	22.6
8	2024/9/19 11:18	22.36	23.31	23.49	23.18	21.46	23.35	21.92	22.58
9	2024/9/19 11:18	22.38	23.29	23.47	23.16	21.46	23.35	21.91	22.56
10	2024/9/19 11:18	22.39	23.28	23.45	23.15	21.47	23.34	21.9	22.54
11	2024/9/19 11:18	22.42	23.3	23.46	23.17	21.5	23.38	21.92	22.56
12	2024/9/19 11:18	22.43	23.29	23.44	23.17	21.51	23.38	21.91	22.54
13	2024/9/19 11:18	22.43	23.29	23.42	23.16	21.51	23.37	21.9	22.53
14	2024/9/19 11:18	22.43	23.28	23.41	23.16	21.51	23.38	21.9	22.52
15	2024/9/19 11:18	22.43	23.28	23.4	23.17	21.52	23.38	21.9	22.52
16	2024/9/19 11:19	22.39	23.25	23.35	23.14	21.5	23.35	21.88	22.49
17	2024/9/19 11:19	22.42	23.28	23.37	23.18	21.53	23.39	21.92	22.52
18	2024/9/19 11:19	22.42	23.28	23.37	23.19	21.54	23.39	21.93	22.53
19	2024/9/19 11:19	22.42	23.27	23.36	23.19	21.55	23.39	21.93	22.53
20	2024/9/19 11:19	22.41	23.27	23.35	23.2	21.56	23.39	21.93	22.53
21	2024/9/19 11:19	22.41	23.28	23.35	23.2	21.58	23.4	21.94	22.54
22	2024/9/19 11:19	22.41	23.28	23.34	23.2	21.59	23.4	21.95	22.54
23	2024/9/19 11:19	22.45	23.31	23.36	23.23	21.63	23.42	21.98	22.57
24	2024/9/19 11:19	22.45	23.31	23.35	23.22	21.64	23.42	21.98	22.57

7.5 Print Sc

"Print Sc"can be used to capature screenshot when USB inserts into the instrument.

The screenshot of test value or histogram will automatically saved in file 

of USB.

8. Temperature Alarm

8.1 Comparator

To compare the measured values to the upper and lower limits, it should perform two steps: turn on the comparator and set the channel. The comparator setup page is as follows.

Figure 8-1 Turn on Comparator

Step to turn on comparator

Step 1 Press【Setup】key to enter < Setup > page.

Step 2 Press【Arrow】key to move cursor to【Comparator】field, press【OK】key to turn on or off the comparator. If it selects ON, T will appear on the screen, indicating the comparator function is enabled.

Step 3 Move cursor to【Beep】field, press【OK】key to turn on or off beep. If it selects ON, the beep will be sound when the measured value exceeds the range of the comparator.

Step 4 User can also set the sampling rate or temperature unit by your own needs.

8.2 Channel Setup

After the comparator is enabled, enter <Channel Setup> page to set the upper/lower limit of channel temperature as shown in Figure 8-2

Figure 8-2 <Channel Setup> Page

Setup Steps

1. Enter the <Channel Set> page by using functional key 【Channe set】 at the bottom of <Function Setup> or < Measurement > page.
2. Use【Arrow】key to move cursor to the upper temperature and the lower temperature of the specified channel, press【OK】key to set, input the upper/lower limit value by numeric keypad and then press【OK】or【Enter】key to complete the setting.
3. As shown in Figure 8-2 <Channel Setup> page, move cursor to the lower temperature of CH01 and press【OK】key to set, input 20 by numeric keypad and then press 【OK】to confirm； move cursor to the upper temperature of CH01 and press【OK】 key to set, input 30 by numeric keypad and then press【OK】to complete the setting.
4. Use functional key at the bottom of the screen to set the function as the following table. User can set it by your own needs.

Functional Key	Description
Reset	Restore the current upper/lower limit to the factory setting
Onekey Set	Set the upper/lower limit of other channels to be the upper limit/lower limit of the current channel

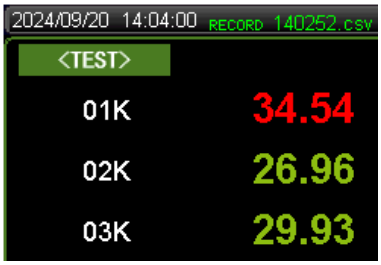
5. Repeat the preceding steps to set other channels.
6. 【TC Model】is used to switch temperature connecting wire for different sensor of each channel. User can select the type based on your needs by the following table.

Functional Key	Description
TC-K	Type K thermocouple
TC-T	Type T thermocouple
TC-J	Type J thermocouple
TC-N	Type N thermocouple
TC-E	Type E thermocouple
TC-S	Type S thermocouple
TC-R	Type R thermocouple
TC-B	B thermocouple
Onekey set	Set sensor model of other channels to be sensor model of the current channel

8.3 Judgement of Upper/Lower Limit

After the comparator is enabled and the upper/lower limit of channel is set, press【Test】key to enter <Measurement> to start data acquisition.

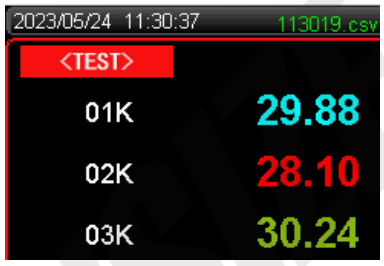
Figure 8-3 Alarm for Over Upper Limit



If the measured value exceeds the upper limit, the temperature data will display with red color.

If the measured value exceeds the lower limit, the temperature data will display with blue color.

Figure 8-4 Alarm for Over Lower Limit



If the comparator function has been turned on, the instrument will immediately give an alarm when the measured value exceeds the upper or lower limit.

To disable the alarm, return to <Setup> page to turn off beep function.

9. [Setup]

9.1 <Function Setup>

Press【Setup】quick key on the panel to enter <Function Setup> page.

This page is to set measurement, including the following parameters.

- Com – Turn on/off comparator function (refer to section 8.1)
- Beep - Turn on/off beep (refer to section 8.1)
- Key beep - Turn on/off key sound
- Rate - Sampling rate
- Unit - Temperature unit
- Auto-start - Auto-start after power outage - Restore to the last measurement state
- Com setup

- Com mode
- Baud rate
- Port
- USB – File name prefix - Prefix of storage file
- USB – Time period per file – Automatic segnebtation of storage file
- USB – delay – Time interval of data record

Figure9-1 <Function Setup> Page

Table 9-1-1 Function Setup

Item	Input Range	Default	Description
Com	ON, OFF	OFF	Turn on or off comparator
Beep	ON, OFF	OFF	Turn on or off comparator beep
Key Beep	ON, OFF	ON	Turn on or off key beep
Rate	Slow, fast	Slow	Fast: sampling period is 0.5s Slow: sampling period is1s
Unit	℃, K,℉	℃	Temperature unit
AutoStart	ON, OFF	OFF	Auto-start after power outage, whether to restore the measurement state after reboot
COM BUS	RS232C, LAN	RS232C	Communication bus setting
COM MODE	Modbus, SCPI	SCPI	The instruments supports two communication protocols SCPI and Modbus (RTU). In general, using SCPI to communicate with computer and Modbus to communicate with PLC.
Baud rate	4800, 9600, 19200, 38400,	9600	Baud rate of serial port bus

	57600, 115200		
ADDR	0~255	1	If Modbus (RTU) is used, the station number address of the device should be set. ① The instrument allows station number 00 for broadcast communication. ② 1~255: Address of the instrument when connected to the bus.
File name Prefix	INSIZE	INSIZE	Prefix of Filename
Time Period per File	Off,512K,1M,2M,5M,10M,20M,30M, 5min, 10min, 15min, 30min, 1hour	2M	Storage file will be automatic segmentation, create a new file and save.
Delay	1s, 2s, 5s, 10s, 15s, 20s, 30s, 1min, 2min, 5min, 10min, 20min, 30min, 1hour	OFF	Time interval of data record

9.1.1 Set【Rate】of Data Acquisition

The rate can be set to slow or fast.

Setup steps

- Press【Setup】quick key to enter <Function Setup> main page;
- Use【Arrow】key to move cursor to【Rate】field，press【OK】and【Arrow】key to select.

Functional Key	Description
Slow	Sampling period is 1s
Fast	Sampling period is 0.5s

9.1.2 Set Temperature【Unit】

Setup steps

- Press【Setup】quick key to enter <Function Setup> main page;
- Use【Arrow】key to move cursor to【Unit】field，press【OK】and【Arrow】key to select.

Functional Key	Description

℃	degree Celsius
K	Kelvins
℉	Fahrenheit scale

9.1.3 【Key Beep】

Setup steps

- Press【Setup】quick key to enter < Setup> main page;
- Use【Arrow】key to move cursor to【Key Beep】field，press【OK】and【Arrow】key to select.

Functional Key	Description
ON	Turn on key beep
OFF	Turn off key beep

9.1.4 【AutoStart】

Setup steps

- Press【Setup】quick key to enter <Function Setup> main page;
- Use【Arrow】key to move cursor to【Auto-start】field，press【OK】key to select.

Functional Key	Description
ON	Turn on auto-start
OFF	Turn off auto-start

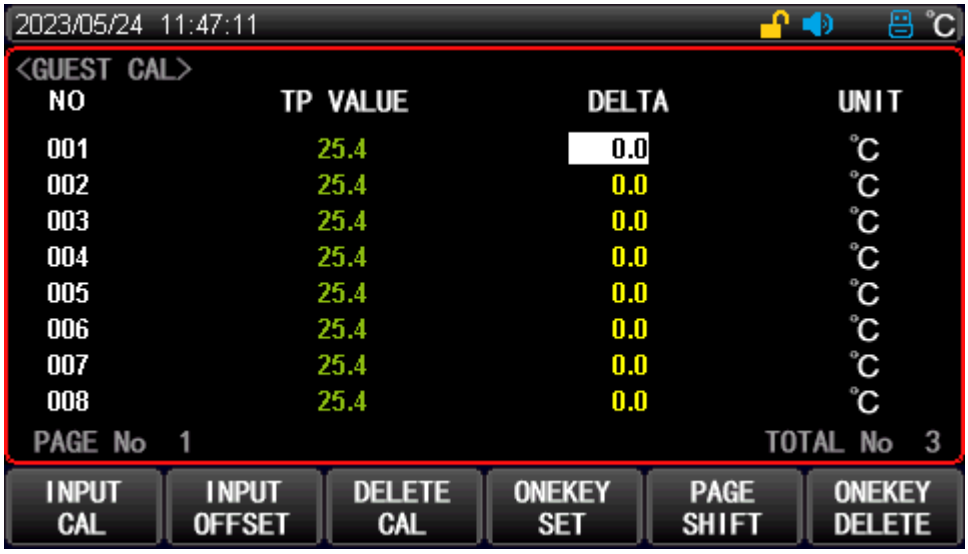
9.2 <Channel Setup>

<Channel Setup> is to set channel's name and the upper/lower limit of temperature. This setting is related with the comparator and can refer to section 5.2.

9.3 <User-calibration>

<Guest Cal> is used to adjust abnormal temperature. Input the actual temperature value in calibration column to complete the setting.

Figure 9-2 <User-calibration> Page



Correct the specified channel, take CH001 as an example

Setup Steps

Press【Setup】key to enter < Setup> page, press【Guest Cal】key to enter <Guest Cal> page, and use【Arrow】key to move cursor to calibration column【0.0】field, and then use functional key at the bottom of the screen to select the function as shown in the following table.

Functional Key	Description
Input cal	Input the calibrated temperature value into the selected channel by using numeric keypad and press【OK】to complete the setting.
Input offset	Input the temperature offset value into the selected channels by using numeric keypad and press【OK】to complete the setting.
Delete cal	Delete the calibrated temperature value.
Onekey Set	Onekey to set all cal data as the current channel cal
Page shift	Switch to the channel on other page.
Onekey Delete	Onekey to delete all channels cal setting

10. System

10.1 <System Configuration>

When the test is stop, press【Setup】quick key to select【System Configuration】key at the bottom of the screen to enter<System Configuration> page.

Figure10-1 <System Configuration> Page

10.1.1【Language】

The instruments supports Chinese and English.

Setup steps

1. In <System config>page, use【Arrow】key to move cursor to <LANGUAGE> field;
2. Use【OK】and【Arrow】key to select the language.

10.1.2【Date/Time】

The instrument adopts 24 hours system.

Setup steps

1. In <System config >page, use【Arrow】key to move cursor to <Date/Time> field;
2. Use【OK】and【Arrow】key to complete time setting.

Note: If the internal battery is lacked, the clock will stop work. It is recommend to return the instrument to the factory to replace the battery.

10.1.3【Display Off】

Setup Steps

1. In <System config>page, use【Arrow】key to move cursor to <Display off> field;
2. Use【OK】and【Arrow】key to complete time setting.

10.2 <System Information>

System information contains product's model, sensor type, channel number, software version and the serial number of the instrument.

10.3 <Bottom Setup>

Functional Key	Description
File	Refer to chapter 8
Channel Set	Channel data set
Guest Cal	Cal data set
System Service	System information
Input	Input parameter
Factory Set	Reset to factory data

11. File Management

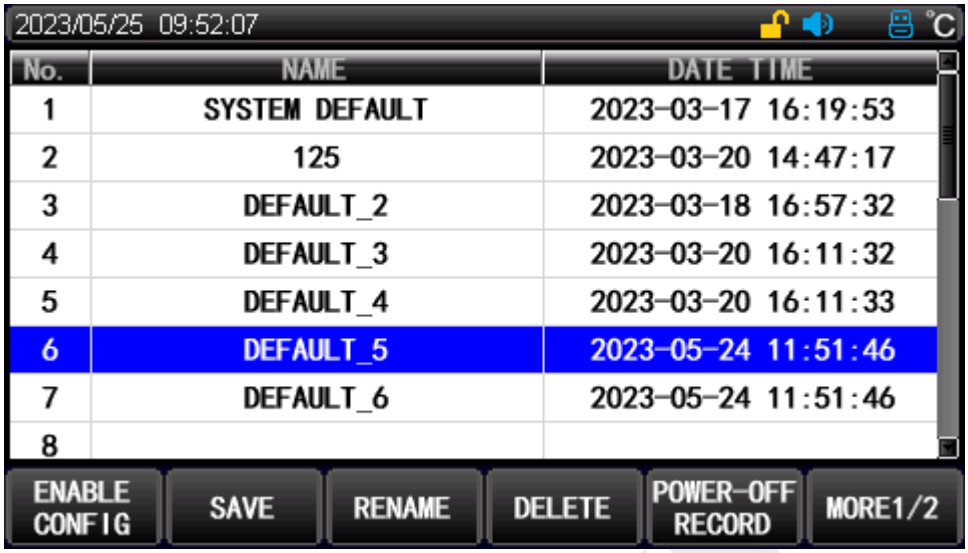
11.1 <File>

Press【Setup】key to select【File】key at the bottom of the screen to enter <File> page.

To save or access the current function settings, perform the following operations.

11.1.1 Rename】File

Figure 11-1 <File Management>



If user want to save the current setting when <Function Setup>, <System Configuration> and <Channel Setup> is set, press【File】key at the bottom of the screen to enter <File> page, the bule column is the current system file.

Use【Arrow】key to move cursor from【File】field to the specified line, such as move cursor to the third line as shown in Figure 11-2, and press【Save】key at the bottom of the screen to save the default filename "DEFAULT_2".

Seven functional keys at the bottom of the screen

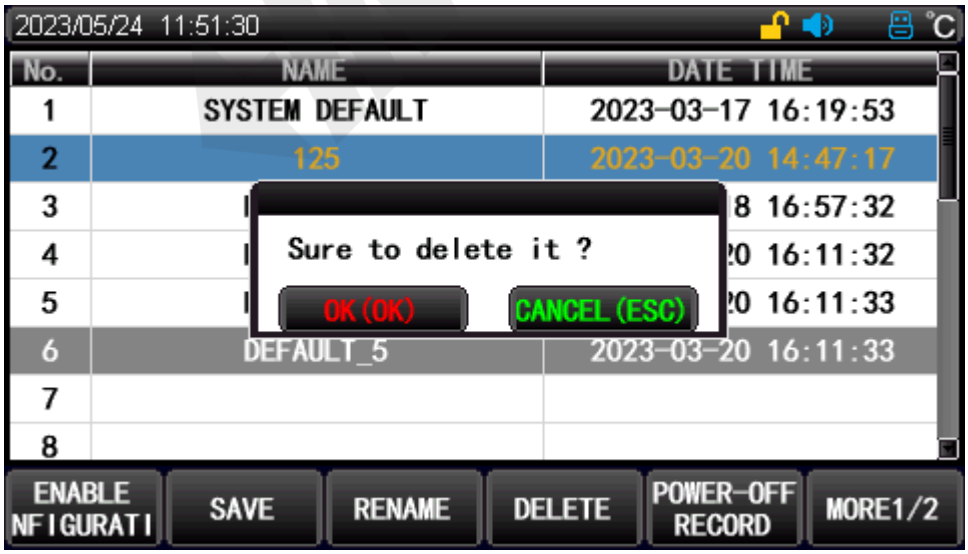
Functional Key	Description
Enable config	To automatically read the saved instrument's setting when next boot up
Save	Save the current setting
Rename	Rename the file
Delete	Delete saved setting
Power-off record	Whether automatically saved the modified configuration before the power failure
U disk	Import the setting from external USB
Save to U disk	Save the current setting into external USB
Duplicate	Copy the current setting

Figure11-2 Rename File

Press left and right keys to move cursor to the character to be display, press【OK】key to input. After the input is completed, pove cursor to【IN】key at the end of the keyboard and press【OK】key to confirm the modified file name; Press【Esc】key to cancel the modification.

11.1.2 File【Delete】

Figure11-3 File Delete

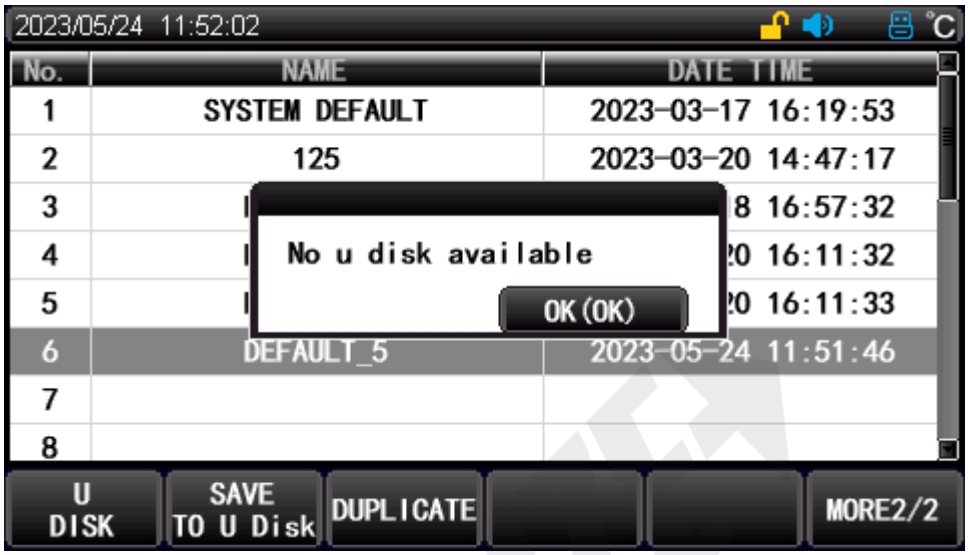


Move the cursor to the file to be delete, press【Delete】key at the bottom of the screen to pop out window and press【OK】key to confirm to delete ; Press【Esc】key to cancel the setting.

11.1.3【Save to USB】

In order to facilitate the customer to quickly set the instrument in batches, the instrument supports save the setting information to an external USB. Other instrument can read the setting parameter from USB. USB supports up to 20 external files.

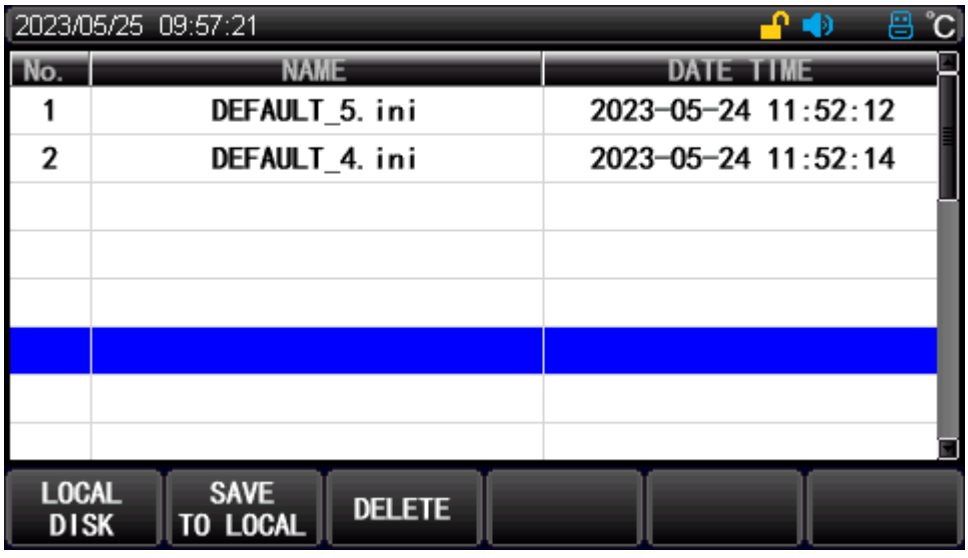
Figure11-4 USB Failure



Press【Save to USB】key at the bottom of the screen to complete the setting. If the screen pops out windown as shown in Figure11-4, indicating that USB is not detected, re-plug USB and try again. Press【OK】key to exit the pop out window.

11.2 Memory <File Management>

Figure 11-5 Memory <File Management>



If user want to save the current setting when <Function Setup>, <System Configuration> and <Channel Setup> is set, press【File】key at the bottom of the screen, press【More 1/2】and press【USB】to enter file management page.

Two functional keys at the bottom of the screen.

Functional Key	Description
Local disk	Switch to file management of the instrument
Save to local	Save the instrument's setting file of external USB into the device.
Delete	Delete the instrument's setting file of USB

11.2.1【Save to Local】

In order to facilitate the customer to quickly set the instrument in batches, the instrument supports external USB save to the instrument. Other instrument can read the setting parameter from USB. USB supports up to 20 external files.

Note: If the file name in USB is the same as the local file, it will be overlay the orginal file.

12. Remote Control

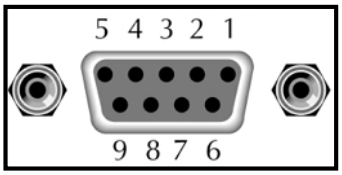
12.1 RS-232C

User can use RS-232 to connect a controller (PC or PLC) via INSIZE RS-232 DB-9 serial communication line. The serial port uses the RS-232 standard for the transmit (TXD), receive (RXD), and signal ground (GND) lines. Hardware handshaking CTS and RTS lines are not used.

Caution:
Only INSIZE's (non-modem) DB-9 cable can be used. The power cable should not over 2 meters.

Table 12-1 RS-232 Port and Pin

NAME	DB-25	DB-9	NOTE	RS-232 port on the instruemnt
DCD	8	1	NC	
RXD	3	2	Receive Data	
TXD	2	3	Transmit Data	
DTR	20	4	NC	
GND	7	5	Ground Line	
DSR	6	6	NC	
RTS	4	7	NC	
CTS	5	8	NC	



Make sure that the controller instrument is connect to 0350-MC SERIES multi-channel temperature tester and use these settings.

RS-232 data transmission:

Data bit: 8-bit

Stop bit: 1-bit

Check bit: none

Baud rate: It is recommend to use 115200.

12.2 SCPI

RS-232 interface uses SCPI language and fully supports SCPI. The detailes refer to "0350-MC Series Multi-channel Temperature Tester - Programming Manual".

13. Appendix

13.1 Appendix A Maintenance and Cleaning

(1) General Maintenance

Keep the instrument away from the direct sunlight.

Caution

Keep sprays, liquids and solvents away from the instrument or probe to avoid damaging the instrument or probe.

(2) Cleaning

Check the instrument frequently according to the operating condition. Follow these steps to clean the external surface of the instrument:

a. Please use a soft cloth to wipe the dust outside the instrument.
b. When cleaning the LCD screen, please pay attention and protect the transparent LCD screen.
c. When cleaning the dust screen, use a screwdriver to remove the screws of the dust cover and then remove the dust screen. After cleaning, install the dust screen in sequence.
d. Please disconnect the power supply, then wipe the instrument with a damp but not dripping soft cloth. Do not use any abrasive chemical cleaning agent on the instrument or probes.

Warning

Please confirm that the instrument is completely dry before use, to avoid electrical shorts or even personal injury caused by moisture.

14. PC software

PC software is stored on the standard 16G USB stick.

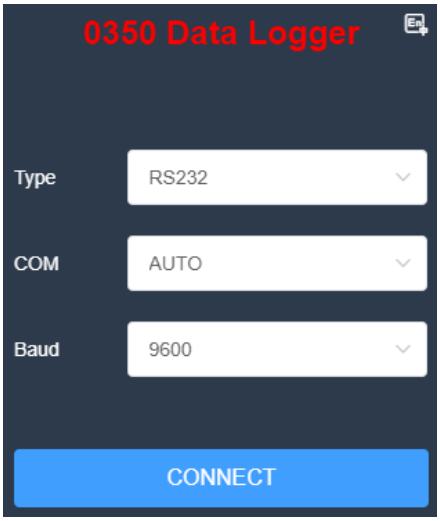
14.1 PC software connection method

14.1.1 RS232

(1) Press the [Setup] shortcut key on the instrument panel to enter the setting page, and set the communication bus to RS232 mode in the communication setting, as in Figure 14-1.
(2) Open the computer software, the software setting interface pops up, change the communication mode to RS232, the serial port is automatically selected, and the baud rate is the same as the device, as in Figure 14-2.

Figure 14-1 Communication bus set to RS232

Figure 14-2 Software settings interface

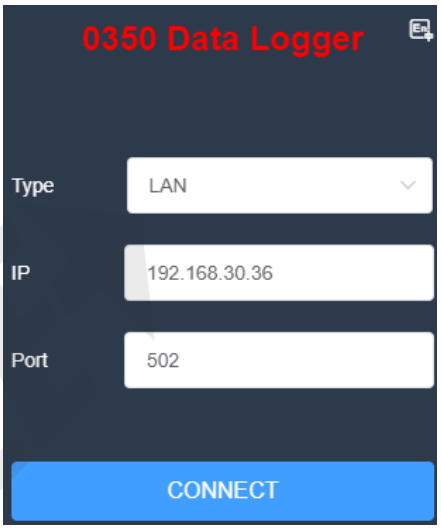


14.1.1 LAN

(1) Press the [Setup] shortcut key on the instrument panel to enter the setting page, and set the communication bus to LAN mode in the communication setting, and there will be a corresponding IP address, as shown in Figure 14-3.
(2) Open the computer software, the software setting interface pops up, change the communication mode to LAN, the IP address must be consistent with the device, and the port number must be set to 502, as shown in Figure 14-4.

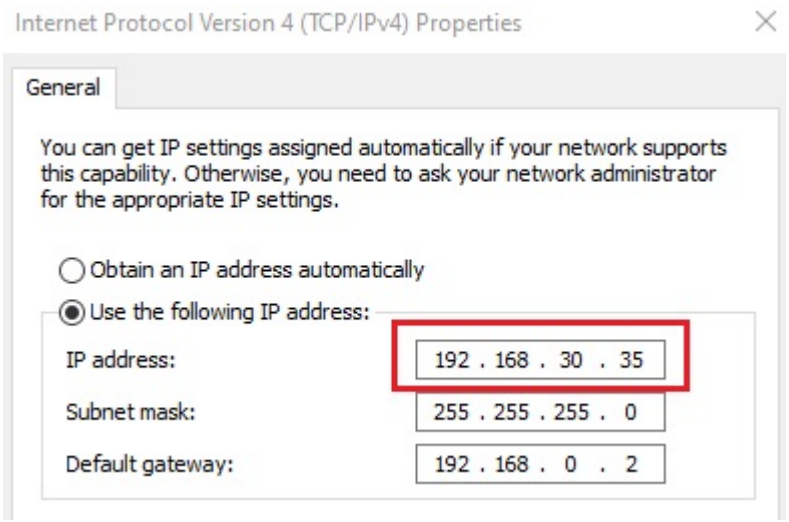
Figure 14-3 Communication bus set to LAN

Figure 14-4 Software settings interface



(3) The local computer IP address needs to be set in the same segment as the device IP, but cannot be set to be the same, as shown in Figure 14-5.

Figure 14-5 Software settings interface



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