Additel 878 Reference Drywell Calibrators

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-------User Manual

[Version：2009V01]

Additel Corporation

STATEMENT

This user's manual provides operating and safety instructions for the Additel 878 reference dry well calibrators. To ensure correct operation and safety, please follow the instructions in this manual. Additel Corporation reserves the right to change the contents and other information contained in this manual without notice. For the most up-to-date manual, please visit www.additel.com.

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Safety Instructions

Warnings - identify action or conditions that may be hazards to the user.

Cautions - identify action or conditions that may damage the calibrator or the equipment under test.

Warning：

To prevent injury, please follow the instruction manual for use.

To prevent possible electrical shock, fire, or personal injury, please do following:

1. General：

- Before using the product, please read the manual, especially the "Safety Instructions" section.
- Don’t use the device ouraisw of the environmental conditions specified.
- The dry well calibrator should be used by trained personnel only.
- Before initial use or anytime the reference dry well calibrator has not been used for more than 10 days, the calibrator needs to be started using the "Dry-out" function to meet all safety requirements and

specifications, see section 5.3.

- Do not use the product if it is damaged or operates incorrectly.
- Do not use in flammable, high humidity, or dusty environments.

2. High Temperature：

- The Reference Dry Well Calibrator has a high temperature warning symbom  , this symbol indicates when the calibrator itself temperature is over 50 ℃.
- Verify the status of the high temperature indicator prior to each use to avoid potential harm when handling the unit, probes and inserts.
- The temperature of the calibrator exceeds 50 ℃, please thermocouple calibration calibrator, never touch the high temperature parts inside the calibrator.
- To avoid damaging the calibrator or units under test, do not cut off the power supply when temperature of calibrator body is above 100 ℃.

- If you are unsure of the temperature of the reference dry well calibrator or any probes under test, do not touch any components of with the exception of the display screen, power swich and handle until ample time has passed to ensure components are not hot to the touch.

3. Electrical：

- Double check the power connection, fuse model and installation before use.
- Do not apply more than 30V AC or DC to any of the process calibrator inputs.
- Always use the correct fuse size and type if replacements are required.
- Only use the proper power cord prodvided.
- Do not apply any type of voltage to the switch terminal, which may damage the controller.
- Do not use any test leads other than those provided with the calibrator.
- Disconnect all test leads before switching to other electrical measurement functions.
- Do not disassemble dry well calibrator.

Cautions：

To prevent instrument damage, please follow this user manual.

To prevent possible electrical shock, fire, or instrument damage, please follow these guidelines:

- ◆ Do not shake, drop, or bump the calibrator while in use.
- ◆ Do not use any power cord other than the one provided with the calibrator.
- ◆ For safety, best performance and logivity, only use the calibrator under the specified environmental conditions.
- ◆ Do not unplug the power cord while in use.
- ◆ Do not clean the calibrator with liquid, please contact Additel for cleaning process.
- ◆ To avoid damaging the unit, do not drop anything into the calibrator.
- ◆ Do not use the calibrator, if it appears to have any issues, and contact Additel immediately.
- ◆ Do not modify the default configuration of the calibrator.

1. Introduction

1.1 Overview

Additel's commitment to continuous improvement, quality and time saving features are on full display in the ADT878 series. With three models to choose from, ranging from -40 to 700°C, you will find the perfect fit for your calibration needs. The Process Calibrator option adds an external reference input, a two-channel readout for UUT's and a full complement of capabilities to help with everything from measuring temperature sensors, to calibrating thermocouples, self-calibrating the Reference Well and configuring HART transmitters. Each unit comes standard with a large touchscreen display, dual-zone control and Additel's commitment to the best customer service in the industry. We are certain that you will be blown away by the outstanding performance of these game-changing Reference Dry Wells!

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1.2 Model Information

Table 1 Model Information

Specification	ADT878PC			ADT878		
Temperature Range	(-40 ~ 160) ℃	(-33 ~ 425) ℃	(33 ~ 700) ℃	(-40 ~ 160) ℃	(-33 ~ 425) ℃	(33 ~ 700) ℃
mA/mV/V/Ω measurement	●	●	●	-	-	-
DC 24V Output	●	●	●	-	-	-
HART communication	●	●	●	-	-	-
Switch Test	●	●	●	-	-	-
External standard RTD (Temperature Control)	●	●	●	-	-	-
Intelligent calibration	●	●	●	-	-	-
Database	●	●	●	-	-	-
Applications	●	●	●	●	●	●
Intelligent Diagnosis	●	●	●	●	●	●
Remote Control	●	●	●	●	●	●
Weight	11.2 kg	9.7 kg	9.7 kg	11.2 kg	9.7 kg	9.7 kg

1.3 Basic Structure

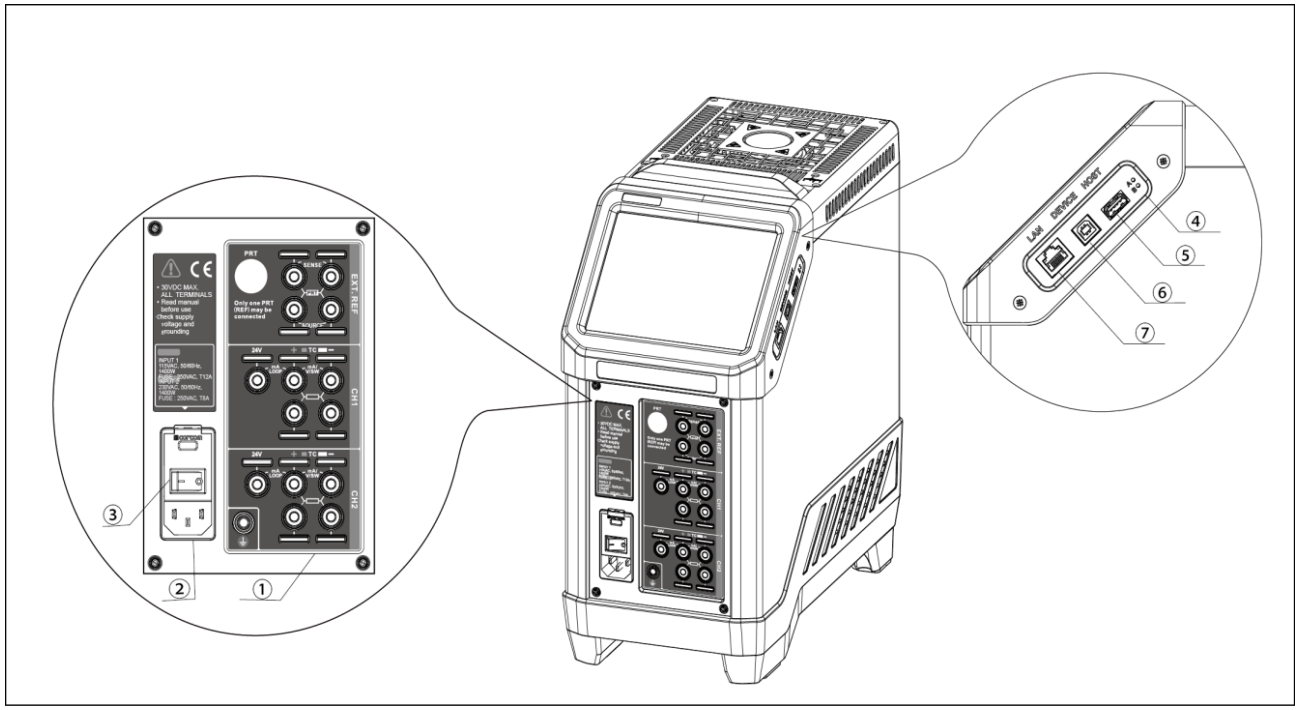

Figure 1 Basic Structure

Table 2 Basic Stucture

NO.	**Description**	Explanation
①	Electrical Measurement plug	Electrical test connection interface, electrical test cable interface and thermocouple interface
②	Power Cord plug	Plug AC power supply
③	Power switch	Located on top of power cord plug
④	Reset Button	Calibrator forced reset button, please consult Additel for usage details
⑤	USB Port (Host)	Used to connect U disk for system upgrade
⑥	USB Port (Device)	Used to connect to the host computer
⑦	Network Cable Port	Used to connect to the host computer

1.4 Features

- ◆ Three models ranging from -40 ℃ to 700℃
- ◆ Reference level performance in accuracy, stability and uniformity.
- ◆ Quick to temperature.
- ◆ Two-channel readout measures RTDs and TCs, and provides task documentation.

- Full HART communicator(PC Option)
- Optional external temperature control .
- Wi-Fi and Bluetooth capable.
- Color touch screen display.
- Quick-Push connectors (PC Option).
- Set point control by reference.
- Self-calibration feature.
- Optional TPW kit for built-in automatic realization (ADT878-160 only).
- Built-in automatic annealing feature (ADT878-700 only).

1.5 Safety Features

- ◆ Over-temperature hardware cutout .
- ◆ Over-temperature software cutout .
- ◆ Automatic detection of temperature control failure .
- ◆ Automatic detection of measuring element failure.

1.6 Environmental Conditions

- ◆ Working Temperature: (0~50) ℃ (32~122) ℉ (Accuracy guarantee: 8℃~38℃)
- ◆ Humidity: 0 ~ 90%RH (0℃ ~ 50℃ (32℉ ~ 122℉), RH (non-condensing))
- ◆ Storage Temperature: (-20~60) ℃ (-4~140) ℉
- ◆ Atmosphere Pressure: Less than 3,000 m (9,800 ft)
- ◆ IP Rating: IP20

1.7 Technical Specifications

1.7.1 General Specifications:

Table 3 General Specifications

Specification	ADT878		
	(-40-160) ℃	(33-425) ℃	(33-700) ℃
Dimensions	170mm × 345mm × 330mm (13.6 x 6.7 x 13.0 in)		
Power Supply	(90-242) VAC，(45-65) Hz, 580W	(90-254) VAC，(45-65) Hz, 1400W	
Display	6.5 in (165 mm) TFT industrial touchscreen, resolution640×480		
Communication	USB A, USB B, RJ45, WiFi, BLE		
Language	English, Chinese, Japanese, Russian, German, French, Italian, and Spanish		
Temperature Units	℃, ℉ , and K		
Temperature Resolution	0.001℃		
Fan Noise	(-40~-30) ℃：＜ 70dB(A) (-30-160) ℃：＜ 60dB(A)	Mute Mode：＜60 dB(A)	
Certificate	CE		

1.7.2 Reference Dry Well Specifications:

Table 4 Reference Dry Well Calibrator Specifications

Specification	878-160	878-425	878-700
Temperature Range at 23°C	-40°C to 160°C	33°C to 425°C	33°C to 700°C
Display Accuracy	±0.1°C at Full Range	±0.2°C at Full Range	±0.20°C at 33°C
			±0.20°C at 425°C
			±0.25°C at 660°C
Stability (30 min)	±0.005°C at Full Range	±0.010°C at 100°C	±0.010°C at 100°C
		±0.015°C at 225°C	±0.020°C at 425°C
		±0.020°C at 425°C	±0.030°C at 700°C
Axial Uniformity at 60 mm (2.4 in)	±0.035°C at -40°C	±0.10°C at 100°C	±0.10°C at 100°C
	±0.020°C at 0°C	±0.15°C at 225°C	±0.25°C at 425°C
	±0.050°C at 160°C	±0.25°C at 425°C	±0.40°C at 700°C
Axial Uniformity at 80 mm (3.15 in)	±0.050°C at -40°C	±0.15°C at 100°C	±0.15°C at 100°C
	±0.040°C at 0°C	±0.20°C at 225°C	±0.30°C at 425°C
	±0.050°C at 160°C	±0.30°C at 425°C	±0.60°C at 700°C
Radial Uniformity	±0.01°C at Full Range	±0.025°C at 100°C	±0.025°C at 100°C
		±0.030°C at 225°C	±0.040°C at 425°C
		±0.040°C at 425°C	±0.060°C at 700°C
Loading Effect	±0.08°C (Display Sensor)	±0.05°C (Display Sensor)	±0.02°C at 100°C
			±0.05°C at 425°C
			±0.15°C at 700°C

	±0.010°C (External Sensor)	±0.01°C (External Sensor)	±0.01°C at 100°C
			±0.02°C at 425°C
			±0.03°C at 700°C
Hysteresis (Display Sensor)	0.025°C	0.04°C	0.07°C
Environmental Conditions	8°C to 38°C guaranteed accuracy		
	0°C to 50°C, 0% to 90% RH non-condensing		
Storage Conditions	-20°C to 60°C		
Immersion Depth	160 mm (6.30 in)	193 mm (7.60 in)	
Insert OD	31.9 mm (1.26 in)	30.8 mm (1.21 in)	
Heating Time	4 min: -40°C to 23°C	15 min: 23°C to 425°C	25 min: 23°C to 700°C
	10 min: 23°C to 160°C		
Cooling Time	8 min: 160°C to 23°C	24 min: 425°C to 100°C	30 min: 700°C to 100°C
	15 min: 23°C to -40°C	15 min: 100°C to 50°C	15 min: 100°C to 50°C
Typical Time to Stability	10 min		
Resolution	0.001°C		
Units	°C, °F, and K		
Display	6.5 in (165 mm) color touch screen		

Note: The above specifications are measured based on the insert ADT110-878-H(L)-INSERT-C.

1.7.3 Electrical Measurement Specifications:

Table 5 Electrical Measurement Specifications

Specification	Description
Readout Accuracy for 100 ohm PRT (Probe	±0.005°C at -40°C

Accuracy Not Included)	±0.006°C at 0°C
	±0.008°C at 50°C
	±0.009°C at 100°C
	±0.011°C at 160°C
	±0.015°C at 300°C
	±0.019°C at 425°C
	±0.026°C at 660°C
	±0.028°C at 700°C
Readout Resolution	0.1 mΩ
Reference Resistance Temperature Measurement Range	-200°C to 962°C
Reference Resistance Accuracy	0Ω to 50Ω: ±1.25mΩ
	50Ω to 400Ω: ±0.0025% RD
Reference Characterizations	ITS-90, CVD, IEC-751
Reference Measurement Capability	4-wire PRT
Reference Probe Connection	6-pin lemo smart connector and Quick-Push connectors to accept banana, mini-banana, large & small spade lug and bare wire connections
RTD Channels	2 channels. Both accept 2, 3, or 4-wire RTDs
RTD Measurement Accuracy (excl sensor) Compliance	0Ω to 25Ω: ±0.002Ω
	25Ω to 400Ω: ±0.004% RD
	400Ω to 4KΩ: ±0.005% RD
RTD Measurement Resolution	0.1mΩ

RTD Measurement Resistance Range	0Ω to 4KΩ
RTD Characterizations	PT10, PT25, PT50, PT100, PT200, PT500, PT1000, CU10, CU50, CU100, NI100, NI120
RTD Connection	Quick-Push connectors accept banana, mini-banana, large & small spade lug and bare wire connections
TC Channel	2
TC Measurement Channels	Accepting S, R, K, B, N, E, J, T, C, D, G, L,and U
TC Range	–75 mV to 75 mV
TC Resolution	0.1µV
TC Voltage Accuracy	0.01% RD + 5 µV
Internal CJC Accuracy	±0.2°C (ambient from 0°C to 50°C)
Current Range	–30 mA to 30 mA
Current Accuracy	0.01% RD + 2 µA
Current Resolution	0.1 µA, Input Impedance: < 10Ω
Voltage Range	-12 V to 12 V and –30 V to 30 V
Voltage Accuracy	±0.01% RD + 0.6 mV
Voltage Resolution	0.1 mV; Input impedance: >1MΩ
Switch Test	Mechanical or Electrical
DC 24V Output	24 V ±0.5 V, MAX 60 mA
Hart Communicator	Read, configure and calibrate HART devices - DD files updated periodically Optional - (order ADT875PC)
Documentation	Up to 1,000 tasks which store up to 10 results each containing as found and as left data. Snap shot feature allows for screen captures. Records auto step and ramp functions.

Temperature Coefficient 0℃ to 13℃ and 33℃ to 50℃	ADT878 (PC)-160: ±0.005°C/°C
	ADT878 (PC)-425/700: ±0.005°C/°C
	Ref Readout: ±1 ppm FS/°C
	RTD Readouts: ±1 ppm FS/°C
	TC Readouts: ±5 ppm FS/°C
	Current: ±5 ppm FS/°C
	Voltage: ±5 ppm FS/°C

1.8 Certification Standards and Mechanical Properties

Table 6 Certification Standards and Mechanical Properties

EMC-Directive	ESD immunity	Contact 4VK，Air 8KV	
	Radio frequency electromagnetic radiation immunity	10V/m（80MHZ~1GHZ）/3V/m（1.4GHZ~2GHZ）/1V/m（2GHZ~2.7GHZ）	
	Conductive disturbance immunity of RF field induction	Power port：3V/m（150kHZ~80MHZ）	
		Signal port：3V/m（150kHZ~80MHZ）	
	Voltage sag	0% 1 Period、40% 10 Period、70% 25 Period	
	Short break	0% 250 Period	
	Disturbance Resistance of Electric Fast Instantaneous Pulse Group	1KV（Signal port）	5kHz/100kHz，1min
		2KV（Power port）	5kHz/100kHz，1min
	Surge immunity	1KV（Line to line）/2KV（Line to ground）	

	Radiation emission	level B
	Conductive emission	level B
LVD- Directive	Insulation	ADT878-160: L/N - FG 1.5V, BI L/N - OP 3kV,PI
		ADT878-700: L/N - FG 1.5kV[1], BI L/N - OP 3kV[1],PI
	Insulation resistance	1KV testing condition，〉1GΩ
Mechnical Properties Testing	Vibration test	2g, High frequency: 10~500HZ, 2 surfaces/30 mins
		2g, Low frequency: 5~200HZ, 2 surfaces/30 mins
	Impact testing	5g, 100 times
	Drop test	1m with package
1 - This parameter is provided by the AC/DC SPS, according to the EN 60950-1 approval, 1 kV insulation protection measures were added.		

2. Display and Functional Operation

2.1 Main Operational Interface

The main operational interface utilizes a dual-screen display, the measured quantity channel at the top of the screen and the temperature output channel at the bottom, as shown in Figure 2.

(1) Status Bar：Includes date and time, cloud service connection status, 24V power status, diagnose

center, screenshot, external device measurement channel status CH1 CH2 , high temperature warning and system menu icon .

Note: All icons (except date and time and cloud service function) on the status bar can be selected via the touch screen to manage and select options.

(2) DUT Channels: including sensor type choosen, measurement project setting, automatic cold junction(only supports TC measurement), thermoelectric protential measurement data (Only support TC measurement), real-time data of electrical measurement and data analysis (need to set);

(3) Temperature output channels: including target temperature point setting INT 0.00, real-time temperature reading, and heating switch .

◆ When a standard thermometer is connected, the calibrator will allow the user to select the external probe as the temperature control sensor, the external temperature control icon and external temperature setting value EXT 0.00 will be displayed on the screen at the same time.

(4) Lock screen: Click the main menu icon and select lock screen. After entering the lock screen state,

only the unlock button can be used.

◆ Unlock：Under the lock screen status, click the unlock button in the upper right corner

2.2 System Temperature Unit Settings

System temperature display units can be changed through the system menu or on the main screen, the dry well system will change temperature units automatically, except for existing sensors and DUT information.

1. Main Menu：

Press on the top right corner of the screen → "Personalization" → "Temperature Unit" → Select temperature unit.

2. Main Screen：

Press the current temperature unit on the display to select the desired temperature unit.

Temperature Output Window

Figure 2 Main Screen

2.3 Temperature Output

2.3.1 Temperature Output Settings

Press the icon on the left of the temperature display screen to enter the setting menu. This menu includes control parameters and reference parameters. The user can switch through the top of the screen and set the following parameters:

(1) Control Parameters

Table 7 Temperature Output Settings

Subject	Valid Value	Explanation
Stability Tolerance	0.01-10.00	One of the conditions for temperature control and stability. The condition is met when temperature varies within this range. Unit: ℃
Stabilazation Time	1~120	One of the conditions for temperature control stability. The condition is met when the stabilized time of temperature control exceeds the set value. Unit: min
Set Point Tolerance	0.00~10.00	One of the conditions for temperature control stability. The condition is met when the difference between the measured temperature and the target value is within this range. Unit: ℃
Temperature Control Rate	0.01~20.000	Choose max or customize the temperature Scan rate. Customized rate is indicated on the process bar. Unit: ℃/min
Set Point Limit	Enable/disable	Limit the range of temperature control
Set Point Range (When set point limit is enabled)	Depends on calibrator model and temperature unit	The temperature will not exceed the upper and lower limits after setting.

(2) Standard Parameters

Table 8 Standard Parameters

Subject	Valid Value	Explanation
Choose REF	INT/EXT	Choose the temperature controlling sensor
Auto choose Ext controlling sesnor	On/Off	The Ext will be set as controlling sensor when it's setting ON
Internal Sensor		
Resolution	1, 0.1, 0.01	Temperature display resolution
Sensor Signal	Read only	Measured temperature of internal sensor
Differential temperature	Read only	Measured temperature of internal sensor
External Sensor		
Resolution	1, 0.1, 0.01, 0.001	Temperature display resolution
Sensor Signal	Read only	Measured temperature of external sensor and resistance value
Sensor Information	Read only	Information of external sensor

2.3.2 Target Temperature Input：

Click target temperature real-time temperature data area, then input the target temperature value through the

numeric keyboard. The target set point should be set within the temperature range above the screen, which is restricted by different model numbers and customized set points. Press enter or press to confirm. Temperature control of the calibrator will start automatically.

2.3.3 Start/Pause Temperature Control:

Temperature control can be initiated or paused by pressing START or PAUSE on the right of the calibrator temperature display screen.

2.3.4 Temperature Control Stabilization:

Temperature control will stabilize when stabilization time and target deviation are met. The display value will turn green accompanied by a beep when the unit is stable.

2.4 DUT Measurement

2.4.1 DUT Settings

Click icon on the left side of DUT channel (when CH1 is associated with the CH2, testing projects of two

channels are the same) or click icon (when CH1 is independent with CH2, testing project of two channels can be different), three sections were separated when entered configuration display, which include DUT channel setting, testing sensor and the electrical signal.

Table 9 DUT Settings

Subject	Valid Value	Description
Channel settings		
CH1 & CH2	Association / Independent	Choose if the testing project of two channels are same or not :association: same / independent different
CH1 & CH2 (association enable)	RTD, TC, mA, mV, switch, HART	Choose DUT Measurement Type
CH1 & CH2(independent enable)		
CH2 testing project (independent enable)	RTD, TC, mA, mV, switch	DUT Measurement Type
Sensor testing		
Resolution	1,0.1,0.01,0.001	Temperature display resolution
Stability Tolerance	≥0.005	One of the conditions for temperature control and stability. The condition is

		met when temperature varies within this range. Unit: ℃
Stabilization Time	1~120	One of the conditions to for temperature control and stabilization. The condition is met when the stabilized time exceeds the set point. Unit: min
Electrical signal		
mA & V resolution	1, 0.1, 0.01, 0.001, 0.0001	Current and voltage display resolution
RTD resolution	1, 0.1, 0.01, 0.001, 0.0001	RTD display resolution

Click ✓ to save changes.

2.4.2 Thermal Resistance (RTD) Measurement

(1) Connection

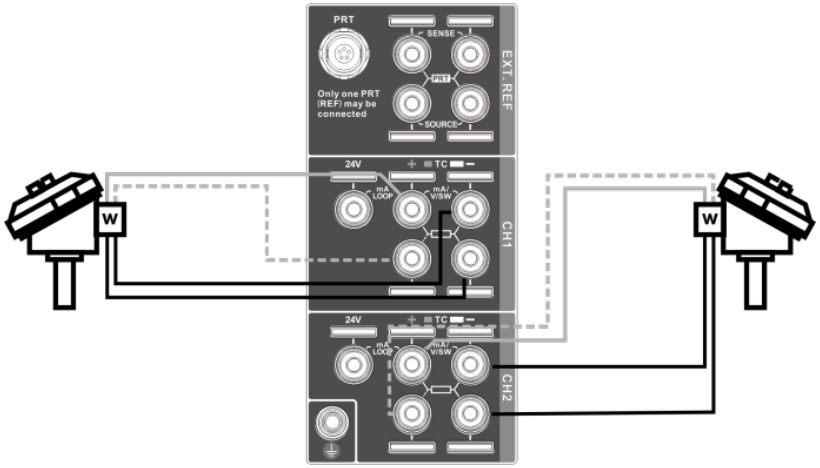

Figure 3 RTD Connection

(2) Measurement settings

Click the CH on the left side of DUT channel (when CH1 is associated with the CH2) or click the CH Icon(when CH1 is independent with CH2), choose CH1, CH2 or CH1&CH2 to enter channel settings display, click “Measurement” and choose RTD, then return to the channel settings screen.

A: Sensor type

Click sensor type entering choose screen.

◆**Standard type Sensor**

Users can directly use the added sensors in the sensor library.

◆**Custom sensor**

Click right icon  to enter sensor add page, please refer to section 3.2 sensor library.

B: Wiring selection

Table 10 RTD wiring selection

Project	Value	Description
Wiring selection	2,3,4	RTD

C: Starting measurements

After sensor and limit selection, click on the lower right icon  , then turn back to setup interface.

click icon  again, system jump to main screen for measuring.

If RTD connection error occures, a red “------” will be shown on the display.

2.4.3 Thermal Couple (TC) Measurement

(1) Connection

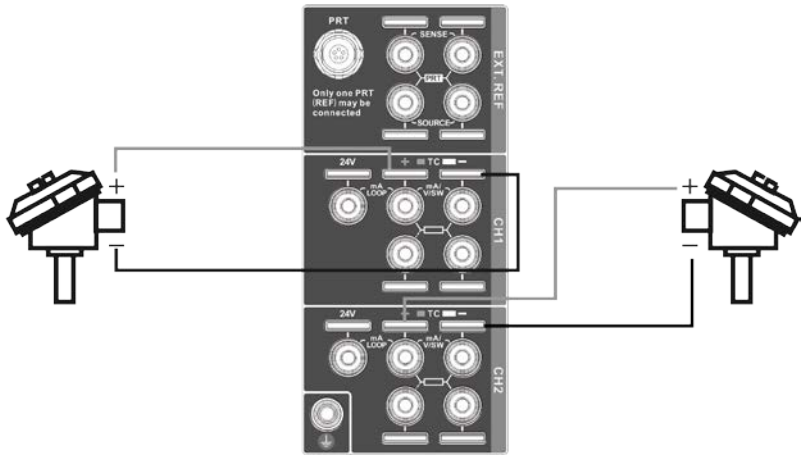

Figure 4 TC Connection

(2) Measurement Settings

Click icon CH on the left side of DUT channel(when CH1 is associated with the CH2) or click icon CH (when CH1 is independent with CH2), choose CH1, CH2 or CH1&CH2 to enter the channel settings display, click

“Measurement” and choose TC, then turn to channel setting display.

◆ TC Type

Click sensor type selection screen.

◆ Sensor Type

System supported sensors are as follows:

Mv, S, R, B, K, N, E, J, T, C, D, G, L, U, LR, A, 10μV/℃, 1mV/℃

◆ Cold Junction Type

Table 11 Cold Junction Type

Subject	Valid Value	Explanation
Cold Junction Type	INT/EXT	INT. means using dry well internal sensor as the cold junction reference, EXT means inputting a custom value as cold junction reference. **Note: There is no need to choose the cold junction type when mV is selected as the sensor type.**
Ext CJC value (when selecting “EXT”)	Numeric Content	Set customer value for the cold junction compensation value

(3) Starting a Measurement

After selecting the sensor type and the cold junction type, the system will jump back to the checked setting interface.

Continue to click the icon  on the lower right corner, the system will return back to the main page and wait for the measurement to start.

If the thermocouple (TC) line is connected incorrectly, the detected channel at the top of the main interface displays a red "------" icon with a prompt tone.

For the temperature output operation, please refer to Chapter 2.3.

2.4.4 Electric Current（mA）Measurement

(1) Wire Connection of Electric Current（mA）Measurement

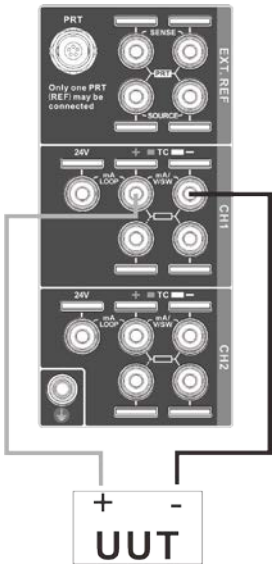

Figure 5 Connection way of Electric Current(mA) Measurement

(2) Measurement Settings

Click icon on the left side of DUT channel(when CH1 is associated with the CH2) or click icon (when CH1 is independent with CH2, choose CH1, CH2 or CH1 & CH2 to enter the channel settings display, click “Measurement” and choose mA, then return to channel settings screen.

(3) Start Measurement:

Click ✓ on the lower right corner, the system will return to the main page and wait for the measurement to start:

For the temperature output operation, please refer to Chapter 2.3.

2.4.5 Voltage (V) Measurement

(1) Wire Connection

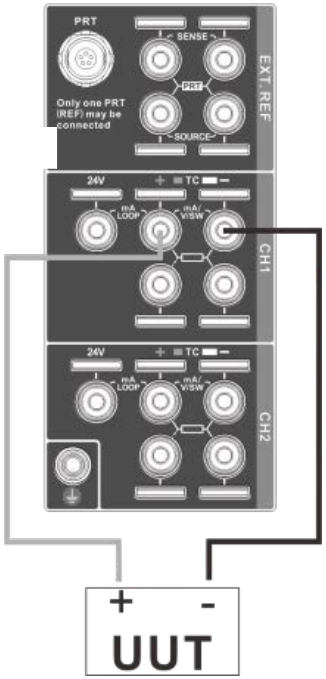

Figure 6 Connection Diagram for Voltage Measurement

(2) Measurement Settings:

Click icon on the left side of DUT channel(when CH1 is associated with the CH2) or click icon (when CH1 is independent with CH2) ,choose CH1, CH2 or CH1&CH2 to enter the channel settings display, click “ project” and choose V, then turn to channel setting display.

Table 12 Voltage Measurement Range Selection

Subject	Effective Value	Explanation
Range	12V, 30V	Select voltage measurement range

(3) Start Measurement

Click on the lower right corner, the system will return back to the main screen and wait for the measurement to start:

For the temperature output operation, please refer to Chapter 2.3.

2.4.6 Switch Test

(1) Connection

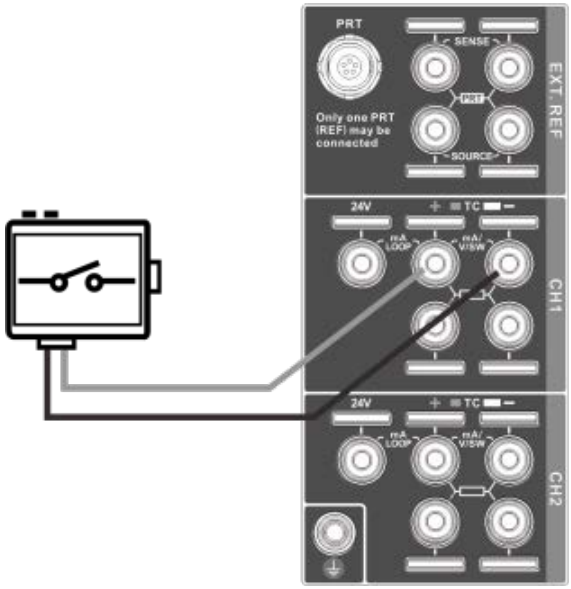

Figure 7 Connection Diagram for Switch Testing

(2) Measurement Settings:

Click icon CH on the left side of DUT channel(when CH1 is associated with the CH2) or click icon CH (when CH1 is independent with CH2) ,choose CH1, CH2 or CH1 & CH2 to enter the channel settings display, click

“Measurement” and choose V, then turn to channel setting display.

Table 13 Switch Type Selection

Subject	Valid Value	Comment
Switch Type	Dry contact, Wet contact, PNP, NPN	Temperature switch type

(3) Start Measurement

Press ✓ on the lower right and the unit will return to the main screen and wait for the measurements to start;

Please see section 2.3 for more information regarding the temperature output.

2.4.6 HART Transmitter Measurement

(1) Cable connection

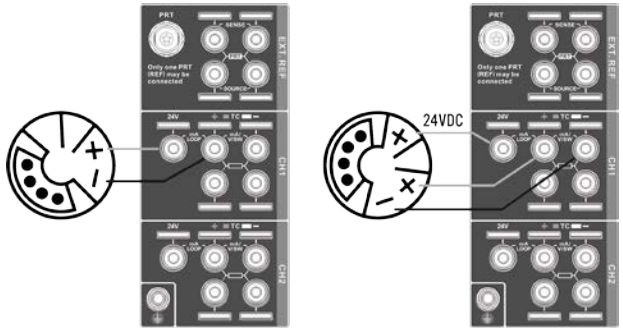

Figure 8 HART Transmitter Connection Diagram

◆Only CH1 supports HART Transmitters

(2) Transmitter Settings:

Click icon on the left side of DUT channel (when CH1 is associated with the CH2) or click icon (when CH1 is independent with CH2) ,choose CH1, CH2 or CH1&CH2 to enter the channel settings menu, click “Measurement” and choose HART, then return to channel settings screen.

(3) Search

Click the right ••• of the DUT channel

Click "Search", the system will automatically search and list the transmitter, if users need to search again, please click on the right side of the screen to start searching:

After the search is complete, click on the name of the desired transmitter and click on the bottom right corner of the screen after checking it:

(4) Settings (some functions are HART only)

Click ••• on the right side of DUT channel and select " " to enter the transmitter setting page:

◆Device Information:

Table 14 HART Device Information

Subject	Valid Value	Explanation
Manufacturer	Read only	Manufacturer of the transmitter
Device Type	Read only	Type of the transmitter
S/N	Read only	Serial number of the transmitter
Label	Alphanumeric content (8 max length)	Custom label of the transmitter
Date	2000/1/1~2099/12/31	Date setting
Write-protect	Read only	Protection type
Information	Alphanumeric content (20 max length)	Custom information
Description	Alphanumeric content (20 max length)	Custom description
Final Assembly Number	Support numeric input, no more than 20 characters	The final assembly number of the transmitter
Leading Character Number	5~20	The leading character number of the transmitter
General Version	Read only	General version of the transmitter
Software Version	Read only	Software version of the transmitter
Hardware Version	Read only	Hardware version of the transmitter
Device Version	Read only	Device version of the transmitter

◆Sensor

Check the information on sensor, upper-lower limits, and the minimum range.

◆Device Output:

Table 15 HART Device Output

Subject	Valid Value	Comment
Master Variable/Range Units	°C, °F, °R, K	Measurement unit of the transmitter
Lower Limit of PV Range	Support numeric input, lower limit expanding 10%	Lower limit of the master variable
Upper limit of PV Range	Support numeric input, upper limit expanding 10%	Upper limit of the master variable
Transform Function	Linear, Root	Transform function of the transmitter
Alarm State	Read only	Alarm state of the transmitter
Damping	Support numeric input, ≥0	Damping time
Poll Address	0~15	Poll address of the transmitter
Burst Mode	Disable, Enable	Burst mode state
Burst Command	1, 2, 3	Burst command depends on different transmitters

(5)Diagnose / Service:

Press the icon on the right of DUT measurement channel screen, select “Diagnose/Service” to enter the transmitter setting screen.

A: Current loop test:

- This function is enabled if and only if the transmitter polling address is 0.
- The current loop test allows the user to compare and calibrate the transmitter current output signal and the calibrator calibrator current measurement signal. If the difference between the two is greater than the tolerance, it is recommended to adjust.
- Input through the numeric keyboard or click the “Fetch” button to intercept the current measurement signal of the calibrator calibrator.
- After pressing the Enter or Confirm button, the calibrator calibrator will output the current value and current measurement value to the transmitter.

B: D/A Adjustment:

- This function will be enabled only when the search address of the transmitter is 0.
- Customers can adjust the current output of the transmitter at zero and full scale through D/A adjustment.

D/A Zero

1) Intercept the current measurement signal (4mA as the typical value) through the numeric keyboard or

press the button “Fetch”.

2) Press enter or pressing the confirm button, the calibrator will send instruction to the transmitter to adjust the current output at zero.

D/A Gain

1) Intercept the current measurement signal (20mA as the typical value) through the numeric keyboard or press the button “Fetch”.

2) Press enter or pressing the confirm button, the calibrator will send instruction to the transmitter to adjust the current output at full scale.

(6) Process

Press ••• on the right of DUT measurement channel screen and select “Process Quantity” to enter the transmitter setting screen, which allows the customers to select the process variable of the transmitter:.

Table 16 HART Device Process Explanation

Subject	Explanation
Maser Variable	The unit of the master variable depends on the setting unit of the transmitter. Please refer to transmitter output setting for details.

Output Current	Output current of the transmitter, unit: mA
Percentage	The percentage of temperature readout in the temperature range of the transmitter
Loop Current	Loop current of the transmitter, unit: mA

2.5 Hart Communicator

The Calibration Calibrator provides full HART communicator functions. Using the original HART DD file, it can be used to complete the maintenance and debugging of all HART pressure equipment, including parameter modification, fault diagnosis, daily maintenance and calibration etc, Because the operation of the Communicator on the HART device depends on the DD file, the operation methods of different HART devices are quite different, so please refer to the instruction manual of the HART device before using the Communicator function.

Note: The Calibration Calibrator always acts as the master during communication with the HART device, so in order to avoid harm to the control system, the HART device must be detached from the control

system before using the calibrator to connect the HART device.

2.5.1 HART Connection and Search

- Click DUT testing channel left icon in the main operation interface, select the mode to start the HART function, the calibrator will automatically switch to the power supply configuration selected by the last HART (the default is the internal power supply internal resistance connection), and set "0" Search by address. After searching for the HART device, it will automatically connect and display its indication.
- Press ••• to select search to enter HART device search screen, type “0-15” for searching.

2.5.2 HART Communicator Operations

- Read the parameters in HART and modify them. The root directory options are 1 ~ 4 items, depending on the HART device,the parameters that have been modified but not written to HART are highlighted in yellow in the list, and you can click to complete the writing to HART operation;
- Provide real-time display of temperature value and loop current value of dry well at the bottom of the interface of hand operator;

- Click and on the right side of the screen to view the communication status and device status respectively. After entering, the hollow circle on the right side of the list indicates that there is no abnormality, otherwise it indicates that the item is abnormal.
- Click on the right side of the screen to return to the main interface of the device. Click on the upper right corner of the screen to return to the HART Communicator again.

3. Settings

Click upper right icon to enter system configuration:

3.1 Communication Settings

3.1.1 Ethernet

Connect the calibrator to a computer through the Network port.

Table 17 Ethernet Address Acquisition methods

Subject	Valid Value	Explanation

Address Acquisition	DHCP / Manual	Choose Calibrator address for acquisition method

◆ Port No. and physical address are factory settings, which can not be changed;

◆ When the DHCP mode is selected, the contents in the table below are automatically assigned by the system and become read-only items.

◆ When the manual method is selected, the following table needs to be filled in manually.

Table 18 Ethernet Address Manually Settings

Subject	Valid Value	Explanation
IP Address	0.0.0.0 ~ 255.255.255.255	Calibrator IP address
Subnet Mask	0.0.0.0 ~ 255.255.255.255	Calibrator subnet mask
Gateway	0.0.0.0 ~ 255.255.255.255	Calibrator gateway

Click ✓ on the lower right corner of the screen to confirm the settings.

3.1.2 Wi-Fi

Connect the calibrator to a computer through Wi-Fi.

Table 19 Wi-Fi Settings

Subject	Valid Value	EXplannation
WLAN	On / Off	Enable or disable Wi-Fi communication function

WI-FI	Depends on network environment	Select WI-FI access point
Adavanced Option	DHCP/Manual	Select calibrator address acquisition way

◆ The port number and physical address are factory set and cannot be changed.

◆When the DHCP option is selected as the advanced option, the following table is automatically assigned by the system and becomes a read-only item.

◆When selecting the manual method for advanced options, the following table needs to be filled in manually.

Table 20 Wi-Fi Communication Manually Settings

Subject	Valid Value	Explanation
IP Address	0.0.0.0 ~ 255.255.255.255	Calibrator IP address
Subnet Mask	0.0.0.0 ~ 255.255.255.255	Calibrator subnet mask
Gateway	0.0.0.0 ~ 255.255.255.255	Calibrator gateway

Click  on the lower right corner of the screen to confirm the settings.

The wireless communication settings take effect directly, without confirming the operation, click  on the upper right corner of the screen to return to the previous menu.

3.1.3 Bluetooth

Connect calibrator with computer through Bluetooth.

Table 21 Bluetooth Settings

Subject	Valid Value	Explanation
BT Name	Read only	Calibrator Bluetooth name
BT Status	On / Off	Enable or disable Bluetooth function
MAC	Read only	Device Physical Address(Displayed only the Bluetooth is on)
Disonnection	Disconnection	Disconnect WiFi device with Furnance

Bluetooth settings are applied immediately, press  on the top left corner for previous menu.

3.2 Sensor Library

The Calibration Calibrator includes a sensor library. Sensor information can be stored in the library for future use. Sensor types are classified into six categories: smart sensors, ITS-90, standard thermocouples, CVD, RTD and NTC.

Click to enter the sensor list under the sensor type, and then click the sensor to enter the selected sensor information page.

3.2.1 Management Functions

(1) Display Settings

Press on the bottom right corner of the screen to view the sensor list display content.

Table 23 Sensor Display Settings

Subject	Valid Value	Comment
Parameter display	Scientific / Decimal	Select parameter display mode： Scientific：$1.1*10^{-2}$ Decimal：0.011
RTD display settings	Model & Name / Serial Number	Select display contents
ITS-90 display settings		
STD display settings		
CVD display settings		
NTC display settings		
Smart sensor display settings		

(2) The interface of Sensor List

Management function Icons in the sub-menu are listed below:

Table 24 The interface of sensor list

Icon	Explanation	Intelligent Sensor	ITS-90	Standard TC	CVD	Thermal resistor	Thermistor

	Add a new sensor	•	•	•	•	•	•
	Quickly add new sensor	•	•		•		•
	Import selected sensor information into connected intelligent sensor	•	•		•		
	Delete one or all sensors	•	•	•	•	•	•

Sensor information

Table 25 Sensor information

Icon	Explanation	Intelligent Sensor	ITS-90	Standard TC	CVD	Thermal resistor	Thermistor
	Edit sensor	•	•	•	•	•	•
	Delete sensor	•	•	•	•	•	•
	Import selected sensor information into connected intelligent sensor	•	•		•		

3.2.2 Intelligent Sensor

Table 26 Sensor basic information

Subject	Valid Value	Explanation
Type/Name	Alphanumeric content (14 max length)	Sensor type and name information
Serial Number	Alphanumeric content (14 max length)	Sensor serial number
Sensor type	ITS-90 / CVD	Intelligent sensor type ,if we select different sensor type will affect the setting of parameters, as shown in the below table
Temperature Range	Depend on sensor type	Sensor temperature range: unit: ℃
Calibration date	2000/1/1~2099/12/31	Sensor calibration date
Date for next calibration	2000/1/1~2099/12/31	Sensor calibration expiration time
Note	Alphanumeric content (14 max length)	Sensor note information

The parameter setting item when choosing ITS-90 as sensor type .

Table 27 Sensor parameter

ITS-90		
Item	**Value**	**Description**
Negative temperature parameter selection	a4, b4: （-200~0）℃	Usually system will choose negative temperature range parameter automatically
	a5, b5: （-40~0）℃	
	N/A	
Positive temperature parameter selection	a6, b6, c6, d, W660.323: （0~960）℃	Usually system will choose positive temperature range parameter automatically
	a7, b7, c7: （0~660）℃	

	a8, b8: （0~420）℃	
	a9, b9: （0~232）℃	
	a10: （0~157）℃	
	a11: （0~30）℃	
Rtp（Ω）	Numbers	Please refer to parameter value
a4	Numbers	
b4		
a6		
b6		
c6		
d		
W（660.323℃）		

(2) The parameter setting item when choosing CVD as sensor type .

Table 28 Sensor parameter

CVD		
Item	**Value**	**Description**
R0（Ω）	Numbers	
A	Numbers	Please refer to parameter value
B		
C		

3.2.3 ITS-90 Sensor

Please refer to table 26 and 27 .

3.2.4 CVD Sensor

Please refer to table 26 and 28 .

3.2.5 Standard TC

Table 29 Sensor Based Information

Subject	Valid Value	Description
Type/Name	Alphanumeric content (14 max length)	Sensor type and name information
Serial Number	Alphanumeric content (14 max length)	Sensor serial number
Temperature range	Depends on the temperature units	Sensor measurement range, Unit °C
Reference TC	S, B	Choosing different standard thermocouple types will affect the parameter setting. See the following table for specific parameters
Calibration date	2000/1/1~2099/12/31	Sensor calibration date
Date for next calibration	2000/1/1~2099/12/31	Sensor calibration expiration time
Note	Alphanumeric content (14 max length)	Sensor note information

Table 30 Type S Thermocopule Parameter Settings

Parameter type	Valid value	Description
a_b_c	A	Parameters for the sensor calculation formula, please refer to the sensor calibration certificate for the values
	B	
	C	
Zn_Al_Cu	mV(Zn_419.527 ℃): (3.4393~ 3.4547)mV	mV signal output by a sensor at a specified fixed point
	mV(Al_660.323 ℃): (5.84945~ 5.87055)mV	
	mV(Cu_1084.620 ℃) (10.56~ 10.59)mV	
Zn_Sb_Cu	mV(Zn_419.527 ℃): (3.4393~ 3.4547)mV	mV signal output by a sensor at a specified fixed point
	mV(Sb_630.630 ℃) (5.54245~ 5.56355)mV	
	mV(Cu_1084.620 ℃) (10.56~ 10.59)mV	

3.2.6 RTD

Table 31 RTD Parameter Settings

Subject	Valid Value	Description
Type/Name	Alphanumeric content (14 max length)	TRD type and name information
Serial Number	Alphanumeric content (14 max length)	TRD serial number

Temperature range	Depends on the temperature units	TRD measurement range, Unit °C
R0（Ω）	Number	TRD RO value
Calibration date	2000/1/1~2099/12/31	TRD calibration date
Date for next calibration	2000/1/1~2099/12/31	TRD calibration expiration time
Note	Alphanumeric content (14 max length)	TRD note information

3.2.7 Thermistor

Table 32 Thermistor Parameter Settings

Item	Effective value	Description
Model/name	Numbers, letters, supports up to 14 input	TRD type and name information
Serial NO.	Numbers, letters, supports up to 14 input	TRD serial number
Temperature Range	Depend on sensor type	TRD measurement range, Unit °C
NTC Type	NTC / Steinhart-Hart	TRD RO value
Calibration Date	2000/1/1~2099/12/31	TRD calibration date
Next Calibration Data	2000/1/1~2099/12/31	TRD calibration expiration time
Remarks	Numbers, letters, supports up to 14 input	TRD note information

Choose NTC as Thermistor

Table 1 NTCParameter settings

Item	Effective value	Description
Rtn	Digit	Please refer to parameter value
Tn		
β		

Choose Hart as parameter setting item of thermistor

Table 34 Stein-Hart Thermister Parameters

Item	Effective value	Description
a	Digit	The thermistor calculation formula uses the parameters, the value please refer to the thermistor calibration certificate
b		
c		

3.3 Data Protection

The calibrator provides data protection function. Users can customize data protection password under this menu and set password protection enabling items.

Table 35 Data Protection Page

Item	Effective value	Explanation
Editing password	Number, supports up to 20 digits	Set the data protection password, the factory default password is: 123456
Mission	Enable/Disable	Enable or disable the task data password protection function. Startup: password is required to delete task data.
Sensor Bank	Enable/Disable	Enable or disable the password protection function of the sensor library. Startup: Password is required to delete sensor library data.
Factory Data Reset	Enable	Only show not editable

Note: Editing the password will affect the access password for power grid specifications, system calibration, and factory reset.

3.4 ACloud Service

（When opened, the status bar displays the cloud service icon）

Upload data to cloud server

Table 36 ACloud Service

Item	Effective value	Explanation
Enable	Open/Close	Open or close Cloud service function
Acloud State		Acloud State
Additel Link	Linkage Information	Linkage Information of cloud service

3.5 System Service

3.5.1 System Calibration

The calibrator provides users with a calibration function. Entering the system calibration page requires a password. The password can be customized. For details, please refer to Chapter 3.4 Data Protection. The factory default password is: 123456

After entering the system calibration page, the following items can be calibrated:

(1) Self-calibration of temperature indication

Select "Temperature display value self-calibration" to enter the temperature display value self-calibration interface,

the user can perform "manual calibration" or "automatic calibration" as needed, or to check the data before and after calibration according to the left side "As found" and "As left".

A. Manual calibration

1) If you need to modify the calibration point, click to enter a custom calibration point;

◆ The indicating temperature and standard temperature value corresponding to each calibration point need to be obtained by the user outside the temperature indicating value self-calibration interface;

◆ The number of calibration points cannot be less than 2;

◆ The minimum interval between calibration point values must be greater than or equal to 10% of the total range.

2) Input the indicated temperature and standard value of each point one by one;

3) Click on the lower right corner to save the data. The calibration data is saved as user calibration data. The calibration data can be viewed in the temperature calibration history.

B. Automatic calibration

1) If you need to modify the calibration point, click to enter a custom calibration point;

◆ The number of calibration points cannot be less than 2;

◆ The minimum interval between calibration point values must be greater than or equal to 10% of the total range.

2) Click to enter the temperature display for self-calibration interface, click Start to start the automatic calibration wizard, the calibrator will automatically control the temperature according to the calibration point;

3) Click on the lower right corner to save the data. The calibration data is saved as user calibration data. The saved calibration data can be viewed in the temperature calibration history.

(2) Electrical Calibration

The calibrator can calibrate the electrical measurement data of the standard channel, channel one and channel two.

A: Standard Channel

Click the target external standard to enter the external standard calibration interface:

◆ Click on the right to restore the factory settings of external sensors.

◆ The number of external sensor calibration points cannot be changed, but you can manually modify the

calibration points by clicking the calibration point list on the left side of the calibration list.

◆ Click  during the calibration process to terminate the calibration procedure, the calibration data will not be saved.

◆ The latest calibration time is displayed below the calibration list.

Calibration process:

1) Click  to start the calibration procedure, and the system will automatically collect data until manually enter the next calibration point.

2) Click  to start to calibrate the next calibration point, or click  to return to the previous calibration point to recalibrate.

3) After the calibration point is over, the system will automatically prompt whether to save the calibration data, or or click  on the right to save the calibration data.

B: Channel One & Channel Two

±30 mA measurement

Calibrate two-channel mA measurement

◆Click on the right to restore the factory setting of ±30 mA measurement.

◆The number of ±30 mA measurement calibration points cannot be changed, but you can manually modify the calibration points by clicking the calibration point list on the left side of the calibration list.

◆Click during the calibration process to terminate the calibration procedure, the calibration data will not be saved.

◆Click on the right to cancel reset.

Calibration process:

1) Click the calibration start button to start the calibration procedure, and the system will automatically collect data until you manually enter the next calibration point.

2) Click to start the calibration of the next calibration point, or click to return to the previous calibration point to recalibrate.

3) After all calibration points are over, the system will automatically prompt whether to save the calibration data, or

click  on the right to save the calibration data.

C: TC Interface Measurement (±75 millivolts)

◆Click  on the right to restore the factory settings of TC interface measurement (±75 mV).

◆The number of calibration points for TC interface measurement (±75 mV) cannot be changed, but you can manually modify the calibration points by clicking the calibration point list on the left side of the calibration list.

◆Click  during the calibration process to terminate the calibration procedure, the calibration data will not be saved.

◆Click  on the right to cancel reset.

Calibration process:

1) Click the calibration start button  to start the calibration procedure, and the system will automatically collect data until you manually enter the next calibration point.

2) Click  to start the calibration of the next calibration point, or click  to return to the previous calibration point to recalibrate.

3) After all calibration points are over, the system will automatically prompt whether to save the calibration data, or click on the right to save the calibration data.

D: ±12V & ±30V Measurement

◆Click on the right to restore the factory setting of ±12V or ±30V measurement.

◆The number of ±12V or ±30V calibration points cannot be changed, but you can manually modify the calibration points by clicking the calibration point list on the left side of the calibration list.

◆Click during the calibration process to terminate the calibration procedure, the calibration data will not be saved.

◆Click on the right to cancel reset.

Calibration process:

1) Click the calibration start button to start the calibration procedure, and the system will automatically collect data until you manually enter the next calibration point.

2) Click to start the calibration of the next calibration point, or click to return to the previous calibration

point to recalibrate.

3) After all calibration points are complete, the system will automatically prompt whether to save the calibration data, or click on the right to save the calibration data.

E:400Ω（4W）& 4000Ω（4W）Resistance

◆Click on the right to restore the resistance calibration factory settings.

◆The number of resistance calibration points cannot be changed, but you can manually modify the calibration points by clicking the calibration point list on the left side of the calibration list.

◆Click during the calibration process to terminate the calibration procedure, the calibration data will not be saved.

◆The last calibration time is displayed below the calibration list.

Calibration process:

1) Click the calibration start button to start the calibration procedure, and the system will automatically collect data until you manually enter the next calibration point.

2) Click  to start the calibration of the next calibration point, or click  to return to the previous calibration point to recalibrate.

3) After all calibration points are over, the system will automatically prompt whether to save the calibration data, or click  on the right to save the calibration data.

F:Cold Junction Calibration:

◆ Click  on the right to restore the resistance calibration factory settings.

◆ Click  during the calibration process to terminate the calibration procedure, the calibration data will not be saved.

◆ Click the sensor type to select the cold end sensor type. The cold end types available for the calibrators are: mV, S, R, B, K, N, E, J, T, C, D, G, L, U, LR, A, 10μV/ ℃, 1mV/℃

Calibration process:

1) Click the standard value display number to adjust the standard value, and enter the reference standard temperature of the environment where the cold junction is currently located;

2) Click on the lower right corner to save the cold junction calibration data.

(3) Temperature Indication Calibration (Verification)

Users can calibrate the display temperature.

How to use:

◆Enter the page to display ″manual calibration″ mode and ″automatic calibration″ mode, the user can click it to enter the corresponding calibration mode.

◆Click ″Manual Calibration″ or ″Automatic Calibration″ to enter the temperature display self-calibration set point editing interface, the user can click the set point to be modified, and modify it through the numeric keyboard.

Manual mode:

Follow the prompts to connect the standard device, and manually input the corresponding indication values of the calibrator and the standard device at different set points. The data of each point needs to be obtained by the user outside the temperature display value self-calibration interface. The well temperature is not provided in manual mode or automatic temperature calibration mode. On this page, the set point cannot be modified. Please exit to

the temperature display self-calibration homepage to modify the set point and click on the lower right corner to save the data.

Automatic mode:

Follow the prompts to connect the standard, click on the lower right corner to start automatic calibration. Click on the lower right corner to save the data.

(4) Axial Temperature Field Calibration

Users can calibrate the axial temperature field.

How to use:

◆Enter the page to display ″manual calibration″ mode and ″automatic calibration″ mode, the user can click it to enter the corresponding calibration mode.

◆Click ″Manual Calibration″ or ″Automatic Calibration″ to enter the temperature field calibration set point editing interface. The user can click the set point to be modified and modify it through the numeric keyboard.

1) Manual mode:

Follow the prompts to connect the standard. Manually input the corresponding indication values of the calibrator and standard device at different set points. The data of each point needs to be obtained by the user outside the temperature display value self-calibration interface. The calibrator does not provide automatic temperature control in manual mode. On this page, the set point cannot be modified, please exit to the temperature field calibration homepage to modify the set point. During operation, please adjust the height of the sensor according to the test procedure. Click on the lower right corner to save the data.

2) Automatic mode:

Follow the prompts to connect the standard. In the temperature field calibration setting interface, the length of the temperature sensing section of the standard sensor and the axial temperature field test sensor can be set. In the standard setting interface, you can view and set the parameters of the standard. Click on the lower right corner to start automatic calibration. Click on the bottom right corner to save the data.

(5) Input Verification Certificate Data

Users can manually input the verification certificate data.

How to use:

Enter the interface to display temperature indication calibration (verification), axial temperature field calibration, and all three items.

Temperature display calibration (verification) and axial temperature field calibration

◆Click ″temperature indication calibration (verification)″ or ″axial temperature field calibration″ to enter the temperature set point editing interface.

◆Click the set point that needs to be modified, and it can be modified through the numeric keyboard.

◆Click on the lower right corner to input the detailed data, and click on the lower right corner to save the data after the input is complete.

◆You can input the name, operator, remarks, temperature indication calibration (verification) and detailed data of axial temperature field calibration;

◆After finishing, click the lower right corner to save the data.

(6) Temperature Calibration History Record

The user can click to view all the temperature calibration history records, and select the historical calibration data to apply to the calibrator according to the needs.

The temperature calibration history record has 3 parts: manufacturer calibration data, user calibration data and verification data. The differences are as follows:

Table 37 Temperature Calibration History Record

Item	Save	View	Add	Cover	Delete	Explanation
Manufacture's standard	Factory data	—	—	—	—	Factory calibration data
User's standard	Latest time	●	●（User）	●	●	User self-calibration data during the inspection period
Verification Data	Each time a verification is performed, one item will be added to the verification data list	●	●（Third-party verification agency）	—	●	Third-party verification data sent periodically

Tip: If the user chooses to apply non-latest verification data as the calibrator system data, the verification data

after the selected data will become invalid data (invalid data can be activated again by clicking to reapply as calibrator system data), the font is grayed out, and all invalid data will be deleted automatically when the verification mode is re-calibrated.

The following information needs to be filled in when storing the verification data:

Table 38 Verification Date Save Settings

Item	Effective value	Explanation
Name	Numbers, letters and characters up to 10 digits	Verification Date Name
Operator	Numbers, letters and characters up to 10 digits	Verification Operator Information
Remarks	Numbers, letters and characters up to 10 digits	Remark Information

How to use:

◆Click and select the required historical data to enter the view page.

◆After confirming that the calibration data of the axial temperature field and temperature indication are correct, click  at the bottom right corner of the screen (except for the restoration of the manufacturer calibration data,

directly select the manufacturer calibration data,the data will immediately prompt whether to switch to the factory calibration data).

(7) Due Date Reminder

Users can turn on the due date reminder to set the calibration due date

How to use:

◆Click the calibration expiration date to edit the detailed expiration reminder time;

◆The expiration date setting time range is 2000/1/1～2099/12/31.

◆Click to select the status "enabled" or "disabled".

3.5.2 Factory Reset

The calibrator provides the function of restoring factory settings. To enable this function, you need to enter a password. The password can be customized. For details, please refer to chapter 3.3 Data Protection. The factory default password is: 123456

◆Restore factory settings will not restore all the system calibration data. To restore the system calibration data, please refer to section 3.5.1.

◆Restore factory settings will not delete user data, including task data, sensor library data, etc.

◆After restoring the factory settings and restarting, the user needs to set the time. For details, refer to chapter

3.5.3 Maintenance

The calibrator provides maintenance function. To enable this function, you need to enter a password. The password can be customized. For details, please refer to Chapter 3.3 Data Protection. The factory default password is:

123456

◆Click the right side of the maintenance record page to add maintenance information.

◆Click ″maintenance brief information″, ″maintenance person″ and ″maintenance content″ to add content.

◆Click ″Maintenance Date″ to modify.

◆ The expiration date setting time range is 2000/1/1～2099/12/31.

3.5.4 System Updated

The calibration provides a firmware upgrade function. System upgrades can applied via local U disk or by network .

◆The local U disk upgrade operation needs to use a U disk, and the format of the U disk needs to be FAT16 or FAT32.

Upgrade operation:

A: U disk upgrade

Copy the upgrade file to the root directory of the U disk, then insert the U disk into the USB port on the right side of the calibrator, select "U disk upgrade" on the calibrator upgrade interface, and click  to start the automatic upgrade. After a few minutes, the upgrade process is completed, the system will display the upgrade completion message, and automatically restart after confirmation.

B: Remote upgrade

The remote upgrade needs to connect the calibrator to the Internet first, which can be completed by automatic or

manual update.

3.6 Personalization

3.6.1 Temperature Unit

The calibrator provides three temperature units: ℃, ℉ and K.

After the temperature unit is changed, the other temperature-related parameters will change except for the data in the sensor library and the mission center.

3.6.2 Date and Time

Table 39 Date and Time

Item	Effective value	Explanation
Time	00:00 ~ 23:59	Time setting
Date	2000-1-1 ~ 2099-12-31	Date setting
Date Format	Year-month-day / Month-day-year / day-month-year	Date format setting
Separator	-, /, .	Date separator setting
24 hours	Open/Close	Set the Time to be displayed in 24-hour or 12-hour format
Time zone	UTC-12:00~UTC+12:00	Set the time zone of the device

3.6.3 Language

The calibrator provides multi-language interface, you can select the available language interface through this menu.

◆After the language interface is selected, the calibrator needs to be restarted to take effect.

3.6.4 Sound

Table 40 Sound Setting

Item	Effective value	Explanation
Keypad tone	Open/Close	Enable or disable key tone
Warning tone	Open/Close	Turn on or off the beep
Over range sound	Open/Close	Enable or disable the beep when the measuring range is exceeded
Volume	0~100	Adjust key tone volume, %

3.6.5 Screen Brightness

Tap the progress bar to adjust the screen brightness.

3.6.6 Screen Protector

The calibrator provides a screen protection function. If there is no operation within the set time, the calibrator will

automatically turn off the touch screen to save energy, and touch it again to activate the screen.

The optional range of setting time is: 1 minute, 5 minutes, 10 minutes, 30 minutes, 60 minutes and never.

3.6.7 Display Mode

The calibrator provides two display modes: highlight and normal.

◆After the display mode is selected, the calibrator needs to be restarted to take effect.

3.7 Product Information

Product information is read-only information, divided into two parts: basic information and version information:

(1) Basic information: including model, serial number and range information.

(2) Version information: including the main program, system version, control board, electrical test board, WiFi and Bluetooth version information.

◆The firmware version information usually refers to the main program version information. If necessary, please provide the main program version information when contacting customer service.

4. Task

The calibrator provides a task function, users can set up calibration tasks according to their needs to realize automatic calibration. In the task function, the user can create or select an existing tested device as the first step of the task start, or create or select an existing test configuration as the first step of the task.

◆Under the task menu, you can set the object of the stability judgment condition by clicking the setting button in the lower right corner:

(1) Standard

(2) DUTs

(3) All

4.1 Device Center

Users can manage all inspected equipment in the equipment center.

4.1.1 Device Management

◆Click ⊕ on the desired device to read the information about the device. Please refer to chapters 4.1.2 to 4.1.9.

◆Click 🗑 on the right to delete the added test task. The user can select the task to be deleted as needed, and delete it by clicking 🗑, or delete all test tasks by clicking ☑ .

◆Click 🔍 on the right to search for the added device to be inspected. The search conditions are as follows:

Table 41 The Test Device Search and Find Condition in Task Center

Item	Effective value	Explanation
Type	Thermal resistance, thermocouple, thermistor, temperature transmitter, temperature switch, glass liquid thermometer, temperature controller, bimetal thermometer, pressure thermometer, transformer winding thermostat, surface thermometer, digital thermometer, double touch Point switch, integrated thermal resistance pointer thermometer, all	Select the device type to be checked, the default is all
Name	Numbers, letters and characters, can support up to 16 inputs	The tested device name
Device Serial No.	Numbers, letters and characters, can support up to 16 inputs	The tesed device serial No.
Execution	Yes/No/All	Whether the inspected equipment has performed tasks on the

		calibrator depends on whether there is test data generated
Creation Time	Start Time ： 2000-1-1 ~ 2099-12-31	To search the scope of the creation time of the inspected device, for example: the inspected device created between January 1, 2018 and December 31, 2018
	Over Time:2000-1-1 ~ 2099-12-31	

◆Click  on the lower right corner to apply the search and finding criteria and the matched devices will appear in the list. Click  on the right to clear the entire search and search criteria that have been entered.

4.1.2 Thermal Resistance

Click  on the right to use the sensor information in the sensor library as a template to quickly add thermal resistance parameters.

Table 42 Thermal Resistance to Be Inspected Adding Setting in Task Center

Item	Effective value	Explanation
Name	Numbers, letters and characters, can support up to 16 inputs	Name of thermal resistance to be inspected.
Device Serial No.	Numbers, letters and characters, can support up to 16 inputs	Serial No. of of thermal resistance to be inspected.
Location	Numbers, letters and characters, can support up to 16 inputs	The location information of the thermal resistance under

		inspection is used to deal with the problem of distinguishing multiple thermal resistances from different departments of the same company.
Remarks	Numbers, letters and characters, can support up to 16 inputs	Remarks of the thermal resistance to be inspected.
Inspection Department	Numbers, letters and characters, can support up to 16 inputs	The name of the company from which the thermal resistance is inspected is used to deal with the problem of distinguishing multiple thermal resistances from different companies.
Range	（-273～10000）℃	The range of the thermocouple to be inspected, the unit can be switched
Permission Error	The calibrator provides several common thermal resistance tolerances, and allows customers to customize	Accuracy of thermal resistance to be inspected **For custom settings, please refer to Chapter 4.1.12 Accuracy Settings of the Device Under Inspection.**
Wiring system	2/3/4 wiring system	Wire system selection of thermal resistance to be inspected
Thermal Resistance Type	Pt series、Cu series、Ni series、CVD	Types of thermal resistance to be inspected

R0	Digits	Thermal resistance RO value

Click  on the lower right corner to save and end the operation of adding thermal resistance.

4.1.3 Thermocouple

Table 43 Thermocouple to be Inspected Adding Setting in Task Center

Item	Effective value	Explanation
Name	Numbers, letters and characters, can support up to 16 inputs	Name of thermocouple to be inspected
Device Serial No.	Numbers, letters and characters, can support up to 16 inputs	Serial No,of thermocouple to be inspected
Location	Numbers, letters and characters, can support up to 16 inputs	The location information of the inspected thermocouple is used to deal with the user's problem of distinguishing multiple thermocouples from different departments of the same company.
Remarks	Numbers, letters and characters, can support up to 16 inputs	Remarks of the thermocouple to be inspected
Inspection Department	Numbers, letters and characters, can support up to 16 inputs	The name of the company from which the thermocouples are inspected is used to deal with the problem of

		distinguishing multiple thermocouples from different companies.
Range	（-273～10000）℃	The range of the thermocoupleto be inspected, the unit can be switched
Permission error	The calibrator provides several common thermocouple tolerances, and allows customers to customize	Accuracy of thermocouple to be inspected **For custom settings, please refer to Chapter 4.1.12 Accuracy Settings of the Device to be inspected**
Thermocouple type	A、B、C、D、E、F、J、K、L、LR、N、R、S、T、U	Types of thermocouple to be inspected
Cold Junction compensation	INT/EXT	Select the cold junction compensation method of the tested thermocouple, and manually enter the compensation value after selecting the fixed method

Click on the lower right corner to save and end the thermocouple adding operation.

4.1.4 Thermistor

Click on the right to use the sensor information in the sensor library as a template to quickly add thermal resistance parameters

Table 44 Thermistor to be Inspected Adding Setting in Task Center

Item	Effective value	Explanation
Name	Numbers, letters and characters,	Name of Thermistor to be

	can support up to 16 inputs	inspected
Device Serial No.	Numbers, letters and characters, can support up to 16 inputs	Serial No,of Thermistor to be inspected
Location	Numbers, letters and characters, can support up to 16 inputs	The location information of the thermistor being inspected is used to deal with the problem of distinguishing multiple thermistors from different departments of the same company
Remarks	Numbers, letters and characters, can support up to 16 inputs	Remarks of the thermistor to be inspected
Inspection Department	Numbers, letters and characters, can support up to 16 inputs	The name of the company from which the thermistor was inspected is used to deal with the user's problem of distinguishing multiple thermistors from different companies.
Range	（-273～10000）℃	Range of the thermistor to be tested, the unit can be switched
Permission error	Depends on user needs, please refer to chapter 4.1.10 Accuracy Setting of the Equipment Under Inspection for details	Accuracy of tested thermistor, please refer to chapter 4.1.12 Accuracy setting of tested equipment for details
Wiring system	1/3/4 wiring	Thermistor wire system selection

		of Thermistor to be inspected
Rtn	Digits	Rtn value of tested thermistor
Tn	Digits	Tn value of tested thermistor
β	Digits	β value of tested thermistor

Click on the lower right corner to save and end the thermistor adding operation.

4.1.5 TemperatureTransmitter

Click on the right to use the existing sensor information in the sensor library as a template to quickly add temperature transmitter parameters

Table 45 Temperature Transmitter to Be Inspected Adding Setting in Task Center

Item	Effective value	Explanation
Name	Numbers, letters and characters, can support up to 16 inputs	Name of temperature transmitter to be inspected
Device Serial No.	Numbers, letters and characters, can support up to 16 inputs	Serial No,of temperature transmitter to be inspected
Location	Numbers, letters and characters, can support up to 16 inputs	The location information of the tested temperature transmitter is used to deal with the user's problem of distinguishing multiple temperature transmitters from different departments of the same company.

Remarks	Numbers, letters and characters, can support up to 16 inputs	Remarks of the tested temperature transmitter
Inspection Department	Numbers, letters and characters, can support up to 16 inputs	The name of the company from which the temperature transmitters are inspected is used to deal with the problem of distinguishing between multiple temperature transmitters from different companies.
Input	（-273～10000）℃	The range of the tested temperature transmitter, the unit can be switched
Output	Analog signal 1. mA：4~20、0~10、0~20 2. V：0~5、0~10、4~20 3.Custom: -30~30 (click the electrical signal unit to switch between mA and V)	The output signal setting of the tested temperature transmitter
	HART transmitter: Primary variable, percentage, output current, loop current	
Accuracy	0.1%、0.2%、0.5%、1%、1.5%、2%、2.5%、 custom	The accuracy of the tested temperature transmitter, the user can set the special accuracy through a custom option, the unit

		is%
Display decimal places	0.001、0.01、0.1、1	Temperature display digits
Conversion function	Wiring/Extraction of root	Transmitter conversion function

Click on the lower right corner to save and end the temperature transmitter adding operation.

4.1.6 Temperature Switch

Click on the right to use the sensor information in the sensor library as a template to quickly add temperature switch parameters.

Table 46 Temperature Switch to Be Inspected Adding Setting in Task Center

Item	Effective value	Explanation
Name	Numbers, letters and characters, can support up to 16 inputs	Name of temperature switch to be inspected
Device Serial No.	Numbers, letters and characters, can support up to 16 inputs	Serial No,of temperature switch to be inspected
Location	Numbers, letters and characters, can support up to 16 inputs	The position information of the temperature switch to be checked is used to deal with the problem of distinguishing multiple temperature switches from different departments of the same company
Remarks	Numbers, letters and characters, can support up to 16 inputs	Remarks of temperature switch to be inspected

Inspection Department	Numbers, letters and characters, can support up to 16 inputs	The name of the company from which the temperature switch is inspected is used to deal with the user's problem of distinguishing multiple temperature switches from different companies
Range	（-273～10000）℃	The tested temperature switch range, the unit can be switched
Set point	Depends on switch range	Set point of tested temperature switch
Set point range	Depends on switch range	The set point range of the tested temperature switch **The calibrator only captures the temperature switch action within the set point range.**
Switch type	Normally open/close	Open and close type of the tested temperature switch
Set point error	Depends on switch range	Permisssion error range of the tested temperature switch
Switch channel type	Dry contact, wet contact, NPN switch, PNP switch	Channel type of the tested temperature switch
Dead band	Depends on switch range	Dead band of of the tested temperature switch

Click  on the lower right corner to save and end the temperature switch adding operation.

4.1.7 Glass Liquid Thermometer, Surface Thermometer

Click  on the right to use the existing sensor information in the sensor library as a template to quickly add glass liquid thermometer and surface thermometer parameters.

Table 47 Glass Liquid Thermometers, Surface Thermometer to Be Inspected Adding Settings in Task Center

Item	Effective value	Explanation
Name	Numbers, letters and characters, can support up to 16 inputs	The tested device name
Device Serial No.	Numbers, letters and characters, can support up to 16 inputs	The tested device serial No.

Location	Numbers, letters and characters, can support up to 16 inputs	The location information of the inspected equipment is used to deal with the user's problem of distinguishing multiple glass liquid thermometers from different departments of the same company
Remarks	Numbers, letters and characters, can support up to 16 inputs	Remarks of inspected equipment
Inspection Department	Numbers, letters and characters, can support up to 16 inputs	The name of the company from which the inspected equipment is sourced, to deal with the user's problem of distinguishing multiple glass liquid thermometers from different companies
Range	（-273～10000）℃	Range of tested equipment, unit can be switched.
Permission error	Depends on user needs, please refer to chapter 4.1.10 Accuracy Setting of the Equipment Under Inspection for details	Accuracy of inspected equipment, please refer to chapter 4.1.12 Accuracy setting of inspected equipment for details.
Division value	Depends on thermometerrange	The temperature difference represented by each grid of the inspected equipment.

Click  in the lower right corner to save and end the adding operation.

4.1.8 Temperature Controller, Bimetal Thermometer, Pressure Thermometer, Transformer Winding Thermostat

Click  on the right to use the existing sensor information in the sensor library as a template to quickly add parameters for bimetal thermometers, pressure thermometers, and transformer winding thermostats.

Table 48 Added Settings in Task Center

Item	Effective value	Explanation
Name	Numbers, letters and characters, can support up to 16 inputs	The tested device name
Device Serial No.	Numbers, letters and characters, can support up to 16 inputs	The tested device serial No.
Location	Numbers, letters and characters, can support up to 16 inputs	The location information of the inspected equipment is used to deal with the user's problem of distinguishing multiple devices from different departments of the same company
Remarks	Numbers, letters and characters, can support up to 16 inputs	Remarks of inspected equipment
Inspection Department	Numbers, letters and characters, can support up to 16 inputs	The name of the company from which the device is inspected is used to deal with the problem of

		distinguishing multiple devices from different companies
Range	（-273～10000）℃	The tested device range, unit can be switchable
Permission error	1%、1.5%、2%、2.5%、4%、custom unit is %	The accuracy of the equipment to be inspected, the user can set a special accuracy through a custom option. (The temperature controller: 0.1, 0.15, 0.3, 0.5, 1, 2.5, custom unit ℃)
Division value	Depends on thermometer range	Display resolution of the tested device
Electric contact	0、1、2	Number of electrical contacts of the equipment under inspection **If the number of electrical contacts is not 0, you must set the electrical contact value, the upper and lower limits of the electrical contact, the effective value and unit depend on the range**

Click ✓ on the lower right corner to save and end the adding operation.

4.1.9 Digital Thermometer

Click  on the right to use the existing sensor information in the sensor library as a template to quickly add digital thermometer parameters.

Table 49 The Digital Thermometer to Be Inspected Adding Setting in Task Center

Item	Effective value	Explanation
Name	Numbers, letters and characters, can support up to 16 inputs	Name of Digital Thermometerto be inspected.
Device Serial No.	Numbers, letters and characters, can support up to 16 inputs	Serial No.of Digital Thermometer to be inspected.
Location	Numbers, letters and characters, can support up to 16 inputs	The location information of the tested digital thermometer is used to deal with the user's problem of distinguishing multiple digital thermometers from different departments of the same company.
Remarks	Numbers, letters and characters, can support up to 16 inputs	Remarks of digital thermometer to be inspected.
Inspection Department	Numbers, letters and characters, can support up to 16 inputs	The name of the company from which the digital thermometers are inspected is used to deal with the user’s problem of distinguishing multiple digital

		thermometers from different companies.
Input	（-273～10000）℃	Measurement range of Digital temperature to be inspected, unit can be switched.
Accuracy	1%、1.5%、2%、2.5%、4%、custom	The accuracy of the digital thermometer to be inspected, the user can set the special accuracy through a custom option, the unit is%
Division Value	Depends on Thermometer Rannge	The temperature difference represented by each cell of digital thermometer to be inspected.
Electrical contacts number	0、1、2	The number of electrical contacts of the digital thermometer to be inspected. If the number of electrical contacts is not 0, you must set the electrical contact value, the upper and lower limits of the electrical contact, the effective value and unit depend on the range.
Enable analog output	Open/Close	Select whether the digital thermometer to be inspected has analog output function

		If you turn on this function, the user also needs to set the output signal.
Output (only when the analog output function is enabled)	-30~30	The output signal range of the tested digital thermometer, the unit depends on the current or voltage measurement (click the electrical signal unit to switch between mA and V)
Analog output accuracy (only when the analog output function is enabled)	1%、1.5%、2%、2.5%、4%、custom	The accuracy of the analog output signal of the tested digital thermometer, the user can set the special accuracy through a custom option, the unit is%

Click  on the lower right corner to save and end the digital thermometer adding operation.

4.1.10 Double Contact Switch

Click  on the right to use the existing sensor information in the sensor library as a template to quickly add dual-contact switch parameters.

Table 50 The Tested Double Contact Switch Adding Setting in Task Center

Item	Effective value	Explanation
Name	Numbers, letters and characters, can support up to 16 inputs	Name of temperature switch to be inspected

Device Serial No.	Numbers, letters and characters, can support up to 16 inputs	Serial No. of temperature switch to be inspected
Location	Numbers, letters and characters, can support up to 16 inputs	The position information of the temperature switch to be inspected is used to deal with the problem of distinguishing multiple temperature switches from different departments of the same company.
Remarks	Numbers, letters and characters, can support up to 16 inputs	Remarks of temperature switch to be inspected
Inspection Department	Numbers, letters, can support up to 16 input	The name of the company from which the temperature switch is inspected is used to deal with the user's problem of distinguishing multiple temperature switches from different companies
Range(Switch Contact1/2)	（-273～10000）℃	The temperature switch to be inspected range (switch contact 1 / 2), the unit can be switched
Set point (Switch Contact1/2)	Depends on switch range	Set point of temperature switch to be inspected(switch contact 1 / 2)
Set point range (Switch Contact1/2)	Depends on switch range	Set point range of temperature switch to be inspected (switch contact 1 / 2), the calibrator only

		captures the temperature switch action within the set point range.
Switch type (Switch Contact1/2)	Normally open/ close	Open and close type of temperature switch to be inspected (switch contact 1 / 2).
Set point error (Switch Contact1/2)	Depends on switch range	Permission error range of temperature switch to be inspected (switch contact 1 / 2).
Switch Channel type (Switch Contact1/2)	Dry contact, wet contact, NPN switch, PNP switch	Channel type of temperature switch to be inspected (switch contact 1 / 2).
Dead band (Switch Contact1/2)	Depends on switch range	Dead band of temperature switch to be inspected (switch contact 1 / 2).

Click  on the lower right corner to save and end the digital thermometer adding operation.

4.1.11 Integrated Thermal Resistance Indicator Thermometer

Table 51 The Inspected Integrated Thermal Resistance Indicator Thermometer Adding Setting in Task Center

Item	Effective value	Explanation
Name	Numbers, letters and characters, can support up to 16 inputs	Name of tested thermal resistance
Device Serial No.	Numbers, letters and characters, can support up to 16 inputs	The serial number of the thermal resistance being inspected
Location	Numbers, letters and characters, can support up to 16 inputs	The location information of the thermal resistance under

		inspection is used to deal with the problem of distinguishing multiple thermal resistances from different departments of the same company
Remarks	Numbers, letters and characters, can support up to 16 inputs	Remarks of the thermal resistance being inspected
Inspection Department	Numbers, letters and characters, can support up to 16 inputs	The name of the company from which the thermal resistors are inspected is used to deal with the user's problem of distinguishing multiple thermal resistors from different companies
Range	（-273～10000）℃	Measuring range of thermal resistance under test, unit can be switched
Permissible Error	The calibrator provides several common thermal resistance tolerances, and allows customers to customize	Accuracy of tested thermal resistance **For custom settings, please refer to Chapter 4.1.12 Accuracy Settings of the Device Under Inspection**
Wiring System	Two/ Three/ Four wiring system	Selection of thermal resistance wire system to be inspected
Thermal Resistance Type	Pt series/ Cu series/Ni series,/CVD	Types of thermal resistance to be inspected

R0	Digits	RO value of Thermal resistance
Pointer guage accuracy	0.5%、1%、1.5%、2.5%、4%、custom	Division Value of Pointergauge to be inspected
Pointer guage divison value	0.01~1000	Division Value of Pointergauge to be inspected

Click ✓ on the lower right corner to save and end the digital thermometer adding operation.

4.1.12 Accuracy Settings of Inspected Equipment

The calibrator provides a powerful function of setting the accuracy of the inspected equipment. In addition to the conventional accuracy setting, it also supports up to three segments of the accuracy setting of the inspected equipment. In the setting interface, all the highlighted values can be modified.

The calibrator provides two types of accuracy settings:

(1) Fixed accuracy

The types of inspections that can be applied with a fixed accuracy setting are: glass liquid thermometer

Example: (0 ~ 100)% ±(0.2 ℃)

How to set a fixed accuracy value:

◆ Click the fixed accuracy value (highlight the value, such as the value 0.2 in the example) to enter the selection page. The system default precision is: 0.1, 0.15, 0.3, 0.5, 1, 2.5 and custom.

◆After selecting custom, the user can input custom values through the keyboard. The unit depends on the range unit setting of the tested equipment.

(2) Fixed accuracy + reading accuracy

The types of inspections that can be applied with a fixed accuracy setting are: thermal resistance, thermocouple, thermistor, surface thermometer.

Example: (0 ~ 100)% ±(0.1 ℃ + 0.002 ＊I t I)

How to set a fixed accuracy value:

Set fixed accuracy: click on the fixed accuracy value (highlight the value, such as the value 0.1 in the example),

◆Enter the selection page, the system default precision: 0.1, 0.15, 0.3, 0.5, 1, 2.5 and custom.

Set the reading accuracy: click on the fixed accuracy value (highlight the value, such as 0.002 in the example),

◆Enter the selection page, the system default accuracy: 0.001, 0.002, 0.004, 0.005, 0.008, 0.01 and custom.

◆After selecting custom, the user can input custom values through the keyboard, and the unit depends on the range unit setting of the tested equipment.

(3) Segmentation Setting

The calibrator allows users to list the accuracy in sections, and each section is set separately to meet different needs,how to set the segmentation accuracy:

Click ∧/∨ on the right side of the screen to increase or decrease the number of segments, or click the number on the right to input the number of segments through the keyboard. Currently, the calibrator supports up to 3 segments of accuracy, refer to chapter 4.1.10.1 Accuracy Setting to set the accuracy of each segment.

4.2 Test Center

Users can manage all test tasks in the test center.

4.2.1 Task Management

Click the task added in the test center to quickly read the test information.

On the task information page, users can:

Click  to directly enter the task start interface. The calibrator will perform a calibration test again according to the previous spare parts equipment and task settings. For task execution operations, please refer to Chapter 4.3 Task Execution.

◆Click  to use the current test settings as a template to quickly add new tasks. The tested device cannot be modified for new tasks added quickly. Please refer to the following for the configuration editing operations of test tasks.

◆On the task setting information page, the content with > the mark can be modified. For the task setting operation, please refer to chapter 4.2.2 task setting.

◆Click  on the right to add a task, click  in the center of the screen, select the equipment to be inspected from the equipment center, the calibrator will display the basic information of the equipment to be inspected, and will automatically list the corresponding equipment according to the type of equipment to be inspected Task setting menu.

◆Click on the right to delete the added tasks. Users can select the tasks to be deleted according to their needs and click to delete them, or click to delete all tasks.

◆Click on the right to search for the added tasks, the search conditions are as follows:

Table 52 Task Search and Find Condition of Task Center

Item	Effective value	Explanation
Test name	Numbers, letters and characters, can support up to 16 inputs	Fill in the name of the task
Device name	Numbers, letters and characters, can support up to 16 inputs	Fill in the name of the inspected equipment involved in the task
Device serial NO.	Numbers, letters and characters, can support up to 16 inputs	Fill in the serial number of the inspected equipment
Execution	Yes/No/ All	Whether the task has been performed on the calibrator depends on whether there is test data generated
Creation time	Start time：2000-1-1 ~ 2099-12-31	The range used to search for the creation time of the task, for example: tasks created between January 1, 2018 and December 31, 2018
	Over time:2000-1-1 ~ 2099-12-31	
Updated time	Start time:：2000-1-1 ~ 2099-12-31	Used to search for the range of the last used time of the task

	Over time：2000-1-1 ~ 2099-12-31	

Click on the lower right corner to apply the search search criteria, and the matching tasks will appear in the list.

Click on the right to clear all the search search criteria that have been entered.

4.2.2 Task Settings

Click the task to enter the task setting interface, which is divided into basic information, control settings, equipment settings, set point list, indication error test, etc.

(1) Dual Channel Test

The tested types that support dual-channel testing are as follows:

Table 53 Dual Channel Test Compatible information of Task Ceneter

Type of inspected equipment	Whether to support dual channel
Thermal Resistance	●
Thermocouple	●
Thermistor	●
Temperature transmitter	
Temperature switch	
Glass liquid thermometer	●

Temperature Controller	
Bimetallic thermometer	
Pressure thermometer	
Winding thermostat for transformer	
Surface thermometer	●
Digital thermometer	
Double contact switch	
Integrated thermal resistance pointer meter thermometer	

For the tested device type that supports dual-channel testing, after adding a tested device, you can click ⊕ to add the next tested device.

(2) Basic Information settings

The types of inspections that support basic information settings are as follows:

Table 54 Task Basic Information Setting Compatibility Table

DUTs type	Basic Information		Operation Settings				
	Name	Remarks	Cycle index	Range	Dwell time	Readings numbers	Readings intervas
Thermal Resistance	●	●	●	●	●	●	●
Thermocouple	●	●	●	●	●	●	●
Thermistor	●	●	●	●	●	●	●

Temperature transmitter	●	●	●	●	●	●	●
Temperature switch	●	●	●				
Glass liquid thermometer	●	●	●	●	●	●	●
Temperature Controller	●	●	●	●	●	●	●
Bimetallic thermometer	●	●	●	●	●	●	●
Pressure thermometer	●	●	●	●	●	●	●
Winding thermostat for transformer	●	●	●	●	●	●	●
Surface thermometer	●	●	●	●	●	●	●
Digital thermometer	●	●	●	●	●	●	●
Double contact switch	●	●	●				
Integrated thermal resistance pointer meter thermometer	●	●	●	●	●	●	●

The basic information setting affects the basic process of the task; each item is introduced as follows:

Table 55 Task Basic Information Settings

Item	Effective value	Explanation
Basic Information settings		
Task name	Numbers, letters and characters, can support up to 16 inputs	Task Name
Remarks	Numbers, letters and characters, can support up to 16 inputs	Task Remark
Operation Settings		
Cycle index	1 / 2 / 3	Task repetition times
Route	One way/Double way	Task running mode
Dwell time	1~60	The dwell time of each test point after the temperature stabilizes to before the reading, to wait for the constant temperature of the tested equipment, unit: minute
Reading time	1~6	After each test point is stable and the dwell time has elapsed, the number of times the calibrator reads the number of the tested equipment.
Reading interval	0~3600	The time interval between each reading, unit: second

Click  on the right corner to apply basic information settings.

(3) Control Settings

The temperature control setting affects the temperature stability judgment conditions of the calibrator, and each item is introduced as follows:

Table 56 Task Temperature Control Settings

Item	Effective value	Explanation
Choose REF	INT / EXT	Choose built-in (INT) or external (EXT) sensor as standard
Fluctuation	0.01~10	Allowable range of temperature fluctuation, one of the conditions for temperature stability judgment, the unit depends on the unit of the range of the tested equipment.
Stabilization time	1~60	Temperature control stability duration, one of the temperature stability judgment conditions, unit: minute
Target deviation	0~10	The allowable range of the difference between the standard temperature indication and the target temperature, one of the conditions for temperature stability judgment, the unit depends on the unit of the tested equipment

When the three items of volatility, stabilization time and target deviation are met at the same time, the temperature is considered stable.

(4) Device Settings

The detected types that support device settings are as follows:

Table 57 Task equipment setting compatibility

DUTs type	Device1&2	Device Fluctuation	Device Stabilization time	Temperature control rate	Device1&2
Thermal Resistance	●	●	●		●
Thermocouple	●	●	●		●
Thermistor	●	●	●		●
Temperature transmitter	●	●	●		●
Temperature switch	●			●	●
Glass liquid thermometer	●	●	●		
Temperature Controller	●	●	●		
Bimetallic thermometer	●	●	●		
Pressure thermometer	●	●	●		
Winding thermostat for transformer	●	●	●		
Surface	●	●	●		

thermometer					
Digital thermometer	●	●	●		
Double contact switch				●	
Integrated thermal resistance pointer meter thermometer		●	●		

Equipment settings affect the application of the inspected equipment, and each item is introduced as follows:

Table 58 Task equipment setting compatibility Explanation

Item	Effective value	Explanation
Device1&2	Depends on the selected equipment to be inspected, please refer to 4.1 Equipment Center for details	The information of the inspected equipment can be edited, and the updated information will overwrite the information in the equipment center.
Fluctuation	Fluctuation:0.01~10	The user can set here the special fluctuation setting for the tested equipment, the unit depends on the range unit of the tested equipment.
Stabilization time	Stabilization time：1~60	The user can set here the dedicated stabilization time setting for the tested equipment, the unit is minute
Temperature control rate	0~30	The temperature control rate of the calibrator, unit: temperature unit/minute

		The calibrator uses this temperature control rate only within the range of the temperature switch set point. For details, please refer to chapter 3.1.6 Temperature Switch
Channel 1&2	CH1/CH2	Set the tested device corresponding to channel 1 and channel 2, depending on whether the tested device type supports dual-channel testing and connection status.

(5) Setpoint List

The types of inspections that support control settings are as follows:

All tested device types support the set point list function

◆The calibrator supports 1 to 17 set point settings. The user can increase or decrease the set point by using the up and down keys on the right, or click the number of set points on the right, and enter the number of set points through the keyboard

◆The number of set points is one-way quantity. For example: if the route is set to round-trip in the basic task setting and the number of set points is 3 (0, 50, 100), the actual number of set points is 6 (0, 50, 100, 100, 50, 0).

(6) Indication Error Test

The calibrator provides the error test function of the indication. This function only supports liquid glass thermometers, bimetal thermometers, temperature controllers, and pressure thermometers.

(7) Electric Contact Test

The calibrator provides an electrical contact test function, this function only supports bimetal thermometers and temperature controllers with non-zero electric contacts.

When checking the electric contact test, the settings are as follows:

Table 59 Electric Contact Test

Item	Effective value	Explanation
Temperature control rate	Depends on temperature unit	Set electrical contact test temperature control rate
First electrical contact value	CH 1 / CH 2	Select the first electrical contact to measure the occupied channel
The second electrical contact value (only enabled for devices with 2 electrical contacts)	CH 1 / CH 2	Select the first electrical contact to measure the occupied channel

You must select one or both of the electrical contact test and the indication error test. The system defaults to

select the indication error test.

4.3 Task Execution

4.3.1 Selection of Tested Equipment and Test Settings

After the tested device and task test configuration are added, the user needs to enter the task execution stage through the existing test tasks in the test center.

How to operate:

1) Select the added task settings and enter the task setting interface, where the user can modify the task settings.

2) After adjusting the task settings, click  on the lower right corner to enter the task execution interface. For details, refer to chapter 4.3.2 Task execution.

◆All setting changes made by the user will overwrite the original settings and take effect immediately after clicking the confirm button.

4.3.2 Task Operation Interface

On the task execution page, the calibrator will display a connection diagram to prompt the user the correct

connection method.

◆Only CH1 supports HART transmitter

Note: Please carefully check the connection method of the tested equipment. The wrong connection method may cause damage to the calibrator or the tested equipment. If you have special connection requirements, please consult the equipment seller for help.

(1) Typical Task Interface

The typical task interface of calibrator is as follows (except temperature switch and double contact switch):

Figure 9 Typical Task Operation Interface

1) In the interface, the temperature output of the calibrator is displayed at the bottom, and the return value of the tested equipment is displayed at the top.

◆For equipment that can automatically collect data in calibrator, such as thermal resistance, thermocouple, etc., the return value is automatically collected data, and the user is not allowed to change it.

◆For equipment that cannot automatically collect numbers in calibrator, such as glass liquid thermometers, bimetal thermometers, etc., users need to manually click the returned value of the tested equipment after the calibrator has a stable temperature control and meet the requirements of the residence time, and use the numeric keyboard Enter the current value of the device under inspection.

2) In the top column of the interface, the current temperature set point and current cycle times are displayed

3) On the right side of the interface are standard buttons, the button description is as follows:

Table 60 Typical Task Execution Interface Buttons

Button Icon	Manual mode	Automatic mode	Explanation

	•	•	Launch the task, all the data currently obtained will be cleared.
	•	•	Switch the display mode to normal or table mode, both modes can modify the displayed value of the tested equipment **During the temperature switch test, click  to switch the display mode, and the normal mode displays the temperature-time graph**
	•	•	Switch to the previous set point The calibrator will clear the set point data and automatically control the temperature to the previous set point.
	•	•	Switch to the next set point **The calibrator will save the instantaneous standard value and the detected value in the final report.**
	•	•	Skip current set point The calibrator will leave the data at this point blank, and the standard value and the detected value will not be displayed in the final report.
		•	Stop or continue the current task

↑50.00 1 Cycle-index	•	•	Pause or resume the current task Display the current number of cycles and the current number of test points in the cycle, in the example, it means that the current is the first cycle, Up, and the set point is 50 ℃.

(2) Temperature switch operation interface

In the operation interface of the task temperature switch in Figure 11, the lower part displays the temperature output change of the calibrator in the form of a curve, and the upper part displays the switch status of the tested equipment and the corresponding temperature value during the last on and off action.

◆ The operating interface of the double contact switch is similar to that of the temperature switch.

◆ The upper part of the operating interface of the double contact switch displays the on-off status of the two temperature switches, and does not display the temperature value corresponding to the last open and close action value.

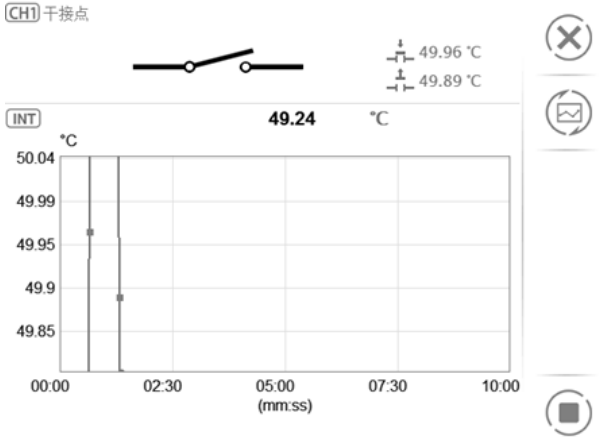

Figure 10 Task Temperature Swich Operation Interface

(3) Thermal resistance, thermocouple, thermistor, temperature transmitter, integrated thermal resistance pointer meter thermometer

◆ Only CH1 supports HART transmitter

The calibrator provides manual and automatic execution modes for the above types of equipment to be inspected.

Manual Performace:

Click  the lower right corner of the screen to start the task, the calibrator will automatically control the temperature to the first set point.

After the temperature of the calibrator is stable, the temperature output value of the calibrator will turn green, and the user will be prompted for the residence time next to it.

When the residence time meets the requirements, the calibrator will display the residence time as green.

Click  to enter the next set point measurement, the calibrator will automatically record the instantaneous temperature output value and the instantaneous return value of the tested equipment to the report

After all the set point tests are completed, click  to enter the task report page, where the user can save the test data for this time. For details, refer to chapter 4.4 task termination.

Automatic Performance:

Click  on the lower right corner of the screen to start the task, and the calibrator will automatically start temperature control. After all the set point tests are completed, click  to enter the task end page, where the

user can redo the test or save the test data. For details, refer to chapter 4.4 task termination.

(4) Temperature switch, double contact switch

The calibrator only provides automatic execution mode for temperature switch task.

Automatic Performance:

Click  on the lower right corner of the screen to start the task, the calibrator will automatically start temperature control.

After all the set point tests are completed, click  to enter the task end page, where the user can redo the test or save the test data. For details, refer to chapter 4.4 task termination.

(5) Liquid glass thermometer, temperature controller, bimetal thermometer, pressure thermometer, transformer winding thermostat, surface thermometer, digital thermometer.

ManualPerformace:

Click  on the lower right corner of the screen to start the task, and the calibrator will automatically control the temperature to the first set point.

After the temperature of the calibrator is stable, the temperature output value of the calibrator will turn green, and the user will be prompted for the residence time.

When the residence time meets the requirements, the calibrator will display the residence time in green.

The user needs to click the return value of the tested equipment at the top of the screen, and input the current displayed value of the tested equipment through the keyboard. After the input is completed, click Enter to apply the value, and the calibrator will automatically control the temperature to the next set point.

After all the set point tests are completed, click  to enter the task end page, where the user can redo the test or save the test data. For details, refer to chapter 4.4 task termination.

ManualPerformace:

◆ Click  on the lower right corner of the screen to start the task, and the calibrator will automatically start temperature control.

◆ When the temperature reaches the set point, the system will automatically take the standard value as the reading of the inspected device. At this time, the user can manually click and modify the reading of the inspected

device.

◆ When the temperature reaches the set point, the user needs to modify the reading of the tested equipment within the dwell time.

◆ If the residence time requirement is met, the calibrator will automatically advance to the next set point, and the reading of the tested equipment at this set point cannot be modified again.

◆ After all the set point tests are completed, click  to enter the task end page, where the user can redo the test or save the test data. For details, refer to chapter 4.4 task termination.

4.4 Task Termination

4.4.1 Task Report

On the task report page, the user can browse all the data of this test. For a dual-channel task, the user can click on the name of the DUTs at the top of the screen to view the test reports of different inspected devices.

Page key description:

Table 61 Task Termination Interface Button

Button Icon	Explanation
	Exit this task immediately; all current task data will be cleared.
	The calibrator will restart this task immediately, and all current task data will be cleared.
	Save the data of this task. For details, refer to Chapter 4.4.2 Report Save.

4.4.2 Saving Reports

After the task is over, the calibrator will automatically jump to the test result save page, where the user can save the test result.

How to set :

Table 62 Task Data Saving Set

Item	Effective value	Explanation
Operator	Numbers, letters and Chinese, up to 16 digits input	Fill in the test operator information

Execution time	2000-1-1 ~ 2099-12-31	Fill in the task execution time
Ambient temperature	Depends on temperature unit	Fill in the ambient temperature
Ambient humidity	0~100	Fill in the environmental humidity, unit: %RH

How to use:

After saving the settings, the user can choose to save the task data as: before adjustment, after adjustment or both, and click the confirm button in the lower right corner to save. Click the cancel button in the upper right corner to cancel the save and return to the task report page.

4.5 Data center

Users can manage all test data in the data center.

4.5.1 Data View and Management

Click the existing test data in the data center to read the important information and test data of the test. On the data information page, the user can click on the lower right corner to redo the task. During this process, the user is not allowed to make any changes to the device or test.

4.5.2 Data Deletion

Click on the right side of the data center to enter the data deletion page to delete existing task data.

How to use:

◆After entering the data deletion page, click the task data to be deleted (multiple selections are possible);

◆Click on the lower right corner to delete the selected task data.

The user can delete all task data in the data center by clicking one key on the right.

4.5.3 Data Search

Click on the lower right corner of the data center to set the task data search items.

How to use:

(1) The user can choose 4 items from the following items:

Table 63 Search Items

SerialNo.	Item name
1	Device name
2	Device No.
3	Device category
4	Test name
5	Executor

6	Result Type
7	Pass
8	Execution time

(2) Click ✓ on the lower right corner to apply settings.

(3) Click the highlighted part under the search item to filter or select keywords for the search item.

◆Keyword filtering does not limit upper and lower case, and supports partial keyword search, refer to Example 1.

◆Delete the content of all search keywords to cancel the keyword filtering under the item, refer to Example 2.

Example 1: Device name-click "all" below-enter "lg"-click ✓ -all data with "lg" in the device name will be listed.

Example 2: Device name-click "lg" below-delete all content—click ✓ -cancel the search for the keyword "lg".

5. Application

The calibrator provides a variety of applications to meet the testing needs of different users.

5.1 Thermo Calculator

The calibrator provides thermocouple and thermal resistance calculator functions, which is convenient for users to perform numerical calculations on site.

How to set

(1) Thermocouple

Table 64 Calculation of thermocouples

Item	Effective value	Explanation
Sensor type	S, R, B, K, N, E, J, T, C, D, G, L, U, LR, A, 10μV/℃, 1mV/℃	Select thermocouple type
Electrical signal	Depends on thermocouple type	Thermocouple electrical signal output, the unit is mV If you need to calculate the electrical signal value, please enter the fixed value of the cold junction first
Celsius system	Depends on thermocouple type	Temperature in degrees Celsius, unit: ℃
Kelvin	Depends on thermocouple type	Temperature in Kelvin, unitL: K
Fahrenheit	Depends on thermocouple type	Temperature in Fahrenheit, unit: ℉
Fixed value of cold junction	-10~50	The fixed value of cold junction, the parameter needed to calculate the electric signal value, unit: ℃

Example: K-type thermocouple:

The user only needs to enter 20 in degrees Celsius, and the calibrator will automatically calculate 68 degrees Fahrenheit and 293.15 Kelvin corresponding to 20 degrees Celsius

If the user needs to calculate the electrical signal value, he also needs to enter the fixed value of the cold junction as a supplementary condition to obtain the correct electrical signal value.

(2) Thermal Resistance

Table 65 Calculation of thermal resistance

Item	Effective value	Explanation
Sensor type	All thermal resistors, ITS-90, CVD and thermistors in the sensor library	Select thermal resistance type
Electrical signal	Depends on thermal resistance type	Thermal resistance electrical signal output, unit: Ω
Celsius system	Depends on thermocouple type	Temperature in degrees Celsius, unit: ℃
Kelvin	Depends on thermocouple type	Temperature in Kelvin, unitL: K
Fahrenheit	Depends on thermocouple type	Temperature in Fahrenheit, unit: ℉

How to use:

The user only needs to click the known item and enter the value, and the calibrator will automatically calculate the value of the remaining items.

5.2 Temperature Control Data Recording

The calibrator provides temperature control recording function, which can record the temperature control data of calibrator within the set range.

How to set:

(1) Basic settings

Table 66 Temperature control data recording settings

Item	Effective value	Explanation
Starting temperature	Current temperature value/custom temperature value	The temperature control data recording start temperature point, after reaching this temperature point, the calibrator will start recording temperature control data
Final temperature	Based on calibrator mode	The temperature control data recording end temperature point, once the temperature is reached, the

		calibrator will stop recording the temperature control data
Control settings	Refer to the following table temperature control data recording control settings	Set the temperature control parameters of the temperature control process
Interval of data acquisition	1~60	The time interval of each data collection point, unit: second
Dwell time	1~60	The dwell time of each test point after the temperature stabilizes to before the reading, to wait for the constant temperature of the tested equipment, unit: minute
Stability test	Enable/Disable	Enable or disable the stability test function, when the calibrator reaches the specified temperature and the dwell time has passed, the test starts
Stability test time (only when fluctuation test is enabled)	1~60	The duration of the stability test, in minutes
CH 1 & CH 2	Refer to the following table temperature control data recording channel settings	Set channel parameters

(2) Control settings

Table 67 Temperature control data recording control settings

Item	Effective value	Explanation
Control parameters		
Stability	0.01~10	Allowable range of temperature stability, one of the conditions for temperature stability judgment, the unit depends on range unit of the DUTs.
Stabilization time	1~120	Temperature control stability duration, one of the temperature stability judgment conditions, unit: minute
Target deviation	0~10	The allowable range of the difference between the standard temperature indication and the target temperature, one of the conditions for temperature stability judgment, the unit depends on the unit of theDUTs
Temperature control rate	Maximum、0~20	Temperature rise and fall rate, select the maximum or custom rate, the custom rate is displayed by the progress bar, unit: °C/min
Setpoint limit	Enable/ Disable	Enable or Disable set point limit
Set point range (only when set point limit is enabled)	-200～2000	Set the set point range, unit: ℃ The calibrator only executes the

		above control parameters within the set point range
Temperature control standard		
Tmeprature control resolution	1,0.1,0.01,0.001	Set the temperature control resolution, which affects the display digits of the sensor signal.
Sensor signal	Read only	Sensor temperature display, display resolution depends on the temperature control resolution setting

(3) DUTs settings

Table 68 Temperature Control Recording Channel Settings

Item	Effective value	Explanation
Basic Settings		
CH1 & CH2 Association	Association/Independent	Set the association in two channels
CH1、CH2 measuring items settings	RTD, TC, current, voltage, HART, switch test	Set channel measurement items RTD and TC projects need to select the sensor type Voltage measurement needs to select 12V or 30V gear
Stability	≥0.005	Set the temperature stability range, unit: ℃
Channel settings (only enabled when current and voltage measurement items are selected)		

Measuring range	-30~30	Set the measurement range, the unit depends on the current or voltage measurement (click the electrical signal unit to switch between mA and V)
Scaling range	Depends on calibrator mode	Set the range scaling

How to use:

(1) After the setting is completed, click  on the lower right corner to start the temperature control data recording execution function. After a few minutes of temperature control preparation, the calibrator will automatically start the temperature control process and record the temperature control data.

(2) During the temperature control data recording process, the user can click  on the lower right corner at any time to stop the data recording process, but all the executed data will be lost.

(3) After the temperature control data is recorded, the result interface will be entered, and the user can save the data.

How to view:

(1) The user clicks  on the right side of the temperature control data record setting page to view the previously

saved temperature control data record.

(2) Users can click to enter the delete page, select the record to be deleted, and click to delete.

5.3 Drying and Dehumidificataion

The calibrator provides drying and dehumidification function to ensure calibrator all indicators.

◆If the calibrator has not been used for a long time, please perform the drying and dehumidification function before calibrating, otherwise it will easily lead to inaccurate measurement data or damage the calibrator

How to set:

Table 69 Drying and Dehumidification

Item	Effective value	Explanation
Dehumidification	Temperature control upperlimit	Set the dehumidification temperature, the calibrator will control the temperature at this temperature for dehumidification treatment, unit: ℃
Dwell time	≥10	Set dehumidification duration

How to use:

(1) Click on the lower right corner to start the dehumidification function.

(2) Click ⏹ to terminate the dehumidification function or wait for the dehumidification program to automatically end.

5.4 Step Test

The calibrator provides step test.

How to set:

Table 70 Step Test

Item	Effective value	Explanation
Range	Based on calibrator mode	Set step test range
Route	One way / (n test points)	Set route mode, there are two round-trip modes, the difference is the number of times of return point measurement
	To and from 1 /\ (2n-1 test points)	
	To and from 2 /\\ (2n test points)	
Residence time	1~240	The dwell time of each test point in temperature stabilization and to before reading, to wait for the constant temperature of the tested equipment, in minutes

Cycle index	1 / 2 / 3	Cycle index of step test
Setpoint list	Refer to chapter 4.2.2.5 Setpoint list	Set the number and value of set points during calibration
CH 1 & CH 2	Refer to chapter 2.4 DUTs infromation	Set DUTs infromation
Conrol setting	Refer to chapter 2.3 control setting	Set calibrator control temperature settings

How to save settings:

The calibrator can save up to 20 step test settings. Users can distinguish by name and saving date.

(1) In the step test setting interface, click  on the right to enter the configuration save interface.

(2) Click to select the configuration to be overwritten, enter the configuration name, and click  on the lower right corner to save data.

(3) In the step test setting interface, click  on the right to load the saved step test setting.

How to use:

(1) Click  on the right to enter the step test operation interface

(2) Buttons introduction:

Table 71 StepTest Interface

Button	Position	Explanation
	Lower right conner	Begin step test
	Bottom center of screen	Switch to the previous or next set point
	Lower right conner	Cancel all current data of this step test, and restart the test from the first set point of the first cycle
	Upper right conner	Switch display mode to normal or graph mode
↑100.00 Cyecle index 2	Above the screen (normal mode) or below (chart mode)	Display the current number of cycles and the current number of test points in the cycle **For example, it means that the current is the second cycle, Up, and the set point is 100 ℃.**
	Upper right conner	Exit this step test and enter the data report page, where users can save this step data

(3) Normal operation:

Click  to start the test, the calibrator will automatically control the temperature to the first set point

How to view:

The user clicks  on the right side of the temperature control data record setting page to view the previously saved temperature control data record

Users can click  to enter the delete page, select the record to be deleted, and click  to delete.

5.5 Switch Test

A: How to set:

Table 72 Switch Test

Item	Effective value	Explanation
CH 1 & CH 2	Open: dry contact, wet contact, NPN switch, PNP switch	Select switch connection channel and switch type
	Close	
Starting and ending temperature	Depends on the calibrator model	Set the start and end temperature of the switch test **The calibrator only starts to capture the temperature switch action within this temperature range**
Temperature control rate	Maximum、0~20 ℃/min	Temperature rise and fall rate, select the maximum or custom rate, the custom rate is

		displayed by the progress bar. **The calibrator is only in the starting and ending temperature range, then can make temperature control.**
Route	One-Way/To and From	Set switch test route mode
Cycle index	1、2、3	Set times of repletion of Switch test

B: How to use:

◆Click the start button in the lower right corner to enter the switch test interface

◆In this interface, the user can read the current temperature indication and switch status at the top of the screen

◆Users can switch the interface display mode through  on the right interface: chart mode and list mode

Graph mode: Display the switch test progress in a graph, and only display the switch test results under the current cycle.

List mode: display the test results of the switch in a list.

◆Click the end button in the lower right corner to end the switch test and enter the data saving page

C: How to view the historical data:

In the switch setting interface, click  on the right to enter the switch test data list, and the user can view and save the switch test data as needed.

The user can click  to enter the delete page, select the record to be deleted, and click  to delete.

5.6 Snapshot Feature

A: How to set:

Table 73 Snapshot Settings

Item	Effective value	Explanation
Snapshots	Open/Close	Enable or disable snapshops
Storage Path	Local / U disk	Select store position of the snapshot
Amount of storage (only if local storage path is selected)	Read Only	Prompts the user for the number of snapshots that can be saved in a local file
File prefix	Numbers, letters and Chinese, up to 16 bits input is supported	prefix setting of snapshot file saved name
File name	Time/ Serial NO.	Select automatically add mode

		for snapshot file name
Start serial number (only when serial number is selected as file name)	1~1000	Select the serial number as the starting name the snapshot file name **If the selected serial number is occupied, the dry body calibrator will be automatically set to the latest available serial number during screen capture operation**

B: How to use:

On the main interface of the calibrator, the user clicks  on the top of the screen to take a snapshot.

◆The calibrator only supports screenshots of the main interface.

C: How to view:

In the snapshot settings interface, users can browse the saved snapshot files by clicking the browse button in the lower right corner, and swipe the screen left or right to browse other snapshot files

The browse operation can only browse the snapshot files in the current storage path. If you need to browse the

snapshot files in other storage paths, please switch the storage path.

D: Select Local as storage path

After clicking the snapshot button, the calibrator will take a snapshot operation and prompt the save name of the current snapshot.

◆Click  on the right to export all the snapshots stored locally to the U disk

◆Click  on the right to delete all locally stored snapshots

E: Select U disk as storage path:

◆The user needs to first confirm whether the U disk is connected correctly.

After clicking the snapshot button, the calibrator will take a snapshot operation and prompt for a file name of the current snapshop.

5.7 Annealing Application

Only supported by high temperature calibrator.

A: How to set:

◆Enter the annealing application, click ⊕ on right side to create a new application configuration of the specified sensor.

◆Set sensor name, annealing temperature, annealing time, cooling temperature and cooling rate respectively.

Sensor name: the sensor corresponding to this task, and save the configuration in the task name.

Annealing temperature: the annealing temperature of the sensor, the device will heat up to this temperature.

Annealing time: the time that the equipment will remain at this temperature after reaching annealing temperature.

Cooling temperature: the target temperature that the equipment will cool to after reaching annealing time period.

Cooling rate: the cooling rate when the equipment is cooled (divided into fast, medium and slow speeds and natural cooling at slow speeds).

◆Click ✓ on the lower right corner to save the configuration and enter to annealing operation interface.

B:How to use

◆Enter the editing interface by creating or selecting an existing application configuration to adjust the configuration as needed, then click on the lower right corner to save the configuration and enter to the annealing operation interface.

◆Click the associated sensor of the electrical measurement control at the bottom of the interface for real-time monitoring as needed (modification is still allowed during the operation phase).

◆Click on the lower right corner to start annealing.After annealing is completed, the program will pop up to prompt that the test is complete, and the user will automatically return to the task configuration selection interface after confirmation.

◆Users can click on the lower right corner to stop the test at any time during the running process.

C: Management Task Configuration

◆In the task configuration selection interface, the user can create a new sensor annealing application configuration by clicking on the right side.

◆Users can enter the delete page by clicking on the right side and choose to delete the created application

configuration file.

5.8 Water Triple Point

Only supported by low temperature calibrator.

5.8.1 Process Instruction

(1) The operation process has six stages: preparation stage, freezing preparation, freezing stage, TPW realization, and TPW maintenance and melting stage. Click  on the right to start the freezing of the water triple point.

(2) During the operation process, you can click  on the right at any stage to enter the melting stage. The melting stage will automatically control the temperature to a safe temperature to protect the water triple point bottle.

(3) In the preparation stage, the temperature will be controlled to 5 ℃. After rea

5 minutes. After the end of 5 minutes, it will automatically enter into the freezing preparation stage.

(4) During the freezing preparation stage, the temperature will be controlled to -5.5°C. After the temperature control is completed, it will automatically enter the freezing stage.

(5) The freezing phase lasts for 8 minutes. After the 8-minute countdown is over, the interface will prompt the user to take out the triple point cell for the realization operation and observe the phenomenon in the form of a pop-up window. If the realization is successful, please click the confirmation button on the pop-up window and the system will enter the TPW implementation stage. If the realization fails, please click the cancel button on the interface, and the system will enter the melting phase. When the pop-up window appears, the system will send out a continuous beep to remind the user to operate. If the user does not operate, the pop-up window will automatically disappear after two minutes and automatically enter the melting stage.

(6) In the TWP realization phase, the temperature will be controlled to 0.005°C. After the temperature control is completed, it will enter a ten-minute countdown, and after the countdown, it will enter the temperature control TWP holding phase. The temperature during the TWP storage phase is stable at 0.005, it can be maintained for up to three hours. In this phase, the phase of measuring the thermometer Rtpw is tested. In the TWP storage stage, if the temperature is unstable, it will automatically enter melting the stage.

(7) During the melting stage, the temperature will be automatically controlled to a safe temperature (20°C) to

protect the water triple point cell.

5.8.2 How To Use

(1) The Rtpw button on the right side of the interface will be displayed when the temperature sensor is connected to the external channel of the device, and it can be clicked when the test enters the Tpw saving stage. Click the Rtpw button to enter the Rtpw adjustment interface.

(2) When the non-smart sensor is connected, the interface displays the internal temperature, the temperature and resistance value of the external sensor. Click ‘Fetch” to obtain the Rtpw in the sensor library corresponding to the current sensor. This will modified the measured resistance value and the TPW value stored in the smart sensor.

(3) After clicking “Fetch“ to save the Rtpw value, the Rtpw adjustment interface will be automatically closed. At this time, the sensor can be replaced to continue the test.

5.9 Grid Quality

Only supported by high temperature calibrator

A: How to set

Table 74 Grid Quality

Item	Effective value	Explanation
Mian power voltage	（90~254）V	The voltage value of the total grid in the grid test
Frequency	(45~65)Hz	Frequency

B:How to use

(1) Click the start button in the lower right corner to enter the switch test interface

(2) Click to terminate the grid quality test or the grid quality waiting for test program will be terminated automatically. The power grid quality test process is five minutes in total.

(3) After the test is over, it will automatically enter the test data save interface.

C: How to view

(1) The user clicks on the right side of the grid quality test setting page to view the previously saved grid quality test records.

(2) The user can click to enter the delete page, select the record to be deleted, and click to delete.

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