

## CA103&CA102S

### Handy Multi - Functions Calibrator

### [User's Manual]



Shaoxing Zhongyi Electronics Co.,Ltd.

## **Introduction**

Thank you for purchasing the Shaoxing Zhongyi Electronics Co.,Ltd. developing CA103&CA102S Handy Multi-Functions Calibrator .This User's manual contains useful information regarding the instrument's functions and operating procedures, as well as that observed during use. To should be precautions ensure proper use of the instrument, read the manual thoroughly before operating it. After you have finished reading this manual, store it in the carrying case for whenever a question arises. quick reference.

## **Notes**

- The information contained in this manual is subject to change without notice. Furthermore, the actual display items may differ slightly from the ones appearing in this manual.
- Every effort has been made to ensure the information contained herein is accurate. However, should any concerns, errors, or emissions come to your attention, or if you have any comments, please contact us.
- Copying or reproduction of any or all of the content of this manual without permission is strictly prohibited.
- The warranty is included in this manual. Be sure to read the warranty to ensure you understand the terms, and then store it in a safe place. (The warranty cannot be reissued.)

## **Revision Information**

1st Edition: June 2014

## Checking the Contents of the Package

After opening the package, check the following items before use. If the product is not the one you ordered, any item is missing, or there is a visible defect, contact the dealer from whom you purchased the instrument.

### Main Unit:

Check that the model name given on the name plate on the back panel of the instrument matches the one on your order.

- Model

Model CA103、CA102S

- Serial No.

Should you need to contact the dealer from whom you purchased the instrument, have your unit's serial number handy to give to the person.

### Accessories:

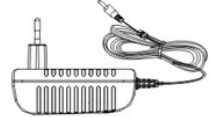
Measurement lead cables  
(CA-B01)



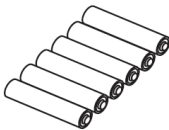
Alligator clip  
(CA-B02)



AC Adapter  
(CA-P01)



Ni-MH charge battery (CA-C02)



Battery charger (CA-W01, Sold separately)



Carrying case (CA-B03)



## Safety Precautions

When operating the instrument, strictly observe the precautions in this manual to ensure correct and safe operation. If you use other than as instructed in this manual, our company is not liable for any damage that may result.

### Safety Symbols

#### **Warning**

---

---

Indicates a hazard that may result in the loss of life or serious injury of the user unless the described instruction is abided by.

---

---

#### **Caution**

---

---

Indicates a hazard that may result in an injury to the user and/or physical damage to the product or other equipment unless the described instruction is abided by.

---

---

#### **Note**

---

---

Indicates information that is essential for handling the instrument or should be noted in order to familiarize yourself with the instrument's operating procedures and/or functions.

---

---

#### **Tip**

---

---

Indicates additional information to complement the present topic.

---

---

## CA103&CA102S Handy Multi-functions Calibrator Operating Instruction

Be sure to comply with the following safety precautions. Failure to do so may result in loss of life or injury to personnel from such hazards as electrical shock, or damage to the instrument.

### **Warning**

---

---

#### ● Prohibition of Use in Gaseous Environments

Do not operate the instrument in the presence of inflammable and explosive gases or vapors. Operating the instrument in such an environment is extremely hazardous.

#### ● External Connections

When connecting the instrument to the object to be tested or an external control circuit, or if you need to touch any external circuit, turn off the power to the circuit and make sure that no voltage is generated.

#### ● Correct Use of Lead Cables

Be sure to correctly use the measurement lead cables and source lead cables without mistaking them.

#### ● Remove the Casing

Removing the casing and disassembling or modifying the instrument is strictly prohibited. Some parts inside the instrument are extremely dangerous because they use a high voltage. When the instrument needs an internal inspection or calibration, contact our company or the dealer from whom you purchased the instrument.

---

---

To use the AC adapter safely, be sure to comply with the following precautions.

### **Warning**

---

---

#### ● Power Supply

Make sure that the rated power supply voltage of the instrument matches the voltage of the power supply before turning on the power.

---

---

## **Contents**

INTRODUCTION .....	1
CHECKING THE CONTENTS OF THE PACKAGE .....	2
SAFETY PRECAUTIONS .....	3
1. PRODUCT OUTLINE .....	7
2. NAMES AND FUNCTIONS OF PARTS .....	8
3. BEFORE STARTING SOURCE OR MEASUREMENT .....	10
3.1 USAGE PRECAUTIONS .....	10
3.2 CONNECTING A POWER SUPPLY .....	12
3.2.1 Using an AC Adapter .....	12
3.2.2 Using an NiMH Battery Pack .....	12
3.3 TURNING THE POWER ON AND OFF .....	14
3.3.1 Turning the Power On and Off .....	14
3.3.2 Screen saver .....	14
3.3.3 Auto Power Off .....	14
3.4 OPERATING ENVIRONMENT .....	14
4. SOURCE .....	15
4.1 CONNECTING THE SOURCE TERMINALS .....	15
4.2 SOURCE KEYS OPERATION .....	15
4.3 SOURCE DC VOLTAGE (DCV) SIGNALS .....	16
4.4 SOURCE DC CURRENT (DCMV) SIGNALS .....	16
4.4.1 Source DC Current Signals .....	16
4.4.2 20 mA SINK Function .....	17
4.5 SOURCE DC VOLTAGE (DCMV) SIGNALS .....	18
4.6 SOURCE RESISTANCE (RESI) SIGNALS .....	19
4.7 SOURCE THERMOCOUPLE (TC) SIGNALS .....	19
4.8 SOURCE FREQUENCY SIGNALS .....	20

## **CA103&CA102S Handy Multi-functions Calibrator Operating Instruction**

<b>5. MEASUREMENT .....</b>	<b>20</b>
5.1 MEASURING DC VOLTAGE (DCV) .....	21
5.2 MEASURING DC CURRENT (DCMA) .....	21
5.2.1 Measuring DC Current .....	21
5.2.2 Measuring 24V LOOP .....	22
5.3 MEASURING DC VOLTAGE (DCV) .....	22
5.4 MEASURING RESISTANCE TEMPERATURE DETECTOR(RTD).....	23
5.5 MEASURING THERMOCOUPLE (TC) .....	24
5.6 MEASURING FREQUENCY (FREQ) .....	25
<b>6. PARAMETERS SETTING .....</b>	<b>25</b>
6.1 GENERAL PARAMETERS SETTING .....	26
6.2 SECOND LEVEL (CALIBRATION) PARAMETER SETTING .....	27
<b>7. INTERNATIONAL TEMPERATURE SCALE ITS-90 .....</b>	<b>29</b>
<b>8. CHARGING .....</b>	<b>30</b>
<b>9. SPECIFICATIONS.....</b>	<b>31</b>
9.1 CA103 SOURCE UNIT RANGE AND ACCURACY .....	31
9.2 CA103 MEASUREMENT UNIT RANGE AND ACCURACY.....	32
9.3 CA102S SOURCE UNIT RANGE AND ACCURACY .....	33
9.4 CA102S MEASUREMENT UNIT RANGE AND ACCURACY .....	34

## 1. Product Outline

### Generation (SOURCE)

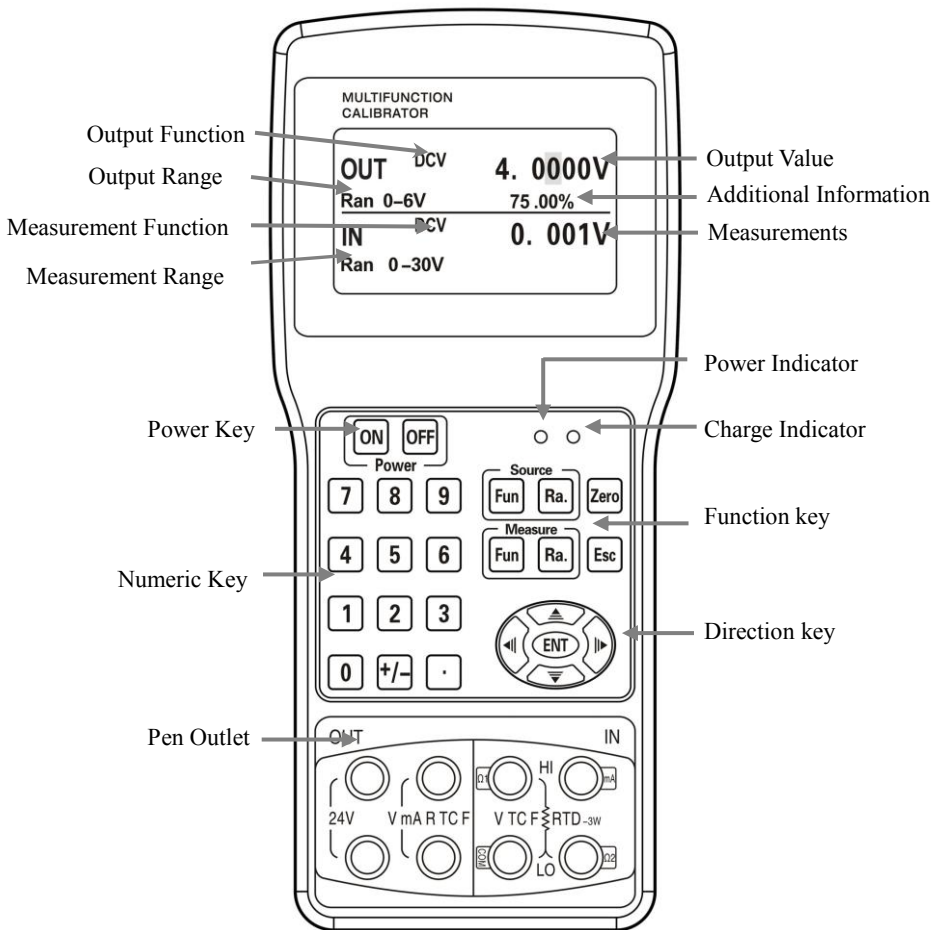
Function	Range
DC Voltage (DCV)	100mV, 6V
DC Current (DCA)	24mA, 24mA SINK
Resistance ( $\Omega$ )	500 $\Omega$
Thermocouple (TC)	S, K, E, T, J, B, R, N, WRe3-25
Frequency (FREQ)	1000Hz, 5kHz

### Measurement (MEASURE)





Function	Range
DC Voltage (DCV)	30V, 100mV
DC Current (DCA)	30mA
Resistance temperature detector(RTD)	Cu50, Pt100
Thermocouple (TC)	S, K, E, T, J, B, R, N, WRe3-25
Frequency (FREQ)	5kHz






## 2. Names and Functions of Parts





### Function keys

- Source Keys  : Changes the source function. The measurement sequence is DCV->DCmA->DCmV->R->TC->F->(DCV) .
-  : Changes the range for each function.  
(DCmA– Range, it will switch to the follow the sequence: 0-24mA->Sink1-24mA.  
(RTD– Range, it will switch to the follow the sequence: Cu50—>Pt100.  
TC– Range, it will switch to the follow the sequence: S->K->E->T->J->B->R->N->W325).
- Measure Keys  : Changes the measure function. The measurement sequence is DCV->DCmA->DCmV->RTD->TC->F->(DCV) .
-  : Changes the range for each function.













### Common Keys

-  : Output value reset to default values.
-  : Enter to query mode for parameter setting and escape to main screen.
-  : Confirmation button.

### Direction keys

-  : Set the main screen and check the screen when the cursor position value..Amend digit in parameter setting.
-  : Locate cursor bits for the digit amending

### Numeric Keys

-   
-   
-    : Key in the input/output setting, query reading directly.
-   

### 3. Before Starting Source or Measurement

#### 3.1 Usage Precautions

##### Safety Precautions

- Before using the instrument, be sure to thoroughly read "Safety Precautions".

- In the case of an abnormality

If the instrument begins to emit smoke, give off an unusual odor, or show any other signs of an abnormality, immediately turn off the power switch. If you are using an AC adapter, unplug the power cord from the outlet. Also turn off any object under test that is connected to the input terminals.

- AC adapter and power cord

Use the designated AC adapter. Do not place anything on the AC adapter or power cord, and prevent heat sources from coming into contact with them. When unplugging the power cord from the outlet, be sure to hold the plug and never pull the actual cord. If the power cord is damaged, contact your dealer.

##### General Handling Precautions

- When carrying the instrument

Turn off the power to the object under test. Turn off the power to the instrument and unplug the power cord from the outlet if you are using an AC adapter. Then, disconnect all lead cables from the instrument. When carrying the instrument, use the carrying case.

- Keep input terminals away from electrically charged articles as they may damage the internal circuitry.

- Do not allow volatile chemicals to come into contact with the casing or operation panel. Also, do not allow the instrument to come into contact with any rubber or vinyl products for prolonged periods. Since the operation

## CA103&CA102S Handy Multi-functions Calibrator Operating Instruction

panel is made of thermoplastic resin, be careful not to let it come into contact with any heat sources such as a soldering iron.

● If the AC adapter will not be used for a prolonged period, unplug the power cord from the outlet.

● Do not use the instrument with the cover for the battery holder left open.

### Operating Environment

Use the instrument in locations that meet the following conditions:

• Ambient temperature and humidity

Ambient temperature: 0 to 40°C

Ambient humidity: 20 to 80% RH (no condensation)

Do not use the instrument in the following locations:

• In direct sunlight or near heat sources

• Where the instrument is exposed to water or other liquids

• Where there is a lot of mechanical vibration

• Near noise sources such as high-voltage equipment or power lines

• Near strong magnetic field sources

• Where an excessive amount of greasy fumes, steam, dust, or corrosive gases are present

• In an unstable place

• Where, for example, fire and explosions caused by inflammable gases and the like are possible

### Note

---

• When you require high source and measurement accuracy, use the instrument under the following conditions:

Ambient temperature:  $23 \pm 5^\circ\text{C}$

Ambient humidity: 20 to 80% RH (no condensation)

When using the instrument in an ambient temperature range of 0 to 18°C or 28 to 40°C, add the temperature coefficient specified in "9. Specifications" to the accuracy.

## CA103&CA102S Handy Multi-functions Calibrator Operating Instruction

- When using the instrument in ambient humidity of 30% or less, use an antistatic mat to prevent static electricity.
  - Condensation may occur if the instrument is moved from a location of low temperature and humidity to a location of high temperature and humidity, or if the temperature otherwise changes suddenly. In such a case, leave the instrument for at least one hour to ensure it is free from condensation before starting operation
- 
- 

### 3.2 Connecting a Power Supply

Calibrator can use two other types of power supply.

- AC adapter
- NiMH (nickel hydrogen) battery(6 battery)

#### 3.2.1 Using an AC Adapter

##### Ratings

---

AC adapter power supply ratings	(Model: CA-P01)
Rated supply voltage	100~240V AC
Rated supply frequency	50/60Hz
Maximum input current	0.5A
Output voltage rating of AC adapter	12V DC
Maximum output current rating of AC adapter	1.0A

---

#### 3.2.2 Using an NiMH Battery Pack

Charging type NiMH (nickel hydrogen) battery (optional): Model: CA-C02

Specifications Voltage: 1.2V×6 V

Capacity 1600 mAh

Number of times can be charged (life cycle): Approx. 300 times (varies depending on the operating environment)

Be sure to observe the following warnings on handling the NiMH battery.

 **Warning**

---

- The electrolyte solution contained in the NiMH battery pack is alkaline. If it comes into contact with any clothing or skin due to a leakage from or rupture in the battery pack, the clothing or skin may be damaged. In particular, if the solution gets into an eye, it may cause loss of eyesight. In such a case, do not rub the affected eye, but thoroughly wash it immediately with clean water. Then see a doctor quickly for treatment.
- Do not leave the NiMH battery pack in strong direct sunlight, inside a vehicle under the hot sun, or near a fire, otherwise it may result in a solution leakage or deterioration in the performance and/or life.
- Do not disassemble or modify the NiMH battery pack, otherwise the protective features of the battery pack may be damaged, resulting in heating up or rupture.
- Do not short the NiMH battery as this may cause burns due to the battery pack heating up.
- Do not dispose of the battery pack in a fire or apply heat to it, otherwise there is a risk that it will rupture or its electrolyte solution will scatter.
- Do not apply excessive shock to the battery pack, for example, by throwing it. Doing so may cause solution leakage, battery pack heating, or rupture.
- Do not use a defective battery pack, such as one leaking solution, deformed, discolored, or showing any other abnormality.
- Avoid any metal coming into contact with the battery pack when carrying it, as there is a danger of a short.
- Do not immerse the battery pack in water or make it wet. Otherwise, it may heat up or rust, as well as lead to a loss of functions.

If the battery pack will not be used for a prolonged period, remove it from the instrument and store it in the following environment.

Storage period of 1 year or less: Temperature of -20 to 35°C (in locations with low humidity)

Storage period of 3 months or less: Temperature of -20 to 45°C (in locations

with low humidity)

---

---

### **3.3 Turning the Power On and Off**

#### **3.3.1 Turning the Power On and Off**

When the power is off, press the POWER key to turn the power on. Press the POWER key again to turn the power off. Pressing the POWER key after the power is turned off does not turn the power on for approximately two seconds

#### **3.3.2 Screen saver**

After setting the screen saver, if within the set time if no operation, the LCD into the screen saver, press any key to exit the screen saver status LCD. "Screen Saver" parameter value is set to 0 to disable this function.

#### **3.3.3 Auto Power Off**

After setting the auto power off, if within the set time if no operation, the instrument will auto power off. " Auto Power Off " parameter value is set to 0 to disable this function.

#### **Note**

---

---

Set the screen saver and auto power off specified in "6 Parameter Settings.

---

---

### **3.4 Operating Environment**

#### **Ambient temperature and humidity**

Use the calibrator in the following environment:

- Ambient temperature: 0 to 40℃
- Ambient humidity: 20 to 80 % RH (no condensation)

## 4. Source

The instrument can source DC voltage, DC current, current sink, resistance, thermocouple, resistance temperature detector, and frequency.

### Note

CA102S does not support the current sink function

### 4.1 Connecting the Source Terminals

Connect the supplied source lead cables (model: CA-B01) to the output terminals of the instrument. Connect the clips 【Alligator clip(CA-B02)】 to the input terminals of the target device.

Be sure to confirm the polarity to ensure the clips are correctly connected to the input terminals.

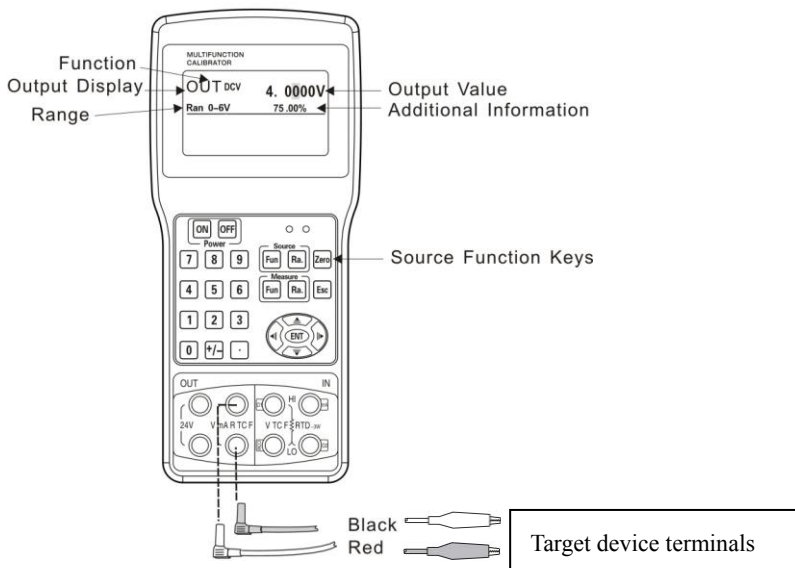


Figure 4.1

### 4.2 Source Keys Operation

Source output value can be modified in the following two ways:



## CA103&CA102S Handy Multi-functions Calibrator Operating Instruction

- ① By cursor left and right arrow keys to select the location, modify the value by ▲▼ this bit up and down keys;
- ② Enter the value directly by numeric keys, you have entered a cursor automatically after a decimal point to the right place automatically skip to the end automatically jump start bit (All of the following numeric input can be modified by these two methods to achieve ).

### 4.3 Source DC Voltage (DCV) Signals

1 Connect the terminals Figure 4.1.

2 Use the FUNCTION key on the SOURCE ,when the output interface is marked as DCV, this time to display DC voltage signal output range (Ran 0-6V), in the additional information column corresponds to the percentage of the current output value 1 ~ 5V display, When data is beyond the range, % will not display. When the output error exceeds "output error" parameter settings, display "error"

3 Use the Direction keys or numeric keys to set the output value. Press the Zero key, return to the initial value is set to "0."

### 4.4 Source DC Current (DCmV) Signals

#### 4.4.1 Source DC Current Signals

1 Connect the terminals Figure 4.1.

2 Use the FUNCTION key on the SOURCE ,when the output interface is marked as DCmV, this time to display DC current signal output range (Ran 0-24mA), in the additional information column corresponds to the percentage of the current output value 4-24mA display, When data is beyond the range, % will not display. when the output error exceeds "output error" parameter settings Or output terminal becomes open, display "error"

3. Use the Direction keys or numeric keys to set the output value. Press the Zero key, return to the initial value is set to "0."

**4.4.2 20 mA SINK Function**

The SINK function allows you to use DC current (DCmA) with the polarity set to (minus). This allows drawing (SINK) the specified value of the current from an external voltage source (distributor, etc.) in the direction of the H terminal. Thus, you can use the instrument in a loop test, for example, as a simulator for two wire transmitters.

**Note**

---



---

When using 20mA Sink function, prohibited the use of measurement functions, otherwise it will cause damage to the calibrator.

---



---

Method 1:

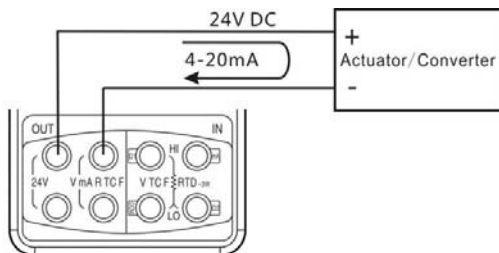


Figure 4.1 DC power wiring Sink function method

Method 2:

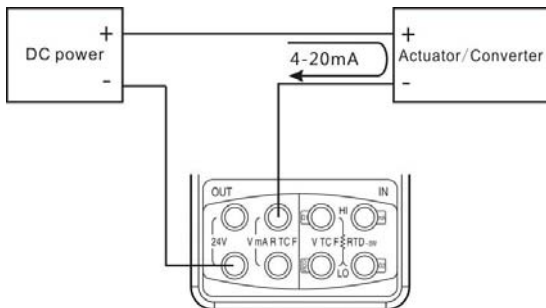


Figure 4.3a Wiring external DC power supply Sink function method (1)

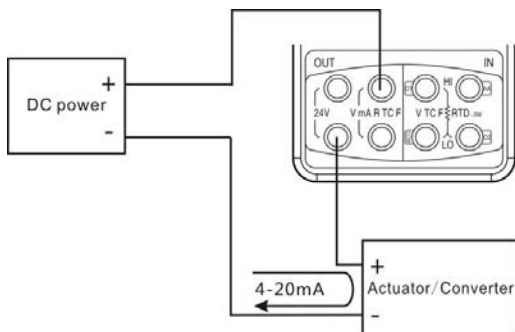


Figure 4.3b Wiring external DC power supply Sink function method (2)

### Note

---

CA103 offers two kinds Sink function wiring, second way the power supply for the external DC power supply should not exceed 30VDC.

---

- 1 Connect the terminals Figure 4.2 or Figure 4.3a or Figure 4.3b.
- 2 Use the FUNCTION key on the SOURCE. When the output interface is marked as DCmV(DC current choice).
- 3 Use the Ra. Keys to select the type and range SINK current (SINK 1-24mA).

In the additional information column corresponds to the percentage of the current output value 4-24mA display. When data is beyond the range, % will not display. When the output error exceeds "output error" parameter settings, display "error".

4. Use the Direction keys or numeric keys to set the output value. Press the Zero key, return to the initial value is set to "1."

## 4.5 Source DC Voltage (DCmV) Signals

- 1 Connect the terminals Figure 4.1.

## **CA103&CA102S Handy Multi-functions Calibrator Operating Instruction**

2 Use the FUNCTION key on the SOURCE ,when the output interface is marked as DCmV, this time to display DC voltage signal output range (Ran 0-100mV), in the additional information column when the output error exceeds "output error" parameter settings, display "error".

3 Use the Direction keys or numeric keys to set the output value. Press the Zero key, return to the initial value is set to "0."

### **4. 6 Source Resistance (RESI) Signals**

1 Connect the terminals Figure 4.1.

2 Use the FUNCTION key on the SOURCE ,when the output interface is marked as RESI, this time to display DC voltage signal output range (Ran 10-510 $\Omega$  ).

3 Use the Direction keys or numeric keys to set the output value. Press the Zero key, return to the initial value is set to "10."

### **4. 7 Source Thermocouple (TC) Signals**

Generate voltages (mV) corresponding to the following thermocouples. Set the temperature with ( $^{\circ}$ C). This enables calibration of a thermometer.

Thermocouple (TC) types: S, K, E, T, J, B, R, N, W325 (For the temperature range, refer to the specifications.)

1 Connect the terminals Figure 4.1.

2 Use the FUNCTION key on the SOURCE, when the output interface is marked as TC. (Thermocouple selection)

3 Use the RANGE key to select a thermocouple type.

In the additional information column shows the current measured temperature corresponds International Temperature Scale ITS-90 value in millivolts. When the output error exceeds "output error" parameter settings, display "error".

4 Use the Direction keys or numeric keys to set the output value. Press the Zero key, return to the initial value is set to "0."

## **Note**

---

---

For TC measuring, cold junction temperature compensation in two ways:

- ① Auto: is using the internal temperature measurement value as cold-junction compensation;
  - ② Man: is manually setting cold-junction compensation value and refer to "6 parameter settings."
- 
- 

## **4.8 Source Frequency Signals**

- 1 Connect the terminals Figure 4.1.
- 2 Use the FUNCTION key on the SOURCE, when the output interface is marked as Frequency (FREQ).
- 3 Use the RANGE key to select the range (Ran 0-1KHz) and (Ran 0-5KHz) switch.
- 4 Use the Direction keys or numeric keys to set the output value. Press the Zero key, return to the initial value is set to "0."

## **5. Measurement**

### **Warning**

---

---

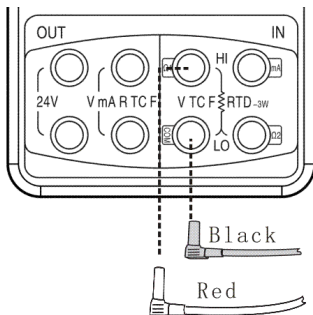
Turn off the power supply to the object to be tested before connecting it to the instrument. It is extremely dangerous to connect and disconnect measurement lead cables while power is being supplied to the object.

- It is extremely dangerous to incorrectly connect the voltage input terminal Hand the current input terminal mA. Make sure that the measurement function (FUNCTION) selection and terminal connections are correct. An incorrect connection may not only cause damage to the circuit or device under test and the instrument, but also result in injury to the operator.
  - The maximum allowable applied voltage for the grounding of all input/output terminals is 30 V<sub>peak</sub>. Be sure not to exceed this voltage because doing so may not only cause damage to the instrument, but also result in injury to the operator.
- 
-

**Note**

CA102S does not support two-wire RTD measurement.

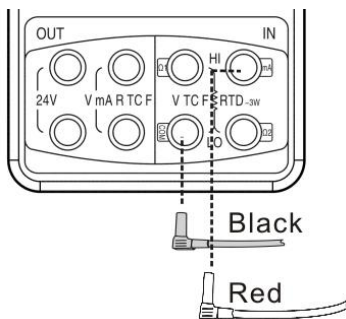
**5.1 Measuring DC Voltage (DCV)**



- 1 Connect the terminals as shown in the figure above.
- 2 Use the Measure key on the Fun, when the output interface is marked as DCV. DC voltage measurement range is displayed (CA103: Ran +/-30V; CA102S: Ran 0-30V).
- 3 The measurement value and unit ( V ) appear.

**5.2 Measuring DC Current (DCmA)**

**5.2.1 Measuring DC Current**



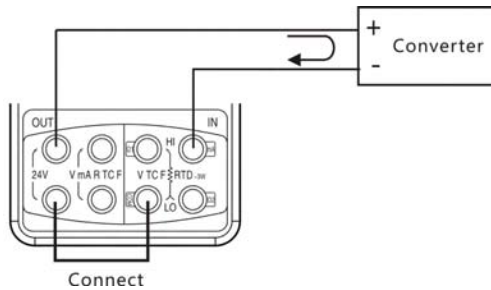
## CA103&CA102S Handy Multi-functions Calibrator Operating Instruction

- 1 Connect the terminals as shown in the figure above.
- 2 Use the Measure key on the Fun, when the output interface is marked as DCmA. DCmA measurement range is displayed (CA103:Ran +/-30mA; CA102S:Ran 0-30mA).
- 3 The measurement value and unit (mA) appear.

### 5.2.2 Measuring 24V LOOP

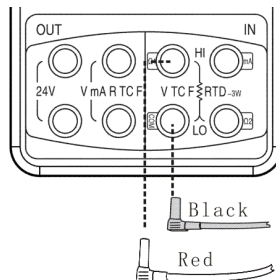
This function is for measuring the current flowing when a 24 V DC constant voltage is applied.

With 24V LOOP measurement, you can perform a transmitter loop test.



- 1 Connect the terminals as shown in the figure above.
- 2 Use the Measure key on the Fun, when the output interface is marked as DCmA. DCmA measurement range is displayed (CA103:Ran +/-30mA; CA102S:Ran 0-30mA).
- 3 The measurement value and unit (mA) appear.

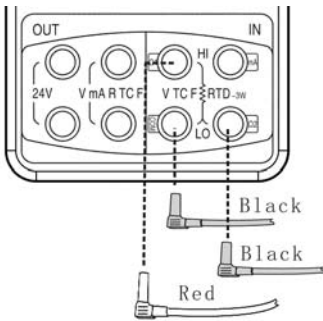
### 5.3 Measuring DC Voltage (DCV)



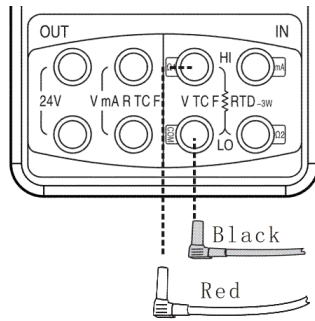
## CA103&CA102S Handy Multi-functions Calibrator Operating Instruction

- 1 Connect the terminals as shown in the figure above.
- 2 Use the Measure key on the Fun, when the output interface is marked as DCmA. DCmA measurement range is displayed (CA103:Ran +/-100mV; CA102S:Ran 0-100mV).
- 3 The measurement value and unit (mA) appear

### 5.4 Measuring Resistance Temperature Detector (RTD)



Three-wire method



Two-wire method

- 1 Connect the terminals as shown in the figure above.
- 2 Use the Measure key on the Fun, when the output interface is marked as RTD (RTD choice).
- 3 Use the Ra. Key to select the type of thermal resistance (Three-WireCu50, Three -WirePt100 ,Two-WireCu50, Two -WirePt100).
- 4 The measurement value and unit ( $^{\circ}\text{C}$ ) appear. In the additional information column shows the current measured temperature corresponds International Temperature Scale ITS-90 value in resistance ( $\Omega$ ).

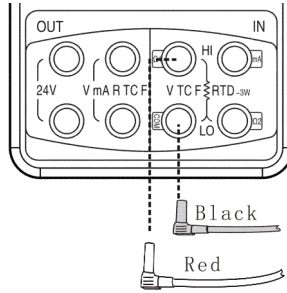
#### **Note**

CA103 supports RTD two / three-wire RTD measurement, CA102S does not support two-wire RTD measurement.



- For accurate measurement, use the three-wire method
  - Temperature standards for the ITS-90 mode
- 
- 

## 5.5 Measuring Thermocouple (TC)



Generate voltages (mV) corresponding to the following thermocouples. Set the temperature with ( $^{\circ}\text{C}$ ). This enables calibration of a thermometer.

Thermocouple (TC) types: S, K, E, T, J, B, R, N, W325 (For the temperature range, refer to the specifications.)

- 1 Connect the terminals Figure 4.1.
- 2 Use the FUNCTION key on the SOURCE, when the output interface is marked as TC. (Thermocouple selection)
- 3 Use the RANGE key to select a thermocouple type(S, K, E, T, J, B, R, N, W325)
- 4 The measurement value and unit ( $^{\circ}\text{C}$ ) appear, In the additional information column shows the current measured temperature corresponds International Temperature Scale ITS-90 value in millivolts(mV).

### Tip

---

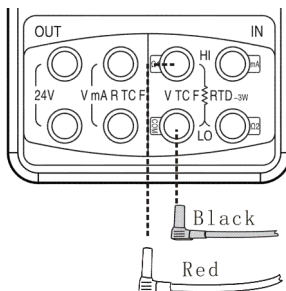
---

- When there is an overrange or measurement is not possible, "--OL--"
- If the operating environment changes suddenly, wait to stabilize before

beginning measurement.

- It may take a while for the temperature of the terminal parts to stabilize after a terminal adapter is attached or a thermocouple is connected.
- The cold junction compensation temperature settings refer to "6 parameter settings"

## 5.6 Measuring Frequency (FREQ)




- 1 Connect the terminals as shown in the figure above.
- 2 Use the Measure key on the Fun, when the output interface is marked as FREQ. FREQ measurement range is displayed (Ran 0-5KHz).
- 3 The measurement value and unit (Hz) appear.

## 6. Parameters setting

In operation, some of the parameters can be viewed and modified. For example, the input and output temperature compensation, contrast, screen saver, Auto Power Off and other settings.

- 1 In the main screen, Press ENT will go into parameter setting, ESC will be back to main screen. The parameters as shown in below:

In Comp	Auto
Comp Temp	00.0°C
Out Comp	Auto
Comp Temp	00.0°C

2 Use the  to select the item to view parameters, continuous pressing will rapidly move up and down parameter entry.

3 When one is selected to modify the parameters, press the "ENT" key or the right to enter the parameter value changes; then modify numerical parameters, see "4.2 Source button operation", modify the text parameters (such as automatic or manual) only through up and down keys.

Parameter modification screen shown below.

In Comp	Auto
Comp Temp	00.0°C
Out Comp	Auto
Comp Temp	00.0°C

4 Press the value of the "ENT" key to save the input parameters and return items to see the picture, If you press "ESC" key to return without saving.

5 After parameters set up, Press the "ESC" key to return to the main screen.

(The following parameters can take these steps)

### 6.1 General parameters setting

Parameter	Range	Default Setting	Description
Input compensation	Manual or Auto	Manual	Cold-junction compensation modes in T.C measuring: <b>Manual</b> compensation parameter setting; <b>Auto</b> compensation setting which instrument detected by environment temperature.

## CA103&CA102S Handy Multi-functions Calibrator Operating Instruction

Compensation Temperature	00.0°C~99.9°C	00.0°C	Cold-junctions compensation value of T.C input measuring in manual mode.
Output Compensation	Manual or Auto	Manual	Cold-junctions compensation value for T.C output manual setting.
Temperature Compensation	00.0°C~99.9°C	00.0°C	T.C input measuring cold-junctions compensation for manual setting.
Contrast	0~10	05	Screen contract setting
screen saver	0~120	03	Screen saver timer time (Unit: minutes)
Auto Power Off	0~120	05	Auto Power Off timer time (Unit: minutes)
Key Sound	Turn on or off	turn on	Sound switch button
Language	Chinese or English	Chinese	English display settings
password	0000~9999	0000	For into the second level parameter setting page

### 6.2 Second level (Calibration) parameter setting

Enter the correct password in the password entry proofreading generic parameter settings, press ENT, ▼ then move to second level parameter setting

#### ☞ Note

---

•Non-engineering personnel shall not enter two parameters. Otherwise, it will cause the instrument to measure the error!

---

Parameter	Range	Default setting	Description
Password	0000~9999	0000	Password change or verify
DC-VZero	-19999+19999	00000	DC V Offset for cal
DC-VProp	0.00001.9999	1.0000	DC V proportion for cal
DCmAZero	-19999+19999	00000	DC mA offset for cal
DCmA Prop	0.00001.9999	1.0000	DC mA proportion for cal

## CA103&CA102S Handy Multi-functions Calibrator Operating Instruction

DCmVZero	-19999~+19999	00000	DC mV Offset for cal
DCmVProp	0.0000~1.9999	1.0000	DC mV proportion for cal
CU50Zero	-19999~+19999	00000	Cu50 offset for cal
CU50Prop	0.0000~1.9999	1.0000	Cu50 proportion for cal
PT-1Zero	-19999~+19999	00000	Pt100 offset for cal
PT-1Prop	0.0000~1.9999	1.0000	Pt100 proportion for cal
TC-SZero	-19999~+19999	00000	(S type TC) offset for cal
TC-SProp	0.0000~1.9999	1.0000	(S type TC) proportion for cal
TC-KZero	-19999~+19999	00000	(K type TC) offset for cal
TC-KProp	0.0000~1.9999	1.0000	(K type TC) proportion for cal
TC-EZero	-19999~+19999	00000	(E type TC) offset for cal
TC-EProp	0.0000~1.9999	1.0000	(E type TC) proportion for cal
TC-TZero	-19999~+19999	00000	(T type TC) offset for cal
TC-TProp	0.0000~1.9999	1.0000	(T type TC) proportion for cal
TC-JZero	-19999~+19999	00000	(J type TC) offset for cal
TC-JProp	0.0000~1.9999	1.0000	(J type TC) proportion for cal
TC-BZero	-19999~+19999	00000	(B type TC) offset for cal
TC-BProp	0.0000~1.9999	1.0000	(B type TC) proportion for cal
TC-RZero	-19999~+19999	00000	(R type TC) offset for cal
TC-RProp	0.0000~1.9999	1.0000	(R type TC) proportion for cal
TC-NZero	-19999~+19999	00000	(N type TC) offset for cal
TC-NProp	0.0000~1.9999	1.0000	(N type TC) proportion for cal
TC-WZero	-19999~+19999	00000	(W type TC) offset for cal
TC-WProp	0.0000~1.9999	1.0000	(W type TC) proportion for cal
V-0Zero	-19999~+19999	00000	DCV output value deviant
V-0Prop	0.0000~1.9999	1.0000	DCV output value zoom
mV-0Zero	-19999~+19999	00000	DCmV output value deviant
mV-0Prop	0.0000~1.9999	1.0000	DCmV output value zoom
mA-0Zero	-19999~+19999	00000	DcmA output value deviant
mA-0Prop	0.0000~1.9999	1.0000	DcmA output value zoom
OutError	0~200	100	mV fluctuation adjustment

### Note

1. Calibrator input and output calibration parameters:

## CA103&CA102S Handy Multi-functions Calibrator Operating Instruction

- 1) Select the required calibration signal;
- 2) Checkpoint 1 (20% range), Checkpoint 2 (80% range);
- 3) Checkpoint will be recorded into the following formula:

Proportional value = (standard point 2 - Standard Point 1) ÷ (Checkpoint

2- Checkpoint 1)

Zero value = standard point 2 - Checkpoint 2 × Scale value

4) The calculated ratio of the value, the value is set to zero in the corresponding parameters.

2. Output error parameter settings:

0: Disable output error alarm function;

1~200: Enable output error alarm function;

When the signal source output error > output parameter value range

× Output error parameter values × 10 PPM. Additional information is displayed "error".

---

---

## 7. International Temperature Scale ITS-90

Find the relationship of mV of TC output and resistance of RTD Vs temperature.

1 In the main screen. Press ESC go to multi-function calibrator -Query" mode:

Query

RTD: **Cu50 Pt100**

TC:

2 Select anyone then press ENT:

Query

**Temp ITS-90**

ITS-90 Temp

## CA103&CA102S Handy Multi-functions Calibrator Operating Instruction

3 Key in the temperature reading, the result will be shown as below:  
Press ESC it will back to main screen.

Query Cu50

Temp : 0000.00°C

ITS-90 : 049.99Ω

## 8. Charging

Normal operation can be measured or output signal calibrator charge. The battery have to be charged when it flat (Calibrator cannot turn on or LCD flicker).

Please do the following:

- 1 Power adapter plugged into an AC outlet.
- 2 Connect the power adapter to the device

Green LED lights up while the Ni-MH battery pack is charged. Red LED lights up while the Ni-MH battery pack is Fast charged.

indicate	Red LED	Green LED	Charging time(Minute)
Charging	Light on	Flicker	0-5
Fast charging	Light on	Light on	About 360
trickle charging	Light on	Light off	About 360

3 When fast charging is completed (rapid charging indicator light goes out) after then please keep the trickle charge 6 hours, to ensure that the battery is fully charged.

4 When the device is fully charged, disconnect the power adapter and the device, and then unplug the power adapter from the wall outlet.

## 9. Specifications

### 9.1 CA103 source unit range and accuracy

Accuracy = ± (% of setting + uV, mV, uA, Ω, °C, Hz) at 23±5°C

parameter	Range	Source Range	Accuracy	Setting Resolution	Remarks
DCV source	100mV	0~99.999mV	±(0.03%+10μV)	1μV	Output resistance: Approx.5Ω
	6V	0~6.0000V	±(0.03%+0.5mV) )	0.1mV	Output resistance: Approx.100Ω
DCmA source	20mA	0~24.000mA	±(0.03%+3μA)	1μA	Maximum load: 500Ω
	20mA Sink	1~24.000mA	±(0.05%+3μA)	1μA	Maximum load: 24V
Resistance Source	500Ω	10.0~510.0Ω	±(0.1%+0.1Ω)	0.1Ω	Excitation current:1~5mA
TC output	K	0.0~1372.0°C	±(0.03%+0.5°C)	0.1°C	TC source accuracy does not include RJ sensor accuracy  RJ Sensor Specification Measurement range:-10~50°C  Accuracy (when combined with main unit)18~28°C: ±0.5°C Other than 18~28°C: ±1°C
	E	0.0~1000.0°C	±(0.03%+0.4°C)		
	J	0.0~1200.0°C	±(0.03%+0.4°C)		
	T	0.0~400.0°C	±(0.03%+0.5°C)		
	N	0.0~1300.0°C	±(0.03%+0.5°C)		
	We3-25	0.0~2300.0°C	±(0.03%+1.2°C)		
	R	0.0~1768.0°C	±(0.03%+2°C)		
	S	0.0~1768.0°C	±(0.03%+2°C)		
B	0.0~1820.0°C	±(0.03%+1.5°C)			
Pulse output	1000Hz	0~1000Hz	±1Hz	1Hz	Output voltage: +5V±10%
	5KHz	0.00~5.0kKHz	±0.01kHz	0.01kHz	
DCV output			24V±2V		Maximum load current:22mA

- 1) Temperature coefficient: When in the ranges of  $0 \leq T \leq 18^\circ\text{C}$  and  $28 < T \leq 40^\circ\text{C}$ , add the accuracy shown above  $\times (1/10) / ^\circ\text{C}$ .
- 2) The above accuracy ranges are for values obtained when the instrument has been left for two hours after charging ends (or is stopped).



## 9.2 CA103 measurement unit range and accuracy

Accuracy = ± (% of setting + uV, mV, uA, Ω, °C, dgt) at 23±5°C

parameter	Range	Source Range	Accuracy	Setting Resolution	Remarks
DCV measurement	100mV	-99.999~ +99.999mV	±(0.03%+50μV)	10μV	Input resistance: 1000kΩ or greater
	30V	-30.000~ +30.000V	±(0.03%+5mV)	1mV	
DCmA measurement	30mA	-30.000~ +30.000mA	±(0.03%+4μA)	1μA	Input resistance: Approx.25Ω
Pulse measurement	5kHz	0.0~ 5000.0Hz	±(0.1%+2dgt)	0.1Hz	Maximum input:30V Sensitivity: Approx.0.5Vpp
TC input	K E J T N We3- 25	-50.0~ 1372.0°C -50.0~ 1000.0°C -50.0~ 1200.0°C -50.0~ 400.0°C -50.0~ 1300.0°C -50.0~ 2300.0°C	±(0.03%+1.5°C)≥100.0°C ±(0.03%+2°C)≤100.0°C	0.1°C	
	R S B	-50.0~ 1768.0°C -50.0~ 1768.0°C -50.0~ 1820.0°C	±(0.05%+2°C)≥600.0°C ±(0.05%+3°C)≤600.0°C		
RTD input	Cu50 PT100	-50.0~150.0 -200.0~ 850.0°C	±(0.03%+0.3°C)	0.1°C	Supports two or three-wire RTD measurement

- 1) Temperature coefficient: When in the ranges of  $0 \leq T \leq 18^\circ\text{C}$  and  $28 < T \leq 40^\circ\text{C}$ , add the accuracy shown above  $\times(1/10)/^\circ\text{C}$ .
- 2) The above accuracy ranges are for values obtained when the instrument has been left for two hours after charging ends (or is stopped).

## CA103&CA102S Handy Multi-functions Calibrator Operating Instruction

### 9.3 CA102S source unit range and accuracy

Accuracy =  $\pm$  (% of setting +  $\mu$ V, mV,  $\mu$ A,  $\Omega$ ,  $^{\circ}$ C, Hz) at 23 $\pm$ 5 $^{\circ}$ C

parameter	Range	Source Range	Accuracy	Setting Resolution	Remarks
DCV source	100mV	0~99.999mV	$\pm(0.05\%+10\mu\text{V})$	1 $\mu$ V	Output resistance: Approx.5 $\Omega$
	6V	0~6.0000V	$\pm(0.05\%+0.5\text{mV})$	0.1mV	Output resistance: Approx.100 $\Omega$
DCmA source	20mA	0~24.000mA	$\pm(0.05\%+3\mu\text{A})$	1 $\mu$ A	Maximum load: 500 $\Omega$
	20mA Sink	1~24.000mA	—	1 $\mu$ A	Maximum load: 24V
Resistance Source	500 $\Omega$	10.0~510.0 $\Omega$	$\pm(0.1\%+0.1\Omega)$	0.1 $\Omega$	Excitation current:1~5mA
TC output	K	0.0~1372.0 $^{\circ}$ C	$\pm(0.05\%+0.5^{\circ}\text{C})$	0.1 $^{\circ}$ C	TC source accuracy does not include RJ sensor accuracy  RJ Sensor Specification Measurement range:-10~50 $^{\circ}$ C  Accuracy (when combined with main unit)18~28 $^{\circ}$ C : $\pm 0.5^{\circ}$ C Other than 18~28 $^{\circ}$ C : $\pm 1^{\circ}$ C
	E	0.0~1000.0 $^{\circ}$ C	$\pm(0.05\%+0.4^{\circ}\text{C})$		
	J	0.0~1200.0 $^{\circ}$ C	$\pm(0.05\%+0.4^{\circ}\text{C})$		
	T	0.0~400.0 $^{\circ}$ C	$\pm(0.05\%+0.5^{\circ}\text{C})$		
	N	0.0~1300.0 $^{\circ}$ C	$\pm(0.05\%+0.5^{\circ}\text{C})$		
	We3-25	0.0~2300.0 $^{\circ}$ C	$\pm(0.05\%+1.2^{\circ}\text{C})$		
	R	0.0~1768.0 $^{\circ}$ C	$\pm(0.05\%+2^{\circ}\text{C})$		
	S	0.0~1768.0 $^{\circ}$ C	$\pm(0.05\%+2^{\circ}\text{C})$		
Pulse output	1000Hz	0~1000Hz	$\pm 1\text{Hz}$	1Hz	Output voltage: +5V $\pm 10\%$
	5KHz	0.00~5.0kKHz	$\pm 0.01\text{kHz}$	0.01kHz	
DCV output			24V $\pm 2\text{V}$	24V $\pm 2\text{V}$	Maximum load current:22mA

- 1) Temperature coefficient: When in the ranges of  $0 \leq T \leq 18^{\circ}\text{C}$  and  $28 < T \leq 40^{\circ}\text{C}$ , add the accuracy shown above  $\times (1/10) / ^{\circ}\text{C}$ .
- 2) The above accuracy ranges are for values obtained when the instrument has been left for two hours after charging ends (or is stopped).

### 9.4 CA102S measurement unit range and accuracy

Accuracy = ± (% of setting + uV, nV, uA, Ω, °C, dgt) at 23±5°C

parameter	Range	Source Range	Accuracy	Setting Resolution	Remarks
DCV measurement	100mV	0~+99.999mV	± (0.05%+50 μV)	10 μV	Input resistance: 1000k Ω or greater
	30V	0~+30.000V	±(0.05%+5mV)	1mV	
DCmA measurement	30mA	0~+30.000mA	± (0.05%+4 μA)	1 μA	Input resistance: Approx. 25 Ω
Pulse measurement	5kHz	0.0~5000.0Hz	±(0.1%+2dgt)	0.1Hz	Maximum input:30V Sensitivity: Approx.0.5Vpp
TC input	K E J T N We3-25	-50.0~1372.0°C -50.0~1000.0°C -50.0~1200.0°C -50.0~400.0°C -50.0~1300.0°C -50.0~2300.0°C	±(0.05%+1.5°C) ≥100.0°C ±(0.05%+2°C) ≤100.0°C	0.1°C	
	R S B	-50.0~1768.0°C -50.0~1768.0°C -50.0~1820.0°C			
RTD input	Cu50 PT100	-50.0~150.0 -200.0~850.0°C	±(0.05%+0.6°C)	0.1°C	

- 1) Temperature coefficient: When in the ranges of  $0 \leq T \leq 18^\circ\text{C}$  and  $28 < T \leq 40^\circ\text{C}$ , add the accuracy shown above  $\times(1/10) / ^\circ\text{C}$ .
- 2) The above accuracy ranges are for values obtained when the instrument has been left for two hours after charging ends (or is stopped).

绍兴中仪电子有限公司  
 地址：绍兴市皋埠集成电路小镇朱林路  
 总机：0575-85118510  
 传真：0575-85118510-818  
 网址：<http://www.maiyb.com>  
 邮箱：[zy@zhoyi.com](mailto:zy@zhoyi.com)