Voltage/Current/TC Calibrator

Manual

Safety Information

To avoid possible electric shock or personal injury:

- Never apply more than 30V between any two jacks, or between any jack and earth ground.
- Make sure the battery door is closed and latched before you operate the calibrator.
- Remove test leads from the calibrator before you open the battery door.
- Do not operate calibrator if it is damaged.
- Do not operate the calibrator around explosive gas, vapor, or dust.

To avoid possible damage the calibrator:

- Make sure choose the right jack and range, before use the calibrator to measurement or calibrator.
- Take away the calibrator from the used circumstance, before operate the calibrator or after close the calibrator.

Introduction

Volt/mA/TC Calibrator is a source and measurement tool. This Calibrator is used to measure or output 0 to 24 mA DC current loop, and 0 to 20 V DC voltage, and Thermocouple measure or output temperatue (determined for model). But the calibrator cannot be used to measurement and source simultaneously.

Volt/mA Calibrator include this accessories: Holster, a pair of Test Leads, AAA*6 battery, and this manual.

If the calibrator is broken or short of some accessories, please contact the supplier. Please contact the distributor about other accessory's information.

The following table has shown the technical parameters and function of the Calibrator.

Measurement and output voltage parameter

Function	Range	Resolution
DC V mV Input	0 ~ 100 mV	0.01 mV
	0 ~ 20 V	0.001 V
DC V mV Output	0 ~ 100 mV	0.01 mV
	0 ~ 20 V	0.001 V
Loop Power Output	24V DC	N/A

Measurement and output mA parameter

Thermocouple	Range	Resolution
DC mA Input	0 ~ 24 mA	0.001 mA
DC mA Output	0 ~ 24 mA	0.001 mA

Measurement and output temperature parameter

Thermocouple	Range	Resolution
K(CA)	-200.0℃ ~+1372.0/ -328℉~+2437. 6℉	0.1℃/℉
J(IC)	-200.0℃ ~+1200.0/ -328℉~+2192℉	0.1℃/℉
E(CRC)	-200.0℃ ~+1000.0/ -328℉~+1832℉	0.1℃/℉
T(CC)	-200.0℃~+400.0℃/ -328℉~+752℉	0.1℃/℉
N	-250.0℃ ~+1300.0℃/ -418℉~+2372℉	0.1℃/℉
S(PR10)	-20℃ ~+1750℃/ -4℉~+3182℉	1℃/℉
R(PR13)	-20℃ ~+1750℃/ -4℉~+3182℉	1℃/℉
B(PR30)	+600℃ ~+1800℃/ 1112℉~+3272℉	1℃/℉

- **This function determined for model**

Specification

Specification are based on a one year calibration cycle and apply from +18℃ to +28℃/ 64.4℉ to 82.4℉ unless stated otherwise. “Counts” means number of increments or decrements of the least significant digit.

DC V Input and Output

Range	Resolution	Accuracy ±(% of reading + Counts)
100 mV	0.01 mV	0.06 % + 4
20 V	0.001 V	0.08 % + 5

Input impedance：	2MΩ	（nominal），< 100pF
Over voltage protection：	30 V	
Voltage driver capability：	1 mA	

DC mA Input and Output

Range	Resolution	Accuracy ±(% of reading + Counts)
24 mA	0.001mA	0.08 % + 5

Overload protection: 125 mA，250V fast acting fuse
Percent display: 0%=4mA，100%=20mA
Source mode: compliance 1000Ω at 20mA for battery voltage ≥6.8V,
（700Ω at 20mA for battery voltage 5.8 to 6.8V）
Simulate mode: External loop voltage requirement: 24V nominal, 30V maximum, 12V minimum.

Measurement and output temperature

Thermocouple	Range	Accuracy
K(CA)	-200.0℃~+1370.0℃/-328°F~+2437.6°F	±0.7℃/33.26°F
J(IC)	-200.0℃~+1200.0℃/-328°F~+2192°F	±0.7℃/33.26°F
E(CRC)	-200.0℃~+1000.0℃/-328°F~+1832°F	±0.7℃/33.26°F
T(CC)	-200.0℃~+400.0℃/-328°F~+752°F	±0.7℃/33.26°F
N	-250.0℃~+1300.0℃/-418°F~+2372°F	±0.9℃/33.62°F
S(PR10)	-20℃~+1750℃/-4°F~+3182°F	±2℃/35.6°F
R(PR13)	-20℃~+1750℃/-4°F~+3182°F	±2℃/35.6°F
B(PR30)	+600℃~+1800℃/1112~+3272°F	±2℃/35.6°F

- **CJC should add 0.3℃ error. Function determined for model.**

LOOP POWER SUPPLY

AAA*6/External power adapter

General Specifications:

Maximum voltage applied between any jack and earth ground or between any two jacks: 30V

Storage temperature: -40˚C～60˚C (-40℉～140℉)

Operating temperature: -10˚C～50˚C (14℉～122℉)

Operating altitude: 2000 meters maximum

Temperature coefficient: ±0.01% of range per ˚C/ ℉ for the temperature range -10˚C to 18˚C (14℉ to 64.4℉) and 28˚C to 55˚C(82.4℉ to 131℉)

Relative humidity: 95% up to 30˚C (86℉), 75% up to 40˚C (104℉), 45% up to 50˚C (122℉), 35% up to 55˚C (131℉)

Power requirements：AAA*6
Size(LxWxH)：204×99×46mm (399.2×210.2114.8 inch)
Weight：460g (16.226 Ounces)（include battery）
Accessories：Test lead, alligator clip, Manual, Mini-USB cable, CD disk, K-Type thermocouple sensor (for temperature model).

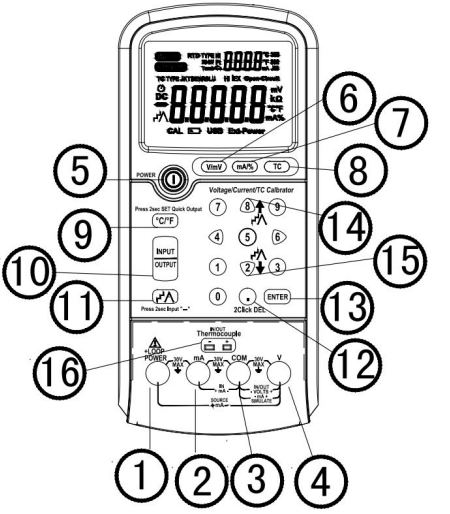
International Symbols

Symbol	Meaning
	Earth ground
	Conforms to European Union directives
	Refer to this instruction sheet for information about this feature.

Explanation on Front Panel

The front panel is shown as in right figure

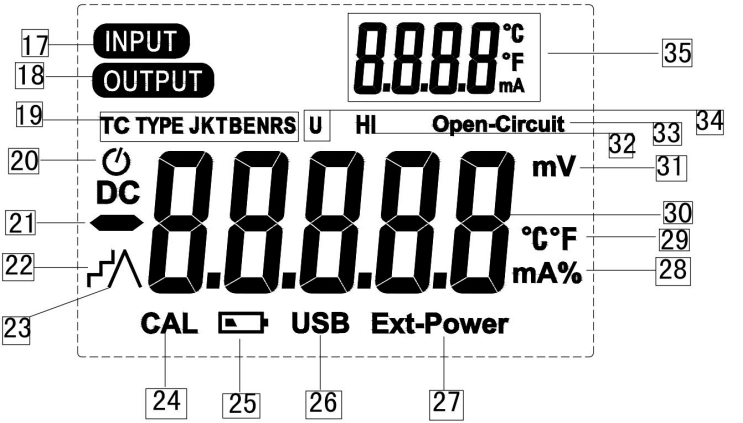
1. Loop power port of current output
2. mA measurement input jack
3. Input or output negative (ground) jack
4. V mV input or output jack
5. Power key
6. V mV function key
7. mA mA% function key
8. Thermocouple type function key
   (Only function on temperature model)
9. Temperature unit select key
   (Only function on temperature model)
10. Input/output key



11. Ladder or ramp output conversion key,
    Minus input (keep press 2sec action)
12. Decimal point
13. Enter key
14. Increase key
15. Decrease key
16. Thermocouple jack (Only function on temperature model)

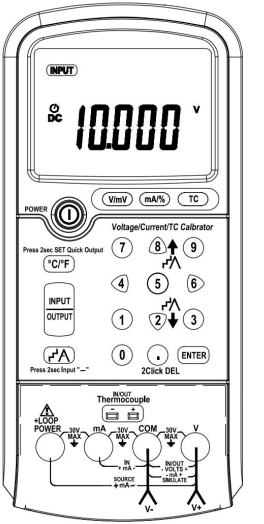
Understanding Display Screen

LCD screen is shown as in following figure



17. Input state indication
18. Output state indication
19. Thermocouple type dispaly
20. Automatic shutdown indication
21. Minus (temperature output)
22. Ladder output indication
23. Ramp output indication
24. Calibration state indication
25. Low power indication
26. USB indication
27. External power indication
28. Current mA mA% indication
29. Centigrade or Fahrenheit degrees
30. Measurement or output dispaly area
31. Voltage V mV indication
32. HI indication
33. Open-circuit indication
34. Output unstable state indication
35. Sub-display zone

Operation Instructions



DC V measurement

1.Press the Power key 5， turn on the Calibrator.

2.Press the input/output key 10, untill
"INPUT" symbol indicated.

3.Press the V mV function key 6, select the range
of measurement that you need.

4. Put the red test lead in V mV input or output jack 4,
black one to the Input or output negative (ground) jack 3.

5. Connect the red test lead to the Source.

6. The value of result as shown.

* The number in the□, referring to
Front Panel (Page12) Display Screen(Page14).

DC V output

1.Press the Power key 5, turn on the Calibrator.

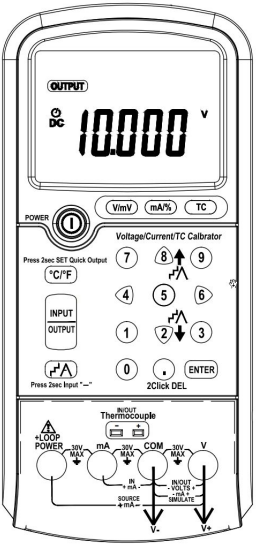
2.Press the input/output key 10, untill "OUTPUT" symbol Indicated.

3.Press the V mV function key 6, select the range of output that you need.

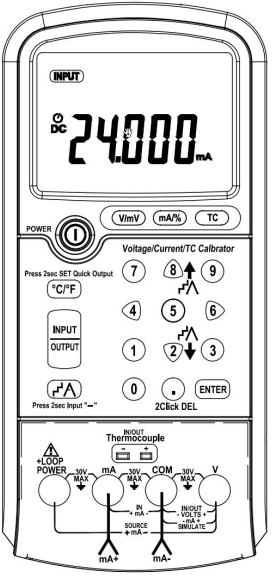
4.Press the numeric keys to input the values you need, and then press Enter key 13 to determine. If the value is incorrect, short press 2 times Decimal point 12 to clear.

5. Put the red test lead in V mV input or output jack 4, black one to the Input or output negative (ground) jack 3.

6. Connect the red test lead with the positive of voltage which is waiting for output, black one to the negative(ground).



DC mA measurement



Outside source power measure current

1.Press the Power key 5, turn on the Calibrator.

2.Press the Input/output key 10, untill “INPUT” symbol Indicated.

3. Press the mA mA% function key 7, make it indicate mA or mA% , at the state of measure you need. In the state of mA% measurement, 4-20mA will be displayed on the sub- display zone.

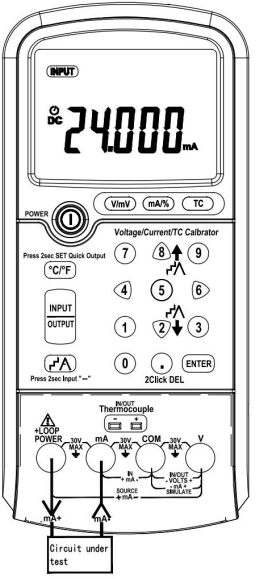
4.Put the red test lead in mA measurement input jack 2,black One to the Input or output negative (ground) jack 3.

5. Connect the red test lead with the positive of current which is waiting for measurement, black one to the negative(ground).

6. The value of result as shown .

Calibrator supply Loop power measure current

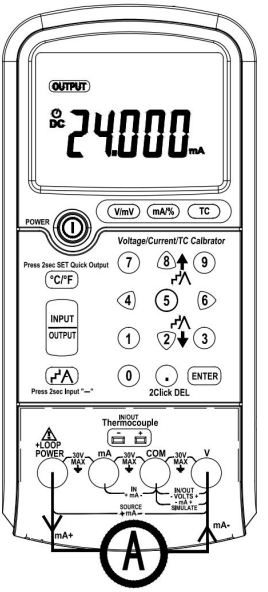
1. Press the Power key 5, turn on the Calibrator.
2. Press the Input/output key 10, untill “INPUT” symbol Indicated.
3. Press the mA mA% function key 7, make it indicate mA or mA% , at the state of measure you need. In the state of mA% measurement, 4-20mA will be displayed on the sub-display zone.
4. Put the red test lead in Loop power port of current output 1, black one to the mA measurement input jack 2.
5. Connect the red test lead with the in of current which is waiting for measurement, black one to the out of current.
6. The value of result as shown.



DC mA output

Sourcing mA

1. Press the Power key 5,turn on the Calibrator.
2. Press the Input/output key 10, untill “OUTPUT” symbol Indicated.
3. Press the mA mA% function key 7, make it indicate mA or mA% , at the state of output you need. In the state of mA% output, 4-20mA will be displayed on the sub-display zone.
4. Press the numeric keys to input the values you need, and then press Enter key 13 to determine. If the value is incorrect, short press 2 times Decimal point 12 to clear .
5. Put the red test lead in Loop power port of current output 1, black one to the V mV input or output jack 4.
6. Connect the red test lead with the positive of current which is waiting for output, black one



to the negative.

7.If you want to change the output value or state, then press the numeric keys or the mA mA% function key 7.when the value is out of range ,it will return the last output value.

Simulating a Transmitter

1.Press the Power key 5,turn on the Calibrator.

2.Press the Input/output key 10, untill “OUTPUT” symbol Indicated.

3.Press the mA mA% function key 7, make it indicate mA or mA%, at the state of output you need. In the state of mA%output, 4-20mA will be displayed on the sub-display zone.

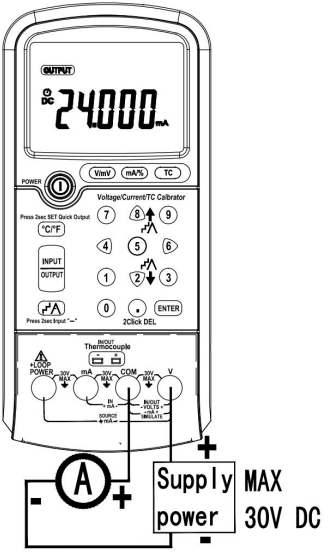
4.Press the numeric keys to input the values you need, and then press Enter key 13 to

determine. If the value is incorrect, short press 2 times Decimal point 12 to clear .

5.Put the red test lead in V mV input or output jack 4, black one to the Input or output negative (ground) jack 3.

6.Connect the red test lead with the positive of power which is outside, black one to the positive of current which is waiting for test.

7.If you want to change the output value or state,then press the numeric keys or the mA mA% function key 7. when the value is out of range ,it will return the last output value.



Thermocouple measurement

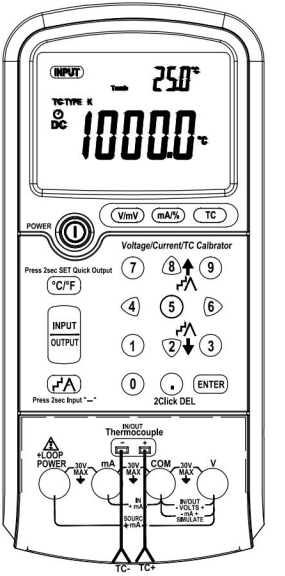
1.Press the Power key 5, turn on the Calibrator.

2.Press the Input/output key 10, untill “INPUT” symbol Indicated.

3.Press the Thermocouple type function key8 , make it indicate ℃ or ℉ , at the state of measure you need. Press Temperature unit select key9 to select the unit you need.Circumstance temperature will be displayed on the sub-display zone.

4.Press Thermocouple type function key8 to select the thermocouple type .

5.make sure the thermocouple is inserted correctly into the Thermocouple jack16 .



6.The value of result as shown.

Temperature output

1.Press the Power key 5,turn on the Calibrator.

2.Press the Input/output key 10, untill “OUTPUT” symbol Indicated.

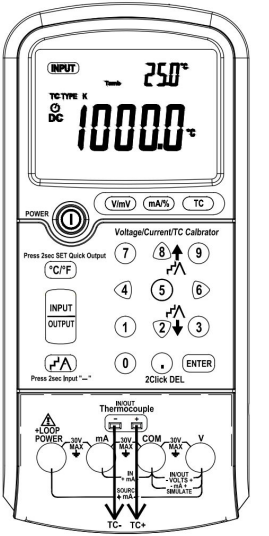
3.Press the Thermocouple type function key8, make it indicate ℃ or ˚F , at the state of measure you need.

Press Temperature unit select key 9 to select the unit.

Circumstance temperature will be displayed on the sub-display zone.

4.Press the numeric keys to input the values you need, and then press Enter key 13 to determine.

If the value is incorrect, short press 2 times Decimal point 12to clear .



5.Put the red test lead in V mV input or output jack 4,

black in the Input or output negative (ground) jack 3.

6.If you want to output negative degrees,press numeric keys to input the value,then long press Minus input key11 .And then press Enter key 13 to determine.

7.If you want to input positive degrees, long press Minus input key11 again.when the value is out of range , it will return the last output value.

External temperature reference setting.
(external cold junction/ambient temperature reference)

1.Keep pressing the Thermocouple type function key8,
then turn on the Calibrator.

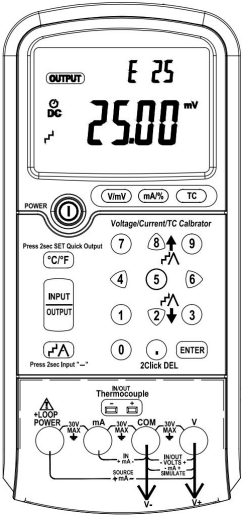
2.Press the Increase key 14 to increase the value
of the temperature, press the Decrease key 15 to
decrease the value of the temperature.

3.Press the Thermocouple type function key8 .

4.If you want to exit this function ,please remove
the batery,then restart your device.

Ladder output

（example : DC mV output, and increase by 25mV each step）



1.Press the Power key 5, turn on the Calibrator.

2.Press the input/output key 10, select state of output.

3.Press the V mV function key 6, select mV range.

4.Press the numeric keys to input the initial values, and then press Enter key 13 to confirm.

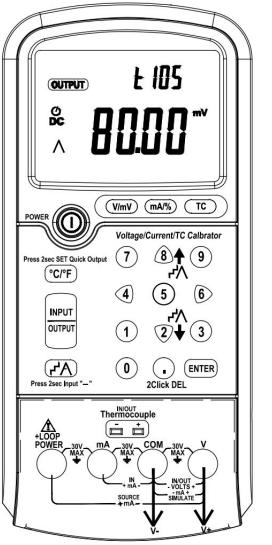
5.Press Ladder or ramp output conversion key 11, LCD display “Ladder” symbol and then press numeric keys to input 25,and then press Enter key 13 to confirm.

6.Press the Increase key 14 to increase 25mV; the Decrease key 15 to decrease 25mV.

7.Press Ladder or ramp output conversion key 11 again to exit the Ladder mode.

Ramp output

（example: DC mV output, start at 20mV, stop at 80mV, interval 10sec trip）



1.Press the Power key 5, turn on the Calibrator.

2.Press the Input/output key 10, untill “OUTPUT” symbol indicated.

3.Press the V mV function key 6. now ,we select mV range.

4.Short press 2 times Ladder or ramp output conversion key 11, press the numeric keys to input the value you want to start .For example, we input 20, and then press Enter key13 to determine. And then press the numeric keys to input the value you want to stop. Now,we input 80, then press Enter key13 to determine.Finally, you need to input the interval time which you want.

For example,we input 10, then press Enter key 13.

5.After finish setting, then If you press the Increase key 14 ,the output value will increase from 20 to 80. And If you press the Decrease key 15 ,the output value will decraese from 80 to 20.

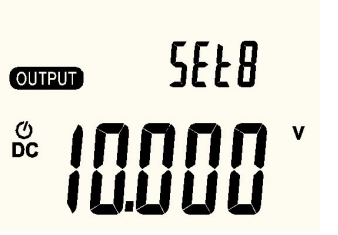
Quick output setting

（example: set keep press "1" key 2sec to quick output DCV 5V）

1.Press the Power key 5, turn on the Calibrator.

3.Press the Input/output key 10, untill "OUTPUT" symbol indicated.

3.Press corresponding function keys 6 or 7 or 8 ,select the function you need .Now, we take the quick output 5V as an example.



4.Press the V mV function key 6, we select V range.

5.Press the numeric keys to input 5, and then press Enter key 13 to determine.

6.Keep pressing Temperature unit select key 9 2sec, then press "1" keys, LCD will show “SET1” at upper display. then press Enter key 13 to determine.

7.If you still want to recall this 5V output for quick output.You just need to keep press the “1” numeric keys 2sec, then device will output 5VDC.

Autopower OFF

Autopower off default setting is 30min.

Setting Autopower off option:

1. Keep pressing mA mA% function key 7, then turn on the power.
2. Release mA mA% function key 7, press the Increase key 14 to increase more value or press the Decrease key 15 to reduce more value to adjust the time.(off,15min.~60min.)

3. Then press mA mA% function key7 to finish setting autopower off option.

*. After change battery the autopower off setting get to default setting.

*. If change battery and found can not turn on power, please take off the battery, and wait 3min, then try again.

Display all symbol

Setting display all symbol:

1. Keep pressing V mV function key6 , then turn on the power.
2. It will display all symbol on LCD.
3. Release V mV function key6 to exit and go on.

USB communication function please reference to software manual

To use Adapter （Only apply to AC power adapter version Calibrator）

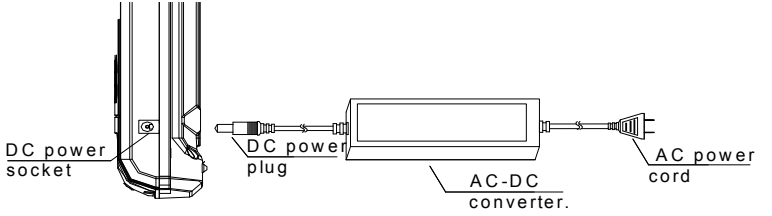
Connecting the power adapter：

1，Connect the AC power cord to the AC—DC converter.

2，Plug the AC power cord into an electrical outlet(100V-240V).

3，Plug the DC power plug of the converter into DC power socket of the meter.

- External power may increase the error of the accuracy, please estimate the situation with the battery supply situation.



AC/DC adapter information：

Input：100V-240VAC,50-60Hz 1.8A

Output :DC 12V ⎓2A MAX

Polarity ： 

WARNING:

1,Please use the original AC power adapter, using other AC power adapter may damage your instrument.

2, The AC power adapter can only be used indoors.

3,Please plug the AC power cord into an electrical outlet first and then firmly insert DC plug into DC input end in the right of the meter. When unplugged, firstly pull out the DC plug perpendicular to DC input end and then unplug the AC plug from the electrical outlet.

4, Do not use the AC power adapter in other equipment except this instrument.

5, In use, it is a normal phenomenon that the AC power adapter will be hot.

6, Do not demolish the AC power adapter. Otherwise, it may be dangerous.

7, Do not use the AC power adapter in a high temperature or wet place.

8, Please make the AC power adapter avoid a strong bump.

9, It is normal when the AC power adapter make some noise in use.

Maintenance

Cleaning

Periodically wipe the case with a damp cloth and detergent; do not use abrasives or solvents.

Calibration

Calibrate your calibrator once a year to ensure that it performs according to its specifications.

Replacing the Battery

Please change the battery when the LCD indicates 

Turn off the power of the Calibrator and take off the test lead, screw off the battery cover, then take off it and instead the fresh battery. Then close the battery cover.

Replacing a Fuse

Warning!

To avoid personal injury or damage to the calibrator, use only a 0.125A 250V fast fuse.

Fuse 1 is probably blown if:

. In the V output mode, with the test leads removed from the calibrator, the Output unstable state indication 34 , it will be always displaying on the screen.

Fuse 2 is probably blown if:

. In the mA input mode, the calibrator always reads 0.000, even with a signal applied.

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