Thermosense®
.CO.UK

Volt/mA Calibrator
User 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 to choose the right jack and rang, before using the calibrator to measure or calibrate.
- Take away the calibrator from the used circumstance, before operating the calibrator or after closing the calibrator.

Introduction

Volt/mA 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. But the calibrator cannot be used for measurement and source simultaneously.

Volt/mA Calibrator include these accessories: holster, a pair of test leads, 6 * AAA 1.5V battery and user 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 showed the technical parameter 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

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

Specification

Specification are based on 1 year calibration cycle and apply from +18℃ to +28℃ 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	0.02 % + 3
20 V	0.001 V	0.02 % + 3

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	0.015 % + 3

Overload protection: 125 mA，250V fast acting fuse

Percent display: 0%=4mA，100%=20mA

Source mode: When output more than 15mA at 500Ω，change the power supply to external power.

The max load is 24mA at 700Ω， when use external power.

Simulate mode: External loop voltage requirement: 24V nominal, 30V maximum, 12V minimum.

LOOP POWER SUPPLY

24 V ± 10%

General Specifications:

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

Storage temperature: -40˚C～60˚C

Operating temperature: -10˚C～55˚C

Operating altitude: 3000 meters maximum

Temperature coefficient: ±0.005% of range per ˚C for the temperature range -10˚C to 18˚C and 28˚C to 55˚C

Relative humidity: 95% up to 30˚C, 75% up to 40˚C, 45% up to 50˚C, 35% up to 55˚C

Shock: Random 2g, 5Hz to 500Hz

Safety：1 meter drop test
Power requirements：AAA*6 1.5V battery
Size：204mm L × 96mm W × 41mm H
Weight：402g（without battery）

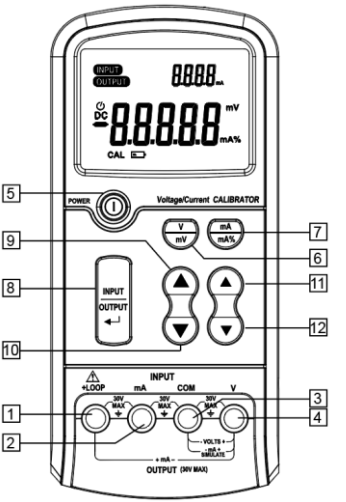
International Symbols

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

Explanation on Front Panel

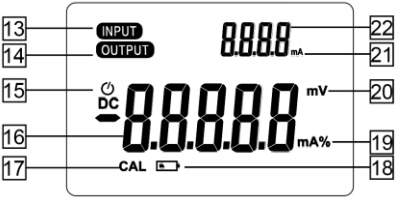
The front panel is shown as in right figure

1 Loop power 24V to ground
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 conversion key
7 mA mA% conversion key
8 Input/output conversion key
9 Increase more value key
10 Decrease more value key
11 Increase less value key
12 Decrease less value key



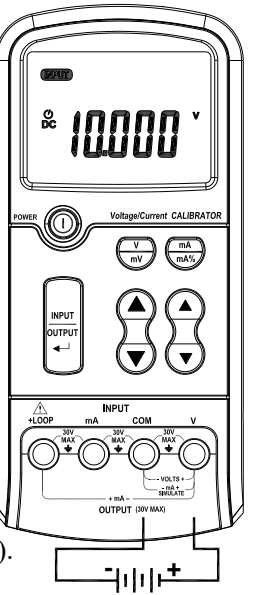
Understanding Display Screen

LCD screen is shown as in following figure



13 Input state indication
14 Output state indication
15 Indicating AUTO POWER OFF is availably
16 Result value
17 Indication to the calibration mode
18 Low power indication
19 Current mA mA% indication
20 Voltage V mV indication
21 Current mA indication
22 Sub-display zone

Operation Instructions



DC V measurement

①Press the power switch 5， turn on the Calibrator.

②Press the input/output conversion key 8,when the state of no input indicator 13. Make it under the state of measurement.

③Press the V mV conversion key 6, make it indicate VDC or mVDC 20, at the range of measure you need.

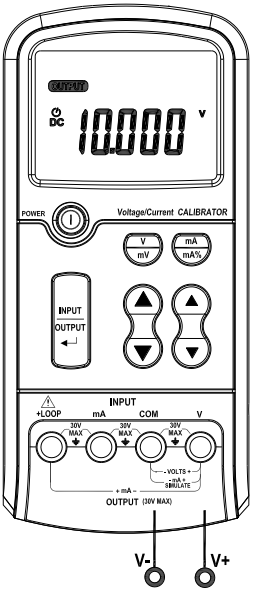
④Put the red test lead in V jack 4, black one to the COM jack 3.

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

⑥The value of result show 16.

* The number in the□, referring to the Explanation on Front Panel (Page9) and the Understanding Display Screen (Page10).

DC V output



①Press the power switch 5, turn on the Calibrator.

②Press the input/output conversion key 8, when the state of no output indicator 14. Make it under the state of output.

③Press the V mV conversion key 6, make it indicate VDC or mVDC 20, at the range of output you need.

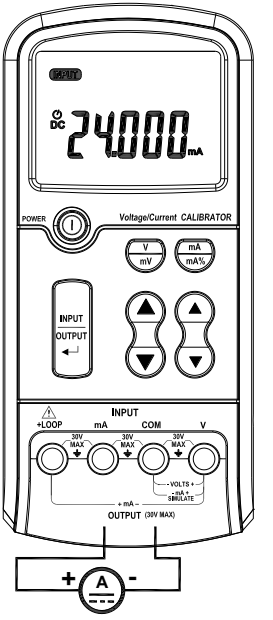
④Press the value adjust key 9 10 11 12, make the value you want.

⑤Put the red test lead in V jack 4, black one to the COM jack 3.

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

⑦If you want to change the output value or range, then press the value adjust key 9 10 11 12 or the V mV conversion key 6.

DC mA measurement



Outside supply power measurement

①Press the power switch 5, turn on the Calibrator.

②Press the input/output conversion key 8, when the state of no input indicator 13. Make it under the state of measurement.

③Press the mA mA% conversion key 7, make it indicate mA or mA% 19, at the state of measure you need. In the state of mA% measurement, 4-20mA will be displayed on the sub-display zone22.

④Put the red test lead in mA jack 2,black one to the COM jack 3.

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

⑥The value of result show 16.

Calibrator supply Loop power measurement

①Press the power switch 5, turn on the Calibrator.

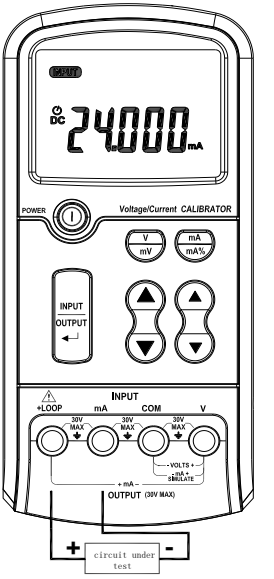
②Press the input/output conversion key 8, when the state of no input indicator 13. Make it under the state of measurement.

③Press the mA mA% conversion key 7, make it indicate mA or mA% 19, at the state of measure you need. In the state of mA% measurement, 4-20mA will be displayed on the sub-display zone 22.

④Put the red test lead in LOOP jack 1,black one to the mA jack 2.

⑤Connect the red test lead with the in of current which is waiting for measurement, black one to the out of current.

⑥The value of result show 16.



DC mA output

Sourcing mA

①Press the power switch 5,turn on the Calibrator.

②Press the input/output conversion key 8,when the state of no output indicator 14. Make it under the state of output.

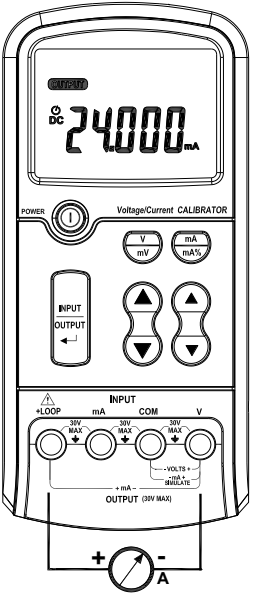
③Press the mA mA% conversion key 7, make it indicate mA or mA% 19, at the state of output you need. In the state of mA% output, 4-20mA will be displayed on the sub-display zone 22.

④Press the value adjust key 9 10 11 12, make the value on you want.

⑤Put the red test lead in LOOP jack 1, black one to the V jack 4.

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

⑦If you want to change the output value or state, then press the value adjust key 9 10 11 12 or the mA mA% conversion key 7.



Simulating a Transmitter

①Press the power switch 5,turn on the Calibrator.

②Press the input/output conversion key 8,when the state of no output indicator 14. Make it under the state of output.

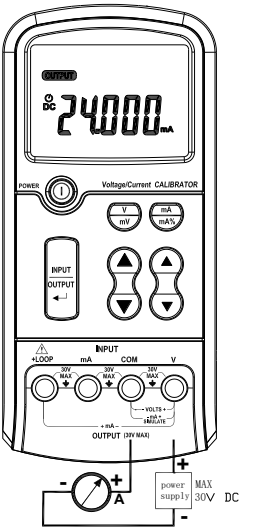
③Press the mA mA% conversion key 7, make it indicate mA or mA% 19, at the state of output you need. In the state of mA% output, 4-20mA will be displayed on the sub-display zone22.

④Press the value adjust key 9 10 11 12, make the value you want.

⑤Put the red test lead in V jack 4, black one to the COM jack 3.

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

⑦If you want to change the output value or state, then press the value adjust key 9 10 11 12 or the mA mA% conversion key 7.



Auto power off

Auto power off default setting is 30min.

Setting Auto power off option:

1. Keep press 7 mA mA% conversion key, then turn on the power.
2. Release 7 mA mA% conversion key, press 9 Increase more value key or 10 Reduce more value key to adjust the time. (Off,15min.~60min.)
3. Then press 7 mA mA% conversion key to finish setting auto power off option.

*. After change battery the auto power off setting get to default setting.

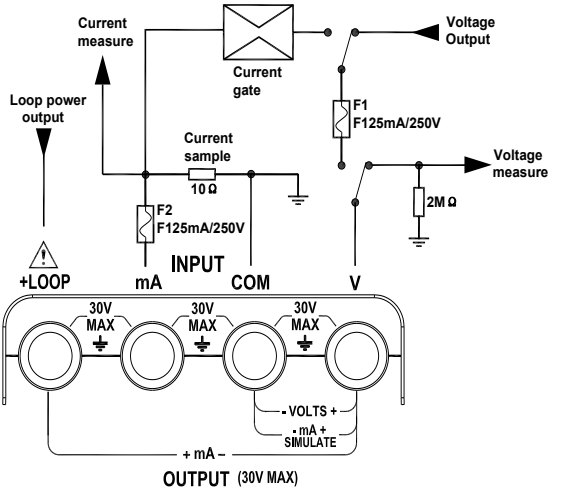
*. If change battery and found cannot turn on power, please take off the battery, and wait 3min, then try again.

Display all symbol

Setting displays all symbol:

1. Keep press 6 V mV conversion key, then turn on the power.
2. It will display all symbol on LCD.
3. Press any key exit and go on.

Terminal circuit diagram



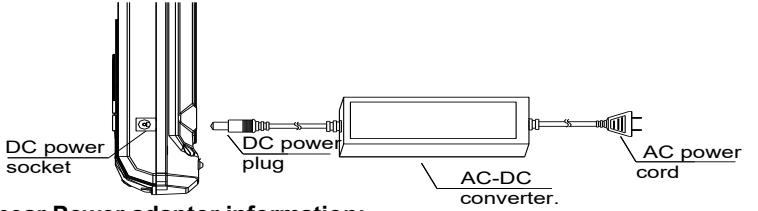
To use Adapter (Only apply to AC power adapter version calibrator)

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 (220V-240V).

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



Linear Power adaptor information:

Input：220V-240VAC,50-60Hz 1A

Output: DC 9V⎓1A MAX，±8%

Polarity ：

Plug size: DCPLUG(Round) -5.5mm-2.1mm(hole)

Ripple: ≤50mVpp

Operation temperature: -10℃-40℃ 5%-90%RH

Storage temperature: -20℃-80℃ 5%-95%RH

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 leads when you change the battery, and 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 display flashes OL.

Fuse 2 is probably blown if:

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