

Volt / mA Calibrator is a source and measurement tool. This calibrator is use to measure or output 0 to 24 mA DC Current loop, & 0 to 20V DC Voltage. But the calibrator cannot be used to measurement and source simultaneously.

## Mode KM-CAL-700



### GENERAL SPECIFICATIONS :

- \* DC Voltage input and output : 0-100.00mV / 20.000V $\pm$  (0.02% + 3)
- \* DC Current input and output: 24.000mA  $\pm$  (0.015% + 3)
- \* Loop Power output : 24V  $\pm$  10%
- \* Input impedance : 2Megohm.
- \* Over Voltage protection : 30V
- \* Voltage driver capability : 1mA
- \* 5 digit LCD dual display
- \* LCD size : 64 x 42mm
- \* Operating Temperature : -10°C ~ 55°C
- \* Storage Temperature : -40°C ~ 60°C
- \* Operating altitude : 3000 meters maximum
- \* Temperature Coefficient :  $\pm$  0.005% of range per °C for the temperature range -10°C to 18°C & 28°C to 55°C
- \* Relative Humidity : 95% upto 30°C, 75% upto 40°C, 45% upto 50°C, 35% upto 55°C.
- \* Shock : Random 2g, 5Hz to 500Hz
- \* Fuse : 125mA / 250V fast acting fuse
- \* Power Supply : 1.5V AAA x 6 batteries.
- \* External power optional
- \* Dimension : 204(L) x 99(W) x 46(H)mm
- \* Weight : Approx. 460g. (including battery)

### ACCESSORIES :

Double insulation Test Leads , 2 Crocodile Clips, DC 1.5V (AAA) Battery x 6, Carrying Case, User's Manual.

Preliminary Data

## ELECTRICAL SPECIFICATIONS : KM-CAL-700

Measurement & Output Voltage Parameter

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

Measurement & Output mA Parameter

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

Note: All Specification are Subject to change without prior notice.

## LIST OF PRODUCTS

- \* Digital Multimeter
- \* Digital AC & AC/DC Clampmeter
- \* AC Clamp Adaptor
- \* AC/DC Current Adaptor
- \* Transistorised Electronic Analog & Digital Insulation Resistance Testers(upto 10 KV)
- \* Digital Sound Level Meter & Sound Level Calibrator
- \* Digital contact & Non-contact Type Tachometer
- \* Digital Non-contact (infrared) Thermometer & Portable Infrared Calibrator
- \* Thermo Hygrometer / Anemometer
- \* Digital Absolute pressure meter
- \* Wood, Paper & Grain Moisture Meter
- \* Distance Meter & Network Cable Tester
- \* Digital Hand Held Temperature Indicators
- \* Digital Lux Meter
- \* Thermal Imaging Camera
- \* Power Factor Regulator
- \* Maximum Demand Controller/Digital Power Meter
- \* Earth Resistance Tester
- \* Digital Panel Meters & DC Power Supplies
- \* Digital Storage / Analog Storage Oscilloscope.
- \* Coating Thickness Guage
- \* Process Calibrators & Multifunction Calibrators
- \* Gas Analysers & Waterproof Pen Testers
- \* Frequency Counter / Function Generator
- \* Phasing Sticks & High Voltage Detector
- \* Transducer & Transmitter
- \* Digital Milli Ohm Meter
- \* Solar Power Meter
- \* EMF/ELF Detector / RF Field Strength Meter



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**KUSAM-MECO**<sup>®</sup>  
An ISO 9001:2008 Company

## Volt /mA Calibrator **MODEL KM-CAL- 700**



## OPERATION MANUAL

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**WARRANTY**

Each "KUSAM-MECO" product is warranted to be free from defects in material and workmanship under normal use & service. The warranty period is one year (12 months) and begins from the date of despatch of goods. In case any defect occurs in functioning of the instrument, under proper use, within the warranty period, the same will be rectified by us free of charges, provided the to and fro freight charges are borne by you.

This warranty extends only to the original buyer or end-user customer of a "KUSAM-MECO" authorized dealer.

This warranty does not apply for damaged Ic's, Burn't PCB's, fuses, disposable batteries, carrying case, electrodes probes, cables or to any product which in "KUSAM-MECO's" opinion, has been misused, altered, neglected, contaminated or damaged by accident or abnormal conditions of operation or handling.

"KUSAM-MECO" authorized dealer shall extend this warranty on new and unused products to end-user customers only but have no authority to extend a greater or different warranty on behalf of "KUSAM-MECO".

"KUSAM-MECO's" warranty obligation is limited, at option, free of charge repair, or replacement of a defective product which is returned to a "KUSAM-MECO" authorized service center within the warranty period.

THIS WARRANTY IS BUYER'S SOLE AND EXCLUSIVE REMEDY AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. "KUSAM-MECO" SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES, INCLUDING LOSS OF DATA, ARISING FROM ANY CAUSE WHATSOEVER.

All transaction are subject to Mumbai Jurisdiction.



MUMBAI

## TEST CERTIFICATE

### **Volt/mA Calibrator**

This Test Certificate warrants that the product has been inspected and tested in accordance with the published specifications

The instrument has been calibrated by using equipment which has already been calibrated to standards traceable to national standards.

MODEL NO.     KM-CAL- 700    

SERIAL NO. \_\_\_\_\_

DATE: \_\_\_\_\_

ISO 9001  
REGISTERED



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### 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 to the calibrator**

- Make sure to choose the right jack and range, before use the calibrator for measurement or calibration.
- Disconnect the calibrator from the used circumstance after finishing the calibration procedure & store it in proper place.

### 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 this accessories: Holster, a pair of Test Leads, AAA\*6 battery, and this manual.

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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 shows the technical parameter and functions of the calibrator.

**Measurement and output voltage parameter**

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

**Measurement and output mA parameter**


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

- 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, do not use abrasives or solvents.

**Calibration** :- Calibrate your instrument 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. When you change the battery, remove screw off the breechblock on the battery cabinet cover, then remove the battery and replace with a new battery.

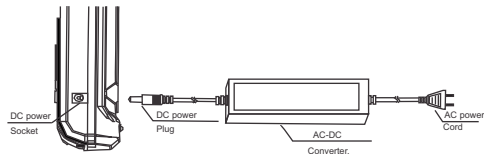
**Replacing a Fuse**

 **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.



**AC/DC adapter information:**

Input : 100V-240VAC, 50-60Hz 1.8A

Output : DC 12V  $\equiv$  2A MAX

Polarity :  $\oplus$   $\ominus$

**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

**Specification**

Specification are based on a one year calibration cycle and apply from +18 °C to +28 °C unless stated otherwise. "Counts" means number of increment or decrements of the least significant digit.

**DC V Input and Output**

Range	Resolution	Accuracy $\pm$ (% of reading + counts)
100 mV	0.01 mV	0.02%rdg + 3dgts
20V	0.001V	0.02%rdg + 3dgts

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

**DC mA Input and Output**

Range	Resolution	Accuracy $\pm$ (% of reading + counts)
24 mA	0.001mA	0.015%rdg + 3dgts

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




**LOOP POWER**

24 V  $\pm$  10%

**General Specifications :**


- **Maximum voltage applied between any jack and earth ground or between any two jack : 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 requirement : AAA \* 6**
- **Size : 204mm L x 99mm W x 46mm H**
- **Weight : 460g (include battery)**

**INTERNATIONAL SYMBOLS**

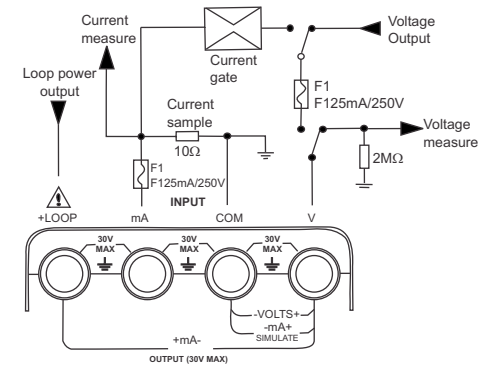
Symbol	Meanings
	Earth ground
	Conforms to European Union directives
	Refer to this instruction sheet for information about this feature.

**Display all symbol**

Setting display all symbol:

- 1) Keep press  / mV conversion key, then turn on the power.
- 2) It will display all symbols on LCD.
- 3) Press any key to exit and enter into normal mode.

**Terminal circuit diagram**

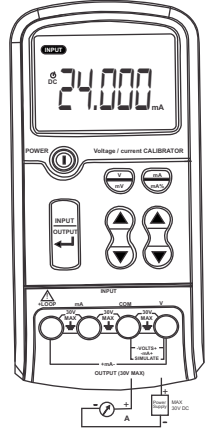


**To use Adapter** (Only apply to AC power adapter version calibrator)

**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 (100V-240V).
- 3) Plug the DC power plug of the converter into DC power socket of the meter

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**Auto power OFF**

Auto power off default setting is 30 min.  
Setting Autopower 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 autopower off option.
  - After changing battery the autopower off setting is set to default setting
  - If change battery and found that meter can not turn on power, please take off the battery, and wait 3min, then try again.

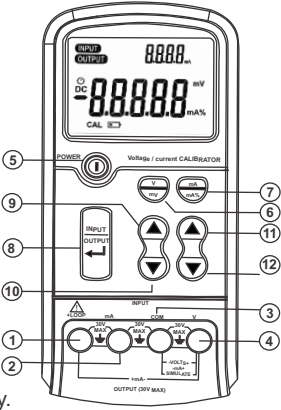
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**Explanation on Front Panel**

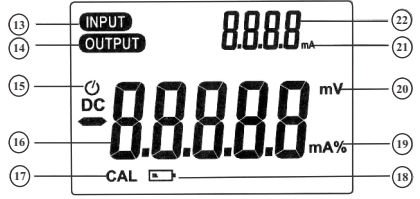
The front panel is shown as in figure:

- 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 switch
- 6) V/ mV conversion key
- 7) mA / mA% conversion key
- 8) Input / Output conversion key
- 9) Increase value key.
- 10) Reduce value key.
- 11) Increase value key.
- 12) Reduce value key.



**Understanding Display Screen**

LCD screen is shown as in following figure



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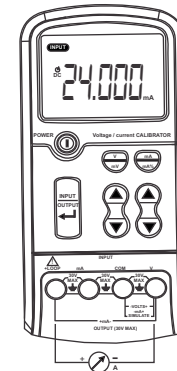


- 13) Input state indication
- 14) Output state indication
- 15) Indicating AUTO POWER ON.
- 16) Result value
- 17) Indication to the calibration mode
- 18) Low power indication
- 19) Current mA / mA% indication
- 20) Voltage V / mV indication
- 21) Current mA indication
- 22) Sub-display zone

**Operation Instruments**

**DC V measurement**

- 1) Press the power switch **5**, turn on the calibrator.
  - 2) Press the input/output conversion key **8**, to set meter to input indicator **13** for measurement.
  - 3) Press the V / mV conversion key **6**, to set communicator to VDC to mVDC **20**, for the measurement
  - 4) Put the red test lead in V jack **4**, black one to the COM jack **3**.
  - 5) Connect the red test lead with the positive of voltage to be measure black one to the negative (ground).
  - 6) The value of result is shown **16**.
- \* The number in the **□**, referring to the Explanation on Front panel (Page 4 ) and the Understanding Display Screen (Page 5).



**Simulating a Transmitter**

- 1) Press the power switch **5**, turn on the calibrator.
- 2) Press the input/output conversion key **8**, when the state of no input indicator **14**. Make it under the state of output
- 3) Press the mA / mA% conversion key **7**, make it indicate mA or mA% **19**, at the state of output you need. In the state if mA% output, 4-20mA will be displayed on the sub-display zone **22**.
- 4) Press the value adjust key **9 10 11 12**, set the value of output required.
- 5) Put the red test lead in V jack **4**, black one to the COM jack **3**.
- 6) Connect the red test lead with the positive of power black one to the positive of current which is waiting test.
- 7) If you want to change the output value or state, then press the value adjust key **9 10 11 12** or the mA / A% conversion key **7**.

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**DC mA output**

Sourcing mA

- 1) Press the power switch **5**, turn on the calibrator.
- 2) Press the input/output conversion key **8**, to set state of no input indicator **14**. Make it under the state of output.
- 3) Press the mA / mA% conversion key **7**, make it indicate mA or mA% **19**, at the state of output you need. In the state if mA% output, 4-20mA will be displayed on the sub-display zone **22**.
- 4) Press the value adjust key **9** **10** **11** **12**, set value of output required.
- 5) Put the red test lead in loop jack **1**, black one to the V jack **4**.
- 6) Connect the red test lead with the positive of current for output, black one to the negative.
- 7) If 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**.

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**DC V output**

- 1) Press the power switch **5**, turn on the calibrator.
- 2) Press the input/output conversion key **8**, to set it to function.
- 3) Press the V / mV conversion key **6**, make it indicate VDC or mVDC **20**, at the range of output you need.
- 4) Press the value adjust key **9** **10** **11** **12**, set value you want.
- 5) Put the red test lead in V jack **4**, black one to the COM jack **3**.
- 6) Connect the red test lead with the positive terminal black one to the negative (ground).
- 7) If 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**.

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DC 0.000 mA

POWER Voltage / current CALIBRATOR

INPUT OUTPUT

INPUT

OUTPUT DIV MAG

V- V+

**DC mA measurement**

Outside supply power measurement

- 1) Press the power switch **5**, turn on the calibrator.
- 2) Press the input/output conversion key **8**, when the state of no input indicator **13** to set it to input mode.
- 3) Press the mA / mA% conversion key **7**, make it indicate mA or mA% **19**, at the state of measure you need. In the state if mA% measurement, 4-20 mA will be displayed on the sub-display zone **22**
- 4) Put the red test lead in V jack **2**, black one to the COM jack **3**.
- 5) Connect the red test lead with the positive of current to be measure black one to the negative (ground).
- 6) The value of result is shown **16**.

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DC 24.000 mA

POWER Voltage / current CALIBRATOR

INPUT OUTPUT

INPUT

OUTPUT DIV MAG

V- V+

Calibrator supply Loop power function.

- 1) Press the power switch **5**, turn on the calibrator.
- 2) Press the input/output conversion key **8**, when the state of no input indicator **13** set it to input function.
- 3) Press the mA / mA% conversion key **7**, make it indicate mA or mA% **19**, at the state of measure you need. In the state if mA% measurement, 4-20mA will be displayed on the sub-display zone **22**
- 4) Put the red test lead in LOOP jack **1**, black one to the mA jack **2**.
- 5) Connect the red test lead with the positive current which is to be measure black one to the negative current.
- 6) The value of result show **16**.

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