

KUSAM-MECO

An ISO 9001:2008 Company

VOLTAGE / mA CALIBRATOR

Model KM-CAL-804

The new KUSAM-MECO Volt & milliampere Calibrator Model KM-CAL-804 is a high accuracy (0.05%) Calibrator. It has 5 digit LCD display with high stability. It can be used for calibrating Transmitters, Thermocouples, SCADA systems, Transducers. It also provides loop circuit power 24V.

The max. load is 1kΩ at 20mA range when the power is higher than 6.8V; The max. load is 700Ω at 20mA range when the power is within 5.8V - 6.8V. Temperature Coefficient ± 0.005%, range / °C (5°C -18°C, 28°C - 40°C). It works on 9Volt alkaline battery and battery life is approx 20 hours under the condition of 10mA.

GENERAL SPECIFICATIONS

- * Basic Accuracy : ± 0.05%
- * Display : 5 Digit LCD display.
- * Max. Allowable Voltage : 30V..
- * Operating Temperature Range : 0 ~ 50°C.
- Humidity range : ≤ 80% RH
- * Storage Temperature Range : ≤ -10°C ~ 55°C
- Humidity range : ≤ 90% RH
- * Temperature Coefficient : 0.1 x (dedicated Accuracy) % / °C (5°C ~ 18°C, 28°C ~ 40°C)
- * Power : 1.5V x 2 alkaline batteries.
- * Power Consumption : about 400mA / 3V in condition of 1kΩ load & 20mA output.
- * Dimension : 180 (L) x 90 (W) x 47 (D) mm (with protector)
- * Weight : About 500g

SAFETY :

Complies with IEC1010 (safety standard issued by International Electrician Committee)

ACCESSORIES :

User Manual, Test lead CF-36, (Clips for probe), Holster & Carrying case.



Preliminary Data

ELECTRICAL SPECIFICATIONS - KM-CAL-804

OUTPUT FUNCTION

Output	Range	Output Range	Resolution	Accuracy	Remarks
DC Voltage	10V	0.000 ~ 11.000V	0.001V	± 0.05% + 2	Max. Output current 5mA
DC Current	20 mA	0.000 ~ 22.000mA	0.001mA	± 0.05% + 4μA	20mA Max. load 1KΩ
Simulate transmitter (sinking Current)	-20 mA	0.000 ~ -22.000mA	0.001mA	± 0.05% + 4μA	20mA Max. load 1KΩ Note: power supply range : 5 ~ 25VDC
Loop Power	24 V			± 10%	Max. Output current 25mA

All Specifications are subject to change without prior notice.

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LIST OF PRODUCTS

- * Digital Multimeter
- * AC Clamp Adaptor
- * Thermo Anemometer
- * Distance Meter
- * Network Cable Tester
- * Earth Resistance Tester
- * DC Power Supplies
- * Calibrators
- * Frequency Counter
- * Phasing Sticks
- * Waterproof Pen Testers
- * EMF Detector
- * Wood, Paper & Grain Moisture Meter
- * 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
- * Maximum Demand Controller/Digital Power Meter
- * Digital Hand Held Temperature Indicators
- * Digital AC & AC/DC Clampmeter
- * AC/DC Current Adaptor
- * Thermo Hygrometer
- * Digital Lux Meter
- * Power Factor Regulator
- * Digital Panel Meters
- * High Voltage Detector
- * Gas Analysers
- * Function Generator
- * Battery Tester
- * Solar Power Meter

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KUSAM-MECO[®]

AN ISO 9001:2008 COMPANY

VOLTAGE / mA SOURCE

MODEL - KM -CAL 804

OPERATION MANUAL

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Section One Safety Information

To ensure safe use ,the meter and manual employ the following symbols:

- △ **Warning** identifies conditions and actions that may pose hazard (s) to the user and avoid methods.
- △ **Caution** identifies conditions and actions that may damage the meter or the equipment under test and avoid methods.
- △ **Note** reminds Users of knowledge of symbols for the operation and explanations of the features.

To avoid possible electric shock or any other dangers, please do follow the under mentioned rules:

- △ **Warning**
 - Do not operate the mete around explosive gas, vapor, or dust ,which is extreme dangerous
 - Never apply voltage exceeding 30V between any two terminals and earth ground terminals.
- △ **Caution**
 - Do not open the meter’s case except for the professional technicians.
 - Use a damp cloth with neutral detergent for cleaning the meter periodically. Do not use abrasives or solvents.

△ Note

- To ensure accuracy, preheat for 5 minutes after power on,
- Please contact the manufacture or dealers if the Users have higher accuracy requirement.

Section Two Component and functions of Meter's Panel

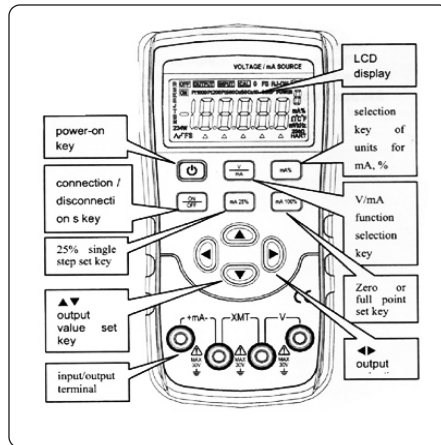
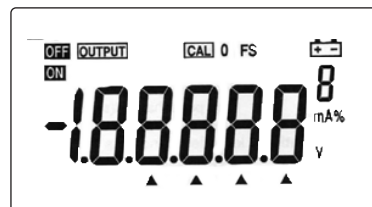


Illustration of LCD Display Area



OUTPUT : indicates the meter is in output state.

CAL : indicates the meter is in calibration state.

0 FS: indicates the present calibrated zero point or full point etc. when the meter is in calibration state.

🔋 : indicates the batteries are exhausting and need replacement.

▲ : Indicates present set output value.

V, mA, % indicates the unit for present output or input value.

ON|OFF : indicates connection or disconnection of output signals

----- : indicates 25% step output or zero/full point output.

Section Three Maintenance

This section provides some basic maintenance procedures. Repair, calibration, and servicing not covered in this manual must be performed by qualified personnel. For maintenance procedures not described in this manual, contact a Service Center.

1) General maintenance

- Periodically wipe the case with a damp cloth and detergent; do not use abrasives or solvents.
- Take out the batteries if the meter won't be used for a long time.
- Dirt or moisture in the terminals can affect readings
- Clean the terminals as follows:



Figure 3-1 Replacing batteries

Replacing Fuse

⚠ Warning

To avoid personnel injury or damage to the meter, use only the specified fuse. The specification is 63mA 250V fast-melt.

Replace the fuse as follows (Refer to Figure 3-2 if necessary):

1. Remove the test leads from the meter and turn the meter OFF;
2. Take off the protector of the meter, remove the four screws by using a standard-blade screwdriver, and then take off the cover;
3. Replace the blown fuse(s);
4. Reinstall the cover;
5. Reinstall the meters protector.

Figure 3-2 Replacing fuse

- 1) Turn the meter off and remove all test leads.
- 2) Shake out any dirt that may be in terminals.
- 3) Soak a new swab with alcohol. Clean each terminal with the swab.

(2) Replacing the batteries

The meter is powered by two LR6 alkaline batteries (AA).

⚠ Warning

To avoid electrical shock or personal injury:

- Remove test leads from the meter before opening the battery door.
- Close and latch the battery door before using the meter.

⚠ Note

- The new and old Batteries can not be mixed.
- Make sure the battery's odes are in accordance with the marks illustrated in battery pool when replacing them.
- Take out the batteries if the meter won't be used for a long time.
- Dispose the old batteries in accordance with the local law.

Replace the batteries as follows (See Figure 3-1):

1. Turn the rotary switch to OFF and remove the test leads from the terminals;
2. Take off the support of the meter, remove the battery door by a standard-blade screwdriver, and then take off the battery case;
3. Replace with two new batteries;
4. Reinstall the battery case, spin the screws and tighten screws.

Section Five Output of the Meter

The meter generates DC current or simulate resistance set by the Users from the corresponding output terminals (OUTPUT) .

⚠ Caution

Do not apply any voltage to output terminal; otherwise damage to interior circuit may occur if the voltage is not proper.

Output Operation flow

Function Operation n	% Operation	Display	Setting Range
DCV 10 V		0.000 V	0.000 V~11.000V
DCI 20mA	20mA ↓ %	00.000 mA -025.00 mA%	00.000~22.000mA -025.00~112.50mA%

Voltage output

1 Insert the testing probe into the V jack of the meter's output terminal (OUTPUT), and connect the other end with input terminal of the Users' meter, see Figure 5-1:

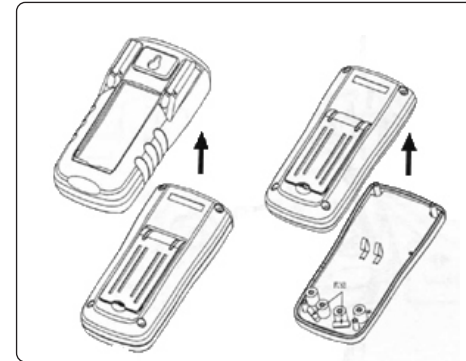


Figure 3-2 Replacing fuse

Section Four Power on/Power off the Meter

(1) Turn on/off the meter

Press (power) key to electrify the meter, and repress (power) key for more than 1 second to cut off the power.

When turning on the power, the meter starts to make inner diagnose and display in full screen, and then undertakes corresponding operation.

⚠ Note

To ensure correct electrifying operation, please wait for 5 seconds to turn on the meter again after cutting off the power.

(2) Automatically turn off the power

The default factory value is set as: the meter will automatically turn off if no operation has been made within 15 minutes.

The Users can set by themselves to choose whether using this function or not (See Section Seven).

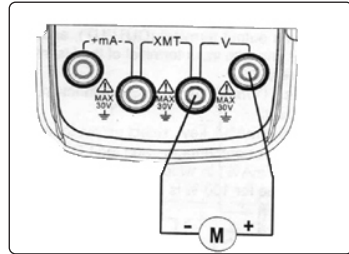


Figure 5-1

2. Press .V/mA, key , select V function, and display 'V' unit;
3. Press (◀) (▶) key, select output set bit;
4. Press (▲) / (▼) key , change the value of set bit, and the value can carry or abdicate automatically, and hold the key, the value will alter constantly after one second.
5. Press (ON/OFF) key, then connect / disconnect the power and the LCD displays 'ON' or 'OFF'

Current output

1. Insert the testing probe into the +mA- jack of the meter's output terminal (OUTPUT), and connect the other end with input terminal of the Users' meter, see Figure 5-2:
2. Press I V/mA ; key , select mA function, and display 'mA' unit;
3. Press (mA%) key , select output for mA set in form of value or percentage , and the LCD displays in unit 'mA' or 'mA%'; in which: the value for 0 % is 4mA; the value for 100 % is 20mA.

4. Press(◀) / (▶) key, select output set bit;
5. Press (A) / (V) key , change the value of set bit, and the value can carry or abdicate automatically, and hold the key, the value will alter constantly after one second.
6. Press (ON/OFF) key, then connect / disconnect the power and the LCD displays 'ON' or 'OFF'

25% step current output

1. Connect as shown in Figure 5-2;
2. Press :V/mA key . select mA function, and display mA' unit;
3. Press (mA 25% J key , and the LCD displays ' and ' A' symbols;
4. Press (mA°/0) key , select output for mA set in form of value or percentage , and the LCD displays in unit 'mA' or 'mA%'
5. Press (▲) / (▼) key, and the output value can be changed by 25 in which: the value for 0 % is 4mA; the value for 100 % is 20mA.
6. Reprress (mA 25%) key to exit from the step current output. 7. Press I V/mA key . select mA function, and display 'mA' unit;
3. Press mA 100% key , and the LCD displays , '▲', '0' and 'FS' symbols.

Zero/full point set current output

1. Connect as shown in Figure 5-2;
2. Press I V/mA key . select mA function, and display 'mA' unit;
3. Press mA 100% key , and the LCD displays , '▲', '0' and 'FS' symbols.

4. Press (▲) key to set selection as 100% , and the current outputs ' 20mA . Press (▼) key to set selection as 0% , and the current outputs 4mA)
5. Reprss (100%/START) key to exit zero/full point set current output
6. Press (ON/OFF) key, then connect disconnect the power and the LCD displays **[ON]** or '**[OFF]**

Simulate transmitter output (XMT)

1. Insert the testing probe into the XMT jack of the meter's output terminal (OUTPUT), and connect the other end with input terminal of the Users' meter, see Figure 5-3:
2. Operation for other key is the same as current output.

△ Note

- **Power supply range:** 5-25VDC
- **Usage:** it is better to employ 24VDC external power source when outputting current and transmitter connection method, which can prolong batteries' life-span extremely.

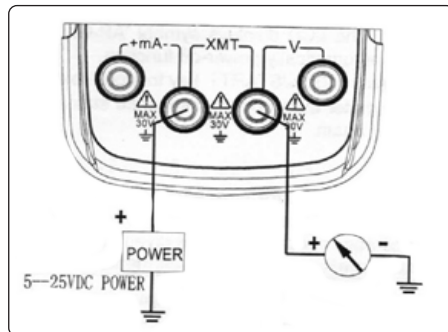


Figure 5-3

Section Six Function Setting

The following operation can change the automatic power off function of the meter:

When the meter is in power off state, press (mA%/V) key and press power 1 key simultaneously, wait until the full-display is over then release the (mA%/V) key, the meter enters into maintenance state and the LCD displays 'AP —XX'

Press (▲) , (▼) key and the LCD displays symbol 'AP-OF', the meter stops automatically power-off function ; The LCD displays symbol 'AP-ON', the meter restores automatically power-off function. Press (100%/START) key to store selection. The meter exits from maintenance state if cutting off the power again.

Section Seven Performance Index

Accuracy is specified for a period of one year after calibration. at 23±5°C. with relative humidity to 75%

Accuracy specifications are given as: ± ([% of reading] + [number of least significant digits]) ("Counts" refers to the number of increments or decrements of the least significant digit).

Input	Range	Output Range	Resolution	Accuracy	Remark
DCVoltage DCV	10V	0.000~11.000V	0.001V	0.05%+2	Max. output current 5mA
DCA	20mA	0.000~22.000mA	0.001mA	0.05%+4uA	20mA Max. load 1KΩ
simulate transmitter (sinking current)	-20mA	0.000~22.000mA	0.001mA	0.05%+4uA	20mA Max. load 1KW Note: power supply range 5~25VDC
Loop power	24V			±10%	Max. output current 25mA

General Feature

- **power** : two 1.5V alkaline batteries(LR6)
- **power consumption** : about 400mA /3V, in condition of 1k load and 20mA output
- **maximum allowed voltage** : 30V 4 within terminals or between terminal and earth ground
- **operation temperature** : 0°C-50°C range
- **operation humidity range:** 80%RH
≤
- **storage temperature range** : -10°C~55°C
≤
- **storage humidity range:** 90%RH
≤
- **temperature coefficient** : 0.1 X (dedicated accuracy) %/°C (5°C , 28 C —40°C)
- **measurement** : 180 (L) x 90 (W x 47 (D) mm (with protector) • weight about 500g
- **accessory:** User's Manual, industrial testing lead CF-36 (clips for probe)
- **safety** : complies with IEC1010 (safety standard issued by International Electrician Committee)

Section Eight Note for the Manual

- The present operation instruction is subject to change without notice;
- The content of the operation instruction is regarded as correct. Whenever any user finds its mistakes, omission, etc., he or she is requested to contact the manufacturer;
- The present manufacturer is not liable for any accident and hazard arising from the customer misuse or inadvertent operation;
- The functions described in this operation instruction should not be used as grounds to apply this product to a particular purpose.

MUMBAI

TEST CERTIFICATE

VOLTAGE / mA SOURCE

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 804**

SERIAL NO. _____

DATE: _____

**ISO 9001
REGISTERED**



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, fuses, burnt PCB's, disposable batteries, carrying case, test leads, 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.