KUSAM-MECO®

An ISO 9001:2008 Company

THERMOCOUPLE CALIBRATOR
Model KM-CAL-802

This is a Thermocouple "Source" &"Sink" Calibrator. It gives output of DC Volts & output for R, S, B, E, K, J, T & N Thermocouples. It measures DC Voltage & also R, S, B, E, K, J, T & N Thermocouples. It has 5 digit LCD display & extremely high accuracy 0.05%.

NEW

Preliminary Data

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 50m / 3V.
- ✶ **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.

ELECTRICAL SPECIFICATIONS - KM-CAL-802

OUTPUT FUNCTION

Output	Range	Output Range	Resolution	Accuracy	Remarks
DC Voltage	100mV	-10.00 ~ 110.00mV	0.01mV	±0.05% ± 30μV	The max. Output current ± 2mA
	1V	-0.1000 ~ 1.1000V	0.1mV	±0.05% ± 30mV	
Thermo-couple	R	-40 ~ 1760°C	1°C	±0.05% + 3(Less than or equals to 100°C) ±0.05% + 2(more than 100°C)	Employs ITS-90 temperature standard The accuracy does not include the error of interior temperature compensation sensor The accuracy does not include the impact of interior thermoelectric force.
	S	-20 ~ 1760°C	1°C		
RTD	B	400 ~ 1800°C	1°C	±0.05% + 3(Less than or equals to 600°C) ±0.05% + 2(more than 600°C)	
	E	-200.0 ~ 1000.0°C	0.1°C	±0.05% + 20 (Less than or equals to -100°C) ±0.05% + 10 (more than -100°C)	
	K	-200.0 ~ 1370°C	0.1°C		
	J	-200.0 ~ 1200.0°C	0.1°C		
	T	-200.0 ~ 400.0°C	0.1°C		
	N	-200.0 ~ 1300.0°C	0.1°C		

INPUT FUNCTION

Output	Range	Output Range	Resolution	Accuracy	Remarks
DC Voltage DCmV	100mV	-10.00 ~ 110.00mV	0.01mV	±0.05% ± 3	Input Resistance : 1MΩ
Thermocouple TC	R	-40°C ~ 1760°C	1°C	±0.05% + 3(Less than or equals to 100°C) ±0.05% + 2(more than 100°C)	Input Resistance : 1MΩ Employs ITS-90 temperature standard The accuracy does not include the error of interior temperature compensation sensor The accuracy does not include the impact of interior thermoelectric force.
	S	-200°C ~ 1760°C	1°C		
	B	400°C ~ 1800°C	1°C	±0.05% + 3(Less than or equals to 600°C) ±0.05% + 2(more than 600°C)	
	E	-200.0°C ~ 1000.0°C	0.1°C	±0.05% + 20 (Less than or equals to -100°C) ±0.05% + 10 (more than -100°C)	
	K	-200.0°C ~ 1370°C	0.1°C		
	J	-200.0°C ~ 1200.0°C	0.1°C		
	T	-200.0°C ~ 400.0°C	0.1°C		
	N	-200.0°C ~ 1300.0°C	0.1°C		

All Specifications are subject to change without prior notice.

KUSAM-MECO®

An ISO 9001:2008 Company

G-17, Bharat Industrial Estate, T. J. Road, Sewree (W), Mumbai - 400 015. INDIA.
Sales Direct.: 022-24156638, **Tel. :** 022-24124540, 24181649, **Fax :** 022-24149659
Email : kusam_meco@vsnl.net, **Website :** www.kusamelectrical.com

LIST OF PRODUCTS

- ✶ Digital Multimeter
- ✶ Digital AC & AC/DC Clampmeter
- ✶ AC Clamp Adaptor
- ✶ AC/DC Current Adaptor
- ✶ Thermo Anemometer
- ✶ Thermo Hygrometer
- ✶ Distance Meter
- ✶ Digital Lux Meter
- ✶ Network Cable Tester
- ✶ Power Factor Regulator
- ✶ Earth Resistance Tester
- ✶ Digital Panel Meters
- ✶ DC Power Supplies
- ✶ High Voltage Detector
- ✶ Calibrators
- ✶ Gas Analysers
- ✶ Frequency Counter
- ✶ Function Generator
- ✶ Phasing Sticks
- ✶ Battery Tester
- ✶ Waterproof Pen Testers
- ✶ Solar Power Meter
- ✶ 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

KUSAM-MECO®

G 17, Bharat Industrial Estate, T. J. Road,
Sewree (W), Mumbai - 400 015. INDIA.
Sales Direct : (022) 24156638
Tel. : (022) 24124540, 24181649. **Fax :** (022) 24149659
Email : kusam_meco@vsnl.net
Website : www.kusamelectrical.com
www.kusam-meco.co.in

KUSAM-MECO®

AN ISO 9001:2008 COMPANY

THERMOCOUPLE CALIBRATOR

MODEL - KM -CAL 802

OPERATION MANUAL

KUSAM-MECO®

TABLE OF CONTENTS

KUSAM-MECO®

Section One Safe Use

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 meter 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 Components and Functions of Meter's Panel

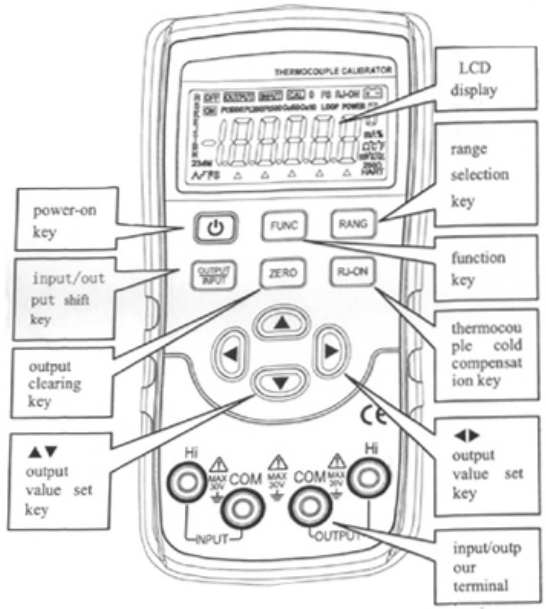
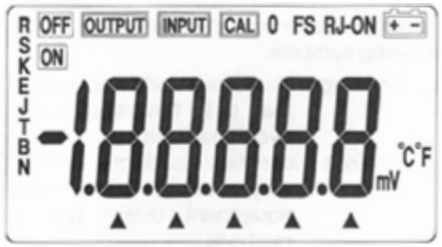


Illustration for LCD display area



a) OUTPUT : indicates the meter is in output state.

b) INPUT : indicates the meter is in input state.

c) CAL : indicates the meter is in calibration state.

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

e) RJ- ON : indicates the meter has undergone cold junction compensation work (See detailed section)

f) : indicates the batteries are exhausting and needs replacement (See detailed section).

g) ▲ : indicates present set output value.

h) mv ,°c ,°F : indicates the unit for present output value.

I) ON : indicates connection of output signals.

j) R, S. K, E, J, T. B, N: indicates graduated no. of thermocouple(TC).

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:

(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

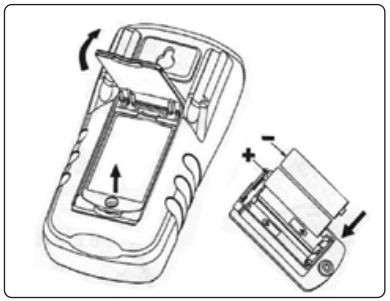
The new and old batteries can not be mixed.

- 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.

Figure 3-1 replacing batteries



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 minute.

The Users can set by themselves to choose whether using this function or not (See the detailed section).

Section Five Output of the Meter

The meter generates DC current or thermocouple simulate temper ature 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.

(1) DC voltage output

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

2. Press (FUN) key , select V/mV function, and display `V' or `mV` unit;

3. Press (RANG) key, select 100.00mV or 1.0000V range;

4. Press (◄) / (►) key, select output set bit;

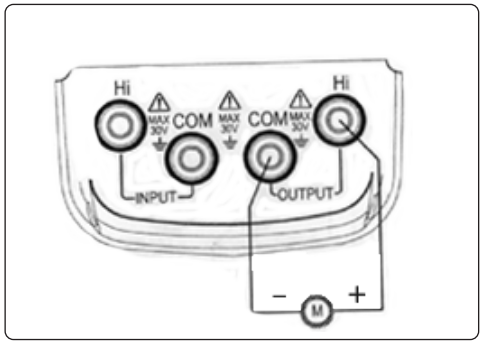


Figure 5-1

5. Press (▲)/(▼)key , change the value of set bit, and the value can carry or abdicate automatically, and hold the key, the value will change constantly after one second;

6. Press (ZERO) key, the output will be set as 000.00mV or 0.0000V.

2) Thermocouple (TC)simulate output

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

2. Press INPUT/OUTPUT key, select output function

3. Press (FUN) key , select thermocouple(TC) function, and display 'GC' unit and 'R' graduation no ;

4. Press (RANG) key, select corresponding graduation no.

5. Press (◄) / (►) key, select output set bit;

6. Press (▲) / (▼) key , change the value of set bit, and the value can carry or abdicate automatically, and hold the key, the value will change constantly after one second.

7. Automatic compensation of cold junctions

When calibrating meter with temperature cold junction compensation directly, press I RJ-ON 1 key to start the automatic compensation function of cold junctions of this meter, and it will output the necessary temperature thermoelectric force, and display 'RJ-ON'. (See detailed section for the accuracy of cold junction compensation). and :

Output thermoelectric force = the corresponding thermoelectric force of set temperature - the corresponding thermoelectric force of room temperature

• The Users need to wait for 2 seconds when starting the interior cold junction compensation of the meter and the meter will make automatic compensation every 10 seconds.

• When the operation ambient temperature change, the Users need to wait until the interior compensation sensor stabilizes (about 10 minutes) and then use

• if the Users do not use the automatic compensation function of this meter, press the i. RJ-ON .1 key and the symbol ' RJ-ON ' will not display any more

8. Press (ZERO') key, the output will be set as 0000cC (R S graduation) 400°C(B graduation ').0000.0°C (other graduation).

9. Press (‘C/F) key , select Centigrade or Fahrenheit unit.

Section Six Measurement

⚠Warning

Usage: the maximum voltage allowed between the terminals and within the terminals and the ground is 30V, any exceeding over this voltage may cause damage to the meter and even make injury to persons.

⚠Caution

Usage: do not apply any voltage exceeding the maximum allowed to the input terminals, which may cause damage to the meter.

Usage: when connected to the measured meter, please first cut off the electricity supply. A connection to the measured meter with power may cause damage of this meter.

Usage: pay particular attention to not to connect the current signal to the input terminal. incorrect connection may cause damage to this meter and the meter under measured.

(1) Measuring DC voltage

1. Insert the testing probe into the jack of the meter's input terminal (INPUT). and connect the other end with output terminal of the Users' meter, see Figure 6-1:

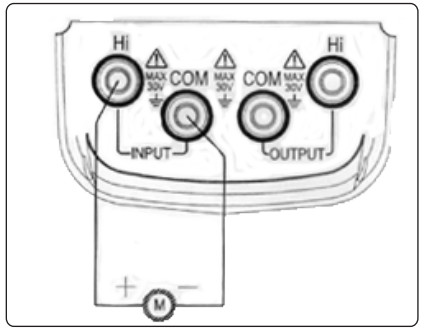


Figure 6-1

2. Press (INPUT/OUTPUT) key . and the LCD displays 'INPUT', 'ON', 'mV' indicating the meter is in input state;

3. The meter starts to measure, and the LCD displays '000.00 which indicates waiting and then displays measurement result.

4. The refreshing rate of measurement is about twice every second, and if the measured value exceeds the measurement range, the LCD displays 'OL'.

(2) Measuring thermocouple(TC)

1. Insert the testing probe into the jack of the meter's input terminal (INPUT), and connect the other end with output terminal of the Users' meter, see Figure

2. Press (INPUT/OUTPUT) key , and the LCD displays 'INPUT', indicating the meter is in input state;

3. Press [FUN] key , select thermocouple(TC) function, and display 1°C" unit and 'R' graduation no.;

4. Press (RANG) a key, select corresponding graduation no.;

5. The LCD displays '0000' , indicating waiting and then displays measurement result. And the refreshing rate is approximately once a second, and if the measured value exceeds the measurement range, the LCD displays '0L.'

6. Automatic compensation of cold junctions
When calibrating meter with temperature cold junction compensation directly, press (RJ-ON) key to start the automatic compensation function of cold junctions of this meter, and :
Displayed temperature = the corresponding temperature of input thermoelectric force + room
temperature

7. Press (’C/F’) key , select Centigrade or Fahrenheit unit.

Section Seven Function Setting

The fallowing operation can change can change the automatic power off function of the meter;

1. When the meter is in power-off state, press (power) key and the LCD displays fully , loose i power) key and pres (RANG) key, the meter enters into maintenance state and the LCD displays 'AP —XX'

2. 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, and the meter exit from maintenance state if cutting off the power again

.

Section Eight 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: ± ([h, of reading] + [number of least significant digits]) ("Counts" refers to the number of increments or decrements of the least significant digit).

Output function and technical index

Output	Range	Output range	Resolution	Accuracy	Illustration
DCV	100mV	-10.00~110.00mV	0.01mV	0.05%+30uV	max. output Current ±2mA
	1V	-0.1000~1.1000V	0.1mV	0.05%+0.3mV	
TC	R	-40~1760°C	1°c		

	S	-20~1760°C	1°c	0.05%+3(less than or equals to 100°C) 0.05%+2 (more than 100°C)	Employs ITS-90 temperature standard The accuracy does not include the error of interior tempensation sensor The accuracy does not include the impact of interior thermoelectric force
	B	400~1800°C	1°c	0.05%+3(less than or equals to 600°C) 0.05%+2 (more than 600°C)	
RTD	E	-200.0 ~ 1000.0°C	0.1°C	0.05%+20(less than or equals to -100°C) 0.05%+10 (more than-100°C)	
	K	-200.0~1370°C	0.1°C		
	J	-200.0~400.0°C	0.1°C		
	T	-200.0~400.0°C	0.1°C		
	N	-200.0~1300.0°C	0.1°C		

Input function and technical index

Input	Range	Output range	Resolution	Accuracy	Illustration
DC voltage DCmV	100mV	-10.00~110.00mV	0.01mV	0.05%+3	Input resistance : 1MΩ
thermocouple TC	R	-40°C~1760°C	1°C	0.05%+3(less than or equal to 100°C)	Input resistance : 1MΩ Employs ITS-90 temperature standard

	S	-200°C~1760°C		0.05%+2 (more than 100°C)	The accuracy does not include the error of interior temperature compensation sensor.
	B	400°C~1800°C		0.05%+3 (less than or equal to 600°C)	
	K	-200°C~1370°C	0.1°C		The accuracy does not include the impact of interior thermoelectric foece
	E	-200°C~1000°C		0.05%+20 (less than or equal to-100°C)	
	J	-200°C~1200.0°C			
	T	-200°C~400.0°C		0.05%+10 (more than -100°C)	
	N	-200.0°C~1300.0°C			

General Feature

- **Power :** two 1.5V alkaline batteries (Lr6)
- **Power consumption :** about 50m/3V
- **maximum allowed voltage :** 30V (within terminal or between & earth ground)
- **operation temperature rang :** 0°C~50°C
- **operation humidity rang :** ≤ 80%RH
- **storage temperature rang :** ≤-10°C~55°C
- **storage humidity rang :** ≤ 90%RH
- **temperature coefficient :** 0.1x(dedicated accuracy) %/C (5°c~18°C 28°C~40°C)
- **measurement :** 180 (L) X90(W)X 47 (D) mm (with protected)

- **weight :** about 500g
- **accessory :** User's Manual, industrial lead CF-36 (clips for probe)
- **safety :** complies with IEC 1010 (safety standard issued by International Electrician Committee)

Section Nine Note for the Manual

- The present operation instruction is subject to change notice;
- The content of the operation instruction is regarded as correct .Whenever any user find its mistakes, omission ,etc.,he or she is requested to contact the manufacturer;
- The present manufacture is not liable f or 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.

KUSAM-MECO®

MUMBAI

TEST CERTIFICATE

THERMOCOUPLE CALIBRATOR

This Test Certificate warrantees 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 802**

SERIAL NO. _____

DATE: _____

ISO 9001
REGISTERED

QC
KUSAM-MECO
PASS

KUSAM-MECO®

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.