KUSAM-MECO®

An ISO 9001:2008 Company

TEMPERATURE CALIBRATOR (THERMOCOUPLE) WITH 3 DISPLAY

9 FUNCTIONS 22 RANGES

Model-KM 3600

This instrument is a 4½ digit, compact-sized portable digital temperature calibrator designed to use external K/J/T/E/R/S/N/L/U/B/C type thermocouples as temperature sensor.The calibrator features a dual thermocouple input, an adjustable T/C offset. The thermocouples types comply with the (N.I.S.T. Monograph 175 Revised to ITS 90 standard).

GENERAL SPECIFICATIONS :

- **Display :** There are three LCD displays : Main, Second and Third.
  The Main and second displays are 4½ digit with maximum reading of 19999.
  The main displays the value of T1, T2 or output setting. The second displays T1 or T2 readings and the third T1-T2 and groups settings.
- **Auto Power Off.**
- **MAX / MIN / MAX-MIN / AVG / REL / HOLD Function.**
- **Battery :** Standard 9V battery.
- **Low Battery Indication :** The "− +" is displayed when the battery voltage drops below the operating level.
- **Dimension :** 192(H) X 91(W) X 52.5(D) mm
- **Weight :** 318g. Approx

ACCESSORIES :

1) Two type "K" thermocouple bead wires.
2) A 9 volts battery.
3) Instruction manual, Holster.
4) Two type "K" thermocouple calibration bead wires. Maximum insulation temperature 260°C (500°F). Wire accuracy ± 2.2°C or ± 0.75% of reading (whichever is greater) from 0°C to 800°C.

ELECTRICAL SPECIFICATIONS : KM 3600

TEMPERATURE SCALE : Celsius or Fahrenheit user-selectable.

Measurement	Range	Measurement (resolution)	Range
K-TYPE (0.1°)	-200°C to 1372°C or -328°F to 2501°F	N-TYPE (0.1°)	-200°C to 1300°C or -328°F to 2372°F
J-TYPE (0.1°)	-210°C to 1200°C or -346°F to 192°F	L-TYPE (0.1°)	-200°C to 900°C or -328°F to 1652°F
T-TYPE (0.1°)	-250°C to 400°C or -418°F to 752°F	U-TYPE (0.1°)	-200°C to 600°C or -328°F to 1112°F
E-TYPE (0.1°)	-250°C to 1000°C or -418°F to 1832°F	B-TYPE (1°)	600°C to 1820°C or 1112°F to 3308°F
R-TYPE (1°)	0°C to 1767°C or 32°F to 3212°F	C-TYPE (1°)	0°C to 2316°C or 32°F to 4200°F
S-TYPE (1°)	0°C to 1767°C or 32°F to 3212°F		

ACCURACY

K/J/T/E/L/U-TYPE ±(0.05% rdg + 0.5°C) -50°C to 1372°C ±(0.05% rdg + 1.0°C) -50°C to -250°C ±(0.05% rdg + 1.0°F) -58°F to 2501°F ±(0.05% rdg + 2.0°F) -58°F to -346°F	**N-TYPE** ±(0.05% rdg + 1.0°C) -50°C to 0°C ±(0.05% rdg + 0.5°C) 0°C to 1300°C ±(0.05% rdg + 2.0°F) -58°F to 32°F ±(0.05% rdg + 1.0°F) 32°F to 2372°F	**R/S/B/C-TYPE** ±(0.05% rdg + 2°C) 0°C to 1767°C ±(0.05% rdg + 4°F) 32°F to 3212°F
Thermocouple Simulate Range Resolution : 0.1° (1° for R/S/B/C-TYPE) Accuracy : ± (0.3°C + 10 V) Accuracy : Specified for operating temperatures over the range of 18°C to 28°C (64°F to 82°F), for 1 year, not including thermocouple error.	**mV Range** Range : -25.00mV to 75.00mV Resolution : 10 V Accuracy : ± (0.025% + 1 digit)	**Temperature Coefficient** 0.1 times the applicable accuracy specification per °C from 0°C to 18°C and 28°C to 50°C (32°F to 64°F and 82°F to 122°F).

Note: All Specification 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
* 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
* 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
* 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

17, Bharat Industrial Estate, T. J. Road, Sewree (W),
Mumbai-400015. INDIA

Sales Direct: (022)24156638 **Tel.:**(022) 2412 4540, 2418 1649
Fax: 2414 9659 **E-mail :** kusam_meco@vsnl.net,
Website : www.kusamelectrical.com; www.kusam-meco.co.in

KUSAM-MECO

AN ISO 9001:2008 COMPANY

TEMPERATURE CALIBRATOR
MODEL - KM 3600

OPERATION MANUAL

KUSAM-MECO

TABLE OF CONTENTS

KUSAM-MECO

INTRODUCTION

This instrument is a 4½ digit, compact-sized portable digital calibrator thermometer designed to use external K/J/T/E/R/S/N/L/U/B/C type thermocouples as temperature sensor. The thermometer featres a dual thermocouple input, an adjustable T/C offset. The thermocouples types comply with the (N.I.S.T. Monograph 175 revised to ITS 90 standard).

SAFETY INFORMATION

It is recommended that you read the safety and operation instructions before using the thermometer.

WARNING

To avoid electrical shock, do not use this instrument when working voltages at the measurement surface over 24V AC or DC.

WARNING

To avoid damages or burns, do not make temperature measurement in microwave ovens.

CAUTION

Repeated sharp flexing can break the thermocouple leads. To prolong lead life, avoid sharp bends in the leads, especially near the connector.

KUSAM-MECO

GENERAL SPECIFICATIONS

- **Displays :**There are three different display areas, Main second and Third. The Main and second display panels are 4½ digit liquid crystal display (LCD) with maximum reading of 19999. The main is used for displaying the value of T1, T2 or output setting. The second displays T1 or T2 readings and the third T1-T2 and groups settings.
- **Battery :** Standard 9V battery (NEDA 1604, IEC 6F22 006P). Battery life is about 17.5 hours when used with a carbon zinc battery.
- **Low Battery indication :** The " ⊞ " is displayed when the battery voltage drops below the operating level.
- **Dimensions :** 192(H) x 91(W) x 52.5(D)mm.
- **Weight :** 320g.
- **EMC :** Through the RS radiation interference test the frequency of 80MHz to 1000MHz, the measurement number producing the unsteady flutter, it immediately recover after stop the test.
- **Accessories :** Two type "K" thermocouple bead wires.
  Two type "K" thermocouple calibration bead wires.
  Maximum insulation temperature 260°C (500°F).
  Wire accuracy ± 2.2°C or ± 0.75% of reading (whichever is greater) from 0°C to 800°C. A9 volts battery. An instruction manual.
  PC connection software. PC interface cable.

ENVIRONMENTAL

- **Ambient Operating Ranges :** 0°C~50°C(32°F to 122°F) < 80%R.H.
- **Storage Temperature :** -20°C ~ 60°C (-4°F to 140°F) < 70% R.H.
- **Input Connector :** Accepts standard miniature thermocouple connectors (flat blades spaced 7.9mm, center to center).

KUSAM-MECO

ELECTRICAL SPECIFICATIONS

Temperature Scale : Celsius or Fahrenheit user-selectable.

Measurement	Range :
K-TYPE (0.1°)	-200°C to 1372°C or -328°F to 2501°F
J-TYPE (0.1°)	-210°C to 1200°C or -346°F to 192°F
T-TYPE (0.1°)	-250°C to 400°C or -418°F to 752°F
E-TYPE (0.1°)	-250°C to 1000°C or -418°F to 1832°F
R-TYPE (0.1°)	0°C to 1767°C or 32°F to 3212°F
S-TYPE (0.1°)	0°C to 1767°C or 32°F to 3212°F
N-TYPE (0.1°)	-200°C to 1300°C or -328°F to 2372°F
L-TYPE (0.1°)	-200°C to 900°C or -328°F to 1652°F
U-TYPE (0.1°)	-200°C to 600°C or -328°F to 1112°F
B-TYPE (0.1°)	600°C to 1820°C or 1112°F to 3308°F
C-TYPE (0.1°)	0°C to 2316°C or 32°F to 4200°F

Based on the ITS-90 temperature standard.

Accuracy :

K / J / T / E / L / U-TYPE
±(0.05%rdg + 0.5°C) -50°C to 1372°C
±(0.05%rdg + 1.0°C) -50°C to -250°C
±(0.05%rdg + 1.0°F) -58°F to 2501°F
±(0.05%rdg + 2.0°F) -58°F to -346°F

N-TYPE
±(0.05%rdg + 1.0°C) -50°C to 0°C
±(0.05%rdg + 0.5°C) 0°C to 1300°C
±(0.05%rdg + 2.0°F) -58°F to 32°F
±(0.05%rdg + 1.0°F) 32°F to 2372°F

R / S / B / C-TYPE
±(0.05%rdg + 2°C) 0°C to 1767°C
±(0.05%rdg + 4°F) 32°F to 3212°F

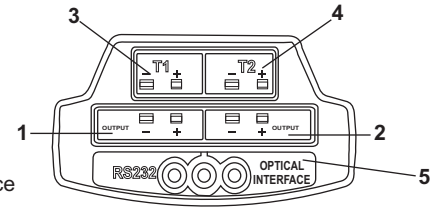
THERMOCOUPLE SIMULATE RANGE

Resolution : 0.1° (1° for R / S / B / C-TYPE)
Accuracy : ±(0.3°C + 10 V)
Accuracy : Specified for operating temperatures over the range of 18°C to 28°C (64°F to 82°F), for 1 year, not including thermocouple error.

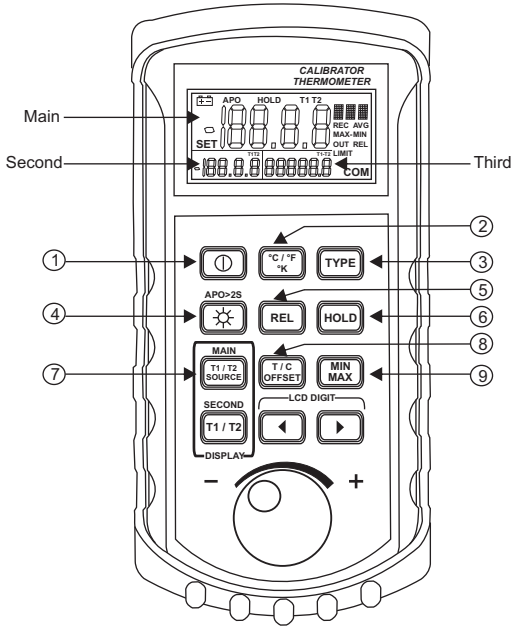
mV Range :
Range : -25.00mV to 75.00mV
Resolution : 10 V
Accuracy : ± (0.025% + 1 digit)

Temperature Coefficient :
0.1 times the applicable accuracy specification per °C from 0°C to 18 and 28°C to 50°C (32°F to 64°F and 82°F to 122°F)

Top Side :
1. Output 1.
2. Output 2
3. Input T1
4. Input T2
5. RS232 optical interface



OPERATING INSTRUCTIONS



1. Power Button " ⏻ "

The "⏻" button turns the thermometer on or off. When entering REC mode, the power off function is disabled.

Remark : The meter will run self calibration when the meter starts.
The measuring leads and calibration wires must be removed before taking measurements, and you can get accurate calibration values.

2. Button "°C/°F/°K"

Press the °C/°F/°K button to cycle through temperature scale, °C, °F and °K.

3. Type Selection (thermocouples)

Press the "type" button and the selected symbol will blink which means in the setting mode.

Press " ▸ " button to make right shifts to cycle through
K→J→T→E→R→S→N→L→U→B→C→mV.

Press " ◂ " button to make left shifts to cycle through
K→mV→C→B→U→L→N→S→R→E→T→J

Press the "type" button again to choose the selected thermocouple.

4. Backlight " ☼ " button

Pressing the button less than two seconds to turn on and pressing the button again less than two seconds to turn off the backlight in the LCD. It will turn off after thirty minutes without operation.

Auto Power Off

It is in the APO mode when the meter is turned on and will turn off the meter without operation for fifteen minutes. Pressing the " ☼ " button over two seconds to cancel the function. And pressing the " ☼ " button again to activate the APO function.

5. " REL" button

The relative value function can be used for comparing the saved reference value with other measurements. Press the " REL" button less than to store the current measurement as the reference value, and press the " REL" over two seconds to disable the function.

6. " HOLD" button

When HOLD mode is selected, the thermometer holds the present readings and stops all further measurements. To activate the data hold mode, press the HOLD button, and "HOLD" is displayed on the LCD. Pressing the HOLD button again cancels the function, & the instrument will automatically resume measurements. When the Hold key is activated, it will stop functions of the other entire key except Power & Backlight.

7. " T1/T2 SOURCE" button

Pressing T1/T2 SOURCE to cycle through T1, T2 and SOURCE. In the main display the blinking digit is the one to be adjusted, you can push the " ◂ ▸ " button to make right or left shifts to the desired position. When incrementing to the utmost range of the selected thermocouples, the LIMIT will show on the display.

SOURCE is to provide the output parameter settings. There are ten individual temperature setting points in group 0, which can be set at your desired output point. Use " ◂ ▸ " to shift the desired digit to be adjusted and rotate the knob to increase or decrease the values you want to set. Press the T/C OFFSET to save the settings.

8. " OFFSET" button (Thermocouple offset adjust)

When the main display input is T1 or T2, and socket thermocouple is connected. Press T/C OFFSET over two seconds the SET annouciator will appear on the right side of display and enter the offset adjustment mode. And the blinking digit is the one to be adjusted. Rotate the knob to the right increasing the values, to the left side decreasing the values. The maximum range of the knob is ±5 centigrade. When turning to the utmost range, it will appear LIMIT symbol on the left side of the display and means that there is no further incrementing of the offset. Press the T/C OFFSET over two seconds to save the settings.

9. " MIN / MAX " button

Press MIN / MAX button to enter the MIN/MAX recording mode and REC shows on the display. The beeper emits a tone when a new minimum or maximum measurement is recorded. Press the MIN / MAX button again to rotate through the current readings :

MAX : The highest measurement recorded.

MIN : The lowest measurement recorded.

MAX-MIN : The difference of the highest and the lowest measurement.

AVG. : The average values of the measurements.

Press MIN/MAX button over two seconds to exit the function.

10. Knob usages in the settings

In the TYPE mode, it is used for thermocouples selection to make right or left shifts to choose selectors. In the SOURCE mode, it is used to increase or decrease the values of the output function.

11. PWM Group

Group 0 set

In the OUT mode, press T/C OFFSET over two seconds to set. LCD display set CLEAr press T1 / T2 SOURCE button to clear data, display Set 0-0. In the main display the blinking digit is the one to be adjusted, you can push the "◀ ▶" button to make right or left shifts to the desired position. Rotary knob to increase or decrease the values. Press T1 SOURCE to save the one step setting. CL3515R can set 10 step, (Group 1 to 9 use software setting) press T/C OFFSET exit group set mode.

Group out

In the OUT mode, press T/C OFFSET less than two seconds.
Rotary knob to select step.
Press T / C OFFSET exit group out mode.

WARNING

To avoid possible electrical shock, disconnect the thermocouple connectors from the thermometer before removing the cover.

MAINTENANCE

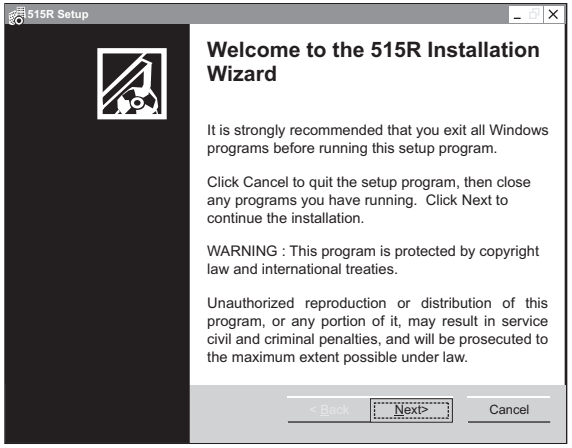
Battery Replacement

Power is supplied by a 9 volt battery. The "⊞" appears on the LCD display when replacement is needed. To replace the battery, remove the two screws from the back of the meter and lift off the battery cover. Remove the battery from battery contacts.

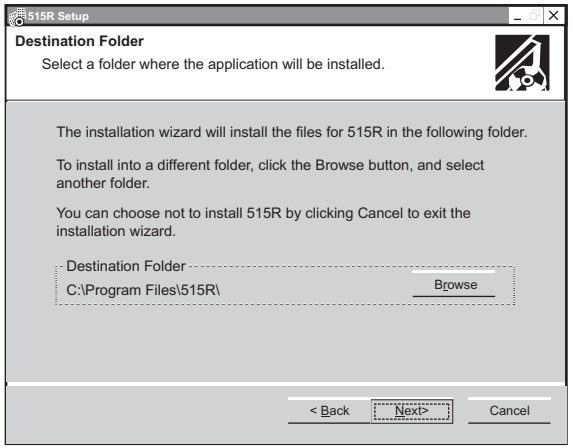
Cleaning

Periodically wipe the case with a damp cloth and detergent, do not use abrasives of solvents.
Periodically wipe the meter with soft and mild cloth. Do not use abrasives or solutions to clean the meter.

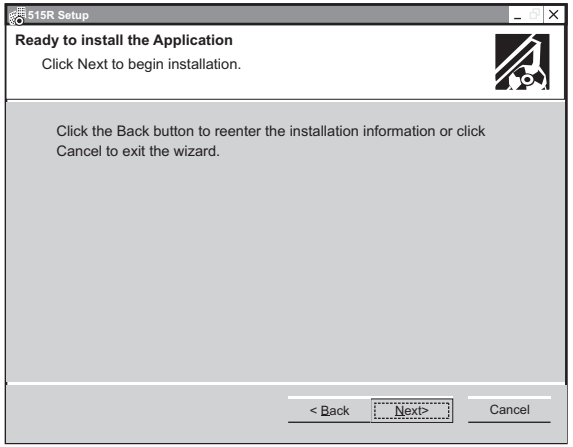
I 515R Software Install



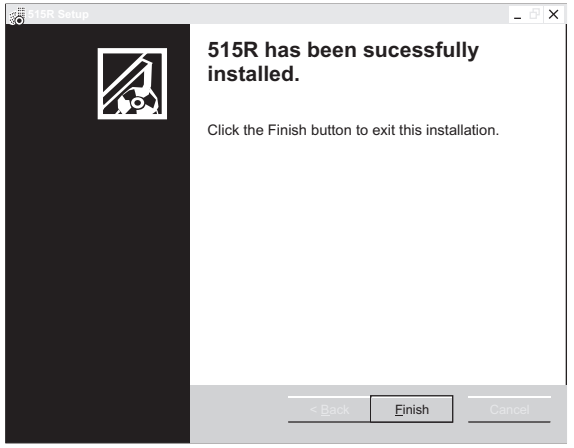
Click Next



Click Next



Click Next



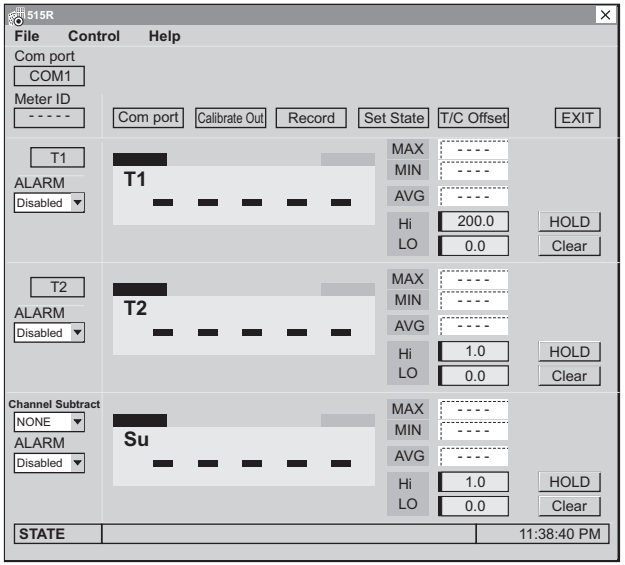
Click Finish

II Uninstall

Start→setting→control→mew/remove program→515R

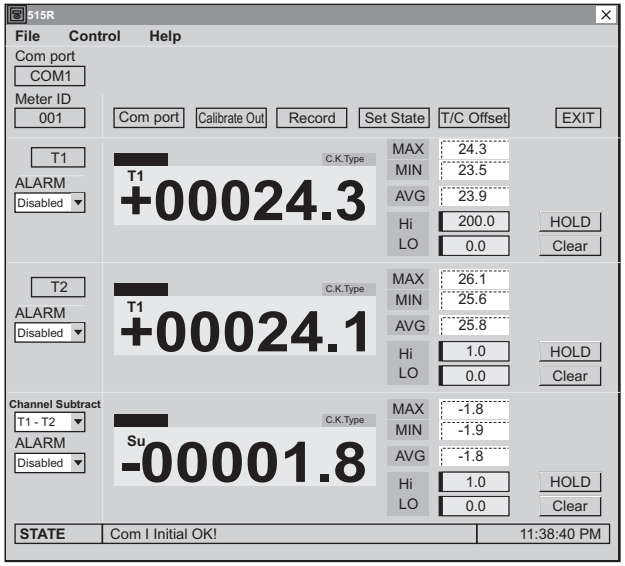
III Software Operating Instructions

Start→Program→515R→515R



Com Port Select
Select 515R Connection Com Port.

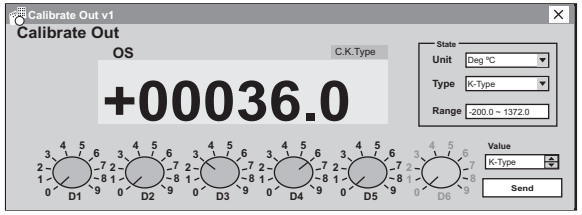
IV Measurement



1. T1, T2, Channel Subtract (NONE, T1-T2, T2-T1)
ALARM function
Disable
Hi enable
Enables alarm Hi function, and it will become red flashing, when it is over Hi setting value.
Lo enable
Enables alarm Lo Function, and it will become blue flashing, when it is below Lo setting value.
Both enable
To enable both Hi and Lo, and it will become red flashing, when it is over Hi setting value, and it will become blue flashing when it is below Lo setting value.
HOLD
Hold the present reading.
Clear
Clear MAX, MIN, AVG recorded.

2. Calibrate Out

Adjust output in real time.



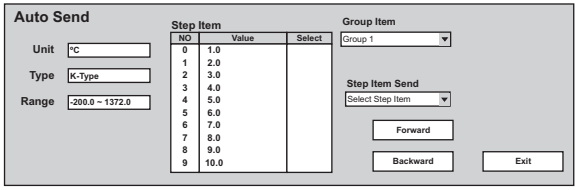
Value

Set the output value

Send

Press "Send" 515R send out the output setting vale.

3. Auto Send



Group Item

Group 0 to Group 9.

Step Item Send

Step Item 0 to Step Item 9.

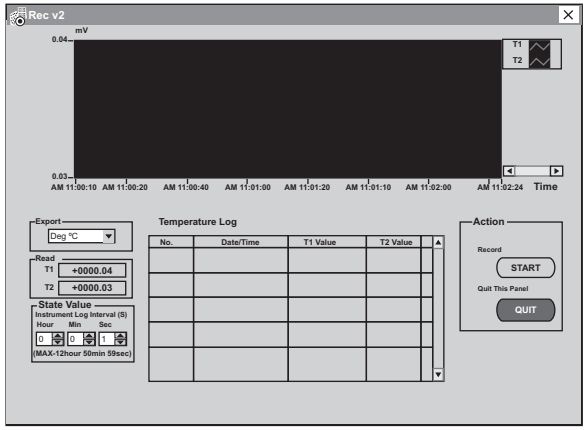
Forward

Select step forward.

Backward

Select step backward.

4. Record



Export

Both

Display drawing T1 and T2.

T1

Display drawing T1.

T2

Display drawing T2.

State Value

Setting Interval.

Start

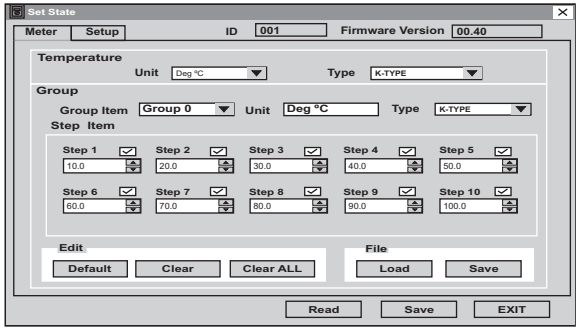
Log

File type *.txt or *.xls

Quit

Exit

5. Set State



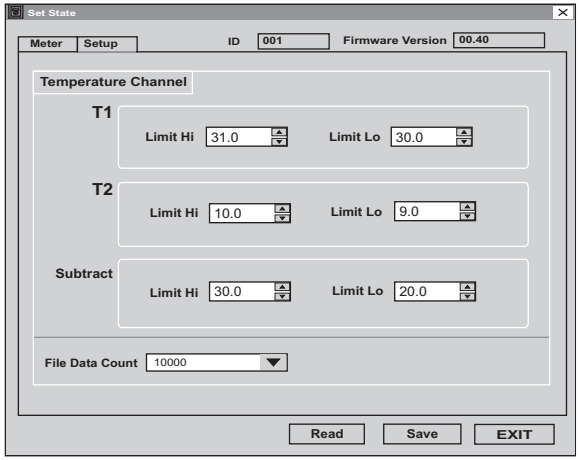
Read
Read out the groups reading of 515R.
Save
Make the setting value read in 515R.
EXIT

6. Meter
Temperature
Unit
ºC, ºF, ºK
Type
K, J, T, E, R, S, N, L, U, B, C, mV

Group
Group Item
Group 0 to Group 9
Unit
ºC, ºF, ºK
Type
K, J, T, E, R, S, N, L, U, B, C, mV
Step Item
Step 1 to Step 10

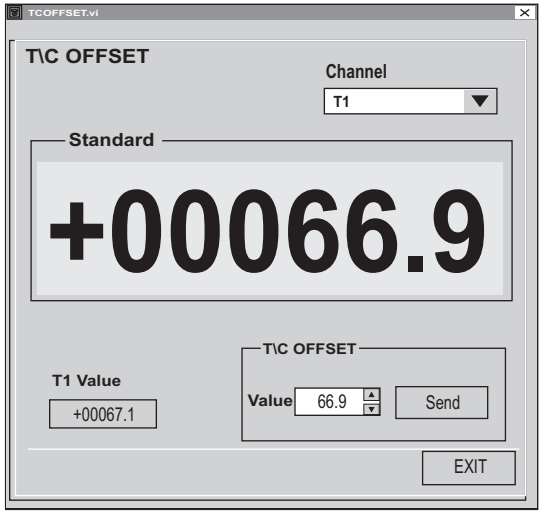
Edit
Default
515R setting values.
Clear
Clear the current group.
Clear All
Clear all group's value.

7. File
Load
From PC load the stored value.
Save
Save the setting value into PC.
Setup



Temperature Channel
T1 Hi, Lo Setting
T2 Hi, Lo Setting
Subtract Hi, Lo Setting
File Data Count
10000, 20000, 30000

8. T/C Offset



Channel
T1
T2
T/C Offset
Offset ±5ºC

KUSAM-MECO

MUMBAI

TEST CERTIFICATE

TEMPERATURE 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-3600**

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.

KUSAM-MECO

WARRANTY

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.

KUSAM-MECO

17, Bharat Industrial Estate, T. J. Road, Sewree (W),
Mumbai-400015. INDIA
Sales Direct: (022)24156638 **Tel.:**(022) 2412 4540, 2418 1649
Fax: 2414 9659 **E-mail :** kusam_meco@vsnl.net,
Website : www.kusamelectrical.com; www.kusam-meco.co.in