DIGITAL CLAMPMETER AC/DC/TRMS

MODEL : 3600

USER MANUAL

SAFETY INFORMATION

The following safety information must be observed to insure maximum personal safety during the operation at this meter:

1. Do not use the meter if the meter or test leads look damaged, or if you suspect that the meter is not operating properly.
2. Use caution when working above 60V dc or 30V ac rms. Such voltages cause a shock hazard.
3. When Using the probes, keep your fingers behind the finger guards on the probes.
4. Measuring voltage which exceeds the limits of the clamp meter may damage the meter and expose the operator to a shock hazard. Always recognize the meter voltage limits as stated on the front of the meter.
5. If the equipment is used in a manner not specified by the manufacturer, the protection provided the equipment may be impaired.

SPECIFICATIONS

Display : 3¾, digit (4000 counts), 9999 counts (Frequency mode), 40 segments analog bar graph and function units sign annunciators

Polarity : Automatic, positive implied, negative polarity indication.

Overrange : "4000 "or"-4000" Most Significant Digit blinks.
Low battery indication : the " ⊟ " is displayed when the battery voltage drops below the operating level.
Measurement rate : 2/sec, nominal. 1/sec, Capacitance and Frequency mode. 20/sec, Analog display.

Operating Environment : 0°C to 40°C at < 70% relative humidity.

Storage Temperature : -20°C to 60°C, 0 to 80% R.H. with battery removed from meter.

Accuracy : Stated accuracy at 23°C + 5°C, <75% relative humidity.

Safety : According to EN61010-1 protection class II over-voltage category (CAT III 600V) pollution degree 2.

Auto Power off : 30minutes after rotary switch or mode changes.

Clamp jaw : According to EN61010-2-032 CAT IV 600V.
Power : single standard 9-volt battery, NEDA 1604, JIS 006P, IEC 6F22.

Battery life : 150 hours typical with carbon-zinc.
Dimensions : 250 x 100 x 46mm (approx.)

Weight : 380gms including battery (approx.)

Accessories : Carrying Case x 1, One pair test leads x 1, 9V battery (installed) x 1, Instruction manual x 1

DC VOLTS

Ranges	:	400mV, 4V, 40V, 400V, 600V
Resolution	:	100㎷
Accuracy (ranges)	:	±(0.25% rdg + 1dgt) on 400mV to 400V ±(0.25% rdg + 3dgts) on 600V
Input impedance	:	> 10MV
Overload protection	:	600VDC or AC rms

AC VOLTS (True RMS) (50Hz-500Hz)

Ranges	:	4V, 40V, 400V, 600V
Resolution	:	1mV
Accuracy	:	±(0.75% rdg + 4dgts) on 50-60Hz ±(2.0% rdg + 4dgts) on 40-500Hz
Input impedance	:	> 10MV
Effect Reading	:	100 - 3999
Overload protection	:	600VDC or 600VAC rms

RESISTANCE

Ranges	:	400V, 4KV, 40KV, 400KV, 4000KV, 40MV
Accuracy (ranges)	:	±(0.3% rdg + 5dgts) on 400V ±(0.3% rdg + 1dgt) on 4KV to 400KV ±(0.5% rdg + 1dgt) on 4000KV ±(2.0% rdg + 4dgts) on 40MV
Open circuit volts	:	0.4Vdc
Overload protection	:	600VDC or AC rms

CONTINUITY

Audible indication : less than 40V±20V
Overload protection : 600VDC or AC rms

DIODE TEST

Test current : 1.0mA + 0.6mA
Accuracy : +(3.0% rdg + 3dgts)
Open circuit volts : 3.0Vdc typical
Overload protection : 600VDC or AC rms

FREQUENCY (Autoranging)

Ranges : 100Hz, 1kHz, 10kHz, 100kHz, 500kHz
Resolution : 0.01Hz
Accuracy : +(0.1% rdg + 2dgts)
Sensitivity : 2.0Vrms min
Effect reading : 10-9999
Overload protection : 600VDC or AC rms

CAPACITANCE

Ranges : 4nF, 40nF, 400nF, 4㎼F, 40㎼F
Accuracy : ±(3.0% rdg + 20dgts) on4nF range (use DZERO)
±(3.0% rdg + 4dgts) on 40nF to 20㎼F ranges
±(6.0% rdg + 4dgts) above 20㎼F

Overload protection : 600VDC or AC rms

DC CURRENT (Put conductor at the center of the jaws)

Ranges : 400A, 1200A

Resolution : 100mA

Accuracy : ±(1.5% rdg + 5dgts)
*700A to 1200A : ±(2.0% rdg + 5dgts)

Overload protection : 1200Adc max. for 1 minute.

AC CURRENT (True RMS) (40Hz-500Hz) (Put conductor at the center of the jaws)

Ranges : 400A, 1000A

Resolution : 100mA

Accuracy : ±(1.75% rdg + 5dgts) on 50Hz-60Hz
±(3.5% rdg + 5dgts) on 40Hz-500Hz

*700A to 1000A (50Hz/60Hz) : ±(2.5% rdg + 5dgts)

Overload protection : 1000Aac max. for 1 minute.

OPERATION

Before taking any measurements, read the Safety Information Section. Always examine the instrument for damage, contamination (excessive dirt, grease, etc.) and defects. Examine the test leads for cracked or frayed insulation. If any abnormal conditions exist do not attempt to make any measurements.

Ⓗ Button

Press "Ⓗ" button to toggle in and out of the Data Hold mode, except if you are already in the MIN MAX Recording mode.

In the Data Hold mode, the "HOLD" annunciator is displayed and the last reading is held on the display, the beeper emits a tone. Pressing (MIN / MAX) button when you are in the Data Hold mode causes you to exit Data Hold and enter the MIN MAX Recording mode.

In the MIN MAX Recording mode, press (HOLD) button to stop the recording of readings, press (HOLD) again to resume recording.

PEAK HOLD Button : (only AC current ranges 40-60Hz) Press "PEAK" button two times to toggle in and out of PEAK Hold mode. In the PEAK Hold mode, the "HOLD P" annunciator is displayed. {Accuracy : ± [10% (readind - residual offset) + 10dgts], effect reading : 80 ~ 4000}

MIN / MAX button

Press (MIN / MAX) button to enter the MIN MAX Recording mode. The minimum, maximum values are then reset to the present input, the readings are stored in memory, and the "HOLD" annunciator turns on. Push the button to cycle through the minimum (MIN) "maximum (MAX), and present readings. The MIN or MAX annunciator turns on to indicate what value is being displayed.

In the MIN MAX Recording mode, press (HOLD) button to stop the recording of readings, press again to restart recording. If recording is stopped, the minimum, maximum, or present values and analog display are frozen. In the MIN MAX Recording mode, when a new minimum value is exceed the actual minimum readings or a new maximum value is overload, the minimum or maximum value will held on the display, but the analog display continues to be active.

AC current ranges without MIN/MAX function.

D ZERO Button

Press (DZERO) button to enter the Relative mode, the "DZERO" annunciator turn on, zero the display, and store the displayed reading as a reference value. Press and hold down the (DZERO) button for 2 seconds to exit the relative mode.

RANGE Button

Press (RANGE) button to select the Manual Range mode and turn off the “AUTO” annunciator. (The meter remains in the range it was in when manual ranging was selected).

In the Manual Range mode. each time you press (RANGE) button, the range (and the input range annunciator) increments, and a new value is displayed. To exit the Manual Range mode and return to autoranging, press and hold down (RANGE) button for 2 seconds. The “AUTO” annunciator turns back on.

Voltage Measurements

1. Connect the red test lead to the “V” jack and the black test lead to the “COM” jack.
2. Set the Function/Range switch to the desired voltage range (AC or DC). The meter will automatically select the best voltage range.
3. Connect the test leads to the device or circuit being measured.
4. For dc, a (-) sign is displayed for negative polarity; positive polarity is implied.

Current Measurements

1. Set the Function/Range switch to the desired highest 1000AAC or 1200A DC range. In DC current measurement use DZERO button, offset the residual magnetic of the jaws.
2. Press the trigger to open transformer jaws and clamp onto one conductor only. Read the current directly on the display. It is recommended that the conductor be placed at the center of the closed jaws for maximum accuracy.
3. When the reading is lower than 400 counts, set the range switch to the next lower range position. For maximum accuracy, select the lower range possible without overranging the meter.

Resistance Measurements

1. Set the Function/Range switch to the resistance range.
2. Remove power from the equipment under test.
3. Connect the red test lead to the “ + ” jack and the black test lead to the “COM” jack.
4. Touch the probes to the test points. In ohms, the value indicated in the display is the measured value of resistance.

WARNING

The accuracy of the functions might be slightly affected, when exposed to a radiated electromagnetic field environment, e.g. radio, telephone or similar.

Continuity Measurements

1. Set the Function/Range switch to the “ •))) ” position.
2. Remove power from the equipment under test.
3. Connect the red test lead to the “ + ” jack and the black test lead to the “COM” jack.
4. Touch the probes to the test points. the beeper sounds continuously, if the resistance is less than 40V.

Diode Tests

1. Connect the red test lead to the “ + ” jack and the black test lead to the “COM” jack.
2. Set the Function/Range switch to the “ ⟶| ” position.
3. Turn off power to the circuit under test.
4. Touch probes to the diode. A forward-voltage drop is about 0.6V (typical for a silicon diode).
5. Reverse probes. If the diode is good, “4000” is displayed. If the diode is shorted, “.000” or another number is displayed.
6. If the diode is open, “4000” is displayed in both directions.

Frequency Measurements

1. Set the Function/Range switch to the Hz position.
2. Connect the red test lead to the “ + ” jack and the black test lead to the “COM” jack.
3. Connect the test leads to the point of measurement and read the frequency from the display.

Capacitance Measurements

1. Set the Function/Range switch to the “ ⊣⊢ ” range.
2. Connect the test leads to the “ + ” jack and the black test lead to the “COM” jack.
3. Connect the red test lead to the capacitor and read the capacitance directly from the display.

MAINTENANCE

> **WARNING**
> Remove test leads before changing battery or performing any servicing.

Battery Replacemeat

Power is supplied by a 9 volt “transistor” battery. (NEDA 1604, IEC 6F22). 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

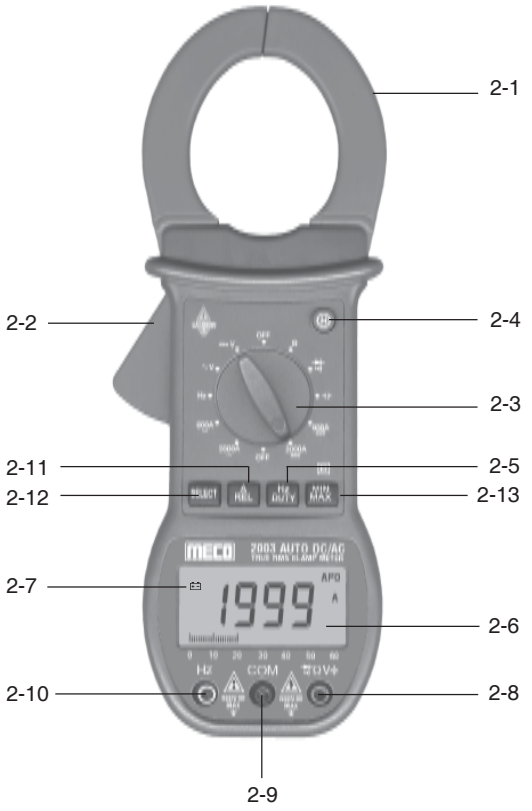
Periodically wipe the case with a damp cloth and detergent, do not use abrasives or solvents.

AUTORANGING DC / AC CLAMP METER

MODEL : 2003AUTO

USER MANUAL

FRONT PANEL CONTROLS



2-1 Transformer Jaw : This is used to sense the current signal. To measure DC/AC current, conductor must be enclosed by the jaw.

2-2 Transformer Trigger : This is used to open the jaw.

2-3 Function selector switch : This is use to select the function user desired such as DCA, ACA, $\underline{V}$, ohm, continuity, diode, Hz and capacitance.

2-4 Hold Button

2-5 Hz/Duty Button

2-6 LCD : This is a 3¾ digit liquid crystal display with maximum indication of 6000 counts.

2-7 Low Battery Symbol : When this Symbol appears, it means the battery voltage drops below the minimum required voltage. Refer to section V for battery replacement.

2-8 VV, ⊣⊢, ⇻, •))) Input Terminal : This terminal is used as input for voltage, ohm, continuity, diode and capacitance measurement.

2-9 COM Terminal : This terminal is used as common reference input.

2-10 Hz Terminal : This terminal is used for frequency input.

2-11 △ Rel Button

2-12 Select Button

2-13 Min/Max Button

1. SPECIFICATIONS

1.1 General Specifications

Display	:	3¾ digit liquid crystal display (LCD) Max reading 6000 counts
Polarity	:	Automatic, Positive implied, (-) negative polarity indication
Zero adjustment	:	Automatic
Over range indication	:	"OL" or "-OL"
Low battery	:	"[+ −]" mark turns on.
Sample rate	:	3 times per second, nominal
Operating conditions	:	O^0C to +50^0C at > 75% RH (Noncondensing)
Storage conditions	:	-20^0C to +60^0C, 80% RH with battery removed
Accuracy	:	Accuracy specification at 27^0C ± 5^0C less than 75% RH.
Power Supply	:	9V battery
Battery Life	:	25 hours typical with carbon zinc
Dimensions	:	250 x 100 x 46mm (approx.)
Weight	:	380gms including battery (approx.)
Accessories	:	Pair of test leads x 1, 9V battery (installed) x 1, Instruction manual x 1, Carrying Case x 1
Max. Jaw Opening	:	55mm

1.2 Electrical Specification

DC CURRENT :

Range	Accuracy	Overload Protection
600A	± (2.50% rdg ± 5 dgts)	2000A DC Max. for 1 minute
2000A		

AC CURRENT :

Range	Accuracy	Overload Protection
600A	± (3.50% rdg ± 5 dgts)	2000A AC Max. for 1 minute
2000A		

AC Voltage (Auto Ranging)

Range : 6V, 60V, 600V
Resolution : 1mV to .1V
Accuracy : ± (1.00% rdg + 6 dgts) on 50 - 60 Hz
± (2.00% rdg + 4 dgts) on 40 - 500Hz
Input impedance : >10MV
Over load protection : 600V DC or 600V AC rms.

DC Voltage (Auto Ranging)

Range : 600mV, 6V, 60V, 600V
Resolution : 0.1mV to 0.1V
Accuracy : ± 0.5 % rdg + 5 dgts
Input impedance : >10MV
Over load protection : 600V DC or 600V AC rms.

Resistance (Auto Ranging)

Range : 600V, 6KV, 60KV, 600KV, 6MV, 60MV
Resolution : 0.1V to 0.01MV
Accuracy : ± (0.3% rdg + 8 dgts) on 600V
± (0.3% rdg + 5 dgts) on 6KV to 600KV
± (0.5 % rdg + 5 dgts) on 6MV
± (2.0 % rdg + 5 dgts) on 60MV
Open Circuit Volts : 0.4V DC

Over load protection : 600V DC or AC rms.

Diode test

Test Current : 1.0 mA ± 0.6 mA
Accuracy : ± 3.0% rdg + 3 dgts
Open circuit volts : 3.0V DC typical.
Overload protection : 600V DC or AC rms.

Continuity

Audiable indication : less than 40V ± 20V
Overload protection : 600V DC or AC rms.

Frequency (Auto Ranging)

Ranges : 10.00Hz to 99.99Hz,
100.0Hz to 999.9Hz,
1.000KHz to 9.999KHz,
10.00KHz to 99.99KHz,
100.0KHz to 999.9KHz,
Resolution : 0.01 Hz to 0.1 KHz
Accuracy : ± (0.1 % rdg + 2 dgts)
Sensitivity : 3.0V rms min.
Effect reading : 10 - 9999
Overload protection : 200V DC or AC rms.

% Duty Cycle (Auto ranging)

Range : 1% to 90 %
Accuracy : ± (0.5 % rdg + 5 dgts)
Resolution : 0.1 %
Overload protection : 200V DC or AC rms.

Capacitance (Auto ranging)

Range : 6nf, 60nf, 600nf, 6㎌, 40㎌
Accuracy : ± (3.00 % rdg + 40 dgts) on 6nf range (use △ REL)
± (3.00 % rdg + 10 dgts) on 60nf to 6㎌
± (6.00 % rdg + 10 dgts) on 40㎌
Overload protection : 600V DC or AC rms.

2. OPERATION

1. Before taking any measurements, read the safety in information section. Always examine the instrument for damage, contamination (excessive dirt, grease, etc.) and defeets. Examine the test leads for cracked or frayed insulation. If any abnormal conditions exist do not ettempt to make any measurement.
2. **Data Hold Button :**

   Press data hold button to toggle in and out of data hold mode, in the data hold mode, the " HOLD " annunciator is displayed.
3. **Select Button :**

   In →|– , •))) range it will select diode or continuity function.
4. △ **REL Button :**

   Press (DREL) button to enter the relative mode the 'D' annunciator turn on, zero the display and store the displayed reading as a refrenece value. Press the (DREL) button to exit the relative mode.
5. **Hz / Duty Button :**

   In ACV range it will select ACV / HZ / Duty function in Hz range it will select Hz / Duty function.
6. **MIN / MAX Button :**

   Press (MIN / MAX) button to enter the MIN / MAX Recording Mode. The minimum & maximum values are then reset to the present input, the reading are stored in a memory. Push the button to cycle through the minimum (MIN), maximum (MAX) and present readings. The MIN or MAX annunciator turns on to indiacte what value is being displayed. In the MIN / MAX recording mode, when a new minimum value exceed the actual minimum readings or a new maximum value is overload, the minimum or maximum value will held on the display. Hz, ⊣⊢, →|–, •))) ranges without MIN / MAX function.

A. **DC/AC Current Measurements.**

7. **WARNING :** Make sure that all the test leads are disconnected from the meter's terminal for current measurement.
8. **DC Current :**
   a) Set the rotary switch at DCA range.
   b) Push the DREL button to stop the reading at zero for one second. If the reading is not stopped at zero, release the button a while and push it again.
   c) Press the trigger to open the jaw and fully enclose the conductor to be mesured. No air gap is allowed between the two half jaws.
   d) Read the measured value from the LCD display.
   e) Make sure that the offset value caused by the residual magnetism is still removed. If the new offset value is produced, remove it with the DREL button and make a new measurement again according to the "c" & "d". (If the current to be measured is larger than the current measured before, or the direction of current changes. the new offset value will be produced.)
9. **AC Current :**
   a) Set the Function/Range switch to the ACA range.
   b) Press the trigger to open transformer jaws, clamp onto completely closed,Read the current directly on the display, It is recommended that the conductor be placed at the center of the close jaws for maximum accuracy.

B. **DC/AC Voltage Measurements.**

10. **WARNING :** Maximum input for DCV is 600V and for ACV is 600V Do not attempt to take any voltage measurement that exceeds the limits. Exceeding the limits could couse electrical shock and damage to the clamp meter.

11. **DC Voltage :**
    a) Set the rotary switch at ⎓ V range.
    b) Insert the testleads into the input jack.
    c) Connect the test probe in parallel to the circuit to be measured.
    d) Read the measured value from the LCD display.
12. **AC Voltage :**
    a) Set the rotary switch at ~V range
    b) Insert the test tead in to the input jack.
    c) Connect the test probe in parallel to the circuit to be measured.
    d) Read the measured value form the LCD display.

WARNING : Before taking any in-circuit resistance measurement remove power from the circuit being tested and discharge all the capacitors.

13. **Resistance :**
    a) Set the rotary switch at V range.
    b) Insert the test lead in to the input jack.
    c) If the resistance being measured is connected to a circuit, turn off power to the circuit being tested and discharge all the capacitors.
    d) Connect test lead across the resistance being measured. When meansuring high resistance, be sure not contact adjacent points even if insulated because some insulator have a relatively low insulation resistance, causing the measured resistance to be lower than the actual resistance.
    e) Read resistance value on digital display. If a high resistance value is shunted by a large value of capacitace allow display to stabilize.

14. **Diode :**
    a) Set the rotary switch at →|, •))) range.
    b) Select →| by pressing select button.
    c) Insert the test lead in to the input jack.
    d) Turn off power to the circuit under test.
    e) Touch probes to the diode A forward voltage drop is about 0.6V (typical for a silicon diode)
    f) If the digital display reads over range "OL" reverse the lead connections. The placement of the test leads when the forweard reading is displayed indicates the orientation of the diode. The red lead is positive and the black lead is negative. If overrange "OL" is display with both lead connection, the juction is open, if a low reading (less than 1000) is obtained with both lead conncetion, the junction is shorted internally or (if junction is measured in a circuit) the junction is shunted by a resistance less than 1kV in the letter case the junction must be disconnected form the circuit in order to verify its opertion.
15. **Continuty :**
    a) Set the rotary switch at →|, •))) range.
    b) Select •))) by pressing select button.
    c) Insert the test lead in to the input jack.
    d) Connect the test lead to the test points the beeper sounds continuosly. If the resistance is less than 40V
16. **Frequency :**
    a) Set the rotary switch at Hz range.
    b) Insert the test lead in to the input jack.
    c) Connect the test lead to the points of measurement and read the frquency form the display.

17. **Duty Cycle :**
    a) Set the rotary switch at Hz range.
    b) Select duty cycle by pressing Hz / Duty button.
    c) Insert the test lead in to the input jack.
    d) Conncet the test lead to the points of measured and read duty cycle from the display
18. **Frequency & Duty Cycle measurement :**

    There are 2 positions for frequency & duty cycle measurment.
    a) 'Hz' position (not for line frequency measurement)
    b) 'ACV' position (for line frequency measurement)

a) 'Hz' position (not for line frequency measurment)

Sensitivity : 3V

Frequency range : 10.00 Hz to 999.9 KHz

Duty cycle : 1% to 90 %

Overload protection : 200V DC or AC peak

1) Set the rotary switch at Hz
2) Connect test lead in to the input jack.
3) Select frequency or duty cycle by pressing 'Hz / Duty' button.
4) Connect the test leads across the source or load under measurement

b) 'ACV' position (for line ferquency, measurement).

Sensitivity : 2V

Frequency range : 40 Hz to 500Hz

Duty cycle : 10% to 90%

Overload protection : 600V DC or 600V AC rms.

1) Set the rotary switch at V̲
2) Connect test lead in to the input jack.

3) Select frequency or duty cycle by pressing 'Hz / Duty' button.
4) Connect the test leads across the source or load under measurment.

19. **Capacitance measurements :**
    a) Set the Function / Range switch to the " ⊣⊢ " range.
    b) Connect the red test lead to the " + " jack and the black test lead to the " COM " jack.
    c) Connect the test leads to the capacitor and read the capacitance directly from the display.

3. MAINTENANCE

WARNING :

Remove test leads before changing battery performing any servicing. Never operate instrument unless bottom cover is closed.

TROUBLE SHOOTING

If there appears to be malfunction during the operation of the meter, the following steps should be performed in order to isolate the cause of the problem :

1. Check the battery.
2. Review the operating instructions for possible mistakes in operating procedure
3. Inspect and test the Test Probes for a broken or intermittent connection.

BATTERY REPLACEMENT

When the low battery symbol is displayed on LCD, replace the old battery with new battery.

A. Turn the power off and remove the test leads from the clamp meter.
B. Remove the screw of the battery compartment.
C. Slide off the battery compartment.

D. Remove the old battery

E. Insert new battery.

F. Replace the battery compartment and secure the screw.

PRECAUTION

1. Observe all safety rules while making measurements. CAUTION should be exercised when making measurements since dangerous voltages can be present in normally safe circuit or areas.
2. If this instrument is NOT going to be operated for an extended period remove the battery since damage can result from leakage.

4. SAFETY RULES

The following safety information must be observed to ensure maximum personal safety during the operation of this meter

1. Do not use the meter if the meter or test leads look damaged. or if you suspect that the meter is not operating properly.
2. This clamp meter is designed to take current measurements on circuit with a maximum voltage difference of 500VAC between any conductor and ground potential. Using the instrument for current measurements on circuit above this voltage may cause electric shock, instrument damage or damage to the equipment under test.
3. Turn off power to the circuit under test before cutting, unsoldering, or breaking the circuit. Small amounts of current can be dangerous.
4. Use caution when working above 60V DC or 30V AC rms. Such Voltages cause a shock hazard.
5. When using the probes, keep your fingers behind the finger guards on the probes.

6. Measuring voltage which exceeds the limits of the clamp meter may damage the meter and expose the operator to a shock hazard.

   Always recognize the meter voltage limits as stated on the meter.

MECO®

Certificate of Calibration

We hereby certify that this product has been calibrated and found to be in accordance with the applicable SPECIFICATIONS and STANDARDS.

Accuracies of the standard equipment used in this calibration are traceable to the National Standards.

MECO METERS PVT. LTD.

Plot No. EL-60, MIDC Electronic Zone, TTC Industrial Area, Mahape, Navi Mumbai - 400710 (INDIA)

Tel : 0091-22-27673311-16, 27673300 (Board)

Fax : 0091-22-27673310, 27673330

E-mail : sales@mecoinst.com

Web : www.mecoinst.com

SR. NO. : _____

CHECKED BY : _____

DATE : _____

MODEL NO. : _____

NOTE

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