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EASURING LIMITS

| mperes : 0.01A to 1000A |
| oltage : 0.1mV to 600V |
| oltage : 0.1mV to 600V |
| stance : 0.1Ω to 20MΩ |
| er : Sounds >120Ω |
| e Test : Test Current <0.3mA |

2. SAFETY INFORMATION

This manual contains information that must be followed for operating the meter safely and maintaining the meter in a safe operating condition. If the meter is not used in a manner specified in this manual, the protection provided by the meter may be impaired

The Model has been designed and complies with IEC 61010-1 and EN 61010-1 Safety Requirements for Electronic Measuring Apparatus.

/ WARNING

- Read through the operating instructions throughly and understand the instructions before operating the meter.
- Keep the manual at hand so as to enable quick reference when necessary
- Ensure that the use of the meter is in its intended applications and follow measurement procedures described in this manual.
- Follow all safety and operating instructions to ensure maximum personal safety during the use and operation of the meter.
- Failure to follow the above instructions may cause injury, instrument damage and/or damage to equipment under test.
- The symbol indicated on the meter means that the user must refer to related parts in the manual for safe operation of the meter. Be sure to carefully read the instructions following each symbol in this manual.

DANGER is reserved for conditions and actions that are likely to cause serious or fatal injury

WARNING is reserved for conditions and actions that are likely to cause serious or fatal injury

CAUTION is reserved for conditions and actions that are likely to cause minor injury or

A DANGER

- Never use the meter to measure voltages on a circuit above the maximum allowable input value on any function.
- Do not exceed the maximum allowable input of any measurement range.
- Never touch exposed wiring, connections or any live circuit when attempting to take measurements.
- Do not attempt to make measurements in flammable gaseous areas, fumes, vapor or dust. The use of the instrument in these areas may cause sparking, which can lead to an explosion.
- Do not attempt to use the instrument if its surface or your hand is wet
- Never open the battery compartment cover when making measurements.

WARNING

- Always inspect the meter and test leads for any signs of damage or abnormality before use. If the meter or its accessories have any structural defects such as broken test leads, cracked cases, exposed metal parts or the display is not reading, do not attempt to make measurements.
- Do not turn the function switch whilst test leads are connected to the meter.
- Do not install substitute parts or make modifications to the meter. Return the meter to your distributor for repair or re-calibration.
- Ensure the meter is switch off before opening the battery cover when replacing the battery.
- Never replace a battery if the surface of the meter is wet or moist.

/ CAUTION

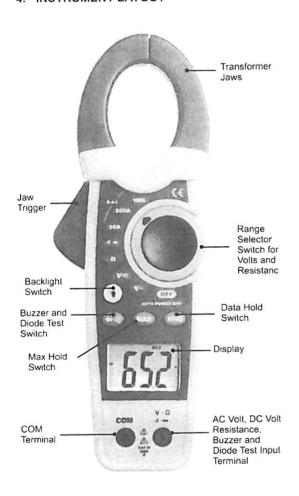
- Before making measurements ensure that the function selector switch is set on the appropriate range position.
- Always make sure that the plug of each test lead is inserted fully into the appropriate terminal of the meter.
- Ensure that the function selector switch is set to the "OFF" position after use. When the meter will not be in use for a long period of time, place it in storage after removing the battery.
- Do not expose the meter to direct sunlight, extreme temperatures or moisture.
- Do not use abrasives or solvents on the meter.
 To clean it use a damp cloth and mild detergent only.

Qualified and trained service technicians should only perform calibration and repair of the meter.

3. FEATURES

- Large 2000 count LCD display with bright white LED backlight.
- Wide measuring range from 0.01A AC up to 1000A AC.
- Measures AC and DC Voltage up to 600 volts
- Measures resistance from 0.01Ω up to $20M\Omega$.
- Designed to the international safety standard IEC61010 CAT III 600V / CAT II 1000V, Pollution degree 2.
- Max Hold records the highest reading in the current and voltage ranges.
- Auto Power Off after approximately 15 minutes to conserve battery life.
- Continuity Buzzer <120Ω
- Diode Test current 0.3mA typical.
- · Low battery indication.
- 30mm Maximum conductor size.
- Data Hold switch used to freeze reading on display.

4. INSTRUMENT LAYOUT



5. SPECIFICATIONS

Measuring Range	Resolution	Accuracy (% of Reading)
0 ~ 20.00A	0.01 A	± (2.5% + 10 digits)
0 ~ 200.0A	0.1 A	± (2.5% + 10 digits)
0 ~ 1000A	1 A	± (3.0% + 8 digits)
	0 ~ 20.00A 0 ~ 200.0A	Measuring Range Resolution 0 ~ 20.00A 0.01 A 0 ~ 200.0A 0.1 A

Range	Measuring Range	Resolution	Accuracy (% of Reading)
200mV	0 - 200.0mV	0.1 mV	± (0.8% + 5 digits)
2V	0 ~ 2.000V	0.001 V	± (1 2% + 3 digits)
20V	0 ~ 20.00V	0.01 V	
200V	0 ~ 200.0V	0.1 V	
600V	0 ~ 600V	1 V	± (1.5% + 3 digits)

Range	Measuring Range	Resolution	Accuracy (% of Reading)
200mV	0 ~ 200.0mV	0.1 mV	± (1.5% + 30 digits)
2V	0 ~ 2.000V	0.001 V	± (1.5% + 3 digits)
20V	0 ~ 20.00V	0.01 V	
200V	0 ~ 200.0V	0.1 V	
600V	0 ~ 600V	1 V	± (2.0% + 4 digits)

Note: No Autoranging on 200mV AC Range

Range	Measuring Range	Resolution	Accuracy (% of Reading)
200Ω	0 ~ 200.0Ω	0.1 Ω	± (1.0% + 4 digits)
2kΩ	0 ~ 2.000kΩ	1Ω	± (1.5% + 2 digits)
20kΩ	0 ~ 20.00kΩ	10 Ω	
200kΩ	0 ~ 200.0kΩ	100 Ω	
2ΜΩ	0 ~ 2.000ΜΩ	1 kΩ	± (2.0% + 3 digits)
20ΜΩ	0 ~ 20.00ΜΩ	10 kΩ	± (3.0% + 5 digits)

30mm Opening Approx Clamp Size

Test Current of 0.3mA typical; **Diode Test** Open circuit voltage 1.5V DC Threshold <120Ω; Test current <1mA Continuity Check "BAT" is displayed Low Battery Indication

Overrange Indication "OL" is displayed 2 per second, nominal Measurements Rate 7.8MΩ (VDC and VAC) Input Impedance Display 2000 count LCD AC Current Bandwidth 50/60Hz (AAC) AC Voltage Bandwidth

50/60Hz (VAC) -10°C to 50°C (14°F to 122°F) Operating Temperature -30°C to 60°C (-22°F to 140°F) Storage Temperature

Relative Humidity Up to 85% Over Voltage Category III 600V Two 1.5V "AAA" Batteries Battery Approx 15 minutes Auto Power Off Dimensions 229 x 80 x 49mm

303g Weight

6. AC CURRENT MEASUREMENT

WARNING: Ensure that the test leads are disconnected from the meter before making current measurements.

- 1. Set the function switch to 1000A or 200A or 20A range position, and make sure that the current under test does not exceed the upper limit of the measuring range you have selected.
- 2. Press the trigger to open up the transformer jaws and clamp around the single conductor under test.
- 3. Read the display.

Note: • During current measurements keep the transformer jaws fully closed, otherwise this will affect the accuracy of the measurement.

> · When large currents the transformer jaws may buzz. This is not a fault and does not affect the accuracy of the reading.

Correct Current Incorrect Current Measurement Measurement



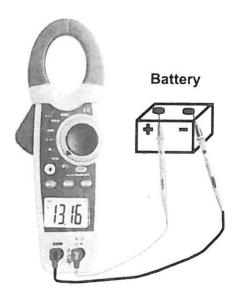
7. DC VOLTAGE MEASUREMENT

- 1. Set the function switch to Vm range position. The meter automatically defaults to
- 2. Insert the red test lead into the "V Ω >> ")" input terminal and the black lead to the "COM" terminal.
- 3. Connect the other end of the test leads to the circuit under test.
- 4. Read the display. If a "-" sign is displayed, the red lead is the negative potential.

Note: • The meter is set to default to "Auto

Range" mode.

• Pressing the MAX hold button will allow the user to record the maximum reading on the DC volt range. See page 13 for further instructions for "MAX" Hold function.



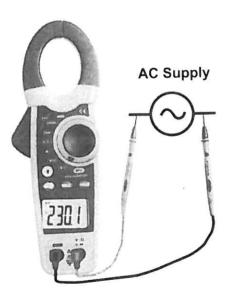
8. AC VOLTAGE MEASUREMENT

- Set the function switch to variance position.
- Insert the red test lead into the "V Ω → ")"
 input terminal and the black lead to the "COM"
 terminal.
- Connect the other end of the test leads to the circuit under test. Take the reading on the display.

Note: • The meter is set to default to "Auto

Range" mode.

Pressing the hold button will allow the user to record the maximum reading on the AC volt range. See page 13 for further instructions for "MAX" Hold function.



9. RESISTANCE MEASUREMENT

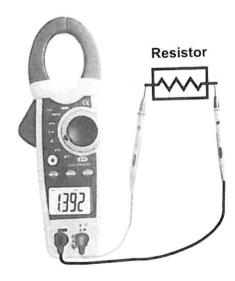
1. Set the function switch to Ω range position.

Insert the red test lead into the "V Ω → ")"
 input terminal and the black lead to the "COM"
 terminal.

3. Connect the other end of the test leads to the circuit or component under test. Take the reading on the display.

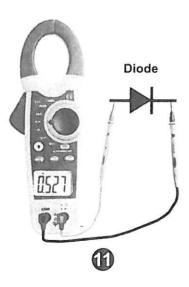
Note: • The meter is set to default to "Auto Range" mode.

 WARNING before attempting to make a resistance measurement, ensure there is no voltage present on the circuit under test.



10. DIODE TEST

- 1. Set the function switch to range position.
- Press the button to select the Diode Test range. The meter automatically defaults to Diode Test range.
- Insert the red test lead into the "V Ω → →»)"
 input terminal and the black lead to the "COM"
 terminal.
- 4. Connect the other end of the test leads to the component under test. Read the display.
- Note: Use the diode test to check diodes, Transistors, silicon controlled rectifiers (SCR's) and other semiconductor devices.
 - The test sends a current through a semiconductor junction, then measures the junction's voltage drop.
 - Normal forward voltage drop (forward bias) for a good silicon diode is between 0.4V to 0.9V. A reading higher than that indicates a leaky (defective) diode. A zero reading indicates a shorted diode.
 - Reverse the test leads connection (reverse bias) across the diode. The display shows "OL" if the diode is good. Any other readings indicate the diode is shorted or resistive (defective).



11. CONTINUITY TESTING

- 1. Set the function switch to range position.
- 2. Press the button to select the Continuity Test range. The meter automatically defaults to Diode Test.
- Insert the red test lead into the "V Ω → ")"
 input terminal and the black lead to the "COM"
 terminal.
- 4. Short the tip of the test leads and make sure the display reads "0" and the buzzer beeps.
- 5. Connect the tip of the test leads to the circuit or component under test. The display reads the resistance and the buzzer beeps when the reading is not more than about 120Ω .

Note: • Using resistance and continuity function in a live circuit will produce false results and may damage the instrument.

- In many cases the suspicious components must be disconnected from the circuit under test to obtain accurate results
- MARNING before attempting to make a test, ensure there is no voltage present on the circuit.



12. DATA HOLD

This is a function used to freeze the reading on the display, ideal for later viewing.

- Press the HOLD button once. When the Hold is activated, the meter beeps, freezes the reading, and displays the "HOLD" indicator on the LCD.
- 2. To deactivate the "HOLD" function, press button once, the meter will beep and the meter will start reading new measurements.

13. MAX HOLD

This is a function used to record the maximum reading on the display for the voltage and current ranges.

- 1. Press the MAX button once. When the MAX is activated, the meter beeps, and displays the "MAX" indicator on the LCD.
- The meter will record the highest reading and freeze the display indicating this maximum reading.
- 3. To deactivate the "MAX" function, press button once, the meter will beep and the meter will start reading new measurements.

14. LCD BACKLIGHT

The backlight is ideally used in dark or dimly lit areas.

- Press the button for 3 seconds, and the bright white light will come on together with the Data Hold.
- 2. To turn off the backlight press the button for 3 seconds.

Note: • The use of the backlight will reduce the battery life considerably.

15. BATTERY REPLACEMENT

When the "BAT" sign appears on the LCD, this indicates the battery should be replaced. Use the following procedure to replace the two standard "AAA" 1.5V batteries (IEC LR 3) batteries.

- Disconnect the test leads from any live source and remove the leads from the input terminals.
- 2. Rotate the function switch to the OFF position.
- The battery cover is secured to the bottom of the case by a screw. Using a screwdriver remove the screw from the battery cover and remove the battery cover from the meter.
- Remove the old battery and replace it with two new IEC LR 3 1.5V batteries.
- 5. Replace the battery cover and reinstall the screw.

