1. INTRODUCTION
This instrument is a high-performance, battery operated, 3 1/2 digital multi-meter for measuring DC and AC voltage, DC and AC current, Resistance and Capacitance, Frequency and Temperature, Transistor, Diode and Continuity test. The Dual-integral A/D converter uses CMOS technology for auto-zero, polarity selection and over-range indication. Full overload protection is provided. Because of its outstanding features, it is most suitable for use on production lines or for lab, R & D, maintenance and repair work.

2. SPECIFICATIONS
2.1 GENERAL SPECIFICATIONS
[Details of specifications are provided regarding display, polarity, zero adjustment, measuring method, sampling rate, over range indication, low battery display, safety standards, operating environment, storage environment, power, and accessories.]

2.2 ELECTRICAL SPECIFICATIONS
[Specifications for accuracy, range, resolution, input impedance, overload protection, capacitance, and frequency are detailed for DC voltage, AC voltage, DC current, AC current, and temperature measurements.]
2) When only the function switch is set to a higher range and work down, until obtain the most accurate reading.

Formulas:

1. For current measurement from 200mA to 20A follow generally the above procedure but connect the RED test lead to "20A" jack.

2. The function switch should be set to the range which you want to test before measuring.

3. Connect the probes or shield cable across the source load under test. Turn off power and capacitors should be fully discharged before measuring.

4. To convert function and range switch, test leads must leave test point. Excessive current will blow the fuse so that must be replaced. The 20A range is not protected by a fuse.

5. The instrument has special thermocouple probes. Do not apply more than DC1000V/AC700V rms to the input. Indication is normal, when measure 10MΩ resistance (on 200MΩ range) display reading is 11.0, measure 1000Vrms resistance (on 200MΩ range) digits reading is 101.0. The 10 digits is a constant and should be subtracted from the reading.

4.4 Capacitance measurement
1. Connect the test leads to COM jack and RED test lead to V/L Hz IC jack.
2. Connect the probes across capacitance to be tested, and set the function switch to 'F' position.

4.5 Frequency measurement
1. Connect test leads or shield cable to COM jack and RED test lead to V/L Hz IC plug.
2. Set the function switch to 20kHz range position.
3. Connect the probes or shield cable across the source load under test.

4.6 Temperature measurement
1. Set the function switch to 'C' or 'F' range position.
2. Insert the cold end of thermocouple into socket (noting polarity and put work end into measurement place. Display reading in °C or °F.

Note:
Do not use this instrument in high temperature environment, it is preferable to use shield cable for measuring small signals.
3. Use a suitable measurement high voltage.

4.7 HFE measurement
1. Connect the HFE test lead to COM jack and the function switch to 'hFE' position.
2. Determine whether the transistor is NPN or PNP and locate the Emitter, Base and collector leads. Insert the leads into the proper holes in the socket on the front panel.

3. The display will read the approximate PVE value at the test condition

4.8 Diode and continuity Test

1. Connect the BLACK test lead to COM jack and RED test lead the VIPIHzlC jack. (Note: The polarity of the red test probe is + ).

2. Set the FUNCTION switch to “\-I\+” position.

3. Connect the test leads across the diode under measurement, display shows the approx. forward voltage of this diode.

4. Connect the test probes to two points of circuit, if the resistance is lower than approx. 70 Ω Buzzer sounds.

Note:
1. When the input is not connected, i.e. at open circuit, the figure “1” or “-1” will be displayed.
2. There is a milli-amp current flow through the diode under test.

3. The meter displays the forward voltage drop in milli-volts and overload when the diode is reversed.

4.9 HOLD KEY

This key is used to hold data during measurement. This function is operative in all measurement method, Pressing the key, reading this held and \( H \) appears in the display. Pressing the key once again in order to release the hold function.

4.10 Auto off and sleep mode

1. Working after 15min, instrument is auto-off.

2. Press “POWER” key, the instrument was opened again.

5. WARNING

1. When measuring more than 36VDC/25VAC voltage ensure that instrument is not connected to a current or resistance range, or to the diode check. Always ensure that the correct terminals are used for the type of measurement to be made.

2. Pay attention when measuring voltage above 50V, especially from sources where high energy is existed.

3. Avoid making connections to live circuits whenever possible.

4. When making current measurements ensure that the circuit not live before opening it in order to connect the test leads, and don’t input more than 20A.

5. Before making resistance measurements or diode test, ensure that the circuit under test is de-energized.

6. Take care not to exceed the over-load limits as given in the specification.

5.1 Care for your multi-meter

1. Keep the multi-meter dry If it gets wet, wipe it dry immediately. Liquids can contain minerals that can corrode electronic circuits.

2. Operate and store the multi-meter only in normal temperature environments. Temperature extremes can shorten the life of electronic devices, damage batteries, and distort or melt plastic part.

3. Handle the multimeter gently and carefully. Dropping it can damage the circuit boards and case and can cause the multi-meter to work improperly although the holder can provide enough protection.

4. Keep the multi-meter away from dust and dirt, which can cause premature wear of parts.

5. Wipe the multi-meter with a damp cloth occasionally to keep it looking new. Do not use harsh chemicals, cleaning solvents, or strong detergents to clean the multi-meter.

6. Use only fresh battery of the required size and type. Always remove old or weak batteries.

7. They can Leak chemicals that destroy electronic circuits.

6.2 Maintenance

1) 9-Volt battery replacement

a. Ensure the instrument is not connected to any external circuit. Set the selector switch to OFF position and remove the test leads from terminals.

b. Remove the screw on the bottom case and lift the bottom case.

c. Remove the spent battery and replace it with a battery of the same type.

2) Fuse replacement

a. Ensure the instrument is not connected to any external circuit. Set the selector switch to OFF position and remove the test leads from terminals.

b. Remove the screw on the bottom case and lift the bottom case.

c. Replace the fuse with same type and rating: 5x20mm, 200mA/250V, fast-blow fuse or as the replacements.