ANALOG MULTIMETER

MANUAL

1. SAFETY INFORMATION

The following are precautions to prevent accidents. Be sure to read them before using the device.

1.1. Symbols

The following symbols appear on the multimeter and the manual.

⚠ Disobedience to instructions with this sign may lead to troubles of the device or accidents like electrical shock.

⚠ Risk of electric shock

1.2. Precautions for safety measurement

⚠ WARNING

To ensure that the meter is used safely, follow all safety and operating instructions

- Never use meter on the electric circuit that exceed 3kV.
- Pay special attention when measuring voltage of AC30Vrms or DC60V or even higher range to avoid injury.
- Never apply an input signals exceeding the maximum rating input value.
- Never use meter for measuring the line connected with other equipment.
- Never use meter if the meter or test leads are damaged.
- Never use uncased meter.
- Be sure to use a fuse of the specified rating or type. Never use a substitute of the fuse or make a short circuit of the fuse.
- Always keep your fingers behind the finger guards on the probe when making measurements.
- Be sure to disconnect the test leads from the circuit when changing the function or range.
- Before starting measurement, make sure that the function and range are accordingly set.
- Never use meter with wet hands or in a damp environment.
- Never use other test leads instead of the standard one.
- Never open the case except when replacing batteries or fuses. .
- To ensure safety and maintain accuracy, calibrate and check the meter at least once a year

2. SPECIFICATIONS

General specification

Item	Specification
Vibration protection	Shockproof design
Circuit protection	The circuit is protected by fuse
Battery	AAA 1.5V*2
Internal fuse	0.5A/250VΦ5.2mmX20mm 10A/250V Φ5X20mm
Standard calibration temperature/humidity range	23±2℃, 45-75%RH
Operating temperature and humidity range	0-40℃, ≤80%RH. No condensation
Withstand voltage	3kV, ACV between input terminal and case (1 min)
Dimensions and weight	160*101.5*40mm About 225g（including battery)

3. FUNCTION AND FEATURE

3.1. Function

This is a portable multimeter designed for measuring small current circuits.

3.2. Feature

- Can measure low voltage and high impedance (up to 200MΩ)
- High sensitivity, shockproof design
- Overload protection circuit up to 230V

3.3. Measurement range and accuracy (*1 not including fuse impedance)

Function (Full scale value)		Accuracy	Remark
DCV	0.1	±5% against full scale	Input impedance 20kΩ/V
	0.5/2.5/10/50	±3% against full scale	
	250/1000		Input impedance 9kΩ/V
ACV	10/50/250/1000	±4% against full scale	Input impedance 9kΩ/V
DCA	50u	±3% against full scale	*1 Voltage drop 0.1V
	2.5m/25m/0.25		*1Voltage drop 0.18V
	10A		
Ω	2k/20k/200k/2M (×1/×10/×100×1k)	±3% of arc	Center value 20Ω 2kΩ release Voltage 3V
	200M(x100k)	±5% of arc	
dB	-10dB~+22dB (10VAC~62 dB)	----------	Input impedance 9KΩ/V
LI	0～150mA at x 1 range 0～15mA at x 10 range 0～150uA at x 1k range 0～1.5uA at x 100k range		Current across test leads
hFE	1000 at x 10 range		

⚠ WARNING: Confirm the range before measurement.

3.4. Measurement preparation

- Adjustment of meter zero position

  Turn the zero adjuster to make the pointer to zero position.
- Range selection:

  Turn the range select knob to an appropriate rang.

  NOTE: When determining measuring range, select a range higher than the value to be measured. However, select a maximum range if the value to be measured can’t be predicted.

4. MEASUREMENT PROCEDURE

4.1. Measuring DCV

- Turn the range selection knob to an appropriate DCV rang
- Connect the black test lead to the negative pole of the measured circuit and the red one to the positive pole.
- Read the reading of pointer by DCV –A

4.2. Measuring ACV

- Turn the range selection knob to an appropriate ACV rang.
- Connect the test lead to the measured circuit
- Read the reading of pointer by DC-A. (Use AC10V scale for 10V only)

  Note: Since the device provides mean-value-system for ACV test circuit, AC wave of different sin wave may cause error.

4.3. Measuring DCA

⚠ Warning: connect the meter to the load in series.

- Turn the range selection knob to an appropriate DCA range.
- Take out measured circuit and connect the black test lead to the negative pole and the red one to the positive pole.
- Read the reading of pointer by DCV–A.

4.4. Measuring Ω

⚠ Do not measure the resistance in a circuit with voltage.

- Turn the range selection knob to an appropriate Ω range.
- Short circuit the test leads and adjust the 0Ω to make the pointer to the zero position

  NOTE: if the pointer fails to 0Ω even when the 0Ω adjuster is turned clockwise fully, please replace the batteries
- Measuring resistance.
- Read the reading.

  NOTE: the positive pole of the battery connected to the positive terminal of meter, so the polarity of the terminal is opposite from the polarity of the resistance. –COM terminal output voltage is + and +COM output voltage is -.

4.5. Measuring AF output (dB).

NOTE: Eliminate DC component with a capacitor of 0.1uF or higher one when measuring the signal with DC component.

- The dB measurement method is the same as the ACV, but it read the reading of the dB scale.
- For measurement the range of 10V, the dB scale (-10dB~+22dB) is under the range of 250V, the maximum dB readable is 22+40=62 (dB).

4.6. Measuring transistor ICEO

- Adjust 0Ω to x10~x1k range by turn the range selection knob.
- For NPN transistor, connect the black test lead to the collector and the red one to the emitter. For PNP transistor, the black one to emitter and the red lead to the collector.
- Determine the leak current by ICEO scale indicated on the scale plate. (Unit in uA, mA)

4.7. Measuring diode (including LED)

- Adjust 0W to a appropriate range: x1(150mA)～x100k (1.5uA) by turn the range selection knob.
- Connect the black test lead to anode side and the red one to cathode side when measuring IF (forward current).

  Connect the black test lead to cathode side and the red one to anode side when measuring IR (reverse current).
- Read the indicated value by LI scale. (To IF, the swing amplitude of the pointer is large. To IR, the swing amplitude of the pointer is small).
- Value indicated on LV scale during the measurement is the forward voltage of diode.

4.8. Measuring transistor hFE

- Turn the range selection knob to x10 range.
- Plug the emitter, base and collector leads of the transistor into the correct holes in either the NPN or PNP transistor test socket.
- Read the indicated value on the hFE scale.

5. FUSE AND BATTERY REPLACEMENT

- The meter can't be used when the fuse is blown, except within DC10A, loosen the screw and remove the battery cover to replace the fuse.
- When 2 of the 1.5V battery power are exhausted, it is no longer possible to adjust 0Ω at the x 1Ω range, replace the battery, and pay attention to the correct polarity when replacing the battery.

⚠ WARING:

Never replace the fuse or batteries during measurements, make sure to set the range selection knob switch to "OFF "position, remove the test leads from the instrument before replacing the fuse and batteries and always use the F250V 0.5A fuse as specified.

6. PACKING LIST

Main device	1pc
Color box	1pc
Test leads	1pair
User's manual	1pc
Battery	1pair

NOTE:

- The operation instruction is subject to change without notice
- The content of the operation instruction is regarded as correct. Whenever any user finds its mistakes, omission, etc., he or she is requested to contact the manufacturer.
- The present manufacturer is not liable for 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.