

# 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
Circuit protection	The circuit is protected by fuse, even if the voltage is up to 230V.
Battery	AAA 1.5V*2、 6F22 9V battery
Standard calibration temperature/humidity range	23±5°C, ≤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

It is a portable device designed for measuring small current circuits.


#### 3.2. Feature

- Can measure high resistance at low voltage (up to 20MΩ)
- Overload protection circuit up to 230V

#### 3.3. Measurement range and accuracy

Function (Full scale value)	Accuracy	Remark
DCV 2.5/10/25/50/250 /1kV	±3% against full scale	Input impedance 20kΩ/V
ACV 10/50/250/1k	±4% against full scale	Input impedance 9kΩ/V
DCA 50uA 0.5/5/50/500mA 10A	±3% against full scale	*1 Voltage drop 0.1V
		Voltage drop 0.13V

Ω	X1/X10/X100/X1k /X10k	±3% of arc	Center value 20Ω
dB	-10dB~+22dB (10VAC)~62 dB	-----	Input impedance 9KΩ/V
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 test leads to the tested circuit.
- Read the value directly.

#### 4.2. Measuring ACV

- Turn the range selection knob to an appropriate ACV rang.
- Connect the test leads to the tested circuit.
- Read the value directly.

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 value of pointer on DC/AC scale plate.

#### 4.4. Measuring $\Omega$



Do not measure the resistance in a circuit with voltage.

- Turn the range selection knob to an appropriate  $\Omega$  range.

- Adjust the  $0\Omega$  knob to make the pointer to the zero position

NOTE: if the pointer fails to  $0\Omega$  even when the  $0\Omega$  adjuster is turned clockwise fully, please replace the batteries

- Connect the test leads to the tested circuit.
- Read the value on  $\Omega$  scale plate.

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.

##### NOTE: Battery replacement step:

- 1) Loosen the screws and take out the battery cover.
- 2) Take out the AAA battery or 6F22 dry battery.
- 3) Close the battery cover and fix the screws.

#### 4.5. Measuring AF output (dB).

- The dB measurement method is the same as the ACV, but it read the value of the dB scale.
- At the range of 10V, the value of the dB scale (-10dB~+22dB) can be read directly, but at the range of 50V, you should add 14dB, and at the range of 250V, you should add 28dB, at the range of 1000V, you should add 40dB. Therefore, the maximum dB readable is  $22+40=62$  (dB) at the range of 1000V.

#### 4.6. Measuring transistor hFE

- Turn the range selection knob to a proper hFE range.
- Short circuit the test leads, and adjust the  $0\Omega$  position.
- Plug the tested transistor into the correct E, B, C holes.
- Read the indicated value on the hFE scale.

### 5. MAINTENANCE

#### 5.1. Replace the fuses

When measuring DCA at  $\Omega$  range, If the overload is above 100V, the fuse is blown to protect the circuit.

- Loosen the screws of the back case and remove it.
- Take the fuse out of the holder on PCB and replace it.
- Close the case and tighten the screws.
- Check and see whether or not indications of respective ranges are normal.

#### 5.2. Storage and other precautions

- Avoid excessive shock or vibration.
- Keep off dust and moisture from the tester.
- Do not leave the tester for a long time in places of a high temperature (higher than  $55^{\circ}\text{C}$ ) and a high humidity (higher than 80%).
- The meter cover is treated with antistatic coating. Do not wipe it hard or clean it with volatile solvent, Use a soft brush to remove dust.

Arc	Range	Multiple	Arc	Range	Multiple	
1	X10k $\Omega$	X10k	4	DCV50V	X1	
	X1k $\Omega$	X10k		ACV50V	X13	
	X100 $\Omega$	X10k		DCA500mA	X10	
	X10 $\Omega$	X10k		DCA50mA	X1	
	X1 $\Omega$	X10k		DCA5mA	X0.1	
2	DCV1000V	X1		DCA0.5mA	X0.01	
	DCV10V	X1		DCA500uA	X10	
	ACV1000V	X1		DCV250V	X1	
	ACV10V	X1		DCV25V	X0.1	
Arc	Range	Multiple				
5	DCA10A	X1				
6	dB					
	ACV10V	X1				
	ACV50V	+14				
	ACV250V	+28				
	ACV1000V	+40				

7	hEE	X1	
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### 6. PACKING LIST

Main device	1pc
Color box	1pc
Test leads	1pair
User's manual	1pc
Battery	1pair AAA 1.5V
Battery	1pc 9V battery

#### 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.