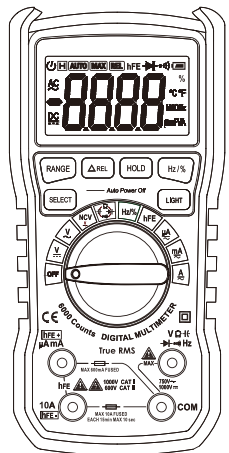


User Manual  
DIGITAL MULTIMETER



Made in China



1.Safety Information

Warning

Before using the meter, please pay special attention since improper use may cause electric shock or damage. Please abide by the general safety procedures and fully comply with the safety measures specified in the manual.

In order to make full use of all functions of the meter and ensure safe operation, please carefully read and follow the manual.

This meter is manufactured strictly in accordance with pollution level 2 safety standard and in conformity with over-voltage standard CAT II 600V. Not only meets GB/T 13978-92 general technical conditions of digital multimeters, but also GB4793.1-1995 (IEC-41010-1) safety requirements of electronic measuring instruments. Please follow the manual to ensure safe use of the meter. The meter will give you a satisfactory service through proper use and maintenance.

1.1 Preparation

- 1.1.1 Before operating the meter, the operator must observe all standard safety procedures in two respects below:
  - Safe procedures against electric shock
  - Safe procedures against unintended use

- 1.1.2 After receiving the meter, check if it is damaged during the transportation.
- 1.1.3 Under the rough condition of preservation, shipment, check and confirm whether the meter is damaged.
- 1.1.4 Test leads must keep in good condition. Before operating, check whether the insulator of test leads is damaged and whether the wires are exposed.
- 1.1.5 Use the standard lead to ensure safety. If necessary, replace the lead with the same size or the same level.

1.2 Safety Measurement

- 1.2.1 When measuring, the operator must correctly use the functions and ranges.
- 1.2.2 Do not exceed the valid value of each measuring range.
- 1.2.3 Do not touch the top of test leads (metal probe) while the meter is measuring the circuit.
- 1.2.4 If the measured voltage exceeds 60V DC or 30V AC (RMS), the operator should pay attention to keep fingers always behind its protective ring.

- 1.2.5 Do not measure the voltage more than 1000VDC or 750VAC.
- 1.2.6 For the manual range, if you do not know the exact range of the measured value in advance, you should select the highest range.
- 1.2.7 Before turning the function switch to another measuring range, be sure that test leads have been removed from the circuit.
- 1.2.8 Before leads on measuring resistance, capacitance, diode and continuity, the operator must cut off the power supply to the circuit.
- 1.2.9 The operator should be careful to avoid the meter connected to the voltage source during current, resistance, capacitance, diode and continuity measurement.
- 1.2.10 Do not measure the capacitance until it is fully discharged.
- 1.2.11 The meter is prohibited from being used in the vicinity of any explosive gas, vapor or dust.
- 1.2.12 If the operator notices any abnormality or malfunction of the meter, stop using it.
- 1.2.13 The meter should not be used unless its bottom case and battery cover are fully fastened in place.
- 1.2.14 Do not store or use the meter under the blazing sunlight, extreme temperature, heavy humidity.

1.3 Safety Symbol

Warning (an important safety symbol, with reference to user manual)

Can be used on live conductors

Double Insulation Protection (Class II)

CAT II In accordance with IEC-41010-1 standard over-voltage (installation) level II, pollution level 2 referring to the level of impulse withstand voltage protection.

Compliant with European Union Directive

Ground

1.4 Maintenance

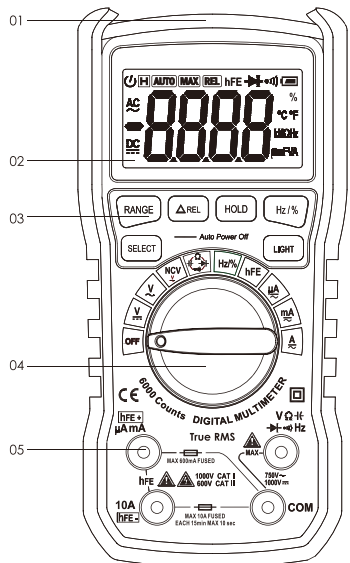
- 1.4.1 Do not attempt to adjust or repair the meter. This operation can only be performed by a professional technician who is fully familiar with the meter against the risk of electric shock.
- 1.4.2 Before opening the bottom case or battery cover, be sure that test leads have been taken off from the circuit.
- 1.4.3 In order to avoid possible electric shock caused by inaccurate readings, the battery should be replaced immediately when the meter displays symbol.
- 1.4.4 Use a damp cloth and a mild detergent to clean the meter, rather than abrasives or solvents.
- 1.4.5 When the meter is not in use, shut off the power and turn the range switch to OFF.
- 1.4.6 If the meter is idle for a long time, remove the battery to prevent damage.

2. Description

- This meter is a portable, professional multimeter equipped with backlight LCD display for quick readings. The range switch can be carried out with single hand, built in overload protection and low battery indication. It is a must-have multimeter suitable for professional electricians, beginners, enthusiasts, and home users.
- AC current, DC current, AC voltage, DC voltage, frequency, duty cycle, resistance, capacitance and continuity measurement, diode, triode test.
- The meter applies manual range and auto range.
- Data hold.
- True RMS on AC current, AC voltage measurement.
- Auto power off.

2.1 Component Name

- 01. Non-Contact Voltage Sensing Detection
- 02. LCD Display
- 03. Buttons
- 04. Rotary Switch
- 05. Input Socket



COM jack: public terminal  
HFE +, HFE jack: triode current magnification (used with the adapter)  
Jacks:  $\mu$ A and mA current input terminals.  
10A jack: 10A current input terminal.

2.2 Instruction of Switches, Buttons and Input Jacks

- HOLD button: used for data hold
- SELECT button: used for function switch
- RANGE button: used for switch between auto range and manual range
- REL button: relative
- LIGHT backlight button: turns the backlight on or off
- OFF: turn off the power.
- VHz% jack: voltage, resistance, frequency, duty cycle, capacitance, diode, continuity input terminal

2.3 LCD Display

	AC
	DC
	Diode
	Beep Continuity
	Auto Range
	Auto Power Off
	Low Battery Indicator
	% (Duty Circle)
	Hz, kHz (frequency)
	mV, V (Voltage)
	A (Current)
	nF, $\mu$ F, mF (Capacitance)
	Q, kQ, MQ (Resistance)
	Triode Current Magnification
	Relative
	Non Contact Voltage Detection
	Data Hold

3. Specifications

The meter should be calibrated at 18 °C ~ 28 °C, relative humidity less than 75% for one year period.

3.1 Summary

- 3.1.1 Auto range and manual range
- 3.1.2 Overload protection in all range
- 3.1.3 Maximum allowable voltage: 1000V DC or 750VAC (RMS)
- 3.1.4 Operating altitude up to 2000m
- 3.1.5 Display: LCD
- 3.1.6 Maximum display value: 9999 counts
- 3.1.7 Polarity indication: auto indication, '-' indicates negative polarity
- 3.1.8 Overrange display: 'OL' or 'OL'
- 3.1.9 Sampling time: approx. 0.4 seconds
- 3.1.10 Unit display: function, range unit display
- 3.1.11 Auto shutdown time: 30 minutes without any operations
- 3.1.12 Power supply: 9V 6F22 battery
- 3.1.13 Low battery indication: LCD display symbol
- 3.1.14 Temperature accuracy: less than 0.1 ° accuracy / °C
- 3.1.15 Operating temperature: 0 °C ~ 40 °C
- 3.1.16 Storage temperature: -10 °C ~ 50 °C
- 3.1.17 Size: 175 × 85 × 22mm
- 3.1.18 Weight: about 365g (battery excluded)

3.2 Technical Directive

Ambient temperature: 23 ± 5 °C Relative humidity: <75%

3.2.1 True RMS

- 3.2.1.1 For the measurement of non sine wave signal, the measurement deviation of True RMS is less than traditional average value response.
- 3.2.1.2 True RMS meter can accurately measure the non sine wave signal. If the rotary switch to CAC Voltage Position without input measured signal (AC Voltage dial, input short circuit), the digital multimeter may display a reading between 1 and 50 words. These deviations are normal. They do not affect the accuracy of the meter for measuring AC current within the specified range of measurements.
- 3.2.1.3 The input signal must to reach a certain level can to measuring for True RMS, so that the AC voltage and current range specified in the full range of 2% ~ 100%.
- 3.2.1.4 To ensure the accuracy of AC measurement, the input signal should be:  
AC Voltage: > 13mV AC  
AC Current: > 1.3A AC

3.2.2 DC Voltage

Range	Resolution	Accuracy
600mV	0.1mV	±(0.8% rdg + 3dgt)
6V	0.001V	±(0.5% rdg + 5dgt)
60V	0.01V	
600V	0.1V	
1000V	1V	

- Input impedance: 10M $\Omega$
- Overload protection: 600mV Range: 250V DC or AC (RMS), 60V-600V range: 600V DC or 600V AC (valid value)
- Maximum input voltage: 1000V DC

3.2.3 AC Voltage

Range	Resolution	Accuracy	Frequency
6V	0.001V	±(1.2% rdg + 5dgt)	45 ~ 1KHz
60V	0.01V	±(1.2% rdg + 5dgt)	
600V	0.1V	±(1.5% rdg + 5dgt)	
750V	0.1V	±(1.5% rdg + 5dgt)	

- Input impedance: 10M $\Omega$
- Overload protection: 600mV Range: 250V DC or AC (RMS), 60V-600V range: 600V DC or 600V AC (valid value)
- Maximum input voltage: 750V AC (RMS)

3.2.4 Resistance

Range	Resolution	Accuracy
600 $\Omega$	0.1 $\Omega$	±(0.8% rdg + 5dgt)
6k $\Omega$	0.001k $\Omega$	
60k $\Omega$	0.01k $\Omega$	
600k $\Omega$	0.1k $\Omega$	
6M $\Omega$	0.001M $\Omega$	±(1.5% rdg + 5dgt)
60M $\Omega$		

- Open circuit voltage: approx. 0.4V
- Overload protection: 250V DC or AC (RMS)

3.2.5 Capacitance

Range	Resolution	Accuracy
6nF	0.001nF	±(4.0% rdg + 5dgt)
60nF	0.01nF	
600nF	0.1nF	
6 $\mu$ F	0.00 $\mu$ F	±(3.0% rdg + 3dgt)
60 $\mu$ F	0.1 $\mu$ F	
600 $\mu$ F	0.1 $\mu$ F	
6mF	0.001mF	±(4.0% rdg + 5dgt)
60mF	0.01mF	

- Overload protection: 250V DC or AC (RMS)

3.2.4 Diode

Range	Resolution	Function
	0.001V	Will display forward drop voltage

- Forward DC current: about 1mA
- Reverse DC voltage: about 3.3V
- Overload protection: 250V DC or AC (RMS)

3.2.7 Continuity

Range	Resolution	Function
	0.1	If the measured resistance is less than 50 $\Omega$ , buzzer will sound

- Open circuit voltage: about 1.2V
- Overload protection: 250V DC or AC (RMS)

3.2.8 Frequency

3.2.8.1 V/C:

Range	Resolution	Accuracy
60Hz	0.01Hz	±(1.5% rdg + 5dgt)
600Hz	0.1Hz	
6kHz	0.001kHz	
60kHz	0.01kHz	

- Measuring range: 10Hz ~ 10kHz
- Input voltage range:  $\geq$  0.2V AC (RMS) (the input voltage increases with the measured frequency increasing)

3.2.8.2 Hz:

Range	Resolution	Accuracy
60Hz	0.01Hz	±(1.5% rdg + 5dgt)
600Hz	0.1Hz	
6kHz	0.001kHz	
60kHz	0.01kHz	
600kHz	0.1kHz	
6MHz	1kHz	
60MHz	10kHz	

- Overload protection: 250V DC or AC (RMS)
- Measurement signal: Vpp3V AC signal

3.2.8.3 Duty Cycle

Range	Resolution	Accuracy
10 ~ 95%	0.1%	±2.0%

3.2.9 DC Current

Range	Resolution	Accuracy
600 $\mu$ A	0.1 $\mu$ A	±(1.0% rdg + 5dgt)
6000 $\mu$ A	1 $\mu$ A	
60mA	100 $\mu$ A	
600mA	1000 $\mu$ A	
10A	10mA	±(2.0% rdg + 5dgt)

Overload protection:  
 $\mu$ A and mA: FF600mA / 700V  
A: F10A / 700V

When the measured current exceeds 5A, the measuring time should be less than 10 seconds for one measurement, the interval time between two measurements should be greater than 1 minute.

3.2.10 AC Current

Range	Resolution	Accuracy
600 $\mu$ A	0.1 $\mu$ A	±(1.5% rdg + 5dgt)
6000 $\mu$ A	1 $\mu$ A	
60mA	100 $\mu$ A	
600mA	1000 $\mu$ A	
10A	10mA	±(3.0% rdg + 5dgt)

Overload protection:  
 $\mu$ A and mA: FF600mA / 700V  
A: F10A / 700V

When the measured current exceeds 5A, the measuring time should be less than 10 seconds for one measurement, the interval time between two measurements should be greater than 1 minute.

4. Operation Guide

4.1 Data hold

- 4.1.1 Press the "HOLD" button, the value on the display will be locked.
- 4.1.2 Press the "HOLD" button again to exit data hold.

4.2 Range

- 4.2.1 When turn the function switch to current, voltage, resistance, capacitance, frequency, the meter will be on the auto range mode.
- 4.2.2 Press the "RANGE" button, the meter will be set to the manual range mode, the current range moves to one higher range with each press: When press the "RANGE" button on maximum range, the range will switch to the minimum range.
- 4.2.3 The "RANGE" button has been pressed for more than 1 second, the meter will switch to the auto range mode.

Note:

Frequency and capacitance measurement can not be set to the manual range mode.

4.3 Relative measurement mode

- 4.3.1 Press the "REL" button to enter the relative measurement mode. Then press the "REL" button again, the meter displays the instant measured value (called the initial value). The displayed value: the current measured value minus the initial value.

4.4 Function

- 4.4.1 When measuring current, press "SELECT" to switch between DC current and AC current.
- 4.4.2 When measuring resistance, capacitance, diode and continuity, press "SELECT" to switch resistance, capacitance, diode and continuity.

4.5 Backlight

- 4.5.1 Press "LIGHT" to turn the backlight on or off.

4.6 Auto power off

- 4.6.1 If the meter lays without any operations in 30 minutes, it will automatically turn off for energy saving.

- 4.6.2 Press any buttons to re-power the meter on the sleep mode.
- 4.6.3 Press and hold the "SELECT" button after power on, the auto power off function is canceled.

4.7 NCV (non-contact voltage detection)

- 4.7.1 Rotary switch to NCV.
- 4.7.2 If the detected voltage of the conductor is greater than 110Vac (RMS), the buzzer will alarm when NCV is close to the conductor.

Note:

- 1: Do not rely on non contact voltage detection to determine whether there is a voltage. The detection operation may be affected by socket design, insulation thickness and type of different factors.
- 2: Due to the existence of induced voltage, input terminal of input voltage may trigger non contact voltage detection.
- 3: External interference (such as flashlight, motor etc.) may mistakenly trigger non-contact voltage detection.

4.8 DC voltage measurement

DC voltage range: 600.0mV, 6.000V, 60.00V, 600.0V, 6000V, 1000.0V

Measuring DC voltage:

- 4.8.1 Turn the rotary switch to .
- 4.8.2 Connect the black test lead to the COM jack and the red to the V jack respectively.
- 4.8.3 Use the probe to measure the voltage of the circuit. (parallel connection with the circuit)
- 4.8.4 LCD displays the measured voltage value. When measuring DC voltage, the LCD will display the voltage direction of the red test lead as well.

4.9 AC voltage measurement

AC voltage range: 6.000V, 60.00V, 600.0V, 600.0V, 750.0V

- 4.9.1 Turn the rotary switch to .
- 4.9.2 Connect the black test lead to the COM jack and the red to the V jack respectively.
- 4.9.3 Use the probe to measure the voltage of the circuit. (parallel connection with the circuit)
- 4.9.4 LCD displays the measured voltage value.

4.10 Resistance Measurement

Measuring resistance:  
Resistance range: 600.0 $\Omega$ , 6.000k $\Omega$ , 60.0k $\Omega$ , 600.0k $\Omega$ , 6.000M $\Omega$ , 60.00M $\Omega$

- 4.10.1 Rotate the rotary switch to .
- 4.10.2 Connect the black test lead to the COM jack and the red to the V jack respectively.
- 4.10.3 Use the probe to measure the resistance of the circuit.
- 4.10.4 LCD displays the measured resistance value.

4.11 Continuity Test

- Turn the rotary switch to and press the SELECT button to switch to the continuity test.
- 4.11.1 Connect the black test lead to the COM jack and the red to the jack respectively.
- 4.11.2 Use the probe to measure the resistance of the circuit. If the measured resistance is no more than 50 $\Omega$ , the buzzer will make continuous sound.

4.12 Diode Test

- Turn the rotary switch to and press the SELECT button to switch to the diode test.
- 4.12.1 Connect the black test lead to the COM jack and the red to the jack respectively.
- 4.12.2 Use the probe to measure the the end of the diode.
- 4.12.3 LCD displays the forward voltage drop.

4.13 Capacitance Measurement

- Capacitance range: 6nF, 60.00nF, 600.0nF, 6.000 $\mu$ F, 60.00 $\mu$ F, 600.0 $\mu$ F, 6mF and 60mF
- Measuring capacitance:
  - 4.13.1 Turn the rotary switch to , press the SELECT button to switch to the capacitance test.
  - 4.13.2 Connect the black test lead to the COM jack and the red to the jack respectively.
  - 4.13.3 Use the probe to measure the capacitance and obtain the value.

4.14 Frequency and duty cycle measurement

- Frequency range: 60Hz, 600Hz, 6kHz, 60kHz, 600kHz, 6MHz, 60kHz Measuring frequency:
  - 4.14.1 Turn the rotary switch to Hz.
  - 4.14.2 Connect the black test lead to the COM jack and the red to the Hz jack respectively.
  - 4.14.3 Use the probe to measure the frequency and obtain the value.

4.15 AC DC current measurement

- Current range: 600 $\mu$ A, 6000 $\mu$ A, 60.00mA, 600.0mA, 10.000A
- 4.15.1 Cut off the power supply of the circuit and discharge all high-voltage capacitance.
- 4.15.2 Turn the rotary switch to ( $\mu$ A, mA or A).
- 4.15.3 Press the SELECT button to switch the AC current \ DC current.
- 4.15.4 Connect the black test lead to the COM jack. If the measured current is less than 600mA, connect the red test lead to the mA jack. If the measured current is between 600mA and 10A, connect the red test lead to the 10A jack.
- 4.15.5 Disconnect the circuit. Connect the black test lead to one end of the disconnected circuit (low voltage) and connect the red one to the other end of the disconnected circuit (high voltage).
- 4.15.6 Power on the circuit. If the LCD only displays "OL", this means that the input from the circuit exceeds the selected range, hence the rotary switch should be set to a higher range.

4.16 Triode Current Magnification Measurement

- 4.16.1 Turn the rotary switch to HFE.

- 4.16.2 + pole of the adapter connects to HFE + input terminal, - pole to HFE-.
- 4.16.3 Insert the corresponding E.B.C of the adapter in accordance with the functional characteristics of the triode.
- 4.16.4 LCD displays the triode current magnification value.

Warning

Before opening the battery cover of the meter, remove the test leads from the circuit to avoid the risk of electric shock.

5. Maintenance

5.1 Battery Replacement

- 5.1.1 If the meter displays the symbol, it indicates that the battery should be replaced.
- 5.1.2 Open the battery cover on the bottom case by screwdriver.
- 5.1.3 Remove the old battery and snap the new one into the battery holder.
- 5.1.4 Install the battery cover.
- Note:  
The polarity of the battery can not be inversely installed.

Warning

When replacing test leads, the size and rating of the new ones should be the same as the old. Test leads must be intact, test lead level: 1000V 10A.

5.2 Test Leads Replacement

If the insulation of test leads is damaged, such as exposed wire, you must replace test leads.

6. Package Content

- 1. x Test Leads
- 2. x User Manual
- 3. x 9V 6F22 Battery
- 4. x Adapter