

**DIGITAL + ANALOGUE**

**HIGH VOLTAGE INSULATION TESTER**

**OPERATOR'S MANUAL**

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 **WARNING**

**Read the operating instruction thoroughly and completely before using. Pay particular attention to warning, follow all safety operating procedures in order to avoid electrical shock and any damage.**

## **1. SAFETY INFORMATION**

This meter has been designed in general to comply with IEC 348 and according to IEC-1010 concerning about electronic measuring instruments with an overvoltage category (5000V CAT II) and pollution 2. Follow all safety and operating instructions to ensure that the meter is used safely and is kept in good operating condition.

Pay attention to cautions and warnings, which will inform you of potentially dangerous procedures.

### **1.1 PRELIMINARY**

 **WARNING**

**To ensure safe operation, please follow the directions in this section carefully.**

1.1.1 When using the meter, the user must observe all normal safety rules concerning:

- Protection against the dangers of electrical current
- Protection of the meter against misuse

1.1.2 When the meter is delivered, check that it has not been damaged in transit.

1.1.3 When poor condition under harsh preservation or shipping conditions caused, inspect and confirm this meter without delay.

1.1.4 test line or test clips must be in good condition. Before using verify that the insulation on test line or test clips is not damaged and/or the leads wire is not exposed.

1.1.5 Full compliance with safety standards can be guaranteed only if used with test line or test clips supplied. If necessary, they must be replaced with the same model or same electric ratings.

1.1.6 This meter must only be used by a competent trained person and in strict accordance with the operator's manual.

## **1.2 DURING USE**


1.2.1 Before use, ensuring that there is no any components damaged by high voltage in the measured circuit.

- 1.2.2 During operating, once press the measuring button, you should be more careful to the existence of high voltage between the line and the other two connections terminal.
- 1.2.3 Press the button for measurement after the meter is connected with the circuit.
- 1.2.4 Keep fingers always behind the probe and the safeguard of the lead while measuring.
- 1.2.5 Do not attempt to take any measurement if the meter, the probe, the lead or the user's hand is wet.
- 1.2.6 Never use the meter under the condition of the explosive air, steam or dirt.
- 1.2.7 Never connect the meter leads across on live circuits. Ensure all circuits are de-energized before measuring.
- 1.2.8 If any faults or abnormalities are observed, the meter can not be used any more and it has to be checked out.
- 1.2.9 Never use the meter unless the rear case is in place and fastened fully.
- 1.2.10 Please do not store or use meter in areas exposed to direct sunlight, high temperature, humidity or condensation.

### **1.3 SYMBOLS**

- △ Important safety information, refer to the operating manual.

 risky voltage

 Double insulation (Protection class II) .

LINE Test Line Terminal

GUARD Guard Terminal

EARTH Earth Terminal

 Low Battery

## **1.4 MAINTENANCE**

1.4.1 Please do not attempt to adjust or repair the meter by removing the rear case while voltage is being applied. A technician who fully understands danger involved should only carry out such actions.

1.4.2 Before opening the battery cover of the meter, ensuring that the function switch is on the “OFF” position, the measuring button is loosened, and always disconnect test line or test clips from all sources of electric current.

1.4.3 In the course of keeping and using, the meter can not be excessively vibrated.

1.4.4 Always set the function switch to the OFF position when the meter is not in use.

1.4.5 If the meter is to be stored for a long period of time, the batteries should be removed to prevent

damage to the unit.

1.4.6 Do not use abrasives or solvents on the meter, use a damp cloth and mild detergent only.



## **2. DESCRIPTION**

- This meter is a portable professional measuring instrument, which can be used in the test of high voltage insulated for the maintenance and service of the industry equipment, such as the cables, transformers, generators, switch, etc.
- This meter has of auto range, the indicator with a dual scales point needle, In the measuring range between 0 to 100000 M $\Omega$ , the meter can auto-change the high or low range according to the value of the resistance. The flash of LED will indicate the user to get the reading from the scale line with the same color.
- Using 8pcs of AA battery as the insulated resistance of the power measurement, its max. current is about 140mA, then the meter can be continuously worked for 4 hours.
- When the measured resistance is larger than 100 M $\Omega$ , the meter can be kept in a rated and high measured voltage (approx. 2500V, with the indicator of LCD), which could be used for precise measurement.
- Dual measuring switch will help the user to avoid error operation. Test button also has the lock function.
- In insulating measurement, the test button is pressed, the meter's alarming system will give out a humming sound, and the red high voltage output indicator is flashing, which warns the operator to pay

attention to the high output voltage, and avoid getting electric shock.

- Special airproof design will keep the inner circuit of the meter away from the humidity and the invasion of rotten air.
- Having the function of battery test, which can expediently judge the battery's quality.
- When using, the needle indicates the value of the measured insulated resistance, the reading of the measured voltage is shown in LCD indicator.
- A rotary switch is used to select functions and ranges.
- Releasing the test button automatically will discharge the capacitance of a circuit under test.

## **2.1 NAMES OF COMPONENTS (See Fig 1)**

- (1) Test Line Probe
- (2) Guard Terminal
- (3) Earth Terminal
- (4) Green LED
- (5) Green Scale
- (6) Red LED

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**DESCRIPTION**

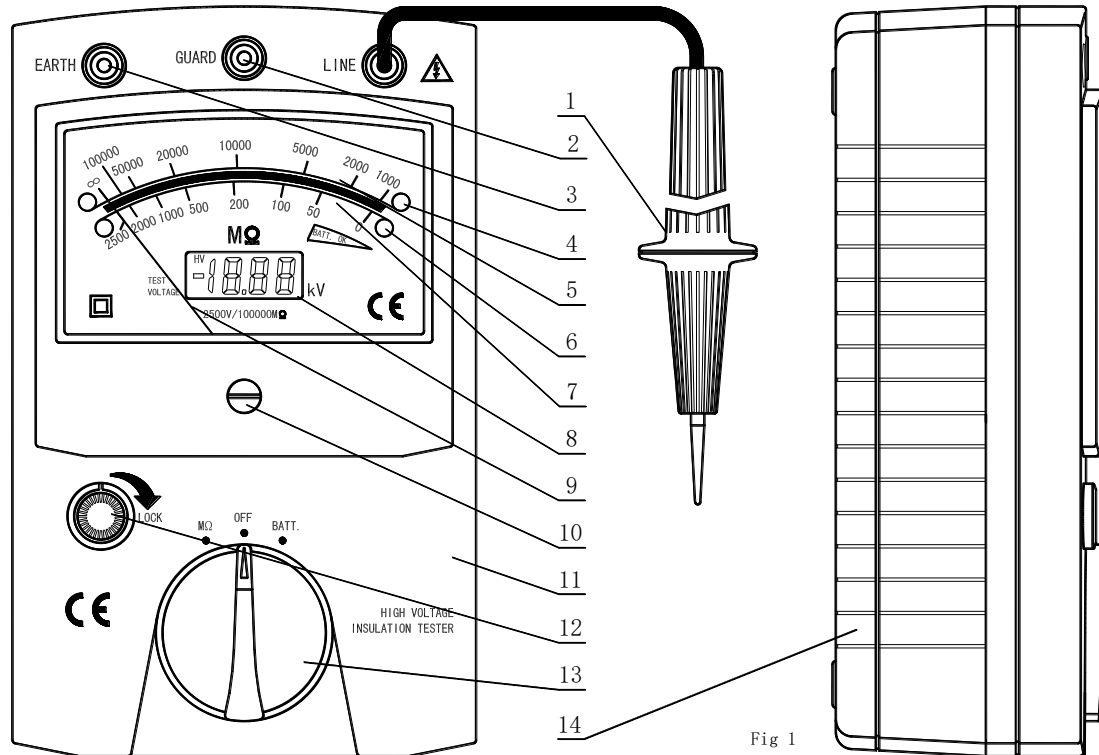


Fig 1

- (7) Red Scale
- (8) LCD Display
- (9) Indicator pointer
- (10) Indicator zero corrector
- (11) Panel
- (12) Test Button
- (13) Function Switch
- (14) Battery Cover

## **2.2 SWITCH AND BUTTONS ELUCIDATE**

- Function Switch

This switch is used to select measure mode and the switch of power.

- Test Button

This Button is used to enter and keep the insulation resistance measurements.

### **3 SPECIFICATIONS**

Accuracy is specified for a period of year after calibration and at 18°C to 28°C (64°F to 82°F) with relative humidity to 70%.

#### **3.1 GENERAL SPECIFICATIONS**

3.1.1 Reading: see the scale with different color

3.1.2 Test Voltage Display: LCD

3.1.3 Low Battery Indication:  displayed

3.1.4 Measuring method: Dual-slope integration A/D converter

3.1.5 Sampling Time: approx. 0.4 second

3.1.6 Power Supply: 12V: 1.5V×8 (size AA) battery (recommended to use the alkaline or heavy duty battery.), 9V: 9V×1 (6F22, 1604) battery

3.1.7 Power Consumption: Approx. 140mA (12V) , Approx. 2mA (9V)

3.1.8 Operating Temperature: 0°C to 40°C (32°F to 104°F)

3.1.9 Operating Humidity: ≤85%RH

3.1.10 Storage Temperature: -10°C to 50°C (10°F to 122°F)

3.1.11 Dimension: 225×138×81 mm

3.1.12 Weight: Approx. 1200g (including battery)

### 3.2 ELECTRICAL SPECIFICATIONS

Circumstance Temperature: 23 ± 5°C

Relative Humidity: < 70%

Measuring voltage		DC Voltage		
Range		0-2000 MΩ / 1000-100000 MΩ (Auto-range)		
Accuracy	Insulated resistance	0-100MΩ	± 3.0 % of arc	Surroundings' temperature: 23 ± 5°C Relative humidity: < 70 %
		100-50000 MΩ	± 2.5 % of arc	
		50000-100000MΩ	± 3.0 % of arc	
	Output voltage	0-100MΩ	± 6.0 % of arc	Surroundings' temperature: 0 ~ + 40°C Relative humidity: < 85 %
		100-50000 MΩ	± 5.0 % of arc	
		50000-100000MΩ	± 6.0 % of arc	
Output voltage		2500V ± 10 %		100 - 100000 MΩ
Insulated resistance		1000 MΩ max. / 1000V		Between the circuit and the case
Voltage-resistant		5000V AC per minute		Between the circuit and the case

Remark: length of green scale:120mm, length of red scale:114mm

## **4. OPERATING INSTRUCTION**

### **⚠ WARNING**

Once press the measured button, be careful to the high voltage between test line and other two connections. Earth terminal must be always connected with the ground for safe and reliable measurement.

Before measure, ensure there are no any components damaged by high test voltage in the circuit.

When measure the insulated resistance, the inside buzzer will send out humming sound continuously for reminding the user of safe operation.

### **4.1 ALARM**

In insulation range, the test button is pressed, the inside alarming system will send out a humming sound.

### **4.2 PREPARATION FOR MEASUREMENT**

4.2.1 Set the function switch to “OFF” position.

4.2.2 Use the screwdriver to adjust the zero corrector in the middle of the panel, make the needle to the left point “.” of the green scale.

### **4.3 BATTERY CHECK**

4.3.1 Set the function switch to “BATT.” position.

4.3.2 Press the measure button, the battery is good if the pointer is in the scale of “BATT.OK”; if it is not in the scale , the battery is exhausted and should be replaced in time, otherwise, it will effect the measuring accuracy of the insulated resistance, or leak the liquid and then cause damage to the meter.

### **ATTENTION**

While check battery, do not lock the measure button or press for long time to avoid excessive power consumption (the output current of which is about 150mA).



#### **4.4 INSULATION RESISTANCE MEASURING**

**⚠ WARNING**

**Insulation tests should be conducted on circuits that are out of energy. Ensure circuits are not live before commencing testing.**

**Ensure that there is no any components damaged by high measured voltage.**

**Using test line and test clips connect the meter and the tested circuit, then press test button.**

**When testing, there is 2500V between the test line and other two connections terminal.**

4.4.1 Set the function switch to “OFF” position.

4.4.2 Connect the tested circuit to the earth ground, then use the test clip to connect the earth and the earth terminal of the tested circuit, ensure better connection.

4.4.3 Set the function switch to “MΩ” position.

4.4.4 Touch the probe of the test line to the tested circuit, then press the button.

4.4.5 LED on the dial will flash. The reading can be gotten from the green scale after the flash of green LED; or from the red scale after the flash of red LED.

4.4.6 Loosen the button after the measurement, wait several seconds and then disconnect the test line from the tested circuit, which is to release the charge stored in the circuit tested.

**ATTENTION**

Due to huge power consumption in the measurement, continuous measurements for long time should be avoided.



**WARNING**

**Never touch the circuit under test during insulation measuring.**

**Never rotate the range switch while the test button is pressed. This may damage the meter.**

**When measuring is complete ensure that the test button is released before the test clips are disconnected. This is because the system may be charged up and it must be allowed to discharge through the tester's internal discharge resistor.**

## **4.5 CONTINUOUS MEASUREMENT**

### **⚠ WARNING**

**Insulation tests should be conducted on circuits that are de-energized. Ensure circuits are not live before commencing testing.**

**Before measure, ensure there are no any components damaged by high test voltage in the circuit.**

**Using test line and test clips connect the meter and the tested circuit, then press test button for testing.**

**When testing, there is 2500V between the test line and other two connections terminal.**

4.5.1 Set the function switch to “OFF” position.

4.5.2 Connect the tested circuit to the earth ground, then use the test clip to connect the earth and the earth terminal of the tested circuit, ensure better connection

4.5.3 Set the function switch to “MΩ” position.

4.5.4 Touch the probe of the test line to the tested circuit.

- 4.5.5 Press the button and clockwise rotate it to “LOCK” position for locking the measured button, then continuous measurement can be realized.
- 4.5.6 LED on the dial will flash. The reading can be gotten from the green scale after the flash of green LED; or from the red scale after the flash of red LED.
- 4.5.7 Loosen the button after the measurement, wait several seconds and then disconnect the test line from the tested circuit, which is to release the charge stored in the circuit.

**ATTENTION**

Due to huge power consumption in the measurement, continuous measurements for long time should be avoided.

 **Warning**

**Never touch the circuit under test during insulation measuring.**

**Never rotate the range switch while the test button is pressed. This may damage the meter.**

**When measuring is complete ensure that the test button is released before the test clips are disconnected. This is because the system may be charged up and it must be allowed to discharge through the tester's internal discharge resistor.**

#### **4.6 USE OF GUARD TERMINAL**

Illustrated in Fig. 2 is an example of the insulation resistance measurement of an electric wire. If the line probe is simply connected to the wire conductor and the earth lead to the immersion liquid container as shown, a measurement error will be introduced as this results in the measurement of the combined resistance of insulation resistance and the surface leakage resistance at the cut end of the electric wire. In order to remove this surface leakage current, wind a guard wire around the cut end of the conductor and connect it to the guard terminal of the instrument using the guard lead. Then, the surface leakage current will bypass the indicating meter of the insulation resistance tester.

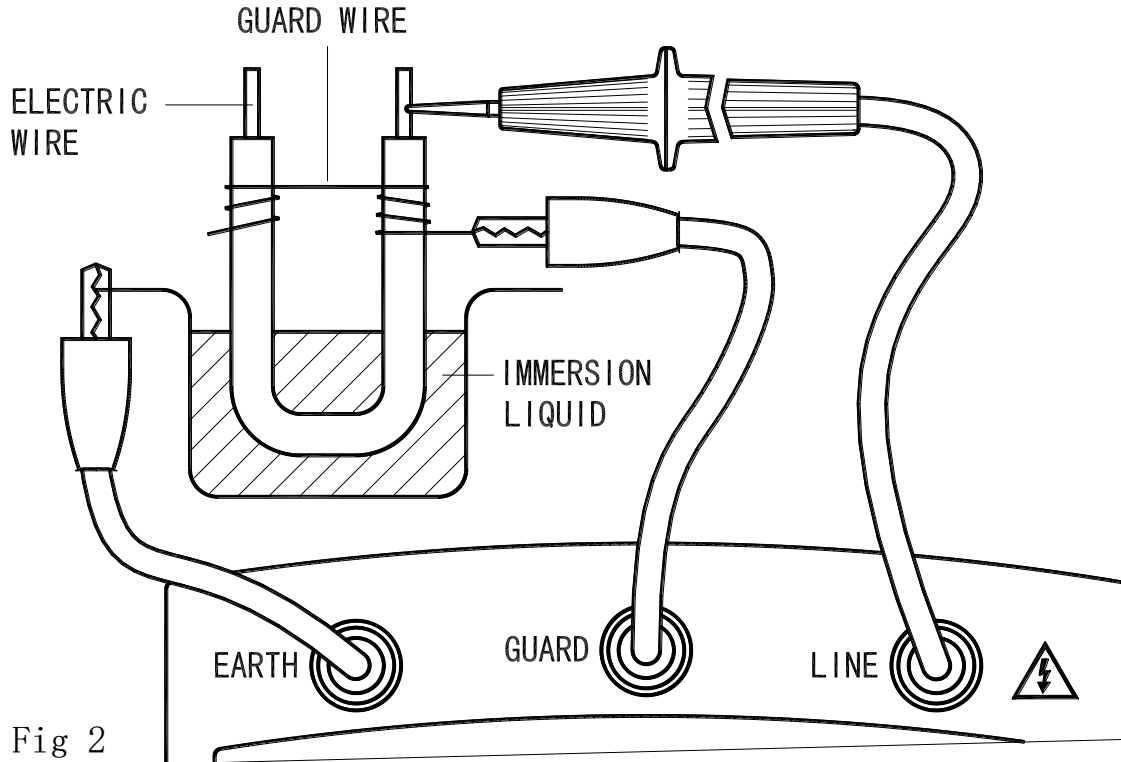


Fig 2

## **5. MAINTENANCE**

### **5.1 BATTERY REPLACEMENT**

**⚠ WARNING**

**Before attempting to remove the battery cover, be sure that test line or test clips have been disconnected from measurement circuit to avoid electric shock hazard.**

#### **5.1.1 12V (AA) BATTERY REPLACEMENT**

5.1.1.1 If the battery test found its quality is poor, then replace with a new 12V battery.

5.1.1.2 Select "OFF" position.

5.1.1.3 Ensure that the test button is loosened.

5.1.1.4 Use the screwdriver to remove the screws on the battery drawer, open the drawer and replace the battery.

5.1.1.5 Put the battery cover as its origin, then fix it up by the screws.

#### **ATTENTION**

● If the meter is used for a short time, then the battery should be removed to avoid damaging the meter

because of its leakage.

- Replacing all of the old battery with new one, never intermix them.
- Had better use the Alkaline battery

### **5.1.2 9V (6F22) BATTERY REPLACEMENT**

5.1.2.1 If the sign ‘’ appears on the LCD display, it indicates that the battery should be replaced.

5.1.2.2 Loosen the screw fixing the battery cover and remove it.

5.1.2.3 Replace the exhausted battery with a new one.

5.1.2.4 Put the battery cover as its origin.

### **5.2 TEST LINE AND TEST CLIPS REPLACEMENT**

** WARNING**

**Full in compliance with safety standards can be guaranteed only if used with test line or test clips supplied. If necessary, they must be replaced with the same model or same electric ratings.**

**Electric ratings of the test line or test clips: 2500V 1A**

You must replace the test line or test clips if the lead is exposed.



**6. ACCESSORIES**

- |     |                                       |              |
|-----|---------------------------------------|--------------|
| (1) | Test line: Electric Ratings 2500V 1A  | One piece    |
| (2) | Test Clips: Electric Ratings 2500V 1A | One piece    |
| (3) | Battery: 1.5V SIZE "AA"               | Eight pieces |
| (4) | Battery: 9V 6F22 1604                 | One piece    |
| (5) | Operator's Manual                     | One piece    |
| (6) | Wrapping Bag                          | One piece    |

