

1.General Information	1
1.1 Safety information	1
1.1.1.Safety instructions	1
1.1.2.Safety considerations	1
1.1.3.Safety symbol	3
1.1.4.Maintenance practices for safety	3
1.1.5.Input protection measures	4
2. A Schematic Diagram for the Meter	4
2.1.A Schematic Diagram for the Meter	5
2.2.Description of the symbols on the display unit	5
2.3.Description of functional keys	7
2.4.Description of input socket	7
2.5.Accessories	8
3.Operational guidelines	8
3.1.Normal operation	8
3.1.1.Measurement mode	8
3.1.2.Relative Value Measurement	8
3.1.3.Maximum/minimum values	9
3.1.4.Hold mode	9
3.1.5.Backlight & lighting	9
3.1.6.Auto power off	10
3.2.Measurement guidelines	10
3.2.1. AC voltage measurement	10
3.2.2. DC voltage measurement	12
3.2.3. AC/DC mV voltage measurement	13
3.2.4. Continuity and Diode measurement	14
3.2.5. Resistance measurement	15
3.2.6. Capacitance measurement	16
3.2.7. Frequency/duty ratio measurement	17
3.2.8. AC and DC Current measurement	18
3.2.9.NCV (non-contact voltage detection) and live line test	19
3.2.10.Temperature measurement	20
3.2.11.External clamp shaped current probe for measuring current	20

4. Technical parameters	21
4.1. Overall parameters	21
4.2. Precision indicator	22
4.2.1. DC voltage	22
4.2.2. AC voltage	22
4.2.3. Frequency and Duty Ratio	23
4.2.4. Resistance	23
4.2.5. Diode	23
4.2.6. Continuity	24
4.2.7. Capacitance	24
4.2.8. DC current (Connected in series through $\mu\text{A}/\text{mA}$ port and COM port)	24
4.2.9. AC current (Connected in series through $\mu\text{A}/\text{mA}$ port and COM port)	25
4.2.10. Clamp current probe input terminal	25
4.2.11. Temperature	25
5. Meter maintenance	26
5.1. General maintenance	26
5.2. Battery & fuse replacement	26

1. General Information

This digital multimeter is designed and manufactured in compliance with EN/IEC-61010 safety requirements on electronic measuring meters and hand-held digital multi-meters.

It is compliant with EN/IEC61010, EN/IEC61010, EN/IEC61010-2-030, EN/IEC61010-2-03 requirements pertaining to 600V CAT IV, 1500V d.c. CAT III and requirements on pollution degree 2. Please read carefully this Operation Manual and pay attention to safety guidelines before operating this meter.

1.1 Safety information

1.1.1. Safety instructions

● Before operating this meter, the operator must observe all standard safety procedures in the two respects below :

- ✧ Safety procedures against electric shock.
- ✧ Safety procedures against unintended use.

△ To ensure your personal safety, please use the test lead that accompanies the meter. Before operating this meter ensure that the test lead is flawless.

1.1.2. Safety considerations

- When the meter is used in the vicinity of the equipment that produces strong electromagnetic interference, the reading on the meter will grow unstable and even produce serious errors.
- Don't operate the meter or pen-shaped meter whose appearance is damaged.
- The safety function of the meter will become null if the meter is not properly operated.
- The meter must be operated with great care when working in the vicinity of an exposed conductor or bus line.
- The meter is prohibited from being used in the vicinity of any explosive gas, vapor or dust.
- The measurement must be made with correct input terminals and functions and within the allowable measuring range.
- To prevent the meter from being damaged, the value to be input shall not exceed the extremes allowed by each measuring range.
- When the meter has already been connected to the line being measured, the operator is prohibited from touching the input terminal that is not in service.

- When the voltage measured exceeds 48Vdc or 30Vac (valid value), the operator shall be careful enough to avoid electric shock.
- When making measurement with a test lead, place your fingers behind its protective ring.
- When switching to another measuring range, be sure that test lead has already been taken off the measured circuit.
- For all DC functions, to prevent potential electric shock as a result of incorrect reading, please first use AC functions to check the absence of any AC voltage. Then, select DC voltage measuring range equivalent to or greater than that for AC voltage.
- Before the tests on electric resistance, diode, capacitor or continuity, the operator must cut off the power supply to the circuit to be measured, and discharge all high-voltage capacitors within the circuit to be measured.
- The electric resistance measurement or continuity test cannot be carried out in any live electrical circuit.
- Before the current measurement, the operator must first examine the protective tube of the meter. Before connecting the meter to the circuit to be measured, the operator must first power off the aforesaid circuit.
- Before repairing TV sets or measuring power switching circuit, the operator must be careful enough to prevent high amplitude voltage impulse from damaging the meter.
- This meter uses 3 x 1.5V AAA batteries that must be correctly installed into the battery compartment.
- When  appears, the batteries must be replaced immediately. The low level of a battery will result in incorrect reading on the meter; which is likely to bring electric shock or personal injury to the operator.
- In measurement, CAT III voltage and CAT IV voltage shall not exceed 1500V d.c and 600V respectively.
- The meter shall not be in service if its case (or part of its case) is dismantled.

1.1.3.Safety symbol

The safety symbols that appear on the meter's body and in this Operation Manual:

	Warning, an important safety symbol. The operator must consult this Operation Manual before using the meter. Unintended use may lead to the damage to the device or its components.
	AC (alternating current)
	DC (direct current)
	AC/DC
	Ground
	Double insulation protection
	Fuse
	Compliant with European Union Directive
	High voltage warning
1500V CAT III	1500V CAT III over-voltage protection
600V CAT IV	600V CAT IV over-voltage protection

1.1.4.Maintenance practices for safety

- The operator must first pull out the test lead when the meter's case is opened or the battery cover is dismantled.
- The designated replacement parts must be used at the moment of maintenance.
- The operator must cut off all relevant power supplies before opening the meter: At the same time, the operator must avoid damage to the meter's elements by ensure that he himself doesn't carry any static.
- The meter can only be calibrated, repaired and maintained by professionals.
- When the meter's case is opened, the operator must understand the fact that the presence of some capacitance may promise the dangerous voltages even if the power supply to the meter is cut off.
- The operator should stop using and maintain the meter immediately if any abnormality has been observed on the meter. The operator must see

to it that the meter cannot be in service unless it is proved conforming.

●When the meter is left idle for a long period, the operator shall remove the battery and place it in a place free from high temperature and humidity.

1.1.5. Input protection measures

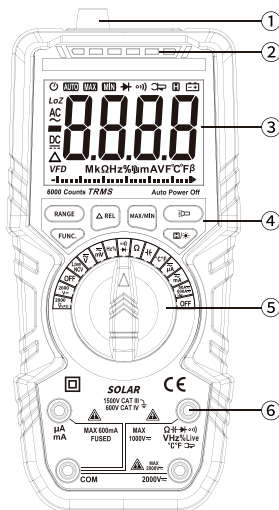
-  port can sustain the maximum input voltage of 1500V (DC) or 1000V (AC) at the moment of voltage measurement.
- The meter can sustain the maximum AC voltage of 1000V or equivalent voltage (valid value) and maximum time of 60 seconds when the tests on K-type thermocouple, frequency, resistance, continuity and diode are carried out.
- The protective tube (FF800mA/1000V) is used for protection purpose when μA and mA current measurements are carried out.
- The input impedance of the 2000V $\approx$ port is 10M Ω .

Please read the user manual carefully before using the instrument, Avoid damaging instruments or causing safety accidents due to improper operation.

2. A Schematic Diagram for the Meter

This meter is a hand-held digital multi-meter with the function of displaying True RMS. It is a large-screen LCD unit with backlight and illumination light functions so that the user can easily recognize reading. It is equipped with the function of overload protection and the indicator of battery under voltage. The dedicated interface can measure up to 2000V AC/DC voltage, making it an ideal multifunctional instrument for professionals, factories, enthusiasts, and photovoltaic applications.

2.1.A Schematic Diagram for the Meter



- ①. Non-contact voltage detection area ②. indicator light ③.LCD screen
 ④. Function button ⑤. Rotary switch ⑥.input socket

2.2.Description of the symbols on the display unit

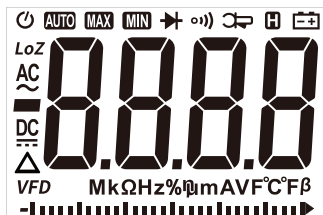


Table.1 (Symbols)

A Schematic Diagram for the Meter

Symbol	Description
	Battery Under Voltage indicator/ Low Battery ⚠ To avoid electric shock or personal injury as a result of incorrect reading, promptly replace the battery when the battery under voltage indicator appears.
	Auto power off indicator
	Relative measurement indicator
	Negative input polarity indicator
	Input voltage AC
	Input voltage DC
	Maximum measurement
	Minimum measurement
	Continuity test mode
	Low pass filter indicator
	Diode test mode
	Automatic range measurement mode
	Data hold mode
	Duty ratio
V, mV	V: Volt, a unit of voltage. MV: millivolts, 1×10^{-3} or 0.001 volts.
A, mA, μ A	A: Ampere, the unit of current. mA: Milliampere, 1×10^{-3} or 0.001 ampere μ A: Microampere, 1×10^{-6} or 0.000001 ampere
Ω , k Ω , M Ω	Ω : Ohm, the unit of electric resistance. k Ω : Kilohm, 1000 Ohm M Ω : Megaohm, 1,000,000 Ohm
Hz, kHz, MHz	Hz: Hz, the unit of frequency kHz: kHz, 1×10^3 Hz MHz: MHz, 1×10^6 Hz or 1000 kHz

A Schematic Diagram for the Meter

F, mF, μ F, nF	F: Farad, the unit of capacitance. mF: Millifarad, 1×10^{-3} or 0.001 farad μF: Microfarad 1×10^{-6} or 0.000001 farad nF: nF, 1×10^{-9} or 0.000000001 farad
	External clamp current probe for measuring current mode

2.3. Description of functional keys

Key	Description of functions
RANGE	Automatic and manual range switching keys
FUNC.	Function selection switch key
REL	Relative value measurement key
	Backlight and Data hold key
	Lighting on key
MAX/MIN	Maximum and minimum measurement key

2.4. Description of input socket

Input socket	Description
COM	All public input terminals to be measured.
Ω       VHz%Live °C°F 	Resistance, capacitance, diode, continuity, voltage, frequency, duty cycle, zero live line detection (Live), positive input terminal for temperature measurement (connected to red test pen); positive input terminal for clamp head.
μ A mA	The positive input terminal (connected to the red test pen) for microampere and milliampere measurements (up to 600mA).
2000V $\approx$	Input terminal with AC/DC voltage greater than 1000V and less than 2000V.

2.5. Accessories

① Operation Manual	One
② Test lead	A pair
③ K-Type thermocouple	A pair
④ Battery 1.5V AAA	×3

3. Operational guidelines

3.1. Normal operation

3.1.1. Measurement mode

The multimeter has both manual and automatic ranges. In automatic range mode, the multimeter will select the optimal range for the detected input signal, making it convenient for users to change the measurement signal without having to reselect the range. The multimeter can also be set to manual range. After the meter is turned on or converted, it defaults to automatic range mode, and the meter displays the "AUTO" symbol. The manual range operation for entering or exiting is as follows:

1. In automatic range mode, press the "RANGE" key to disable the "AUTO" symbol.
2. Press the "RANGE" button to increase the range. When the maximum range is reached, the meter will return to the minimum range.
3. Press and hold the "RANGE" button for 2 seconds to exit manual range mode, and the meter panel will display the "AUTO" symbol.

Note: There is only one range for millivolts, frequency, duty cycle, continuity, diodes, capacitance and temperature functions. The measurement gear of the external clamp head needs to be manually switched to the range that matches the clamp head.

3.1.2. Relative Value Measurement

The meter is equipped with a relative value measurement function. In this mode, the value displayed on the meter = actual value - set reference value. Follow the operations below to enter or exit the relative measurement operation:

1. Set the meter to the measurement function you want, let the probes contact the object you want to set as the reference value, and the meter displays the measured value.
2. Press "△REL" to store the measured value as reference value and enter the relative measurement mode, the meter displays "△".

3. Measurement, the meter will display "actual value - set reference value".
4. Press " Δ REL" again to exit the relative value measurement mode and the " Δ " sign fades.

Note: There is no relative value measurement mode for NCV , Live frequency, duty ratio, continuity and diode measurements.

3.1.3.Maximum/minimum values

The meter is equipped with maximum and minimum value retention functions. The operation to enter or exit this function is as follows:

1. Set the meter to the measurement function you need.
2. Press the "MAX/MIN" key to enter the maximum value holding mode, and the meter panel displays the "MAX" symbol.
3. Press the "MAX/MIN" button again to enter the minimum value holding mode, and the meter panel will display the "MIN" symbol.
4. Press and hold the "MAX/MIN" button for more than 2 seconds, and the meter will return to normal measurement mode.

Note: There is no relative value measurement mode for NCV, live, frequency, duty cycle, capacitance, transistor, continuity, and diode measurements.

3.1.4.Hold mode

In the hold mode, the reading can be maintained on the display unit. Changing the measurement function position or pressing the key " $\square/\odot$ " again to exit the hold mode.

Hold mode: entry and exit

1. Press the key " $\square/\odot$ " and the reading will be held and the symbol " $\square$ " will appear on the LCD screen.
2. Press the key " $\square/\odot$ " again to restore the meter to its status for normal measurement.

3.1.5.Backlight & lighting

The meter is equipped with the functions of backlight and lighting so that the operator can access measurement results even if he is in a darker place. The backlight function can be enabled or disabled by the steps below :

1. Press the key " $\square/\odot$ " for over 2 seconds to enable backlight.
2. Press the key " $\square/\odot$ " again for over 2 seconds to manually disabled backlight; wait for 30 seconds until the backlight is

automatically disabled.

The lighting function can be enabled or disabled by the steps below :

1. Press the key  once to turn on the lighting.
2. Press the button  again to manually turn off the lighting; Or automatically turn off the lighting after about one minute.

3.1.6.Auto power off

- 1.After turning on meter, the symbol  will be displayed in the upper left corner of the LCD display. If there is no operation in 10 minutes, the instrument will emit "beep beep" sound and enter sleep mode.
2. After automatic shutdown, press the "**FUNC.**" or "/☀" button or switch gears to restore the working status of the meter.
- 3.If press the FUNC. button to turn on the meter, the automatic shutdown will be canceled after hearing 5 beeps and the symbol  in the upper left corner of the LCD display will disappear.

3.2.Measurement guidelines

3.2.1. AC voltage measurement

WARNING

- To avoid any electric shock and/or damage to the meter; do not input 1000V AC/DC voltage (valid value) in  port. To avoid any electric shock and/or damage to the meters don't attempt to impose between any public terminal and ground any voltage whose valid value is over 1000V AC/DC voltage.
- If you need to measure voltage higher than 1000V DC or 1000V AC RMS, turn the rotation gear to 2000V $\approx$ and connect the test pen to the dedicated port.

The steps for measuring AC voltages known not exceed 1000V are as follows:

- 1.Turn the rotary switch to  and press the "**FUNC.**" key to switch to AC voltage function.
- 2.Connect the black test pen and the red test pen to the **COM** input jack and  input jack respectively.
- 3.Use the test pen to measure the voltage value of the circuit to be tested at both ends.
- 4.Read the measured voltage value from the LCD display.

The steps for measuring AC voltage exceeding 1000V or when the range of the measured voltage is unknown:

1. Turn the rotary switch to $\frac{2000}{V_{VFD}}$.

2. Connect the black test pen and the red test pen to the **COM** input jack and **2000V $\approx$** input jack respectively.

3. Use the test pen to measure the voltage value of the circuit to be tested at both ends.

4. Read the measured voltage value from the LCD display.

In the AC voltage measurement mode, press the "**FUNC.**" button to measure the frequency of the AC voltage.

Note:

● In AC voltage measurement mode, long press the "**FUNC.**" key to enter the "**VFD**" low-pass filter; Internally, a specific filtering circuit will be used to filter out high-frequency interference signals, ensuring the accuracy of measurement data! Can be applied in situations with VFD variable frequency voltage.

● The AC voltage value measured using this instrument is the true RMS (root mean square). For sine waves and other waveforms (without DC offset), such as square waves, triangular waves, and stepped waves, these measurements are accurate.



Wiring diagram when voltage is less than 1000V



Wiring diagram when voltage is above 1000V

3.2.2. DC voltage measurement

WARNING

- To avoid any electric shock and/or damage to the meter; do not input 1000V AC/DC voltage (valid value) in  port. To avoid any electric shock and/or damage to the meters don't attempt to impose between any public terminal and ground any voltage whose valid value is over 1000V AC/DC voltage.
- If you need to measure voltage higher than 1000V DC or 1000V AC RMS, turn the rotation gear to  and connect the test pen to the dedicated port.

The steps for measuring DC voltages known not exceed 1000V are as follows:

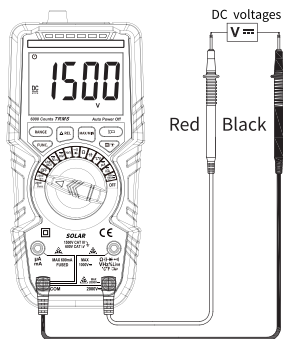
1. Turn the rotary switch to  and press the "FUNC." key to switch to DC voltage function.
2. Connect the black test pen and the red test pen to the **COM** input jack and  input jack respectively.
3. Use the test pen to measure the voltage value of the circuit to be tested at both ends.
4. The measured voltage value is read by the LCD display, and the display will also display the polarity of the voltage connected to the red probe.

The steps for measuring DC voltage exceeding 1000V or when the range of the measured voltage is unknown:

1. Turn the rotary switch to .
2. Connect the black test pen and the red test pen to the **COM** input jack and  input jack respectively.
3. Use the test pen to measure the voltage value of the circuit to be tested at both ends.
4. Read the measured voltage value from the LCD display.



Wiring diagram when voltage
is less than 1000V



Wiring diagram when voltage
is above 1000V

3.2.3. AC/DC mV voltage measurement

⚠ WARNING

- To avoid any electric shock and/or damage to the meter; do not attempt a voltage measurement if the voltage (valid value) is 1000V for DC current or 1000V for AC voltage.
- To avoid any electric shock and/or damage to the meters don't attempt to impose between any public terminal and ground any voltage whose valid value is over 1000V for DC voltage or 1000V for AC voltage.

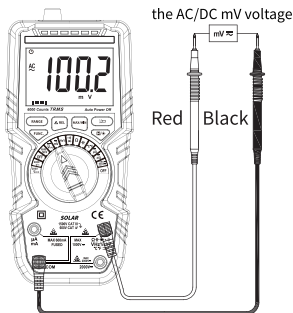
The steps for measuring the AC/DC mV voltage are as follows:

1. Turn the knob to the " $\overline{mV}$ " position and press the "FUNC." key to switch between DC or AC voltage functions.
2. Insert the red probe into the $\overline{mV}$ input socket and the black probe into the **COM** input socket to make contact with the measured circuit, measure the voltage, and read the measurement result from the display screen.

Note:

- The AC voltage value measured using this instrument is the true RMS (root mean square). For sine waves and other waveforms (without DC offset), such as square waves, triangular waves, and stepped waves, measurements are accurate.

● AC/DC millivolt voltage measurement, with a maximum range of 600mV. When the probe is open, it will display a number, which is normal. As long as the probe is short circuited, it will return to zero or contact the measured circuit, and the reading will stabilize.



3.2.4. Continuity and Diode measurement

⚠ WARNING

To avoid damage to instruments or tested equipment, all power sources to the tested circuit should be cut off and all high-voltage capacitors fully discharged before conducting diode and continuity measurements.

Turn the rotary switch to  and press the "FUNC." key to switch continuity and diode measurements.

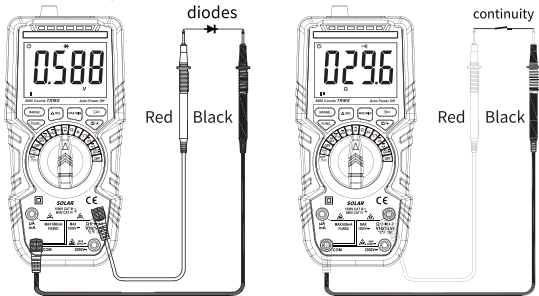
1) The steps for measuring continuity are as follows:

1. Connect the black test pen and the red test pen to the **COM** input jack and  input jack respectively.

2. Measure the resistance of the circuit being tested at both ends of the test pen. If the resistance of the circuit being tested is not greater than about 30Ω, the induction indicator light (green light) will light up and the buzzer will emit a continuous sound. If the measured resistance is greater than 30 Ω but less than 600 Ω, the induction indicator light (red light) will light up. The light does not turn on when it is greater than 600Ω.

2) The operation steps for measuring diodes are as follows:

1. Connect the black test pen and the red test pen to the **COM** input jack and **VHz Ω Live** input jack respectively.
2. Connect the black test pen and the red test pen to the negative and positive terminals of the diode being tested, respectively.
3. The instrument will display the forward bias value of the measured diode. If the polarity of the test pen is reversed, the instrument will display "OL". In the circuit, a normal diode should still generate a forward voltage drop of 0.5V to 0.8V; But the reading of reverse bias will depend on the change in resistance values of other channels between the two probes.



3.2.5. Resistance measurement

Turn the rotary switch to Ω .

The steps for measuring resistance are as follows:

1. Connect the black test pen and the red test pen to the **COM** input jack and **VHz Ω Live** input jack respectively.
2. Use a test pen to measure the resistance value of the circuit being tested at the other two ends.
3. Read the measured resistance value from the LCD display.

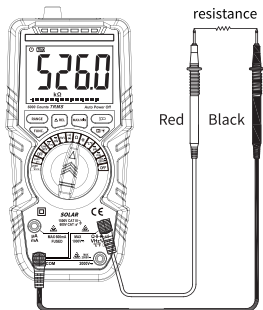
Note:

● The resistance value measured on a circuit usually differs from the rated value of the resistance.

● When measuring low resistance, in order to measure accurately, please first short-circuit the two probes and read the resistance value of the short circuit on the probe. After measuring the measured resistance, subtract the resistance value.

● At $60\text{M}\Omega$ gear, it takes a few seconds for the reading to stabilize. This is normal for high resistance measurements.

● When the meter is open circuit, the display will display "OL", indicating that the measured value is outside the range.



3.2.6. Capacitance measurement

WARNING

To avoid the meter or the measured equipment from damage, do not attempt a capacitance measurement unless the operator has already cut off all power sources for the circuit to be measured and fully discharged all high-voltage capacitors. Use the DC voltage position to determine that all capacitors have been discharged.

The steps for measuring capacitance are as follows:

1. Turn the rotary switch to .
2. Connect the test leads in black and in red to **COM** input socket and **VHz%Live** input socket respectively.
3. Use another two ends of the test lead to measure the capacitance of the capacitor to be measured, and capture the measured value on LCD screen

Note :

● When measuring a large capacitor, discharge the capacitor first, and it takes some time for the reading to stabilize during measurement.

● To avoid damage to the meter, the measurement of a capacitor with polarities requires much attention to its polarity.



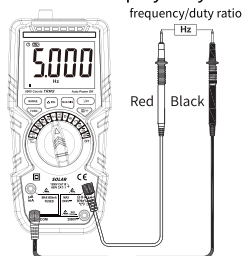
3.2.7. Frequency/duty ratio measurement

⚠ WARNING

To avoid any electric shock and/or damage to the meter, do not attempt a frequency measurement if the voltage is over 250V for DC or AC voltage(valid value).

The steps for measuring frequency/duty ratio are as follows:

1. Turn the rotary switch to the position **Hz%**.
2. Connect the test leads in black and in red to **COM** input socket and **Hz%** input socket respectively.
3. Use another two ends of the test lead to measure the frequency of the circuit to be measured.
4. Read the measured frequency on LCD screen.
5. Press "**FUNC.**" to switch the display duty ratio.



3.2.8. AC and DC Current measurement

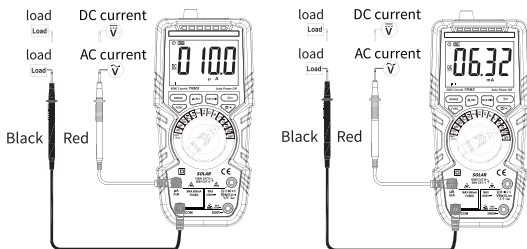
⚠ WARNING

- Do not attempt a measurement on the current in a circuit, if when the voltage between the open-circuit voltage and the ground is over 1000V. If the fuse is blown at the moment of measurement, you are likely to damage the meter or get yourself hurt.
- To avoid any damage to the meter or equipment to be measured, do not attempt a current measurement unless you have examined the meter's protective tube. In attempting a measurement, you should use the correct input sockets, function positions and measuring ranges. When a test lead is inserted into the current input socket, do not put the other end of the test lead in parallel connection with any circuit.

The steps for measuring AC and DC current are as follows:

1. Turn the rotary switch to $\overline{\mu A}$ or $\overline{mA}$.
2. Connect the test leads in black and in red to **COM** input socket and **$\mu A/mA$** input socket respectively.
3. Disconnection of the circuit to be measured Connect the test lead in black to the end of disconnected circuit (the voltage is lower) and connect the test lead in red to the end of the disconnected circuit (voltage is higher).
4. Connect the power to the circuit and capture the displayed reading. If the display unit only shows "OL", it means the input is over the selected measuring range. At this moment, turn the rotary switch to a higher measuring range.

Note: The maximum measurable current is 600mA.



3.2.9.NCV (non-contact voltage detection) and live line test

Turn the rotary switch to **NCV/Live**.

The steps for test NCV are as follows:

Place the top of the meter approach the conductor. If the meter detects the AC voltage, the indicators for signal density (high, medium and low) will be on in accordance with the detected density. The number of "-" displayed on the screen indicates signal strength, and the more it is, the stronger the signal and the beeper will sounds alarms at different frequencies.

The steps for test live line are as follows:

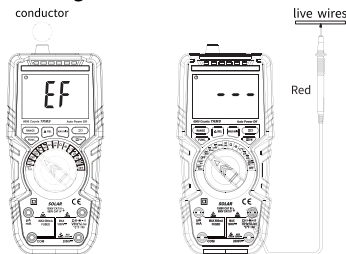
1. Connect the red test pen to the Ω (H₀), VHz%, Live, °C/F input jack.
2. Single insertion into power socket L socket or near live wires. Place the top of the meter approach the conductor. If the meter detects the AC voltage, the indicators for signal density (high, medium and low) will be on in accordance with the detected density. The number of "-" displayed on the screen indicates signal strength, and the more it is, the stronger the signal and the beeper will sounds alarms at different frequencies.

Note :

● **Voltage may still remain in the absence of any indication. The operator shall not rely on non-contact voltage detector to check the presence of voltage. The detection operation may be affected by various factors, including socket design, insulation thickness and type.**

● **When the voltage is input into the meter's input terminal, the voltage sensor LED may be on as a result of induced voltage.**

● **External sources of interference (like flashlight and motor) may trigger non-contact voltage detection.**



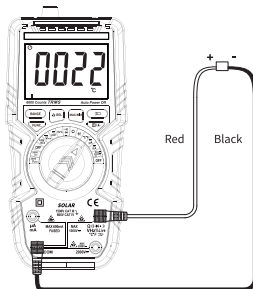
3.2.10. Temperature measurement

The steps for temperature measurement are as follows:

1. Turn the rotary switch to the **°C/°F** position.
2. Insert the red plug of the thermocouple into the **VHz%Live** input socket, and the black plug into the **COM** input socket.
3. Place the temperature sensing end of the thermocouple close to the surface of the temperature body to be measured.
4. Once the reading is stable, the temperature value can be directly read from the display screen.
5. Short press the "**FUNC.**" key to switch between **°C** and **°F**.

Note :

The maximum measurement temperature of the randomly delivered K-type thermocouple is 250 °C, and the instantaneous measurement can reach 300 °C.



3.2.11 External clamp shaped current probe for measuring current

The multimeter supports measuring current with an external clamp shaped current probe, with a maximum support of 600A. The steps are as follows:

1. Turn the rotary switch to **60A** $\approx$ **600A** gear.
2. Insert the red plug of the clamp shaped current probe into the **VHz%Live** input socket and the black plug into the **COM** input socket.
3. Press the "**FUNC.**" button to switch between AC current or DC current (some probes do not support DC).
4. Press the "**RANGE**" button to switch the range corresponding to the clamp current probe.
5. Clamp the clamp probe onto the cable to be tested and read the

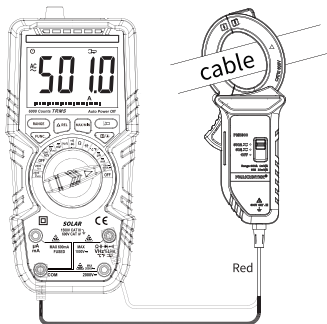
value from the screen.

Note :

● When the clamp shaped current probe is not connected, the instrument display reading numbers is normal, and it will return to zero after connecting the probe.

● Due to differences in the parameters of different clamp probes, when the probe is connected and the reading does not return to zero, press the "REL" button to return the reading to zero.

Please press the "RANGE" button to select the range corresponding to the specifications of the clamp current probe.



4. Technical parameters

4.1. Overall parameters

- Operating environment :
 - ✧ CAT IV 600V and CAT III 1500V d.c, Pollution level: 2.
 - ✧ Altitude < 2000 m.
 - ✧ Working temperature & humidity: 18~28 °C (80%RH, not consider <10°C).
 - ✧ Storage temperature & humidity : -10~60 °C (batteries shall be removed when RH is below 70%).
- Coefficient of temperature: $0.1 \times \text{accuracy} / ^\circ\text{C}$ (<18°C or >28°C).
- $\Omega, \text{Hz}, \text{V}_{\text{Live}}, \text{C}, \text{F}$ allowable max voltage between terminal to be measured and ground: CAT III 1500V.
- Fuse protection : mA position: fuse(FF800mA/1000V).
- Rotation rate: about 3 times/sec.

- Display: 6000 counts displayed on LCD screen. Automatically display the symbol for unit in accordance with measurement function position.
- Over-range indication: the LCD screen will display "OL" .
- Battery low voltage indication: " " will be displayed when the battery voltage is below the normal operating voltage.
- Input polarity indication: "-" is automatically displayed.
- Power supply: 3 x 1.5V AAA batteries.
- External dimensions: 194mm(L) × 90 mm(W) × 56mm(H).
- Weight: about 380g(battery included).

4.2.Precision indicator

Accuracy: $\pm$ (% reading + digit), Accuracy is applicable for one year after calibration.

Reference conditions: Ambient temperature 18 ° C to 28 ° C, relative humidity not greater than 80%.

4.2.1.DC voltage

Range	Resolution	Accuracy
600.0mV	0.1mV	$\pm(0.5\%\text{reading}+3\text{digit})$ (600mV range only in mV range)
6.000V	1mV	
60.00V	10mV	
600.0V	100mV	
1000V	1V	$\pm(0.5\%\text{reading}+5\text{digit})$
2000V	1V	$\pm(0.8\%\text{reading}+5\text{digit})(\text{only in } 2000\text{V range})$

Input impedance: >10M Ω .

 maximal input voltage: 1000V DC or 1000V AC RMS.

2000V $\approx$ maximal input voltage: 2000V DC or 2000V AC RMS.

4.2.2.AC voltage

Range	Resolution	Accuracy
600.0mV	0.1mV	$\pm(0.8\%\text{reading}+5\text{digit})$ (600mV range only in mV range)
6.000V	1mV	
60.00V	10mV	
600.0V	100mV	
1000V	1V	$\pm(1.0\%\text{reading}+3\text{digit})$
2000V	1V	$\pm(1.5\%\text{reading}+3\text{digit})(\text{only in } 2000\text{V range})$

Input impedance: >10M Ω .

 maximal input voltage: 1000V DC or 1000V AC RMS.

2000V  maximal input voltage: 2000V DC or 2000V AC RMS.

Frequency response: 40Hz~1kHz TRMS.

4.2.3. Frequency and Duty Ratio

Range	Resolution	Accuracy
9.999Hz	0.001Hz	$\pm (0.5\% \text{reading} + 5 \text{digit})$
99.99Hz	0.01Hz	
999.9Hz	0.1Hz	
9.999kHz	0.001kHz	
99.99kHz	0.01kHz	
999.9kHz	0.1kHz	
9.999MHz	1kHz	
1%~99%	0.1%	$\pm (3.0\% \text{reading} + 2 \text{digit})$

Input voltage range : 200mV-10V AC RMS.

Overload protection : 1000V DC or 1000V AC RMS.

4.2.4. Resistance

Range	Resolution	Accuracy
600.0 Ω	0.1 Ω	$\pm (1.0\% \text{reading} + 3 \text{digit})$
6.000k Ω	1 Ω	
60.00k Ω	10 Ω	
600.0k Ω	100 Ω	
6.000M Ω	1k Ω	
60.00M Ω	10k Ω	$\pm (2.0\% \text{reading} + 3 \text{digit})$

Overload protection : 1000V DC or 1000V AC RMS.

Open-circuit voltage: about 1V.

4.2.5. Diode

Functions	Range	Resolution	Testing conditions
	3V	0.001V	Forward DC current: about 1mA; Open-circuit voltage: about 3.2V. The display unit shows the approximate value of the diode's forward voltage drop.

Overload protection : 1000V DC or 1000V AC RMS.

4.2.6.Continuity

Functions	Range	Resolution	Description	Testing conditions
o))	600Ω	0.1Ω	When the built-in beeper sounds and the accompanying green indicator is on, the measured resistance shall not be over 30Ω, The red indicator will be on when the resistance is 40Ω~600Ω.>600Ω display OL.	Open-circuit voltage: about 1V

Overload protection : 1000V DC or 1000V AC RMS.

4.2.7.Capacitance

Range	Resolution	Accuracy
100nF	0.01nF	$\pm (4.0\% \text{reading} + 5 \text{digit})$
1000nF	0.1nF	
10μF	0.001μF	
100μF	0.01μF	
1000μF	0.1μF	
10mF	0.001mF	$\pm (5.0\% \text{reading} + 3 \text{digit})$
100mF	0.01mF	

Overload protection : 1000V DC or 1000V AC RMS.

4.2.8.DC current

(Connected in series through μA/mA port and COM port)

Range	Resolution	Accuracy
600.0μA	0.1μA	$\pm (0.8\% \text{reading} + 3 \text{digit})$
6.000mA	0.001mA	
60.00mA	0.01mA	
600.0mA	0.1mA	

Overload protection: fuse tube(FF800mA/1000V).

Maximal input current : μA position : 6mA DC/AC RMS,
mA position : 600mA DC/AC RMS.

4.2.9.AC current

(Connected in series through μ A/mA port and COM port)

Range	Resolution	Accuracy
600.0 μ A	0.1 μ A	$\pm(1.0\%\text{reading}+3\text{digit})$
6.000mA	0.001mA	
60.00mA	0.01mA	
600.0mA	0.1mA	

Overload protection: fuse tube(FF800mA/1000V).

Maximal input current : μ A position : 6mA DC/AC RMS,

mA position : 600mA DC/AC RMS.

Frequency response: 40Hz-1kHz True RMS.

4.2.10.Clamp current probe input terminal

Range	Input specification	Accuracy	Description
60.00A	10mV/1A	Voltage: $\pm(0.5\%\text{reading}+3\text{digit})$	When inputting 10mV, the instrument displays 1A; The maximum input is 600mV.
600.0A	1mV/1A	Voltage: $\pm(0.5\%\text{reading}+3\text{digit})$	When inputting 10mV, the instrument displays 1A; The maximum input is 600mV.

Maximum error: maximum voltage error+maximum current error.

Overload protection : 1000V DC or 1000V AC RMS.

Frequency response: 40Hz-1kHz True RMS.

4.2.11. Temperature

Range	Resolution	Accuracy
-40°C~1000°C	1°C	$\pm(1.0\% \text{ reading} + 2 \text{ digits})$
-40°F~1832°F	1°F	

Overload protection : 1000V DC or 1000V AC RMS.

5. Meter maintenance

5.1. General maintenance

WARNING

● To avoid any electric shock or damage to the meters do not attempt to clean the inside of the meter. You must remove the line connecting a test lead to input signals, before opening the case or battery cover.

You must regularly use damp cloth and a small quantity of detergent to clean the meter's shell. Don't attempt the use of any abrasive or chemical solvent.

The dirty or damp input socket may affect reading

Steps for cleaning input sockets :

- ① Shut down the meter and pull all test leads out of the input socket.
- ② Clean up all dirty substances on sockets.
- ③ Use a new cotton ball with a detergent or lubricant to clean each socket because lubricant can prevent the socket vulnerable to dampness form pollution.

5.2. Battery & fuse replacement

WARNING

- To avoid any electric shock or personal injury as a result of incorrect reading, replace batteries once the symbol "" appear on the display unit.
- Only the designated fuse (800mA/1000V fuse) can be used.
- To avoid any electric shock or personal injury, don't attempt to open the battery cover to replace batteries, unless you have already powered off the device and carried out an examination to ensure that the test lead has been disconnected from the circuit to be measured.

Batteries must be replaced by the following steps:

1. Cut off the power to the meter.
2. Pull all test leads out of the input socket.
3. Use a screw driver to unscrew the bolts that are used to fix battery cover.
4. Take off the battery cover. Remove the old batteries and replace new batteries.
5. Remount the battery cover and fix a bolt.

Fuse must be replaced by the following steps:

1. Cut off the power to the meter.
2. Pull all test leads out of the input socket.
3. Use a screw driver to unscrew the bolts that are used to fix battery cover.
4. Take off the battery cover.
5. Remove the damaged fuses and replace a new fuse 800mA/1000V, size 6*32mm.
6. Use a screw driver to unscrew the bolts that are used to fix battery cover.

