SMART PEN MULTI - PURPOSE METER

OPERATING INSTRUCTION

⚠WARNING AND PRECAUTIONS

To avoid possible electric shock or personal injury, and to avoid possible damage to the meter or to the equipment under test, comply with the follow practices:

- ✧ Do not use the meter if it is damaged. Before you use the meter, inspect the case. Pay particular attention to the insulation surrounding the connectors.
- ✧ Inspect the test leads for damaged insulation or exposed metal. Check the test leads for continuity. Replace damaged test leads before you use the meter.
- ✧ Do not use the meter if it operates abnormally. Protection may be impaired. When in doubt, have the meter serviced.
- ✧ Do not operate the meter around explosive gas, vapor, or dust.
- ✧ Do not apply more than the rated voltage, as marked on the meter, between terminals or between any terminal and earth ground.
- ✧ Before use, verify the meter's operation by measuring a known voltage.
- ✧ When servicing the meter, use only specified replacement parts. Do not use the Meter in a manner not specified by this manual or the safety features of the Meter may be impaired.
- ✧ Use with caution when working above 30V ac rms, 42V peak, or 60V dc. Such voltages pose a shock hazard.
- ✧ When using the probes, keep your fingers behind the finger guards on the probes.
- ✧ Connect the common test lead before you connect the live test lead. When you disconnect test leads, disconnect the live test lead first.
- ✧ Remove the test leads from the meter before you open the battery door.
- ✧ Do not operate the meter with the battery door or portions of the cover removed or loosened.
- ✧ To avoid false readings, which could lead to possible electric shock or personal injury, replace the batteries as soon as the low battery indicator (" ⊟ ") appears.

1. GENERAL SPECIFICATION

- ➢ Display: 3-3/4 digits LCD with a maximum reading of 4000.
- ➢ Measurement rate: updates 2 -3/sec.
- ➢ Over range indication: "1" figure only in the display
- ➢ Automatic negative polarity indication.
- ➢ The " ⊟ " is displayed when the battery voltage drops below the operating voltage. Full range over load protection.
- ➢ Capacitance measurement Auto-Zeroing.
- ➢ Auto Power Off: It will be automatically cut off in about 15 minutes after the power is turned on. It needs to be turned off and turned on again to continue the power.
- ➢ Operating temperature: 0℃ ~40℃, 0~75% R.H.
  Storage temperature: -10℃~50℃, 0~75% R.H.
- ➢ Power: Single standard 1.5V AAA battery X 2.
- ➢ Dimensions: 205L*43W*25Hmm.
- ➢ Weight: approx 80g (including battery)
- ➢ Safety Compliance: IEC 61010-1, 2000 CAT I 1000V overvoltage standards.

Overvoltage installation categories per IEC 61010-1, 2000: The Meter is designed to protect against transients in these categories:

CATI From high-voltage low-energy sources, e.g., electronic circuits or a copy machine.

CAT II From equipment supplied from the fixed installation, e.g., TVs, PCs, portable tools and household appliances.

CAT III From equipment in fixed equipment installations, e.g., installation panels, feeders and short branch circuits, and lighting systems in large buildings.

2. ELECTRICAL SPECIFICATIONS

Accuracy is given as ±(% of reading + number of least significant digits) for one year, at 23℃+5℃ RH<75%

1) **DCV**

Range	Accuracy	resolution
4V	± (0.8%+3d)	1mV
40V		10mV
400V		100mV
600V	± (1%+3d)	1V

Input impedance: 10MΩ on all range

2) **ACV**

Range	Accuracy	resolution
4V	± (1%+3d)	1mV
40V		10mV
400V		100mV
600V	± (1.2%+5d)	1V

Input impedance: 10MΩ Frequency range: 40 ~ 400Hz

3) **CAPACITANCE**

Range	Accuracy	resolution
4nF	±(3%+5d)	1pF
40nF	±(3%+5d)	10pF
400nF	±(3%+5d)	100pF
4uF	±(3%+5d)	1nF
40uF	±(3%+5d)	10nF
400uF	±(3%+5d)	100nF
4mF	±(5%+10d)	1uF

4) **OHM**

Range	Accuracy	resolution
4KΩ	±(1.0%+5d)	1Ω
40KΩ	±(1.0%+5d)	10Ω
400KΩ	±(1.0%+5d)	100Ω
4MΩ	±(1.0%+5d)	1KΩ
40MΩ	±(1.2%+8d)	10KΩ

3.2.6 frequency

量程	分辨率	准确度
40.00Hz	0.01Hz	± (0.8% 读数 +8 字)
400.0Hz	0.1Hz	
4.000kHz	1Hz	
40.00kHz	10Hz	
400.0kHz	100Hz	
4.000MHz	1kHz	± (1.2% 读数 +8 字)

Maximum input voltage: 110V or AC effective value;

Frequency response: 40HZ-400Hz, sine wave effective value (average response)

3. METHOD OF MEASUREMENT

⚠ **Warning**

Dangerous voltages may be present at the input terminals and may not be displayed.

3.1 DCV & ACV MASUREMENT

1) Select "AUTO" mode,In "AUTO" mode, voltage and resistance can be identified automatically.
2) Connect black test lead to "COM" terminal .
3) Connect test pen to measuring point and read the display value the polarity of the Integrated test pen will be indicated at the same time as the voltage.

Note:

Never try to measure the voltage above 600V! Although the indication is possible to show, there is a danger of damaging the internal circuitry.

3.2 RESISTANCE MEASUREMENT AND CONTINUITY TEST

⚠ **Warning**

To avoid electrical shock or damage to the Meter when measuring resistance or continuity in a circuit, make sure the power to the circuit is turned off and all capacitors are discharged.

1) Connect black test lead to "COM" terminal
2) Select "AUTO" mode,In "AUTO" mode, voltage and resistance can be identified utomatically.
3) Parallel the test pen to the resistance under test and read the display value.
4) When the resistance detected is less than 50 ohms, the **"Continuity test"** is automatically started and the buzzer emits an alarm.

Note:

a) The polarity of the Integrated test pen is"+".
b) When the input is not connected, i.e. at open circuit, the figure "1" will be displayed for the over range condition.

3.3 CAPACITANCE MEASUREMENT

⚠ **Warning**

To avoid damage to the Meter, disconnect circuit power and Discharge all high-voltage capacitors before measuring capacitance.

1) Press the "SELECT" button and SELECT the capacitance measurement mode.
2) Connect the test pen to both ends of the tested capacitor and read the displayed value.

Note: The tested capacitor should be discharged before the testing procedure. Never apply voltage to the"⏚" input terminals, or serious damage may result.

3.4 Frequency measurement

1) Press the "Hz" button and SELECT the Frequency measurement mode.
2) Connect the black test lead to "COM" terminal ;
   (Note: the polarity of the Integrated test pen is "+").
3) Connect the test pen to the measuring point and the display screen displays the frequency value.

3.5 Non-contact induced voltage test (NCV)

1) Press "SELECT" to SELECT "NCV" mode.
2) Put the top of the multimeter near the ac charged body
3) When the sensor on the top of the multimeter detects the presence of ac electric field, the internal buzzer will alarm and the corresponding induced voltage intensity will be displayed on the LCD screen.

Note: This function is only used for the presence of inductive electric field, so it is not possible to judge whether the measured circuit is safe, Cause the risk of electric shock.

4. Button function

1. "**SELECT**" : Select "Capacitance"or"NCV"or"AUTO" mode.
2. "**Hz**" : Select "Frequency" or "AUTO" mode
3. "HOLD/☼" : Digital hold and backlight. (Short press: number hold and release; Long press : backlight on and of.)

5. MAINTENANCE

Beyond replacing batteries and fuses, do not attempt to repair or service your Meter unless you are qualified to do so and have the relevant calibration, performance test, and service instructions. The recommended calibration cycle is 12 months.

Periodically wipe the case with a damp cloth and mild detergent. Do not use abrasives or solvents. Dirt or moisture in the terminals can affect readings.

To clean the terminals

a) Push the Meter OFF and remove the test leads.

b) Shake out any dirt that may be in the terminals.

c) Soak a new swab with isopropyl alcohol and work around the inside of each input terminal.

Use a new swab to apply a light coat of fine machine oil to the inside of each terminal.

6. Replace the battery

1) Battery replacement should only be done after the test leads have been.
2) Open the battery box on the back of the machine, replace the battery with a new one, and then fasten the battery box.