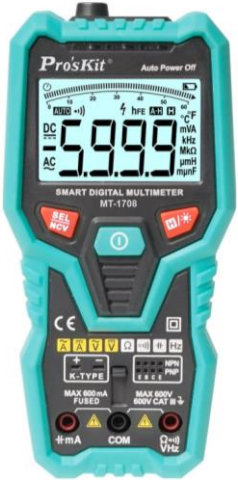
Pro'sKit®

# MT-1708
# 3-5/6 Smart Digital Multimeter

CE




**User's Manual**
**2nd Edition, 2020**

## 1.General Information

This digital multi-meter is designed and manufactured in compliance with IEC-61010 safety requirements on electronic measuring instruments and hand-held digital multi-meters. It is compliant with IEC-61010 requirements pertaining to 600V 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:
  A. Safety procedures against electric shock
  B. 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 interferences, 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 60Vdc 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 AV 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 use 3x 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, category III voltage does not exceed 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 |
| CE | Compliant with European Union Directive |
| ϟ | High voltage warning |

| | |
|---|---|
|  | Battery Under Voltage indicator/ Low Battery |
| CAT.III 600V | 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.

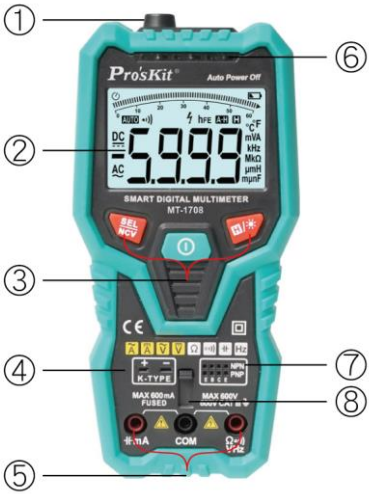
### 1.2 Input protection measures

* The meter can sustain the maximum input voltage of DC 600V or AC at the moment of voltage measurement.
* The meter can sustain the maximum AC voltage of 600V or equivalent voltage (valid value) when the tests on frequency, electric resistance, continuity and diode are carried out.
* The protective tube (F630mA/250V) is used for protection purpose when current measurements are carried out.

## 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. Either for professionals, factories, schools, enthusiasts or households, it is an ideal multi-functional meter.

## 2.1 A Schematic diagram for the meter




**Physical appearance**

①.NCV inductive probe ②. LCD display screen ③.Functional key
④.K-type thermocouple temperature probe socket ⑤ Input socket.
⑥.LED indicator ⑦ hFE Transistor testing socket ⑧ Toggle switch

## 2.2 Accessories

| | |
|---|---|
| Operation Manual | X 1 |
| Test lead | X 1 pair |
| K-Type thermocouple | X 1 |
| Fuse | X 2 |

## 3 Operational Guidelines

This instrument is a kind of intelligent digital multi-meter, so the operation is very simple, and it is not required to carry out function selection during measurement; the instrument will recognize measured signals automatically, then measure and display measurement results.

**Not:**

- The instrument could not carry out measurement on two or more functions.
- Instrument's automatic detection sequence on measurement instrument:

**AC voltage → DC voltage → AC current → DC current → Temperature measurement → Transistor measurement → Capacitor measurement → Resistance & On-off**

### 3.1 Startup/ Shutdown

**Startup:** When the instrument is shut down, press the ⏻ key and hold, till the buzzer sends a "Di" sound, then release.

**Shutdown:** When the instrument is started, press the ⏻ key and hold, till the buzzer sends a "Di" sound, then release.

### 3.2 Automatic shutdown function

If no pressing operation within 10 minutes, while no signal is input, the instrument will shut down automatically.

### 3.3 Backlight and lighting function

Press the key  for more than 2 seconds to turn on the backlight and the light; then press this key for more than 2 seconds to turn off the backlight and the light, or turn off automatically within about 10 seconds after startup.

### 3.4 Data hold function

Press the key  to start data hold, the character H will show on the display; then press the key  to close data hold.

### 3.5 AC&DC voltage/Frequency/Resistance measurement / Continuity test

- Press the key ⏻ to start the power of the instrument.
- Insert the red test lead into the V socket, and the black test lead into the COM socket.
- Parallel connect the test lead to the circuit, power supply or resistance to be measured. The instrument will judge AC voltage, DC voltage and resistance automatically.
- During measuring the resistance, when the resistance is less than about 30Ω,the built-in buzzer will sound, while the green LED indicator will light up; when the resistance is more than about 30Ω and less than about 50Ω,the red LED indicator will light up, and the buzzer will not sound.
- Read measurement results from the display screen. When measuring DC voltage, the voltage polarity of the testing points of the red test lead will show synchronously on the display.
- When measuring AC voltage, press the  key to display frequency, and then press the key  to shift back to ac voltage display.

- When the measurement is completed, press the power key, to shut down the instrument power supply.

**⚠ Warning: In order to avoid safety accidents such as potential electric shock or personal injury etc., please comply with safety work norms:**

### 3.6 AC/DC Current/ Frequency / Capacitor measurement

- Press the key to start the power of the instrument.
- Insert the red test lead into the mA socket, and the black test lead into the COM socket.
- During measuring the capacitor, parallel connect the test lead to both ends of the capacitor to be measured; during measuring the current, connect the test lead in series to the circuit to be measured. The instrument will recognize and measure automatically.
- Read measurement results from the display screen. When measuring DC voltage, the current polarity of the testing ends of the red test lead will show synchronously on the display.
- When measuring AC current, press the key to display frequency, and then press the key to shift back to AC current display.
- When the measurement is completed, press the power key to shut down the instrument power supply.

- **Max. current measurement of the instrument is 600mA, and the min. current measurement is 5mA.**
- **During measuring the maximum capacitor, it requires about 10 seconds to display the measurement result.**

**⚠ Warning: In order to avoid safety accidents such as potential electric shock or personal injury etc., please comply with safety work norms:**

### 3.7 Temperature Measurement

- Press the key to start the power of the instrument.
- Take off the test lead and push down the Toggle switch on the instrument panel lightly, till the Toggle switch is locked.
- Insert the temperature probe of the K-type thermocouple into the socket of the temperature probe of the temperature probe of the K-type thermocouple.
- Read measurement results from the display screen.
- Press the key to shift between degrees Celsius and Fahrenheit.
- When the measurement is completed, press the power key to shut down the instrument power supply.