

# Pro'sKit®

## MT-1236 3-5/6 True RMS Multimeter



**User's Manual**  
**1<sup>st</sup> Edition, 2021**

©2021 Copyright by Prokit's Industries Co., Ltd.

## 1. General information

This digital multimeter is a high-quality, high-precision, safe meter. Suitable for professional engineers, maintenance engineers, teaching, etc.

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 60V DC or 30V AC (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, 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, category II voltage shall 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.
	High voltage warning
	Equipment with double insulation or reinforced insulation protection
	AC (alternating current)
	DC (direct current)
	Ground
	Fuse
CAT. II 600 V	Over-voltage protection
	Conform with European Union standard

### 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.

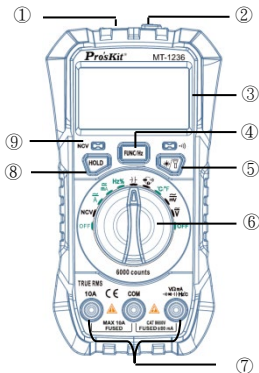
## 1.2 Input protection measures

- The meter can sustain the maximum input voltage of 600V (DC/AC) at the moment of voltage measurement.
- The limit voltage is 250 ACV or the equivalent RMS voltage when the resistance, continuity or diode is measuring.
- The protective tube (F600mA/250V) is used for protection purpose when mA current measurements are carried out. The protective tube (F10A/250V) is used for protection purpose when A current measurements are carried out.

## 2. A Schematic Diagram for the Meter

### 2.1 A Schematic Diagram

- ① LED light
- ② Non-contact voltage indicator
- ③ LCD screen
- ④ "FUNC/HZ" selection key
- ⑤ Backlight & LED key
- ⑥ Rotary switch
- ⑦ Input socket
- ⑧ Hold key
- ⑨ NCV indicator



## 2.2 Description of the symbols on the display unit

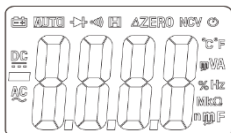



Table.1 Symbols

Symbol	Description	
	Low Battery Indicator <b>⚠ To avoid electric shock or personal injury as a result of incorrect reading, promptly replace the battery when the battery under voltage indicator appears.</b>	
	Auto power off indicator	
	Negative input polarity indicator	
%	Duty cycle	
	Diode test or Continuity test mode	
	Data hold mode	
NCV	Non-contact AC voltage detection mode	
AUTO	Automatic range measurement mode	
°C , °F	Unit of temperature(°C : Celsius; °F: Fahrenheit)	
V, mV	V: mV :	V: the unit of volt Millivolt · 1x10 <sup>-3</sup> or 0.001 volt.
A, mA	A: mA:	Ampere, the unit of current. Milliamperere, 1x10 <sup>-3</sup> or 0.001 ampere.
Ω, kΩ, MΩ	Ω: kΩ: MΩ:	Ohm, the unit of electric resistance. Kilohm, 1000 Ohm Megaohm, 1,000,000 ohm.
mF, μF, nF	F: mF: μF: nF:	Farad, the unit of capacitance. Millifarad, 1x10 <sup>-3</sup> or 0.001 farad. Microfarad, 1x10 <sup>-6</sup> or 0.000001 farad. nF, 1x10 <sup>-9</sup> or 0.000000001 farad.
MkHz	Hz: KHz: MHz:	Hz, the unit of frequency KHz, 1x10 <sup>3</sup> Hz. MHz, 1x10 <sup>6</sup> Hz or 1000 KHz.

## 2.3 Description of functional keys

Key	Description of functions
HOLD	Press the key to hold the measured value for the current moment Press the key again to cancel this function.
FUNC/HZ	Voltage measurement position: press the key to select DC voltage or AC voltage measurement mode. Current measurement position: press the key to select DC current or AC current measurement mode. Hz/% position: press the key to select Hz or % mode. $\Omega$ $\rightarrow$ $\rightarrow$ $\rightarrow$ $\rightarrow$ $\rightarrow$ position: press the key to select $\Omega$ , $\rightarrow$ $\rightarrow$ or $\rightarrow$ $\rightarrow$ $\rightarrow$ measurement mode. $^{\circ}\text{C}/^{\circ}\text{F}$ position: press the key to select $^{\circ}\text{C}$ or $^{\circ}\text{F}$ mode.
	Short press the key to turn on backlight and short press again to exit. It turns off automatically with no operation for 15S. Long press the key to turn on the illumination function and the backlight at the same time. Short press the key again to turn off the illumination function. It turns off automatically with no operation for 30S.

## 2.4 Description of input socket

Input socket	Description
COM	All public input terminals to be measured are connected to test leads in black or the public output plugs of exclusive multi-function test sockets.
V $\Omega$ mA $\rightarrow$ $\rightarrow$ $\rightarrow$ $\rightarrow$ $\rightarrow$ $\rightarrow$ Hz $^{\circ}\text{C}$	Positive input terminals (connected to a test lead in red) for voltage, current (mA), electric resistance, capacitor, diode, beep on/off test, temperature, frequency, duty ratio measurement.
10A	10A positive input terminal (connected to a test lead in red).

## 2.5 Accessories

- |                     |          |                        |     |
|---------------------|----------|------------------------|-----|
| 1. Operation Manual | X 1      | 3. K-Type thermocouple | X 1 |
| 2. Test lead        | X 1 pair |                        |     |


## 3. Operational guidelines

### 3.1 General operation


#### • Auto power off


If no operations are made in 15 minutes following the initialization, the meter will sound to remind the operator to automatically cut off power supply and enter the state of dormancy. The meter can be rebooted when the operator presses any key in the auto power off mode.

- **Reading Hold mode**

The reading hold mode can keep the current reading on the display and the symbol “”.change the measurement function position or press “ HOLD ”button again to exit the data hold mode.

- **Backlight and lighting function**

Short press “” button to turn on backlight; and short press again to exit. It turns off automatically with no operation for 15S.

Long press “” button to turn on the lighting function and the backlight at the same time. Short press the button again to turn off the lighting function. It turns off automatically with no operation for 30S.

- **Function select**

Press the “FUNC/HZ” button and enter into function selection mode.

## 3.2 Measurement guidelines

### 3.2.1 Measurement of AC voltage and DC voltage




***To avoid any electric shock and/or damage to the meter, do not attempt a voltage measurement if the voltage (valid value) is over 600V DC or AC current.***

***To avoid any electric shock and/or damage to the meter, don't attempt to impose between any public terminal and ground any voltage whose valid value is over 600V for DC or AC current.***

The meter provides DC/AC voltage measuring ranges as follows: 600.0mV, 6.000V, 60.00V, and 600V.

Measurement of AC voltage or DC voltage

- Turn the rotary switch to the position  and press “FUNC-Hz” to choose DCV or ACV
- Connect the test lead in black and test lead in red to COM input socket and V input socket respectively.
- Use another two ends of the test lead to measure the voltage of the circuit to be measured. (In parallel connection with the circuit to be measured)
- Read the measured voltage value on LCD screen. When DC voltage measurement is attempted, the display unit will show the voltage polarity of the circuit connected to the pen-shaped meter in red.

#### Notes:

- Within the measuring range of DC and AC voltage of 600mV, even if there is no input or no connection to the test lead, the meter will display some information. In this situation, press short circuit “V—Ω” and “COM” terminal to reset the meter to zero.

- The value of the AC voltage measured with this meter is True RMS (root mean square). These **measurements are accurate** for sine wave and other waves (**without DC offset**), square wave, triangular wave and step wave.

### 3.2.2 Electric resistance measurement



**To avoid the meter or the measured equipment from damage, do not attempt a resistance measurement unless the operator has already cut off all power sources for the circuit to be measured and fully discharged all high-voltage capacitors.**

Ohm is the unit of electric resistance ( $\Omega$ ).

The measuring ranges of electric resistance of this meter are  $600.0\Omega$ ,  $6.000k\Omega$ ,  $60.00k\Omega$ ,  $600.0k\Omega$ ,  $6.000M\Omega$  and  $60.00M\Omega$ ,

Measurement of electric resistance

1. Turn the rotary switch to the  $\Omega \rightarrow \text{H}$  position and press "FUNC/Hz" to choose  $\Omega$ .
2. Connect the test lead in black and test lead in red to COM input socket and  $V/\Omega$  input socket respectively.
3. Use another two ends of the test lead to measure the electric resistance of the circuit to be measured.
4. Read the measured electric resistance value on LCD screen.

#### Notes:

- The measured value of the electric resistance of the circuit differs a bit from the rated value of the electric resistance.
- To ensure measurement accuracy, in attempting a low resistance measurement, first put two pen-shaped meters in short circuit and capture the resistance reading of these short circuits. Then subtract the aforesaid reading from the measured resistance.
- When the meter is in open circuit, the display unit will show "OL" that indicates the measured value is over the measuring range.

### 3.2.3 Diode test



**To avoid the meter or the measured equipment from damage, do not attempt a diode test unless the operator has already cut off all power sources for the circuit to be measured and fully discharged all high-voltage capacitors.**

**Diode test outside the circuit:**

1. Turn the rotary switch to the  $\Omega \rightarrow \text{H}$  position and press "FUNC/Hz" to choose  $\rightarrow$ .
2. Connect the test leads in black and in red to COM input socket and  $V/\Omega$  input



socket respectively.

3. Connect the test leads in black and in red to the positive and negative poles of the diode to be tested respectively.
4. The meter displays the forward bias value of the diode to be tested. If the polarity of the test lead is reversed, the meter will display "OL".

### 3.2.4 Beep continuity test



***To avoid the meter or the measured equipment from damage, do not attempt a diode test unless the operator has already cut off all power sources for the circuit to be measured and fully discharged all high-voltage capacitors.***

#### Steps for a continuity test:

1. Turn the rotary switch to the  $\Omega \rightarrow \text{diode}$  and press "FUNC/HZ" to choose  $\text{diode}$
2. Connect the test lead in black and test lead in red to COM input socket and V/ $\Omega$  input socket respectively.
3. Use another two ends of the test lead to measure the resistance of the circuit to be measured. If the measured distance is less than  $30\Omega$ , the beeper will sound continuously, and the LED will be on.

### 3.2.5 Capacitance measurement



***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 measuring range for the capacitance of this meter are 60.0nF/600.0nF /6.000 $\mu$ F/60.00 $\mu$ F/600.0 $\mu$ F/6.000mF/60.00mF.

Measurement of capacitance:

1. Turn the rotary switch to the  $\text{diode}$  position.
2. Connect the test leads in black and in red to COM input socket and 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:

1. The measurement of a large capacitance requires a given period of stabilization of reading.
2. To avoid damage to the meter, the measurement of a capacitor with polarities requires much attention to its polarity.

### 3.2.6 Measurement of DC current and AC current



***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 250V. 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 meter provides DC/AC current measuring ranges as follows: 60.00mA, 600.0mA and 10.00A.

Measurement of current:

1. Turn the rotary switch to the appropriate position and press "FUNC/Hz" to choose DC or AC current measurement.
2. Connect the test lead in black to COM input socket. Connect the test lead in red to a mA input socket when the measured current is less than 600mA; connect the test lead in red to a 10A input socket when the measured current is 600mA~10A.
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.

### 3.2.7 Frequency and Duty cycle measurement



***Do not test any voltage higher than 250V to prevent electric shock or damage to the instrument.***

1. Turn the switch to HZ%.
2. Connect the black test pen to the COM jack and the red pen to the Hz jack.
3. Measure the frequency value of the circuit under test with the other two ends of the test pens.
4. Press the "FUNC-Hz" button to select Frequency or Duty cycle measurement, display show the readings of the test result.

### 3.2.8 Measuring temperature



**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 current or AC current(valid value).**

1. Turn the rotary switch to the °C/°F position and press “FUNC/Hz” to choose °C or °F.
2. Insert the red plug of the thermocouple into the end of °C, and insert the black plug into COM socket.
3. Directly read the temperature value from the display screen after the reading is stable.

**Notes:** The maximum measuring temperature for the K-type thermocouple dispatched at random is 250°C/482°F, and its instant measuring value can reach 300°C/572°F.

### 3.2.9 NCV test (non-contact voltage detection)

Turn the rotary switch to NCV position, and place the top of the meter approach the conductor. If the meter detects the AC voltage, The beeper will sounds alarms at different frequencies, and the indicator will be flashing.

**Note:**

1. 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.
2. When the voltage is input into the meter's input terminal, the voltage sensor LED may be on as a result of induced voltage.
3. External sources of interference (like flashlight and motor) may trigger non-contact voltage detection.

## 4. Technical parameters

### 4.1 Overall parameters

- Operating environment:

600V CAT II Pollution level: 2


Altitude < 2000 m

Working temperature & humidity: 0~40°C (The requirements will not be considered when temperature is less than 10°C and relative humidity is below 80%).

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).
- Allowable max voltage between terminal to be measured and ground: 600V DC

or AC (valid value)

- Protection of protective tube: mA position: protective tube F 600mA/250V; A position protective tube F 10A/250V
- Rotation rate: approximately 3 revolutions/second
- Display unit: 6000 counts displayed on LCD screen. Automatically display the symbol for unit in accordance with measurement function position.
- Outrange indication: the LCD screen will display "OL".
- Battery Low indication: "  " will appear when the battery's voltage is below the normal working voltage.
- Input polarity indication: "-" will automatically appear.
- Power: 3 x 1.5V AAA battery
- Dimensions: 148mm(L)×79mm(W)×48mm(H).
- Weight: approximately 210g (not included batteries or test leads)

## 4.2 Precision indicator

Accuracy:  $\pm$ (% reading + digit)

The accuracy warranty will run for 1 year upon the ex-factory date.

Reference conditions: ambient temperature is between 18°C and 28°C and relative humidity is no more than 80%.

### 4.2.1 DC voltage

Measuring range	Resolution	Accuracy
600mV	0.1mV	$\pm(0.5\% \text{Reading} + 5 \text{digits})$
6V	0.001V	
60V	0.01V	
600V	0.1V	

Input impedance: 10M $\Omega$

Maximal input voltage: 600V DC or AC valid value

### 4.2.2 AC voltage

Measuring range	Resolution	Accuracy
600mV	0.1mV	$\pm (1\% \text{ readings} + 4 \text{ digits})$
6V	0.001V	
60V	0.01V	
600V	0.1V	

Input impedance: 10M $\Omega$

Maximal input voltage: 600V DC or AC valid value

Frequency response: 40Hz-1kHz True-Rms

### 4.2.3 Frequency

Measuring range	Resolution	Accuracy
9.999Hz	0.001Hz	± (1.5%Reading +5 digits)
99.99Hz	0.01Hz	
999.9Hz	0.1Hz	
9.999KHz	0.001KHz	
99.99KHz	0.01KHz	
999.9KHz	0.1KHz	
9.999MHz	0.001MHz	

Input voltage range: 200mV-10V AC valid value.

Overload protection: 250V DC/AC

### 4.2.4 Duty Cycle

Measuring range	Resolution	Accuracy
1%~99%	0.1%	± (2.5%Reading +5 digits)

Input voltage range: 200mV-10V AC valid value.

Overload protection: 250V DC/AC

### 4.2.5 Capacitor

Measuring range	Resolution	Accuracy
60nF	0.01nF	± (4%Reading +5 digits)
600nF	0.1nF	
6μF	0.001μF	
60μF	0.01μF	
600μF	0.1μF	
6mF	0.001mF	
100 mF	0.01mF	± (4%Reading +10 digits)

Overload protection: 250V DC/AC



### 4.2.6 Electric resistance

Measuring range	Resolution	Accuracy
600Ω	0.1Ω	±(0.8% Reading + 5 digits)
6kΩ	1Ω	
60kΩ	10Ω	
600kΩ	100Ω	
6MΩ	1kΩ	
60MΩ	10kΩ	

Overload protection: 250V DC/AC

Open-circuit voltage: 2.4V

#### 4.2.7 Diode

Functions	Testing conditions
Diode test 	Forward DC current: approximately 1.2mA; Open-circuit voltage: approximately 3.2V. The display unit shows the approximate value of the diode's forward voltage drop.
	The buzzer beeps when the resistance is less than 30Ω

Overload protection: 250V DC/AC

#### 4.2.8 DC current

Measuring range	Resolution	Accuracy
60mA	0.01mA	±(1.2% Reading + 5 digits)
600mA	0.1mA	
10A	0.001A	±(3% Reading + 5 digits)

Overload protection:

Protective tube for mA measuring range (F600mA/250V) ;

Protective tube for 10A measuring range (F10A/250V) .

Maximal input voltage : mA position : 600mA DC/AC (valid value) ;  
10A position: 10A DC/AC (valid value)

When the measured current is over 5A, the duration of continuous measurement shall not be over 10 seconds. The current measurement shall be carried out 1 minute after the completion of previous measurement.

#### 4.2.9 AC current

Measuring range	Resolution	Accuracy
60mA	0.01mA	±(1.5% Reading + 5 digits)
600mA	0.1mA	
10A	0.001A	±(3% Reading + 5 digits)

Overload protection:

Protective tube for mA measuring range (F600mA/250V) ;

Protective tube for 10A measuring range (F10A/250V) .

Maximal input voltage : mA position : 600mA DC/AC (valid value) ;  
10A position: 10A DC/AC (valid value)

When the measured current is over 5A, the duration of continuous measurement shall not be over 10 seconds. The current measurement shall be carried out 1 minute after the completion of previous measurement.

Frequency response: 40Hz-1kHz True RMS

## 4.2.10 Temperature

Measuring Range	Resolution	Accuracy
-20°C ~ 1000°C	1°C	± ( 1% readings +3 digits )
-4°F ~ 1832°F	1°F	± ( 1% readings +3 digits )

Overload protection: 250V DC/AC

## 5. Meter maintenance

This section provides the basic information on maintenance, including the descriptions about replacement of protective tubes and batteries. Do not attempt the meter maintenance unless you are experienced in maintenance and have read the information on calibration, performance test and maintenance.

### 5.1 General maintenance



***To avoid any electric shock or damage to the meter, 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 abrading or chemical solvent.


The dirty or damp input socket may affect reading.

#### Steps for cleaning input sockets:

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

### 5.2 Battery & fuse replacement



***To avoid any electric shock or personal injury as a result of incorrect reading, replace batteries once the symbol “ ” appear on the display unit.***

***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.***

#### Battery replacement:

1. Turn off the power of the meter.
2. Disconnect all test leads from the input socket.
3. Use a screwdriver to remove the screw of battery cover.
4. Take off the battery cover.

5. Take out the old batteries carefully and replace with 3 pcs 1.5 V AAA new batteries.
6. Fix the battery cover.

### **Fuse replacement**

When fuse is blown, replace with the same type of fuse.

1. Turn off the power of the meter and take out the holster.
2. Use a screwdriver to remove the screw of back cover.
3. Take off the back cover.
4. Remove the blown fuse and replace with the same type of fuse
5. Screw the back cover
6. Put the holster back.



***Pro'sKit***<sup>®</sup>

寶工實業股份有限公司



PROKIT'S INDUSTRIES CO., LTD.

©2021 Copyright by Prokit's Industries Co., Ltd(C). All right reserved.