MANUAL DE INSTRUCCIONES
INSTRUCTION MANUAL



CAT III
600V

Intertek

Multímetro digital
Digital multimeter

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1. Safety standards

The multimeter meets the following safety standards: EN/UL/CSA STD C22.2 NO. 61010-1, 61010-2-030, 61010-2-033 for electronic testing instruments. This meter meets CAT III 600V installations and a pollution degree of 2.

- The protection provided by the meter can only be ensured if all safety procedures are strictly followed.
- The safety symbols on the meter are to advise of potential dangerous situations. Caution is required when measuring close to the meter's safety limits.
- Never exceed the protection limit values indicated in the specifications for each range of measurement.

> ⚠ **WARNING**
>
> **The special attention should be paid when using the meter because the improper usage may cause electric shock and damage the meter**. **The safety measures in common safety regulations and operating instruction should be complied with when using**. **In order to make fully use of its functions and ensure safe operations please comply with the usage in this section carefully**.

1.1 FCC Statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful

interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution:
Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

1.2 Using the Meter

1.2.1 Always set the meter to the proper function and range first.
1.2.2 Never exceed protection limits indicated for each measurement.
1.2.3 Keep fingers behind the probe barriers while measuring.
1.2.4 Always be careful when working with voltages above 60V DC or 30V AC RMS.
1.2.5 When using the CAT IV environment,if the measuring voltage between terminals and earth ground exceeds 600V,CAT III environments or voltage measurement between the terminal and the earth more than 1000V,do not measure voltage.
1.2.6 In manual range, if the circuit value is unknown, start the meter at the maximum range and then adjust accordingly.

1.2.7 Remove the leads from the circuit first before switching between functions.
1.2.8 Do not power on circuit while measuring resistance, capacitance, diodes and continuity.
1.2.9 Never connect the meter's leads across a voltage source while the rotary switch is in the resistance, capacitance, diode or continuity mode.
1.2.10 Do not measure capacitance before capacitors are discharged.
1.2.11 Do not operate the meter near explosive gas, vapor or dust.
1.2.12 Stop using the meter if any abnormality is observed.
1.2.13 Do not use the meter unless the battery cover is securely fastened to the meter.
1.2.14 Avoid direct exposure to sunlight to ensure extended life of the meter.

1.3 Safety standards

⚠	Important safety information.
⚠	High voltage with danger.
⏚	Ground.
⧈	Double Insulation (Class II safety equipment).
⎓	Fuse must be replaced as per the specification herein.
~	AC (Alternating Current)
⎓	DC (Direct Current)
≂	AC & DC (Both direct and Alternating Current)
ETL Intertek	Conforms to UL STD. 61010-1, 61010-2-030, 61010-2-033; Certified to CSA STD C22.2 NO. 61010-1, 61010-2-030,61010-2-033
CE	Complies with European (EU) safety standards

CAT III: MEASUREMENT CATEGORY III is applicable to test and measuring circuits connected to the distribution part of the building's low-voltage MAINS installation.

1.4 Maintenance

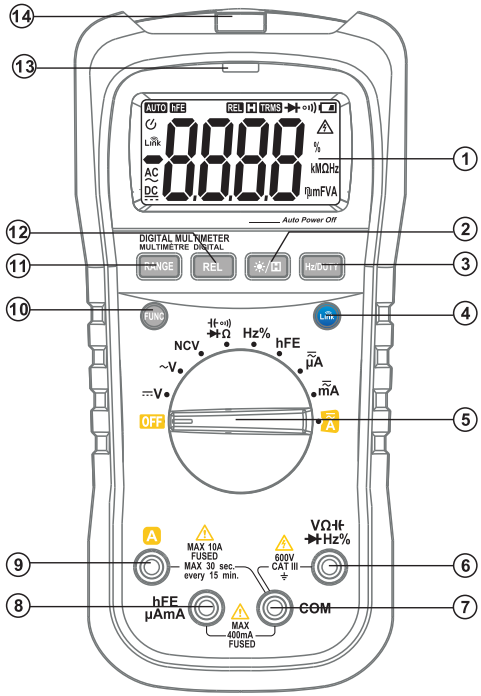
1.4.1 To avoid electric shock or personal injury, repairs/ servicing not covered in this manual should be performed only by qualified personnel.
1.4.2 Remove test leads from any circuit before opening battery cover.
1.4.3 To avoid false readings that may become dangerous, replace the battery as soon as the ymbol appears.
1.4.4 Clean the meter using a damp cloth and mild detergent only; do not use abrasives or chemical solvents.
1.4.5 Always move rotary switch to OFF when not using the meter.
1.4.6 If meter is not going to be used for an extended period of time, remove battery to prevent damage to the meter.

2. Description

-The multimeter is a portable, hand-held yet professional meter that features true RMS measurement display, AC/DC current, AC/DC voltage, Frequency, Capacitance, Resistance, Communication, non-contact voltage tests and hEF tests. This meter is easy to use even with one hand, suitable for professional user or amateurs, and ideal for school or home use.
- Both auto and manual range.
-Display hold.
-True RMS for AC voltage/ current measurements.
-Relative measurement.
-Automatic Power OFF.

2.1 Part Name

No.	Description	No.	Description
1	LCD display	8	Input jack (hFE,μA,mA)
2	Hold/BKL	9	Input jack (10A)
3	Frequency/Duty-cycle	10	Function button
4	Wireless	11	Range button
5	Rotary switch	12	Relative button
6	Input jack (V,R,D,F,C)	13	Voltage alert light
7	Common jack	14	Voltage alert area



2.2 Buttons/Input jack description

FUNC button:

- Press “FUNC” to switch between AC/DC or between function in a rotary switch position.

HOLD button:

- Press “**HOLD**” to keep the current reading on screen. “**H**” symbol will appear on the display.
- Press “**HOLD**” again to release th hold.

☀ button:

- Press “ ☀ ” to turn on the backlight. the backlight will turn off automatically after 15 seconds

RANGE button:

- Press “**RANGE**”to switch to manual range.Each press of the button will switch to the next highest range, until reaching the highest range where it will switch to the lowest range.
- Hold “**RANGE**” to return to auto range.

Link button:

- With the rotary switch in any position other than OFF, press Link to enable the Wireless communication function of the meter. Open the app (iOS or Android) on the mobile device to be used and search for the multimeter and establish a connection. Once connected, the app will mirror the display of the meter and show any measurement being performed. Press Link again to disconnect the meter from the mobile device.

Hz/DUTY button:

- Press “**Hz/DUTY**” to start the frequency counter.
- Press “**Hz/DUTY**” again to enter duty-cycle mode.
- Press “**Hz/DUTY**” again to exit the frequency counter mode.

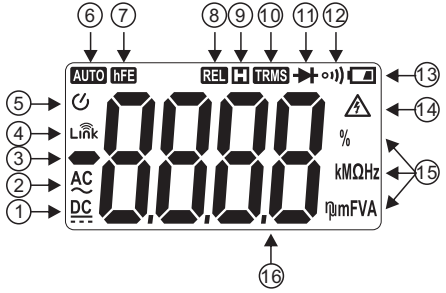
REL button:

- Press “**REL**” to enter and exit the relative measurement mode.

2.3 Auto power off function

- After 15 minutes of non-use the meter will automatically turn itself off.
- To turn the meter back on, press “**FUNC**”.
- To deactivate the auto power off function, hold down “**FUNC**” when turning on the meter. ⏻ will no longer be displayed.

2.4 LCD Display



No.	Description	No.	Description
1	DC (direct current)	9	Data hold
2	AC (alternating current)	10	True root mean square
3	Polarity indicator	11	Diode measurement
4	Wireless indicator	12	Continuity buzzer
5	Auto power off indicator	13	Low battery indicator
6	Auto-range	14	Unsafe voltage warning
7	Transistor test mode	15	Measurement units
8	Relative measurement	16	Main display

Symbol	Description	
V,mV	V: mV:	Volts. The unit of voltage. Millivolt. $1x10^{-3}$ or 0.001 volts.
A,mA,μA	A: mA: μA:	Amperes (amps). The unit of current. Milliamp. $1x10^{-3}$ or 0.001 amperes. Microamp. $1x10^{-6}$ or 0.00001 amperes.
Ω,KΩ,MΩ	Ω: kΩ: MΩ:	Ohm. The unit of resistance. Kilohm. $1x10^{3}$ or 1000 ohms. Megohm. $1x10^{6}$ or 1,000,000 ohms.
Hz,KHz,MHz	Hz: KHz: MHz:	Hertz. The unit of frequency. Kilohertz. $1x10^{3}$ or 1000 hertz. Milohertz. $1x10^{6}$ or 1,000,000 hertz.
Hz,KHz,MHz	F: mF: μF: nF:	Farad. The unit of capacitance. Millifarad. $1x10^{-3}$ or 0.001 farads. Microfarad. $1x10^{-6}$ or 0.000001 farads. Nanofarad. $1x10^{-9}$ or 0.000000001 farads.

3. Technical specifications

Accurancy: ±(% reading + digits) at 18℃~28℃ with a relative humidity of <80%; guaranteed for a period of one year.

3.1 General specifications

Safety Rating: CAT III 600V, pollution degree of 2
Operating Altitude: <2000m
Operating Temperature/Humidity: 0~40℃, <80% RH
Storage Temperature/Humidity: -10~60℃, <70% RH, remove battery
Max. Input between terminals and earth ground: 600V DC or AC True-RMS
Fuse Protection: A/mA ranges: FF 400mA H 1000V
10A range: FF 10A H 600V
Display: 3¾ digit LCD display
Overload Indication: Display shows “OL”

Low Battery Indication: When battery voltage drops below normal operating voltage, “▭” is shown on the display
Polarity Indication: Display automatically displays “-”
Power Supply: DC 9V (NEDA 1604, 6F22 or 006P)
Wireless Communication Distance:
Indoor/Outdoor: ≦10m
Supported App OS: iOS: 7.0 and above
Android: 4.3 and above
Size(LxWxH): Approx. 92x188x50mm
Weight: Approx. 432g

3.2 Technical indicators

3.2.1 Dc voltage

Range	Resolution	Accuracy
400mV	0.1mV	±(0.8% of reading + 3 digits)
4.0V	0.001V	±(1% of reading + 5 digits)
40V	0.01V	
400V	0.1V	
600V	1V	

- Input impedance: 10MΩ
- Overload protection: 600V DC or AC True-RMS.
- Max. input voltage: 600V DC or AC True-RMS.

3.2.2 Ac voltage

Range	Resolution	Accuracy
400mV	0.1mV	±(1.0% of reading + 8 digits)
4.0V	0.001V	
40V	0.01V	
400V	0.1V	
600V	1V	±(1.2% of reading + 8 digits)

- Input impedance: 10M
- Max. input voltage: 600V DC or AC True-RMS.
- Frequency reponse: 40~400Hz
- Response: True-RMS

3.2.3 Resistance

Range	Resolution	Accuracy
400Ω	0.1Ω	±(0.8% of reading + 3 digits)
4KΩ	0.001kΩ	
40KΩ	0.01kΩ	
400KΩ	0.1kΩ	
4MΩ	0.001MΩ	±(1.5% reading + 5 digits)
40MΩ	0.01MΩ	

- Overload protection: 600 DC or AC True-RMS

3.2.4 Diode test

Function	Range	Resolution	Function
	2.7V	1mV	Displays shows forward voltage drop

- Overload protection: 600V DC or AC True-RMS

3.2.5 Continuity

Range	Resolution	Function
	Open circuit voltage~1 V	If the resistance of circuit to be measured is less than 50Ω, the meter's built-in buzzer will sound.

- Overload protection: 600V DC or AC True-RMS

3.2.6 DC current

Range	Resolution	Accuracy
400μA	0.1μA	±(1.0% of reading + 10 digits)
4000μA	1μA	
40mA	0.01mA	
400mA	0.1mA	
10A	10mA	±(2.0% reading + 5 digits)

- Overload protection:
  mA jack: FF 400mA H 1000V
  10A jack: FF 10A H 600V
- Max input current:
  mA jack: 400mA
  10A jack: 10A

3.2.7 AC current

Range	Resolution	Accuracy
400μA	0.1μA	±(1.5% of reading + 5 digits)
4000μA	1μA	
40mA	0.01mA	
400mA	0.1mA	
10A	10mA	±(3.0% of reading + 5 digits)

- Overload protection:
  mA jack: FF 400mA H 1000V
  10A jack: FF 10A H 600V
- Frequency response: 40~400Hz, true RMS response
- Max input current: mA jack: 400mA DC or AC rms
  10A jack: 10A DC or AC rms
- When measuring current exceeding 2A, do not measure for longer than 2 minutes continuously. Wait 10 minutes to continue measurement.

3.2.8 hFE transistor gain

Function	Description
hFE	Displays approx. hFE transistor gain (0-1000)

- Base current: approx. 5μA
- Vce: approx. 1.6V
- Protection: FF 400mA H 1000V

3.2.9 Capactance

Range	Resolution	Accuracy
9.999nF	0.001nF	±(5.0% of reading + 5 digits)
99.99nF	0.01nF	±(4.0% of reading + 5 digits)
999.9nF	0.1nF	
9.999μF	0.001μF	
99.99μF	0.01μF	
999.9μF	0.1μF	
9.999mF	0.001mF	
99.99mF	0.01mF	

- Overload protection: 600 DC or AC True-RMS

3.2.10 Frequency
3.2.10.1 In V mode

Range	Resolution	Accuracy
99.99Hz	0.01Hz	±(1.5% reading + 5 digits)
999.9Hz	0.1Hz	
9.999KHz	0.001kHz	
>10KHz	0.01kHz	±(1.5% reading + 5 digits)

- Input voltage range: ≧3V AC (True-RMS)
(higher input voltage at higher frequency)
- Input impedance: 10MΩ
- Max.input voltage: 600V AC (True-RMS)

3.2.10.2 In μA,mA,A mode

Range	Resolution	Accuracy
99.99Hz	0.01Hz	±(1.5% reading + 5 digits)
999.9Hz	0.1Hz	
>1KHz	0.001kHz	

- Input current range:
μA range:≧ 100μA AC (True-RMS)
mA range: ≧ 10mA AC (True-RMS)
A range: ≧ 5A AC (True-RMS)
(higher input current at higher frequency)
- Max.input current:
μA range: 400mA AC (True-RMS)
mA range: 400mA AC (True-RMS)
A range: 10 A AC (True-RMS)

3.2.10.3 In Hz mode

Range	Resolution	Accuracy
9.999Hz	0.001Hz	±(0.5% of reading + 3 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: ≧2V AC (True-RMS)
  (higher input voltage at higher frequency)
- Max.input voltage: 600V AC (True-RMS)

3.2.10.4 Duty ratio

Range	Resolution	Accuracy
0.1%-99.9%	0.1%	±3.0%

- By μA, mA, A range:
  - Input current range:
    μA range: ≧ 100μA AC (True-RMS)
    mA range: ≧ 10mA AC (True-RMS)
    A range: ≧ 5A AC (True-RMS)
    (higher input current at higher frequency)
  - Max.input current:
    μA range: 400mA AC (True-RMS)
    mA range: 400mA AC (True-RMS)
    A range: 10 A AC (True-RMS)
- By V range:
  - Input voltage range: ≧ 3V AC (True-RMS)
    (higher input voltage at higher frequency)
  - Input impedance: 10MΩ
  - Max.input voltage: 600V AC (True-RMS)
- By Hz range:
- Input voltage range: ≧2V AC (True-RMS)
  (higher input voltage at higher frequency)
- Max.input voltage: 600V AC (True-RMS)

4. Operating instructions

4.1 AC/DC Voltage measurement

- Set the rotary switch to the AC or DC voltage position.
- Connect the red test lead to the input jack and the black lead to the COM jack.
- Connect the leads to the circuit under test and read the measurement on the display. Observe polarity for DC measurement. In manual mode, if "**OL**" is display it means the measurement has exceeded the current range. Increase the selected range and measure again.

⚠WARNING

Do not measure voltages higher than 600V DC or AC rms to prevent damage to the meter or personal injury.

⚠WARNING

Never measure open-circuit voltages exceeding 600V between the input terminals and ground to prevent injury or damage to the meter.

4.2 AC/DC Current measurement

- Turn off power to the circuit. Allow all capacitors to discharge.
- Set the rotary switch to the appropriate AC/DC current voltage.
- Press "FUNC" to switch between AC and DC current.
- Depending on the current to be measured, connect the red test lead to either the input or 10A jack and the black lead to the COM jack.
- Break the circuit and connect the leads in series with the circuit (black lead on the lower voltage side).

• Turn circuit power on and read the measurement on the display, it means the measurement has exceeded the current range. Move the rotary switch to a higher range.

Note:

- Check fuses before making current measurements. Make sure to use correct input jacks to prevent damage to the meter.

4.3 Resistance measurement

• Turn off the power to the circuit. Allow all capacitors to discharge.
• Set the rotary switch to the multi-function position. The default function is resistance.
• Connect the red test lead to the input jack and the black lead to the COM jack.
• Connect the leads to the circuit under test and read the measurement on the display.

Tips for measuring resistance:

• In-circuit resistance is usually different from a resistors rating due to the factthat the meter's test current flows in parallel with the circuit.
• For increased accuracy when measuring low resistance, short the test leads, record the test displayed, then connect the leads to the circuit and subtract the shorted value from the circuit measurement.
• When the leads are disconnected from the circuit under test, "**OL**" will be displayed on the screen.

⚠WARNING

To prevent injury or damage to the meter, turn off power to circuitand discharge all capacitors fully before making resistance measurements.

4.4 Continuity measurement

• Turn off the power to the circuit. Allow all capacitors to discharge.
• Set the rotary switch to the multi-function position. Press "**FUNC**" twice to enter continuity mode.
• Connect the red test lead to the input jack and the black lead to the COM jack.
• Connect the leads to the circuit under test. If the measured resistance is less than 50Ω, the buzzer will sound.

⚠WARNING

To prevent injury or damage to the meter, turn off power to circuit and discharge all capacitors fully before making continuity measurements.

4.5 Diode test

• Turn off the power to the circuit. Allow all capacitors to discharge.
• Set the rotary switch to the multi-function position. Press "**FUNC**" once to enter diode mode.
• Connect the red test lead to the input jack and the black lead to the COM jack.
• Connect the red test lead to the anode (+) and the black lead to the cathode (-) of the diode and read the measurement on the display.

The meter will display "**OL**" if the connection is reserved.

⚠WARNING

To prevent injury or damage to the meter, turn off power to circuit and discharge all capacitors fully before making diode measurements.

4.6 Capacitance measurement

- Turn off the power to the circuit. Allow all capacitors to discharge.
- Set the rotary switch to the multi-function position. Press "**FUNC**" three times to ativate capacitance test.
- Connect the black and red test leads to the COM and ⊣⊢ terminals respectively (or you can measure the capacitance by using the special multi-function socket).
- Connect the test leads to the capacitor being measured and read the displayed value.

Some tips for measuring capacitance:

- The meter may take a few seconds to stabilize reading. This is normal for for high capacitance measuring.
- To improve the accurancy of measurements less than 10nF, subtract the residual capacitance of the meter and leads.

> **⚠WARNING**
>
> **To avoid eletrical shock and/or damage to the instrument, disconnect circuit power and discharge all high-voltage capacitors before measuring capacitance. Use the DC voltage function to confirm that the capacitor is discharged.**

4.7 Transistor measurement

- Set the rotary switch to **hFE** range.
- Connect the "**COM**" plug and "**+**" plug of the special multi-function socket to the **COM** and **hFE** terminals.
- Determine whether the transistor to be tested is **NPN** or **PNP** type and locate the Emitter, Base and Collector leads.
- Insert leads of the transistor into proper holes of the special multi-function socket.

- The meter will show the approx.

> **⚠WARNING**
>
> **To avoid eletrical shock and/or damage to the instrument, do not apply more than 36Vdc or 36Vac rms between the hFE terminal and the COM terminal.**

4.8 Frequency measurement

- Set the rotary switch to **Hz%** range.
- Connect the black and red leads to the **COM** and **Hz** terminals respectively.
- Connect the test leads to the circuit being measured.
- Read the displayed value.

> **⚠WARNING**
>
> **Do not measure frequency on high voltage (>250V) to avoid electrical shock hazard and/or damage to the instrument.**

4.9 Non-contact voltage(NCV) measurement

- Set the rotary switch to the **NCV** position.
- Move the top of the meter toward the voltage source. If voltage is detected (>100V AC), the meter will beep and the **NCV** indicator will flash. The closer to the voltage soursce the meter is, the faster the meter will beep/flash.

Note:

- Even without indication, voltage may still present. Do not reply solely on **NCV** detection to determine the presence of voltage. Detection could be impaired by socket design, insolation thickness, or other factors.
- External interference sources could mistakenly trigger

NCV indication.

4.10 Wireless operation

- With the rotary switch in any position other than OFF, press Link to enable the Wireless communication of the meter.
- Open the app (iOS or Android) on the mobile device to be used and search for the multimeter and establish a connection. Once connected, the app will mirror the display of the meter and show any measurement being performed.
- Press Link again to disconnect the meter from the mobile device.

5. Maintenance

5.1 General Maintenance

This section provides basic information on maintaining the meter, such as replacing fuses and the battery. Only experienced and authorized personnel should make repairs to the meter.

> ⚠ **WARNING**
>
> **To avoid injury or damage to the meter,do not allow moisture inside the case and remove test leads before opening battery cover.**

- Use a damp cloth to regularly clean the outside of the meter. Do not use abrasives or chemical solvents. Dirty or damp input jack can adversely affect readings.
- To clean input jacks, follow the following steps:
  1.Turn off the instrument and remove the test leads.
  2.Clear any dirt or other particles on the input jacks.
  3.Use a cotton ball/swab with a lubricant (i.e. WD-40) to clean off the contacts of the input jacks.
  4.Use a separate cotton ball/swab for each jack to prevent cross-contamination.

5.2 Replacing the Battery

> ⚠ **WARNING**
>
> **To avoid false readings and potential dangerous situations, replace the battery immidately when the " ▭ " symbol appears. Turn off the meter and disconnect the test leads before opening the battery cover to prevent electrical shock and personal injury.**

Use the following steps to replace the battery:
1.Turn off the meter.
2.Remove test leads.
3.Unscrew and remove battery cover from back of meter.
4.Replace used battery with a new 9V battery.
5.Replace battery cover and fasten securely.

5.3 Replacing the Fuse

> ⚠ **WARNING**
>
> **Turn off the meter and disconnect test leads before opening back cover to avoid electical shock and personal injury.**

Use the following steps to replace the fuses:
1.Turn off the meter.
2.Remove test leads.
3.Remove outer holster.
4.Unscrew and remove back cover from the meter.
5.Replace blown fuse(s) with same amp/voltage ratings.
6.Replace back cover and fasten securely.
7.Replace outer holster.

5.4 Replacing the Probe

If insulation on probe is damaged, replace it.

> ⚠ **WARNING**
>
> Use meet EN 61010-031 standard, rated CAT III 600V, 10A or better probe.

6. Accessories

1)	Test leads	1 set
2)	Manual	1pcs
3)	9V Battery	1pcs
4)	Package	1pcs
5)	Multi-Function Socket	1pcs

KPS EUMAN, S.L.
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