



KMD-S04

Pocket Multimeter

KOBAN 

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## Overview



### Warning

To avoid electric shock or personal injury, read the “Safety Information” and “Rules for Safety Operation” carefully before using the Meter.

Pocket-Sized Digital Multimeter (hereafter referred to as “the Meter”) is a 3 3/4 digits with steady operations, fashionable structure, low power consumption and highly reliable hand-held measuring instrument. The Meter uses large scale of integrated circuit with double integrated A/D converter as its core. The Meter not only can measure AC/DC Voltage, Resistance, Capacitance, Frequency, Diodes and Continuity, but also has D-HOLD, Full Icon Display, Duty Cycle and Sleep Mode features.

## Unpacking Inspection

Open the package case and take out the Meter. Check the following items carefully to see any missing or damaged part:

Item	Description	Qty
1	English Operating Manual	1 piece
2	Built-In Test Lead	1 pair
3	Vinyl Holder	1 piece
4	3V Button Battery (CR2032)	1 piece


In the event you find any missing or damage, please contact your dealer immediately.

## Safety Information

This Meter complies with the standards IEC61010: in pollution degree 2, overvoltage category (CAT. II 300V) and double insulation.

CAT. II: Local level, appliance, PORTABLE EQUIPMENT etc., with smaller transient voltage overvoltages than CAT. III

Use the Meter only as specified in this operating manual, otherwise the protection provided by the Meter may be impaired.

In this manual, a  **Warning** identifies conditions and actions that pose hazards to the user, or may damage the Meter or the equipment under test.

A **Note** identifies the information that user should pay attention on.

International electrical symbols used on the Meter and in this Operating Manual are explained on page 7.


## Rules For Safe Operation

### Warning

To avoid possible electric shock or personal injury, and to avoid possible damage to the Meter or to the equipment under test, adhere to the following rules:









- Before using the Meter inspect the case. Do not use the Meter if it is damaged or the case (or part of the case) is removed. Look for cracks or missing plastic. Pay attention to the insulation around the connectors.
- Inspect the test leads for damaged insulation or exposed metal. Check the test leads for continuity.
- Do not apply more than the rated voltage, as marked on the Meter, between the terminals or between any terminal and grounding.
- The rotary switch should be placed in the right position and no any changeover of range shall be made during measurement is conducted to prevent damage of the Meter.
- When the Meter working at an effective voltage over 60V in DC or 30V rms in AC, special care should be taken for there is danger of electric shock.
- Use the proper terminals, function, and range for your measurements.
- Do not use or store the Meter in an environment of high temperature, humidity,

explosive, inflammable and strong magnetic field. The performance of the Meter may deteriorate after dampened.

- When using the test leads, keep your fingers behind the finger guards.
- Disconnect circuit power and discharge all high-voltage capacitors before testing resistance, continuity, diodes or capacitance.
- Replace the battery as soon as the battery indicator  appears. With a low battery, the Meter might produce false readings that can lead to electric shock and personal injury.
- Remove the connection between the testing leads and the circuit being tested, and turn the Meter power off before opening the Meter case.
- When servicing the Meter, use only the same model number or identical electrical specifications replacement parts.
- The internal circuit of the Meter shall not be altered at will to avoid damage of the Meter and any accident.
- Soft cloth and mild detergent should be used to clean the surface of the Meter when servicing. No abrasive and solvent should be used to prevent the surface of the Meter from corrosion, damage and accident.
- The Meter is suitable for indoor use.
- Turn the Meter power off when it is not in use and take out the battery when not using for a long time. Constantly check the battery as it may leak when it has

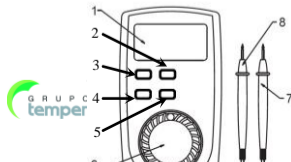
been using for some time, replace the battery as soon as leaking appears. A leaking battery will damage the Meter.

### International Electrical Symbols

~	AC (Alternating Current)
≡	DC (Direct Current)
	Important safety information. Refer to the manual
	Dangerous voltage may be present
	Earth ground
	Diode
CE	Conforms to European Union directive
	Double insulated
	Deficiency of Built-In Battery
	Capacitance
	Continuity Test(buzzer)

### The Meter Structure (see figure 1)

1. LCD Display
2. **RANGE** Button
3. **SELECT** Button







4. **D-HOLD** Button
5. **Hz/DUTY** Button
6. Rotary Switch
7. Black Test Lead
8. Red Test Lead

Figure 1

### Functional Buttons

Below table indicated for information about the functional button operations

Button	Operation Performed
<b>SELECT</b>	Presses <b>SELECT</b> to switch between resistance, capacitance, continuity buzzer and diode measurement modes; the Meter beeps. Resistance measurement is default.
<b>D-HOLD</b>	<ul style="list-style-type: none"> <li>◆ Press <b>D-HOLD</b> once to enter hold mode.</li> <li>◆ Press <b>D-HOLD</b> again to exit hold mode.</li> <li>◆ In Hold mode, <b>H</b> is displayed and the present value is shown.</li> </ul>
<b>Hz/DUTY</b>	<ul style="list-style-type: none"> <li>◆ Press <b>Hz/DUTY</b> at DCV  to step through DCV, frequency and duty cycle measurement mode. AUTO on the LCD will be disappeared.</li> <li>◆ Press <b>Hz/DUTY</b> at ACV  to step through ACV, frequency and duty cycle measurement mode. AUTO on the LCD will be disappeared.</li> <li>◆ The <b>Meter</b> will be at DCV: 400mV or ACV: 4V after stepping through</li> </ul>

	frequency and duty cycle measurement mode. Therefore it is necessary to turn the rotary switch or turn off and on the Meter to resume to auto ranging mode when measuring higher voltage.
<b>RANGE</b>	AC/DC voltage and Resistance measuring ranges can be selected manually or automatically by pushing the range control button. Push this button as follows to choose range control mode and needed ranges.

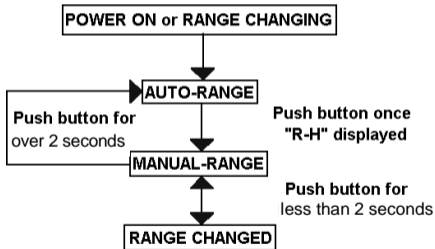




Figure 2

### Measurement Operation

Make sure the Sleep Mode is not on if you found there is no display on the LCD after turning on the Meter.

Make sure the Low Battery Display  is not on, otherwise false readings may be provided. Pay extra attention to the  symbol which is located besides the input terminals of the Meter before carrying out measurement.

#### A. DC Voltage Measurement (see Figure 3)

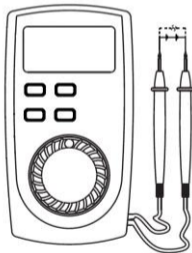



Figure 3

**⚠Warning**

**To avoid harms to you or damages to the Meter from electric shock, please do not attempt to measure voltages higher than 300V although readings may be obtained and take extra care when measuring high voltage.**

To measure DC voltage, connect the Meter as follows:

1. Set the rotary switch to **DCV**  range.
2. Connect the test leads across with the object being measured with red test lead to the positive and black test lead to the negative. The measured value shows on the display.

**Note**

The LCD displays the negative reading when the test lead connection is reversed. When DC voltage measurement has been completed, disconnect the connection between the testing leads and the circuit under test.

**B. AC Voltage Measurement** (see Figure 3 with dotted line)**⚠Warning**

**To avoid harms to you or damages to the Meter from electric shock, please do not attempt to measure voltages higher than 300V although readings may be obtained and take extra care when measuring high voltage.**

To measure AC Voltage, connect the Meter as follows:

1. Set the rotary switch to **ACV**  range.

2. Connect the test leads across with the object being measured.

The measured value shows on the display

**Note**

When AC voltage measurement has been completed, disconnect the connection between the testing leads and the circuit under test.

**C. Measuring Resistance** (see figure 4)

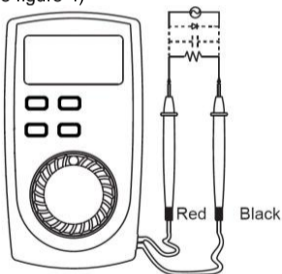


Figure 4

**⚠Warning**

**To avoid damages to the Meter or to the devices under test, disconnect circuit power and discharge all the high-voltage capacitors before measuring resistance.**


**Note**

The test leads can add 0.1Ω to 0.3Ω of error to the resistance measurement.

To obtain precision readings in low-resistance, that is the range of 400Ω, short-circuit the red and black test leads beforehand and record the reading obtained (called this reading as X).

Then use the equation: measured resistance value (Y) – (X) = precision readings of resistance.

To measure resistance, connect the Meter as follows:

1. Set the rotary switch to  $\Omega$   range.
2. Connect the test leads across with the object being measured. The measured value shows on the display.

For high resistance (>1MΩ), it is normal taking several seconds to obtain a stable reading.

When there is no input, for example in open circuit condition, the Meter displays “OL”.

When resistance measurement has been completed, disconnect the connection between the testing leads and the circuit under test.

#### D. Frequency and Duty Cycle Measurement (see figure 4)

##### Warning

To avoid harm to you or damages to the Meter, do not attempt to measure voltages higher than 60V in DC or 30V rms in AC although readings may be obtained. The testing resolution may vary from the inputted frequency and waveform, the Meter resolution is based on the sine wave.

##### Note

When Hz or Duty Cycle measurement has been completed, disconnect the connection between the testing leads and the circuit under test.

To measure frequency and duty cycle, connect the Meter as follows:

1. Set the rotary switch to **ACV** or **DCV** range.
2. Press **Hz/DUTY** button select Frequency or Duty Cycle measurement mode.
3. Connect the test leads across with the object being measured.

The measured value shows on the display.

#### E. Measuring Diodes & Continuity (see figure 4)

##### Warning

To avoid damage to the Meter or to the equipment under test, disconnect circuit power


**and discharge all high-voltage capacitors before measuring diodes and continuity. Never attempt to input over 60V in DC or 30V rms in AC to avoid personal dangerous.**

### Testing Diodes

Use the diode test to check diodes, transistors, and other semiconductor devices.

The diode test sends a current through the semiconductor junction, and then measures the voltage drop across the junction. A good silicon junction drops between 0.5V and 0.8V.

To test out a diode out of a circuit, connect the Meter as follows:

1. Set the rotary switch to  $\Omega$   range.
2. Press **SELECT** button to select diode test.
3. For forward voltage drop readings on any semiconductor component, place the red test lead on the component's anode and place the black test lead on the component's cathode. The LCD displays the nearest value of diode forward voltage drop.

#### Note

In a circuit, a good diode should still produce a forward voltage drop reading of 0.5V to 0.8V; however; the reverse voltage drop reading can vary depending on the resistance of other pathways between the probe tips.


Connect the test leads properly as said above to avoid error display. The LCD will display "OL" indicating open-circuit for wrong connection. The unit of diode is Volt (V), displaying the positive-connection voltage-drop value.



When diode testing has been completed, disconnect the connection between the testing leads and the circuit under test.

### Testing for Continuity

To test for continuity, connect the Meter as below:

1. Set the rotary switch to  $\Omega$   range.
2. Press **SELECT** button to select continuity test.
3. Connect the test leads across with the object being measured. The buzzer sounds continuously if the resistance of a circuit under test is around less than 70 $\Omega$ . The LCD displays the resistance value of a circuit under test simultaneous.

### F. Capacitance Measurement (see figure 4)

#### Warning

**To avoid damage to the Meter or to the equipment under test, disconnect the tested circuit power when measuring on line capacitors and discharge all high-voltage capacitors before measuring capacitance.**

**Use the DC voltage function to confirm that the capacitor is discharged.**

**Never attempt to input over 60V in DC or 30V rms in AC to avoid personal dangerous.**

To measure capacitance, connect the Meter as follows:

1. Set the rotary switch to  $\Omega$   range.

2. Press **SELECT** button to select capacitance test.
3. Connect the test leads across with the object being measured. The measured value shows on the display.

**Note**

For testing the capacitor with polarity, connect the red test lead to anode & black test lead to cathode.

For measuring capacitance higher than 10uF, it is normal taking several seconds to obtain a reading.

When capacitance measurement has been completed, disconnect the connection between the testing leads and the circuit under test.

**Sleep Mode**

To preserve battery life, the Meter automatically turns off if you do not turn the rotary switch or press any button for around 15 minutes. The Meter can be activated by pressing any functional buttons or turning the rotary switch. When the Meter is activated by pressing **SELECT** button, the Sleep Mode feature will be disabled.

**General Specifications**

Maximum voltage between any Terminals and Grounding: 300V rms or 300DCV

Range: Auto ranging or manual ranging.

Maximum Display: 3999. (3 3/4 digits)


Measurement Speed: Updates 3 times/second.


Operating Temperature: 0°C~40°C (32°F~104°F), Relative Humidity: 75%

Storage Temperature: -10°C~50°C (14°F~122°F), Relative Humidity: 80%

Altitude: Operating: 2000m; Storage: 10000m.

Battery Type: 3V button battery (CR2032).

Battery Deficiency: At around < 2.4V, Display “”.

D-HOLDing: Display “”

Negative reading: Display “-“

Overloading: Display “**OL**”.

Dimensions (H x W x L): 108x58x12mm.

Weight: Approx.125g (battery and test lead included).

Safety/Compliances: IEC61010 CAT II 300V overvoltage and double insulation standard.

**General Specifications****Accuracy Specifications**

Accuracy:  $\pm(a\% \text{ reading} + b \text{ digits})$ , guarantee for 1 year.

Operating temperature: 23°C  $\pm$  5°C

Relative humidity: <75%.

Temperature coefficient:  $0.1 \times (\text{specified accuracy}) / 1^\circ\text{C}$

### A. Resistance Test

Range	Resolution	Accuracy	Overload Protection	Remarks
400 $\Omega$	0.1 $\Omega$	$\pm(1.2\%+2)$	250V AC	Open circuit voltage: approx. 0.45V
4k $\Omega$	1 $\Omega$	$\pm(1.0\%+2)$		
40k $\Omega$	10 $\Omega$			
400k $\Omega$	100 $\Omega$			
4M $\Omega$	1k $\Omega$	$\pm(1.2\%+2)$		
40M $\Omega$	10k $\Omega$	$\pm(1.5\%+2)$		

### B. DC Voltage

Range	Resolution	Accuracy	Overload Protection	Remarks
400mV	0.1mV	$\pm(0.8\%+3)$	300V DC 300V AC.	Input Impedance: 10M $\Omega$
4V	1mV	$\pm(0.8\%+1)$		
40V	10mV			
300V	100mV			



### C. AC Voltage

Range	Resolution	Accuracy	Overload Protection	Remarks
4V	1mV	$\pm(1.2\%+3)$	300V DC 300V AC.	Input Impedance: 10M $\Omega$ Frequency response: 40Hz~400Hz. Display effective value of sine wave (mean value response).
40V	10mV			
300V	100mV			

**D. Frequency**

Range	Resolution	Accuracy	Overload Protection	Remarks
99.99Hz	0.01Hz	$\pm(1.2\%+2)$	250V AC	The inputted voltage is sine wave When 10Hz ~10kHz: 1V rms When 10kHz~100kHz: 30V rms.
999.9Hz	0.1Hz	$\pm(0.5\%+3)$		
9.999KHz	1Hz			
99.99KHz	10Hz			

**F. Diodes and Continuity Test**

Function	Range	Resolution	Input Protection	Remarks
Diode		1mV	250V AC	Open circuit voltage approx.1.5V
Continuity Buzzer		0.1 $\Omega$		Open circuit voltage approx. 0.45V, f=2.7kHz

				Approx. $\leq 70\Omega$ buzzer beeps continuously
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### E. Duty Cycle

Range	Resolution	Overload Protection	Remarks
0.1% ~ 99.9%	0.1%	250V AC	Press <b>Hz/DUTY</b> button at ACV $\sim$ or DCV $\dots$ range to select Duty Cycle measurement mode. Reading is only for reference

### G. Capacitance

Range	Resolution	Accuracy	Overload Protection	Remarks
4nF	0.001nF	-	250V AC	Open circuit voltage:

40nF	0.01nF	±(4.0%+3)	around 0.45V Measuring under Relative mode. When the tested capacitor is greater than 100uF, the reading is only for reference
400nF	0.1nF		
4uF	1nF		
40uF	10nF		
200uF	100nF	±(5.0%+10)	

## Maintenance

### Warning

**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 information.**

**To avoid electrical shock or damage to the Meter, do not get water inside the case.**

This section provides basic maintenance information including battery and fuse replacement instruction.

## A. General Service



Periodically wipe the case with damp cloth and mild detergent. Do not use chemical solvent. To clean the terminals with cotton bar with detergent, as dirt or moisture in the terminals can affect readings.

Turn the Meter OFF when it is not in use and take out the battery when not using for a long time.

Do not store the Meter in place of humidity, high temperature, explosive, inflammable and strong magnetic field

#### **B. Replacing the Battery** (see figure 5)

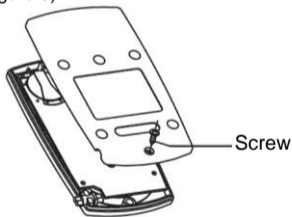


Figure 5

#### **⚠ Warning**

**To avoid false readings, which could lead to possible electric shock or personal injury,**

**replace the battery as soon as the battery indicator  appears.**

To replace battery:

1. Disconnect the connection between the testing leads and the circuit under test
2. Turn the Meter OFF.
3. Remove the screw from the case bottom; separate the case bottom from the case top.
4. Remove the battery and replace with a new 3V Button Battery (CR2032).
5. Rejoin the case bottom and the case top, and install the screw.



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