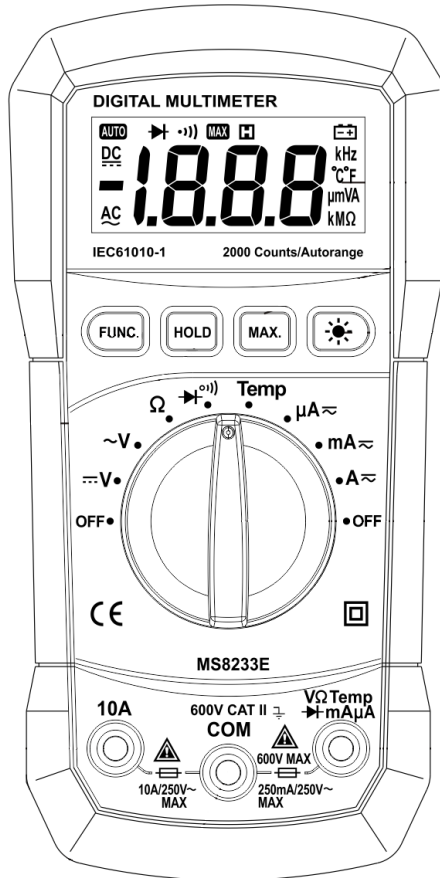


DURATOOL



MODEL: D03124

**DIGITAL MULTIMETER
AUTORANGING**

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INTRODUCTION

- This meter is a handheld, battery operated digital multimeter (DMM) with multi-function.
- This meter is designed to meet IEC61010-1 & CAT II 600V over voltage category and double insulation.

WHAT'S INCLUDED









- One autoranging digital multimeter
- One user manual
- One set of test leads
- One 9V battery
- One K-type temperature probe

IMPORTANT SAFETY INFORMATION

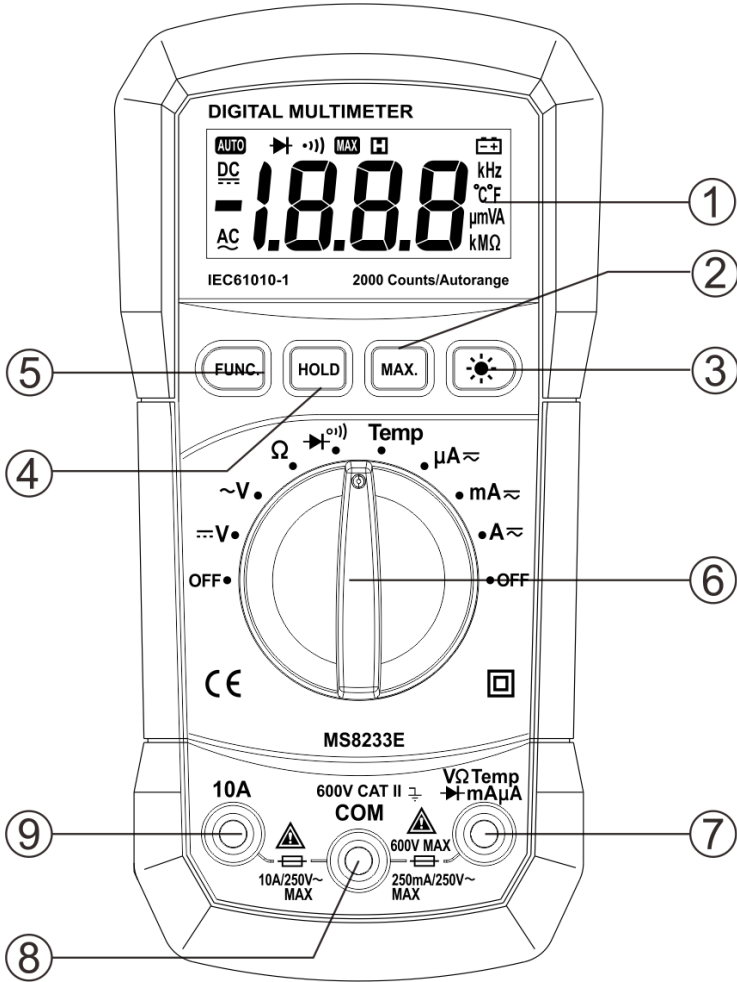
Please read these instructions carefully before use and retain for future reference.

- When using electrical appliances basic safety precautions should always be followed.
- Use the meter only as specified in this manual, or the protection provided may be impaired.
- Do not operate the meter or use test leads if they appear damaged, or if the meter is not operating properly.
- There are no user-serviceable parts in this product. Refer servicing to qualified personnel.
- Do not apply voltage between the COM and OHM terminals, while in the resistance measuring state.
- Do not measure current with the test leads inserted into the voltage or OHM terminals.
- Do not expose the instrument to direct sunlight, extreme temperature or humidity.
- Before measuring current, check the fuses and turn the power to the circuit off before connecting the meter to the circuit.
- Disconnect circuit power and discharge all high voltage capacitors before testing continuity, diode, resistance, capacitance or current.
- Do not use the meter around explosive gas or vapour.
- When using the test leads, keep your fingers behind the finger guards.
- Remove test leads from the meter before opening the meter case or battery door.
- Never operate the meter with the cover removed or the battery door open.
- Use only the test leads supplied or the protection may be impaired.
- Replace the batteries as soon as the low battery indicator appears on the display.
- Fit a full set of batteries at one time.
- Remove dead batteries from the appliance or if it is not going to be used for a long time.
- Never mix old and new batteries together, or different types of batteries.
- Never dispose of batteries in a fire, or attempt to recharge ordinary batteries.

SYMBOL GUIDE


	Dangerous Voltage		Ground
	AC (Alternating Current)		Warning (adhere to instruction manual)
	DC (Direct Current)		Double Insulation
	AC or DC		Fuse

OVERVIEW







1	LCD	6	Rotary switch
2	MAX button	7	V/Ω/Hz/μA/mA/Temp Input terminal
3	Backlight button	8	COM input terminal
4	Hold button	9	10A input terminal
5	Function button		

BUTTONS

Button	Function
FUNC	“FUNC” key is the function select key that act with trigger. Use the key as switch of DC/AC current, Diode/ Continuity and °C/°F.
HOLD	Enter and exit the hold mode in any mode that acts with trigger.
MAX	This key acts with trigger. Press “MAX” once and the maximum value will hold (‘MAX’ will be displayed in the LCD). After pressing the button, A/D will keep working and the display values are updated and kept to the maximum value. Note: The actual MAX value is not the peak value.
	Press and hold the button for two seconds to turn on the backlight. Press the button again to disable the backlight.

DISPLAY INDICATORS



Indicator	Meaning
	DC Voltage or Current
	AC Voltage or Current
	Diode
MAX	Maximum Value
HOLD	Data Hold
	Low Battery Indicator
MkΩ	Ω KΩ MΩ is unit of resistance
°C/°F	The unit of temperature
μmVA	mV, V - unit of voltage μA, mA, A - unit of current
—	Indicative negative reading

GENERAL SPECIFICATION

- Autoranging digital multimeter
- AC electric field detection function (NCV function)
- Data hold function
- MAX value hold function
- Backlight
- Low battery indication

Display	3½ digit LCD
Overload Protection	Used the PTC protection for resistance, temperature and frequency measurement.
Auto Power-Off	If the meter is idle for 15 minutes, the meter automatically turns off. After auto power-off, pushing any button or turning the rotary switch can turn the meter on again. Note: After auto power-off in AC mode, if changing the rotary switch to DC mode, the power will not turn on again. Note: The meter enters sleep mode after auto power-off. The auto power-off function is disabled if you press "HOLD" to re-power on, while in sleep mode.
Operating Temperature & Humidity	0 ~ 40°C (32 ~ 104°F) & < 80% RH
Storage temperature & Humidity	-10 ~ 50°C (14 ~ 122°F) & < 70% RH
Power Supply	9V battery (6F22 or 1604A Type)
Safety Class	IEC 61010-1, CAT II 600V
Dimensions	140mm x 67mm x 30mm (L x W x H), approx. 112g

ELECTRICAL SPECIFICATION - DC VOLTAGE

Range	Resolution	Accuracy
200mV	0.1mV	±(0.5% rdg + 2 counts)
2V	0.001V	
20V	0.01V	
200V	0.1V	
600V	1V	±(0.8% rdg + 2 counts)

- Overload protection: SG (Spark Gap) used to protect from voltage over 1500V.

AC VOLTAGE


Range	Resolution	Accuracy
2V (40Hz-400Hz)	0.001V	±(0.9% rdg + 3 counts)
20V (40Hz-400Hz)	0.01V	
200V (40Hz-400Hz)	0.1V	
600V (40Hz-200Hz)	1V	±(1.2% rdg + 3 counts)

- Overload protection: SG (Spark Gap) used to protect from voltage over 1500V.

RESISTANCE


Range	Resolution	Accuracy
200Ω	0.1Ω	±(0.8% rdg + 2 counts)
2kΩ	0.001kΩ	
20kΩ	0.01kΩ	
200kΩ	0.1kΩ	
2MΩ	0.001MΩ	±(1.0% rdg + 2 counts)
20MΩ	0.01MΩ	

DIODE CHECK

Range	Resolution	Function
	0.001V	Will display the forward drop voltage

- Operating current: about 1mA
- Open circuit voltage: about 1.48V

CONTINUITY

Range	Function
	If the measured resistance is less than 100Ω, the buzzer is sounded

- Open voltage: about 0.5V

DC CURRENT

Range	Resolution	Accuracy
200μA	0.1μA	±(1.5% rdg + 3 counts)
2000μA	1μA	
20mA	0.01mA	
200mA	0.1mA	
10A	0.01A	

- Overload protection: use the fuse (F250mA/250V) at μA/mA range, and use the fuse (F10A/250V) at 10A range.
- Max input current: 250mA at 'mA' input terminal and 10A at '10A' input terminal.

AC CURRENT (40Hz-400Hz)

Range	Resolution	Accuracy
200μA	0.1μA	±(1.5% rdg + 4 counts)
2000μA	1μA	
20mA	0.01mA	
200mA	0.1mA	
10A	0.01A	

- Overload protection: use the fuse (F250mA/250V) at μA/mA range, and use the fuse (F10A/250V) at 10A range.
- Max input current: 250mA at 'mA' input terminal and 10A at '10A' input terminal.
- Frequency response: 40 to 400Hz.

FREQUENCY

Range	Resolution	Accuracy
20kHz	10kHz	±(1.5% rdg + 5 counts)

- Sensitivity: 0.8V.

TEMPERATURE

Range	-20 to 1000°C	
Resolution	1°C	
Accuracy	-20 to 0°C	(5% rdg + 4 counts)
	0 to 400°C	(2% rdg + 3 counts)
	400 to 1000°C	(3% rdg + 3 counts)
Fahrenheit temperature (°F)		
Range	0 to 1800°F	
Resolution	1°F	
Accuracy	-0 to 50°F	(5% rdg + 4 counts)
	50 to 750°F	(2% rdg + 3 counts)
	750 to 1800°F	(3% rdg + 3 counts)

• You can select °C or °F with the “FUNC” key.

MEASUREMENT OPERATION - DC & AC VOLTAGE MEASUREMENT

WARNING

To avoid harm to yourself from electric shock, or damage to the meter, do not attempt to measure voltage higher than DC/AC 1000V although readings may be obtained.

The DC voltage ranges are 200.0mV, 2.000V, 20.00V, 200.0V and 600V.

The AC voltage ranges are 2.000V, 20.00V, 200.0V and 600V.

To measure DC or AC voltage:

- Insert the red test lead into the “**V**” input terminal and the black test lead into the COM terminal.
- Set the rotary switch to DC or AC range.
- Connect the test lead across with the object under testing.
- The measured value will be shown on the LCD display.

Note: When DC or AC voltage measurement has been completed, disconnect the connection between the testing lead and the circuit under test.

RESISTANCE MEASUREMENT

The resistance ranges are 200.0Ω, 2.000KΩ, 20.00KΩ, 200.0KΩ, 2.000MΩ and 20.00MΩ.

To measure resistance connect the meter as follows:

- Insert the red test lead into the “**V**” terminal and the black test lead into the COM terminal.
- Set the rotary switch to proper resistance range.
- Connect the test lead across with the object under test.
- The measured value will be shown on the LCD display.

Note: The test lead can add 0.1Ω to 0.2Ω of error to resistance measurement.

- To obtain precision reading in low-resistance measurement, that is the range of 200.0Ω, short the input terminal before measuring.
- At this time, the contact resistance is displayed on the LCD. You can subtract the

contact resistance value from the measured value.

- For high-resistance measurement ($>10M\Omega$), it is normal to take several seconds to obtain a stable reading.
- The LCD display will read “OL”, indicating an open-circuit for the tested resistor or the resistor value is higher than the maximum range of the meter.

DIODE CHECK

- Set the rotary switch to the “ $\rightarrow \bullet \parallel$ ” position.
- For the first time, the default mode is the diode check mode. You can enter the continuity check mode by the “FUNC” key.
- Insert the red test lead into the “**V Ω** ” terminal and the black test lead into the “COM” terminal.
- Use the diode test mode to check diodes, transistors and other semiconductor devices. In diode test mode, a current is sent through the semiconductor junction and the voltage drop across the junction is measured.
- A good silicon junction drop is between 0.5V and 0.8V.
- For forward voltage drop readings on any semiconductor component, place the red test lead on the component anode and the black test lead on the component cathode. The measured value will be shown on the display.
- Reverse the test lead and measure the voltage across the diode again.
 - If the diode is good, the display shows “OL”
 - If the diode is shorted, the display shows “0” (zero) in both directions.
 - If the display shows “OL” in both directions, the diode is an open circuit.

CONTINUITY CHECK

- Press the “FUNC” key to enter continuity mode.
- The buzzer sounds if the resistance of a circuit under test is less than 100Ω .

FREQUENCY MEASUREMENT

- Set the rotary switch to ‘Hz’ position.
- Insert the red test lead into the **V Ω Hz** input terminal and the black test lead into the **COM** terminal.
- Connect the test leads across with the circuit under testing. The measured value will be shown on the display.

Note: Input signal level must be higher than 0.5V.

DC/AC μ A OR mA MEASUREMENT

- DC current range is $200.0\mu A/2000\mu A$ and $20.00mA/200.0mA$ and then 10A range.
- AC current range is $200.0\mu A/2000\mu A$ and $20.00mA/200.0mA$ and then 10A range.
- Turn off power to the circuit and set the rotary switch to the proper DC/AC μA or DC/AC mA position.
- Break the current path to be tested. Connect the red test lead to the more positive side of the break and the black test lead to the more negative side of the break.
- Turn on the power to the circuit. The measured value will be shown on the display.

DC/AC 10A MEASUREMENT

- Insert the red test lead into the input terminal marked as “10A”.
- Break the current path to be tested. Connect the red test lead to the more positive side of the break and the black test lead to the more negative side of the break.
- Turn on the power to the circuit. The measured value will be shown on the display.

Note: The measuring time for high current should be ≤ 10 seconds for each

measurement and the interval time between two measurements should be greater than five minutes.

- When current measurement has been completed, disconnect the connection between the testing lead and the circuit under test.

TEMPERATURE MEASUREMENT

- To measure temperature use the K-type probe.
- Set the rotary switch to the “TEMP” range. If no probe is connected, the environmental temperature value is displayed on the LCD.
- Insert the K-type probe to the COM and TEMP terminals. The two “+” and “-” pins of the temperature probe must be direct at the COM and °C terminals respectively.
- The measured temperature value will be displayed on the LCD.

MAINTENANCE

Replacing the battery

- When the meter displays the low battery symbol, replace the battery immediately in order to maintain normal operation.
- Disconnect and remove all test probes from any live source and the meter.
- Open the battery cover on the bottom case with a screwdriver.
- Remove the old battery and fit a new one into the battery holder.
- Replace the battery cover.

Fuse replacement

Replacing the defective fuse should be done according to the following procedure:

- To avoid electrical shock, remove the test lead and any input signal before opening the bottom case.
- Open the bottom case and then remove the blown fuse.
- Replace it with a new fuse of the same size and rating.
- Replace the bottom case and reinstall the screws.

Cleaning

- Clean the meter with a clean, soft cloth.
- Do not use any chemicals, abrasives or solvents that could damage the meter.



INFORMATION ON WASTE DISPOSAL FOR CONSUMERS OF ELECTRICAL & ELECTRONIC EQUIPMENT

These symbols indicate that separate collection of Waste Electrical and Electronic Equipment (WEEE) or waste batteries is required. Do not dispose of these items with general household waste. Separate for the treatment, recovery and recycling of the materials used. Waste batteries can be returned to any waste battery recycling point which are provided by most battery retailers. Contact your local authority for details of the battery and WEEE recycling schemes available in your area.

