

DURATOOL



Models: D03143A / D03144A
Digital Multimeter

IMPORTANT SAFETY INFORMATION

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

This instrument is designed and manufactured in compliance with: IEC61010-1, CAT II 600V, Pollution Degree 2 double insulated.

- Check the test leads, probes and case insulation before using. If you find any breakage or abnormality, or you consider the device is broken, stop using the device immediately.
- Comply with local and national safety code. Wear personal protection equipment (such as rubber gloves, masks and flame retardant clothes etc.) to prevent being injured by electric shock due to exposed hazardous live conductors.
- When using the test probes, keep your fingers behind the finger protection ring.
- Do not use the meter with the back cover open.
- Select appropriate test range for measurements.
- Ensure all inputs are less than the range selected otherwise it may cause electrical shock or meter damage.
- Do not change the range selector position during voltage or current measurements.
- Do not apply more than the rated voltage as marked on the meter, between the terminals or between any terminal and earth ground.
- Take caution when working voltages are above 60V DC or 30V AC rms.
- Do not connect the meter to voltage signals when the range selector is on current, resistance, capacitance, diode, temperature or continuity ranges.
- When a measurement has been completed, disconnect the testing probes from the circuit under test.
- Do not use the meter around explosive gas or vapour.
- Replace the batteries as soon as the low battery indicator appears on the display.
- Remove dead batteries from the meter or if it is not going to be used for a long time.
- Never dispose of batteries in a fire, or attempt to recharge ordinary batteries.
- Before replacing the battery, turn off the meter and disconnect all the test probes.
- To prolong battery life turn off the meter after use.
- CAT II: Measurement category II is for measurements performed on equipment supplied from the fixed installation, e.g., TVs, PCs, portable tools and household appliances.
- Only use test leads and probes that are in compliance with IEC 61010-031, and rated CAT II 600V.

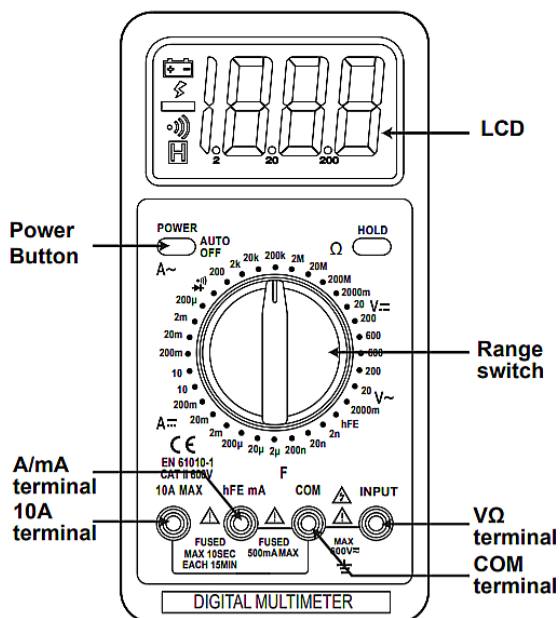
WHAT'S INCLUDED

- Digital multimeter
- User manual
- Set of test leads

SYMBOLS

	DC (Direct Current)
	AC (Alternating Current)
	DC or AC
	Important safety information. Refer to the manual
	Dangerous voltage may be present
	Earth ground
	Low battery
	Fuse
	Diode
	Continuity test
$^{\circ}\text{C}$	Centigrade
$^{\circ}\text{F}$	Fahrenheit
	Double insulated

PANEL DESCRIPTIONS



MODEL FUNCTIONS

MODEL	DCV	ACV	DCA	ACA	Ω			hFE	CAP	Hz	°C
D03143A	✓	✓	✓	✓	✓	✓	✓	✓			
D03144A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

OPERATION

Measuring Voltage

Connect the BLACK test lead to the “COM” jack and the RED to the “INPUT” jack.

- Set the function switch to desired V~ or V== range.
- If the voltage magnitude to be measured is unknown beforehand, select the highest range.
- Connect the test leads across the source or load to be measured.
- Read LCD display. The polarity of the RED lead connection will be indicated when making a DC measurement.

Note: In small range, the meter may display an unstable reading when the test leads have not been connected to the load to be measured. It is normal and will not affect the measurements.

- When the meter shows the over range symbol “OL”, a higher range must to be selected.
- To avoid damage to the meter, don't measure a voltage which exceeds 600Vdc (for DC voltage measurement) or 600Vac (for AC voltage measurement).

Measuring Current

- Connect the BLACK test lead to the “COM” jack. If the current to be measured is less than 200mA, connect the red test lead to the “mA” jack. If the current is between 200mA and 10A, connect the red test lead to the “10A” jack instead.
- Set the function switch to desire A~ or A== range.
- If the current magnitude to be measured is not known beforehand, set the ranges switch to the highest range position and then reduce it range by range until satisfactory resolution is obtained.
- If the current magnitude to be measured is not known beforehand, select the highest range.
- Connect test leads in series with the circuit to be measured.
- Read the reading on the display. For DC current measurement, the polarity of the red test lead connection will be indicated as well.

Note: When the display shows the over range symbol “OL”, a higher range must be selected.

Measure Resistance

- Connect the BLACK test lead to the “COM” jack and the RED to the “INPUT” jack (Note: The polarity of the red test lead is positive “+”).
- Set the range switch to desire Ω range
- If the resistance magnitude to be measured is not known beforehand, select the highest range.

- Connect the test leads across the load to be measured.
- Read the reading on the display.

Note: For resistance measurements $>1\text{M}\Omega$, the meter may take a few seconds to stabilize reading. This is normal for high-resistance measurement.

- When the input is not connected, i.e. at open circuit, the symbol “OL” will be displayed as an over range indicator.
- Before measuring in-circuit resistance, be sure that the circuit under test has all power removed and all capacitors are fully discharged.

Continuity Test

- Connect the BLACK test lead to the “COM” jack and the RED to the “INPUT” jack (Note: The polarity of the red test lead is positive “+”).
- Set the range switch to  range.
- Connect the test leads across the load to be measured.
- If the circuit resistance is lower than about 50Ω , the built-in buzzer will sound.

Diode Test

- Connect the BLACK test lead to the “COM” jack and the RED to the “INPUT” jack (Note: The polarity of the red test lead is positive “+”).
- Set the range switch to  range.
- Connect the red test lead to the anode of the diode to be tested and the black test lead to the cathode.
- The meter will show the approximate forward voltage of the diode. If the connections are reversed, “OL” will be shown on the display.

Transistor Test (With multifunction adapter)

- Set the range switch to hFE range.
- Connect the adapter “+” to the “COM” jack and “-” to the “hFE” jack. Don’t reverse the connection.
- Identify whether the transistor is NPN or PNP type and locate Emitter, Base and Collector lead. Insert the leads of the transistor to be tested into the proper holes of the transistor test socket of the adapter.
- LCD display will show the approximate hFE value.

Measuring Temperature

- Set the range switch to $^{\circ}\text{C}$ range.
- Connect the adapter “+” to the “INPUT” jack and “-” to the “COM” jack. Don’t reverse the connection.
- Insert the “-” plug of the K type thermocouple to the adapter “-” socket, and the “+” plug to the adapter “+” socket.
- Carefully touch the end of the thermocouple to the object to be measured.
- Wait a while, read the reading on the display, when the thermocouple is not inserted, the meter displays the current ambient temperature.

Capacitance Measuring

- Connect the BLACK test lead to the COM jack and the RED to the "INPUT" jack.
- Set the function switch at F position. (NOTE: The polarity of the RED lead is positive "+")
- Connect test leads across the capacitor under measure and be sure the polarity of connection is observed.

Note: To avoid damage to the Meter, disconnect circuit power and discharge all high-voltage capacitors before measuring capacitance. The tested capacitor should be discharged before the testing procedure. Never apply voltage to the input, or product damage may result.

Frequency Measuring

- Set the function range switch to the required "Hz" position.
- Connect the BLACK test lead to the "COM" jack and the RED to the "INPUT" jack (Note: The polarity of the red test lead is positive "+").
- Connect the test leads across the load to be measured.

Note: Do not apply more than 250V rms to the input. Indication is possible for a voltage higher than 100V rms, but reading maybe out of specification.

Auto Power Off

- If you don't operate the meter for about 15 minutes, it will turn off automatically. An alarm tone will sound before the meter auto powers off.
- Long press the power button to cancel the auto power off function when the tone sounds.

SPECIFICATIONS

DC VOLTAGE

Range	Resolution	Accuracy
200mV	0.1mV	$\pm(0.5\% \text{ of rdg} + 3\text{dgts})$
2V	1mV	$\pm(0.8\% \text{ of rdg} + 5\text{dgts})$
20V	10mV	
200V	100mV	
600V	1V	$\pm(1.0\% \text{ of rdg} + 5\text{dgts})$

Input Impedance: 10M Ω

Overload Protection: 600V DC AC rms

Max. Input voltage: 600V DC

AC VOLTAGE

Range	Resolution	Accuracy
200mV	0.1mV	$\pm(1.2\% \text{ of rdg} + 5\text{dgts})$
2V	1mV	$\pm(1.0\% \text{ of rdg} + 5\text{dgts})$
20V	10mV	
200V	100mV	
600V	1V	$\pm(1.2\% \text{ of rdg} + 5\text{dgts})$

Input Impedance: 10M Ω

Overload Protection: 600V DC AC rms

Max. Input voltage: 600V DC

TEMPERATURE

Range	Resolution	Accuracy
-40 ~ 1370°C	1°C	-40°C~150°C: $\pm(1.0\% + 4)$
		150°C~1370°C: $\pm(1.5\% + 15)$

Overload Protection: 250V DC/AC rms

DC CURRENT

Range	Resolution	Accuracy
20 μ A	10nA	$\pm(1.8\% \text{ of rdg} + 2\text{dgts})$
200 μ A	100nA	
2000 μ A	1 μ A	
20mA	10 μ A	
200mA	100 μ A	$\pm(2.0\% \text{ of rdg} + 2\text{dgts})$
2A	1mA	$\pm(2.0\% \text{ of rdg} + 10\text{dgts})$
10A	10mA	

Overload Protection:

mA: F0.5A/600V fuse

10A: F10A/600V fuse

Voltage Drop: 200mV

AC CURRENT

Range	Resolution	Accuracy
20μA	10nA	±(2.0% of rdg + 5dgts)
200μA	100nA	±(2.0% of rdg + 3dgts)
2mA	1μA	
20mA	10μA	
200mA	100μA	±(2.0% of rdg + 5dgts)
2A	1mA	±(2.5% of rdg + 10dgts)
10A	10mA	

Overload Protection:

mA: F0.5A/600V fuse

10A: F10A/600V fuse

Voltage Drop: 200mV

Frequency Range: 40Hz ~ 400Hz

Response: Average, calibrated in rms of sine wave

TRANSISTOR hFE TEST

Range	hFE	Test Current	Test Voltage
PNP & NPN	0~1000	I _b ≈10μA	V _{ce} ≈2.8V

RESISTANCE

Range	Resolution	Accuracy
200Ω	0.1Ω	±(1.0% of rdg + 10dgts)
2KΩ	1Ω	±(1.0% of rdg + 4dgts)
20KΩ	10Ω	
200KΩ	100Ω	
2MΩ	1KΩ	
20MΩ	10KΩ	±(1.0% of rdg + 10dgts)
200MΩ	100KΩ	±[5%*(rdg-10) + 10dgts]

Overload Protection: 250V DC/AC rms

DIODE AND CONTINUITY

Range	Introduction	Remark
	The approximate forward voltage drop will be displayed	Open circuit voltage: about 2.3V
	The built-in buzzer will sound if the resistance is less than about 30±20Ω.	Open circuit voltage: about 2.3V

Overload Protection: 250V DC/AC rms

CAPACITANCE

Range	Resolution	Accuracy
2nF	1pF	$\pm(4\% \text{ of rdg} + 5\text{dgts})$
20nF	10pF	
200nF	100pF	
2uF	1nF	
20uF	10nF	

Overload Protection: 250V DC/AC rms

FREQUENCY

Range	Resolution	Accuracy
2KHz	1Hz	$\pm(3\% \text{ of rdg} + 5\text{dgts})$
20KHz	10Hz	

Overload Protection: 250V DC/AC rms

BATTERY REPLACEMENT

- Battery and fuse replacement should only be done after the test leads have been disconnected and power is off.
- Never operate the meter with any covers removed.
- If the sign  appear on the display, it indicates battery should be replaced.
- Remove screws and open the back case, replace the dead battery with new battery (9V IED 6F22, NEDA 1604 or equivalent).

Note: Battery not included with this product.

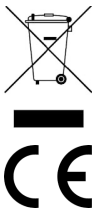
- Snap the battery connector leads to the terminals of a new battery and reinsert the battery into the case top.
- Locate the battery leads so that they will not be pinched between the case bottom and case top.
- Replace the casing and refit and tighten the screws.

FUSE REPLACEMENT

- Loosen screws with suitable screwdriver and remove case bottom.
- The meter is protected by fuse:
- mA: F0.5A/600V Fast, Breaking capacity is 10KA, dimensions is $\Phi 5 \times 20$ mm.
- 10A: F10A/600V Fast, Breaking capacity is 10KA, dimensions is $\Phi 5 \times 20$ mm.
- Replace the casing and refit and tighten the screws.

SPECIFICATIONS

Display	LCD, 1999 counts updates 2/sec
LCD size	66 x 34mm
Polarity Indication	"-" displayed automatically
Over-range Indication	"OL" displayed
Low Battery Indication	 displayed
Range select	Manual
Operation Temperature	0°C to 40°C, less than 80%RH
Storage Temperature	-10°C to 50°C, less than 85%RH
Battery Type	9V battery IEC 6F22, NEDA 1604 - NOT SUPPLIED
Dimension (H×W×D)	193 x 90 x 37mm
Weight	Approx 251g



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.

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