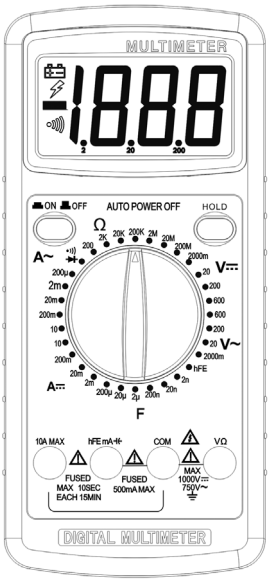
DURATOOL



Digital Multimeter

Models: D03143 & D03144

CONTENTS

WHAT'S INCLUDED

- One digital multimeter
- One user manual
- One pair of test leads
- One K-Type thermocouple (D03144)
- One adaptor

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

IMPORTANT SAFETY INFORMATION

- When using electrical appliances basic safety precautions should always be followed.
- 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 must be placed in the correct position and no changeover of range must be made while conducting measurements, in order to prevent damage to the meter.
- Use the proper terminals, function and range for measurements.
- Do not use or store the meter in an environment of high temperature or high humidity as the performance of the meter may deteriorate.
- 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 hFE.
- This meter is designed for indoor use only.
- Replace the battery as soon as the low battery indicator appears.
- Before opening the case of the meter, remove the connection between the testing leads and the circuit being tested and turn the power off.
- When servicing the meter, only use the same model number or identical electrical specifications for replacement parts.
- Turn the meter off when it is not in use and remove the battery when not in use for a long period of time.

GENERAL SPECIFICATION

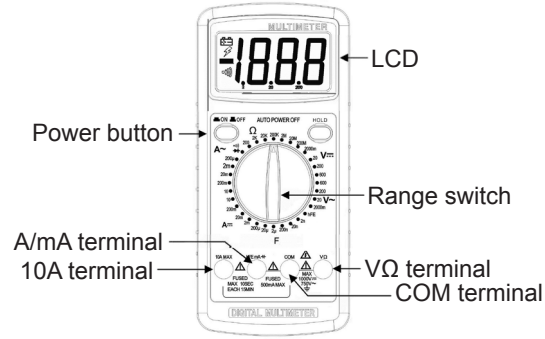
Display	LCD, 1999 counts updates 2/sec
LCD size	66 x 34mm
Polarity indication	"-" displayed automatically
Over-range indication	"1" displayed
Low battery indication	"⊟" displayed.
Range select	Manual
Operation temperature	0°C to 40°C, less than 80% RH
Storage temperature	-10°C to 50°C, less than 85% RH
Battery type	9V battery IEC 6F22, NEDA 1604
Dimensions	193 x 90 x 37mm
Weight	Approx. 251g

- Accuracy is guaranteed for 1 year 23°C ± 5°C less than 80% RH.

FUNCTION TABLE

Model	DCV	ACV	DCA	ACA	Ω	▶|	•))	hFE	CAP	Hz	°C
D03143	✓	✓	✓	✓	✓	✓	✓	✓			
D03144	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

PRODUCT OVERVIEW



DC VOLTAGE

Range	Resolution	Accuracy
200mV	0.1mV	± (0.5% of rdg + 3dgts)
2V	1mV	± (0.8% of rdg + 5dgts)
20V	10mV	
200V	100mV	
600V	1V	± (1.0% of rdg + 5dgts)

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

AC VOLTAGE

Range	Resolution	Accuracy
200mV	0.1mV	± (1.2% of rdg + 5dgts)
2V	1mV	± (1.0% of rdg + 5dgts)
20V	10mV	
200V	100mV	
600V	1V	± (1.2% of rdg + 5dgts)

- Input impedance: 10MΩ.
- Frequency range: 40Hz~400Hz.
- Overload protection: 600V DC AC rms.
- Response: Average, calibrated in rms of sine wave.
- Max. input voltage: 600V AC rms.

TEMPERATURE

Range	Resolution	Accuracy
-40°C ~ 1370°C	1.0°C	-40°C~150°C: ± (1.0% + 4)
		± (1.0% of rdg + 5dgts)

- Overload protection: 250V DC/AC rms.

TRANSISTOR hFE TEST

Range	hFE	Test Current	Test Voltage
PNP & NPN	0~1000	Ib≈10μA	Vce≈2.8V

DC CURRENT

Range	Resolution	Accuracy
20μA	10nA	± (1.8% of rdg + 2dgts)
200μA	100nA	
2000μA	1μA	
20mA	10μA	
200mA	100μA	± (2.0% of rdg + 2dgts)
2A	1mA	± (2.0% of rdg + 10dgts)
10A	10mA	

- mA: F0.5A/600V fuse (D03144).
- A: F2A/600V fuse (D03143).
- 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)
2000μA	1μA	
20mA	10μA	
200mA	100μA	± (2.0% of rdg + 5dgts)
2A	1mA	± (2.5% of rdg + 10dgts)
10A	10mA	

- mA: F0.5A/600V fuse (D03144).
- A: F2A/600V fuse (D03143).
- 10A: F10A/600V fuse.
- Voltage drop: 200mV.
- Frequency range: 40Hz~400Hz.
- Response: Average, calibrated in rms of sine wave.

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	± (5.0%* (rdg - 10) + 10dgts)

- Open circuit voltage: about 3V.
- Overload protection: 250V DC/AC rms.

DIODE & CONTINUITY

Range	Introduction	Remark
	The approx. forward voltage drop will be displayed	Open circuit voltage: about 2.8V
	The built-in buzzer will sound if resistance is less than about 30±20Ω	Open circuit voltage:about 2.8V

- Overload protection: 250V DC/AC rms.

CAPACITANCE

Range	Resolution	Accuracy
2nF	1pF	± (4.0% of rdg + 5dgts)
20nF	10pF	
200nF	100pF	
2µF	1nF	
20µF	10nF	

- Overload protection: F0.5A/600V fuse.
- Over-load protect: 250V DC/ AC rms.

FREQUENCY

Range	Resolution	Accuracy
2kHz	1Hz	± (3.0% of rdg + 5dgts)
20kHz	10Hz	

- Overload protection: 250V DC/ AC rms.

OPERATION - MEASURING VOLTAGE

- Connect the black test lead to the “COM” jack and the red to the “VΩ” jack.
- Set the function switch to the 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 measured.
- Read the LCD. The polarity of the red lead connection will be indicated when making a DC measurement.

Notes:

- In a 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 “1”, a higher range must be selected.
- To avoid damage to the meter, do not measure a voltage that exceeds 600V DC or 600V AC.

MEASURING CURRENT

- Connect the black test lead to the “COM” jack. If the current to be measured is less than 200mA (2A for for D03143), connect the red test lead to the “mA”/“A2” jack. If the current is between 200mA/2A and 10A, connect the red test lead to the “10A” jack instead.
- Set the function switch to the desired **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 the satisfactory resolution is obtained.
- If the current magnitude to be measured is not known beforehand, select the highest range.
- Connect the 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 “1”, a higher range must be selected.

MEASURING RESISTANCE

- Connect the black test lead to the “COM” jack and the red to the “VΩ” jack (note: the polarity of the red test lead is positive).
- Set the range switch to the desired **Ω** range.
- If the current 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.

Notes:

- For resistance measurements >1MΩ, the meter may take a few seconds to stabilise the reading. This is normal for high-resistance measurement.
- When the input symbol is not connected i.e. at open circuit, the symbol “1” will be displayed as an over range indicator.
- Before measuring in-circuit resistance, make sure that the circuit under test has all the power removed and all capacitors are fully discharged.

CONTINUITY TEST

- Connect the black test lead to the “COM” jack and the red to the “VΩ” 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 30 ± 20Ω, the built-in buzzer will sound.

DIODE TEST

- Connect the black test lead to the “COM” jack and the red to the “VΩ” jack (note: the polarity of the red test lead is positive).
- Set the range switch to the ▶|– 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, “1” will be shown on the display.

TRANSISTOR TEST (W/MULTIFUNCTION ADAPTOR)

- Set the range switch to the **"hFE"** range.
- Connect the adaptor to the “COM” jack and the “hFE” jack. Do not reverse the connection.
- Identify if the transistor in NPN or PNP type and locate the emitter, base and collector lead. Insert the lead of the transistor to be tested onto the proper holes of the transistor test socket of the adaptor.
- The LCD will show the approximate hFE value.

MEASURING TEMPERATURE (W/MULTIFUNCTION ADAPTOR)

- Set the range switch to the **°C** range.
- Connect the adaptor to the “COM” jack and “°C” jack. Do not reverse the connection.

- Insert the black plug of the K-type thermocouple to the adaptor “-” socket and the red plug to the adaptor “+” socket.
- Carefully touch the end of the thermocouple to the object to be measured.
- Wait a short while and read the display.

MEASURING CAPACITANCE

- Connect the black test lead to the “COM” jack and the red to the “mA” jack.
- Set the function switch to **F** position (note: the polarity of the red lead is positive).
- Connect the test leads across the capacitor under measurement and ensure you observe the polarity of the connection.
- Note: To avoid damage to the meter, disconnect the 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 serious damage may result.

MEASURING FREQUENCY

- Set the function range switch to the required **Hz** position.
- Connect the black test lead to the “COM” jack and the red to the “VΩ” 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 may be out of specification.

AUTO POWER OFF

- If you do not operate the meter for 15 minutes, it will turn off automatically. To switch it on again push the power button twice.

REPLACING THE BATTERY & FUSE

- Prior to replacing the battery or fuse, disconnect the test leads and ensure the power is off.
- If the low battery symbol appears on the display it indicates that the battery should be replaced. Remove the screws and open the back case, replace the old battery with the new battery (9V IEC 6F22, NEDA 1604 or equivalent specification).
- Snap the battery connector leads to the terminals of a new battery and reinsert the battery into the case top. Dress the battery leads so that they will not be pinched between the case bottom and top.
- The meter is protected by a fuse:
  - mA: F0.5A/600V fast, breaking capacity is 10kA, dimensions ϕ5x20mm
  - 10A: F10A/600V fast, breaking capacity is 10kA, dimensions ϕ5x20mm
  - A (D03143): F2A/600V fast, breaking cacpacity is 10kA, dimensions ϕ5x20mm
- Replace the case bottom and reinstall the three screws. Never operate the meter unless the case bottom is fully closed.

INFORMATION ON WASTE DISPOSAL FOR CONSUMERS OF ELECTRICAL & ELECTRONIC EQUIPMENT.

When this product has reached the end of its life it must be treated as Waste Electrical & Electronic Equipment (WEEE). Any WEEE marked products must not be mixed with general household waste, but kept separate for the treatment, recovery and recycling of the materials used. Contact your local authority for details of recycling schemes in your area.

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