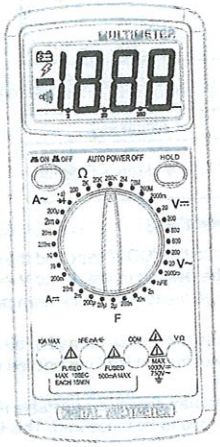
DURATOOL



Models: D03143 / D03144

Digital Multimeter

CONTENTS

WHAT'S INCLUDED?

- One digital multimeter
- One pair of test leads
- One K-type thermocouple
- One adaptor
- One user manual

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.
- 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.

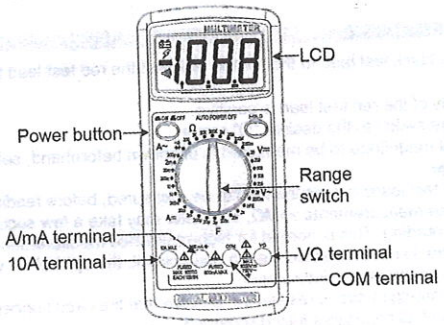
GENERAL SPECIFICATION

Display	LCD, 1999 count. Updates 2/sec
LCD Size	66 x 34mm
Polarity Indication	"-" displayed automatically
Overrange 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

FUNCTIONS

Model	DCV	ACV	DCA	ACA	Ω	→|←	·)))	hFE	CAP	Hz	°C
D03143	✓	✓	✓	✓	✓	✓	✓	✓			
D03144	✓	✓	✓	✓	✓	✓	✓	✓	✓		

OVERVIEW



SPECIFICATIONS

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

DC VOLTAGE

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

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

AC VOLTAGE

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

- 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 ~ 1370°C	1°C	-40°~150°C ± (1.0% + 4)
		150°C~1370°C ± (1.5% + 15)

- Overload protection: 250V DC/AC rms.

DC CURRENT

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

Overload protection:
- 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 + 5 digits)
200µA	100nA	± (2.0% of rdg + 3 digits)
2mA	1µA	
20mA	10µA	
200mA	100µA	± (2.0% of rdg + 5 digits)
2A	1mA	± (2.5% of rdg + 10 digits)
10A	10mA	

Overload protection:
- 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.

TRANSISTOR hFE TEST

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

RESISTANCE

Range	Resolution	Accuracy
200Ω	0.1Ω	± (1.0% of rdg + 10 digits)
2kΩ	1Ω	± (1.0% of rdg + 4 digits)
20kΩ	10Ω	
200kΩ	100Ω	
2MΩ	1kΩ	± (1.0% of rdg + 10 digits)
20MΩ	10kΩ	± (5% (rdg - 10) + 10 digits)
200MΩ	100kΩ	

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

DIODE & CONTINUITY

Range	Introduction	Remark
→|	The approximate forward voltage drop will be displayed	Open circuit voltage: about 2.8V
·)))	The built-in buzzer will sound if the resistance is less than about 30 ± 20Ω	Open circuit voltage: about 2.8V

- Overload protection: 250V DC/AC rms.

connection will be indicated as well.
Note: When the display shows the overrange symbol "1", a higher range must be selected.

MEASURING RESISTANCE

- Connect the black test lead to the "COM" jack and the red test lead 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 unknown beforehand, select the highest range.
- Connect the test leads across the load to be measured, before reading the display.
- 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 is not connected, i.e. an open circuit, the symbol "1" will be displayed as an overrange indicator.

Note: Before measuring in-circuit resistance, be sure that the circuit under test has all power removed and all capacitors fully discharged.

CONTINUITY TEST

- Connect the black test lead to the "COM" jack and the red test lead to the "VΩ" jack.

Note: The polarity of the red test lead is positive.
- Set the range switch to the "·)))" range.
- Connect the test leads across the load to be measured.
- If the circuit resistance is lower than about 30 ± 20Ω, the built-in buzzer will sound.

DIODE TEST

- Connect the black test lead to the "COM" jack and the red lead 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 or the diode to be tested and the black test lead to the cathode.
- The meter will shows the approximate forward voltage drop of 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 whether the transistor is NPN or PNP type and locate the emitter, base and collector lead. Insert the lead of the transistor to be tested into 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.

CAPACITANCE

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

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

FREQUENCY

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

- Overload protect: 250V DC/AC rms.

OPERATION - MEASURING VOLTAGE

- Connect the black test lead to the "COM" jack and the red lead to the "VΩ" jack.
- Set the function switch to the desired range: V~ or V⎓.
- 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 the LCD. The polarity of the red lead connection will be indicated when making a DC measurement.

Note: 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. This is normal and will not affect the measurements.
When the meter shows the overrange symbol "1", a higher range must be selected.
To avoid damage to the meter, don't 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 for D03144, or less than 2A for D03143, connect the red test lead to the "mA"/"A" 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 unknown beforehand, set the ranges switch to the highest range position and then reduce it range by range until the desired resolution is obtained.
- Connect the test leads in series with the circuit to be measured.
- Read the display. For DC current measurement, the polarity of the red test lead

- 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.

CAPACITANCE MEASURING

- Connect the black test lead to the "COM" jack and the red lead to the "mA" jack.
- Set the function switch at position "F".

Note: The polarity of the red test lead is positive.
- Connect the test leads across the capacitor under pressure and be sure that the polarity of the connection is observed.

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 as the meter could be seriously damaged.

FREQUENCY MEASURING

- Set the function range switch to the required "Hz" position.
- Connect the black test lead to the "COM" jack and the red lead to the "VΩ" jack.

Note: The polarity of the red test lead is positive.
- Connect the test leads across the load to be measured.
- Do not apply more than 250V rms to the input. Indication is possible to a voltage higher than 100V rms, but the reading may be out of specification.

AUTO POWER OFF

- If the meter is not used or operated for 15 minutes, it will automatically turn off.
- To turn it on again, just push the power button twice.

BATTERY & FUSE REPLACEMENT

- Before replacing the battery or the fuse ensure that all test leads have been disconnected and the power is off.
- If the low battery indicator (⎓) appears on the display, replace the battery immediately.
- Remove the screws and open the back case.
- Then replace the exhausted battery with a new one of the same specification (9V IEC 6F22, NEDA 1604).
- The meter is protected by a fuse:
  - mA: F0.5A/600V fast, breaking capacity is 10kA, dimensions 5 x 20mm.
  - 10A: F10A/600V fast, breaking capacity is 10kA, dimensions 5 x 20mm.
  - A (D03143): F2A/600V fast, breaking capacity is 10kA, dimensions 5 x 20mm.

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 & Electronics 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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