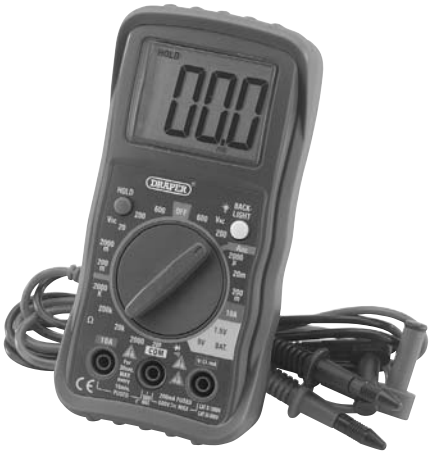
INSTRUCTIONS FOR

Digital Multimeter

Stock No.78993 Part No.DMM2B

IMPORTANT: PLEASE READ THESE INSTRUCTIONS CAREFULLY TO ENSURE THE SAFE AND EFFECTIVE USE OF THIS PRODUCT.



WARNING: Ensure rubber casing does not interfere with correct installation of the test probes

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05/2005

GENERAL INFORMATION

This manual has been compiled by Draper Tools and is an integrated part of the product with which it is enclosed and should be kept with it for future references.

This manual describes the purpose for which the product has been designed and contains all the necessary information to ensure its correct and safe use. We recommend that this manual is read before any operation or, before performing any kind of adjustment to the product and prior to any maintenance tasks. By following all the general safety instructions contained in this manual, it will ensure both product and operator safety, together with longer life of the product itself.

All photographs and drawings in this manual are supplied by Draper Tools to help illustrate the operation of the product.

Whilst every effort has been made to ensure accuracy of information contained in this manual, the Draper Tools policy of continuous improvement determines the right to make modifications without prior warning.

CONTENTS

DECLARATION OF CONFORMITY

We :
Draper Tools Ltd.,
Hursley Road,
Chandler's Ford,
Eastleigh, Hampshire.
SO53 1YF.
England.

Declare under our sole responsibility that the product:

Stock No:- **78993.**

Part No:- **DMM2B.**

Description:- **Digital Multimeter.**

To which this declaration relates is in conformity with the following directive(s) 73/23/EEC, 89/336/EEC.

With reference to: EN61010-1:2001, EN61010-3-031:1994, EN61326:1997, EN55022, EN61000-4-2, EN61000-4-3.

J.N. Draper
Managing Director

11/08/2004

SPECIFICATION

Stock No.....78993
Part No..... DMM2B
Battery Type.....1x9V PP3
Dimensions..... 146(H) x 66.2(W) x 41.5(D) mm
Weight.....200g

- **DC VOLTAGE:** Input impedance: >1M ,
  Overload protection: 600V DC or 600V AC RMS.

Range	Resolution	Accuracy
200mV	0.1mV	±0.5% rdg ± 2 dgts
2000mV	1mV	±0.8% rdg ± 2 dgts
20V	0.01V	
200V	0.1V	
600V	1V	±1.0% rdg ± 2 dgts

- **AC VOLTAGE:** Input impedance: >1M ,
  Overload protection 600V DC or 600V AC RMS, Frequency range: 50-60Hz.

Range	Resolution	Accuracy
200mV	0.1V	±1.2% rdg ± 10 dgts
600V	1V	

- **DC CURRENT:** Maximum Input: 200mA on µA/mA ranges,
  10A on 4A/20A ranges, Input protection: 0.2A/250V fuse: µA/mA range,
  10A/250V fuse: 10A range.

Range	Resolution	Accuracy
2000µA	1µA	±1.0% rdg ± 2 dgts
20mA	10µA	
200mA	100µA	±1.2% rdg ± 2 dgts
10A	10mA	±3.0% rdg ± 2 dgts

SPECIFICATION

- **RESISTANCE**

Range	Resolution	Accuracy
200	0.1	±0.8% rdg ± 2 dgts
2000	1	
20k	0.01k	
200k	0.1k	
2000k	1k	±1.2% rdg ± 2 dgts

- **9V BATTERY TEST:** Test current: 6mA (9V)/100mA (1.5V).

Range	Resolution	Accuracy
1.5V	10mV	±1.5% rdg ± 2 dgts
9V	10mV	

- **DIODE CHECK:** Test current: 1mA typical.

Open Circuit Voltage	Resolution	Accuracy
2.8V DC Typical	~	~

- **AUDIBLE CONTINUITY:** Overload protection: 250V DC or 250V AC RMS.

Audible Threshold	Resolution	Test Current
<30	~	~

reading - accuracy of the measurement circuit.

digits - accuracy of the analog to digital conversion.

- **WARNING: Ensure the test leads are fully engaged prior to carrying out any measurements to avoid electric shock.**

GUARANTEE

Draper tools have been carefully tested and inspected before shipment and are guaranteed to be free from defective materials and workmanship for a period of 12 months from the date purchase except where the tools are hired out when the guarantee period is ninety days from the date of purchase.

Should the tool develop a fault, please return the complete tool to your nearest authorised warranty repair agent or contact Draper Tools Limited, Chandler's Ford, Eastleigh, Hampshire, SO53 1YF. England. Telephone: (023) 8026 6355.

If upon inspection it is found that the fault occurring is due to defective materials or workmanship, repairs will be carried out free of charge. This guarantee does not apply to normal wear and tear, nor does it cover any damage caused by misuse, careless or unsafe handling, alterations, accidents, or repairs attempted or made by any personnel other than the authorised Draper warranty repair agent.

This guarantee applies in lieu of any other guarantee expressed or implied and variations of its terms are not authorised.

Your Draper guarantee is not effective unless you can produce upon request a dated receipt or invoice to verify your proof of purchase within the 12 month period.

Please note that this guarantee is an additional benefit and does not affect your statutory rights.

Draper Tools Limited.

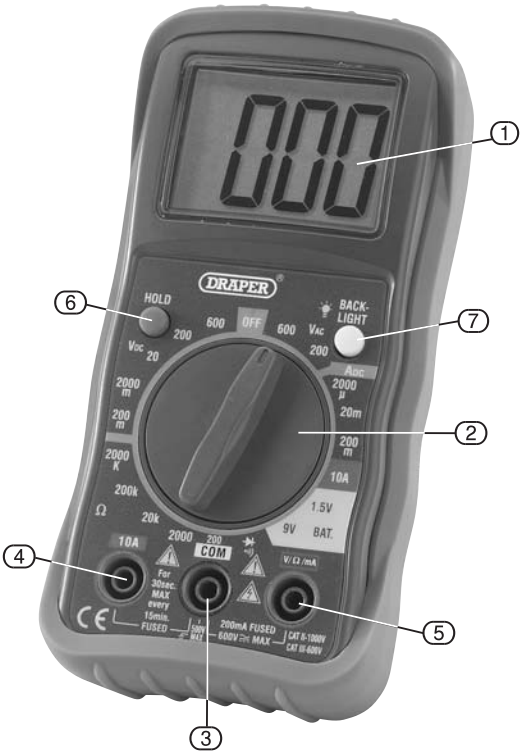
GENERAL SAFETY INSTRUCTIONS

SAFETY INFORMATION:

The following safety information must be observed to insure maximum personal safety during the operation of this meter.

- Do not use the meter if the meter or test leads look damaged, or if you suspect that the meter is not operating correctly.
- Never ground yourself when taking electrical measurements. Do not touch exposed metal pipes, outlets, fixtures, etc. which might be at ground potential. Keep your body isolated from ground by using dry clothing, rubber shoes, rubber mats, or any approved insulating material.
- Turn off power to the circuit under test before cutting, unsoldering, or breaking the circuit. Small amounts of current can be dangerous.
- Use caution when working above 60Volts DC or 30Volts AC, as these voltages pose a shock hazard.
- When using probes, keep your fingers behind the finger guards on the probes.
- Measuring voltage which exceeds the limits of the multimeter may damage the meter and expose the operator to a shock hazard. Always recognize the meter voltage as stated on the front of the meter.
- Never apply voltage or current to the meter that exceeds the specified maximum.

GETTING TO KNOW YOUR MULTIMETER



1. Liquid Crystal Display.
2. Function Range Selector Switch. This switch is used to select the function and desired range.
3. COM jack socket. Plug in the black (negative) test lead.
4. 10A jack socket. Plug in the red (positive) test lead for measuring amperage to a maximum of 10A.
5. V, , µA, mA (Voltage, Resistance, Diode Check, Microamps, Milliamps) jack socket. Plug in the red (positive) test lead.
6. Data Hold Button.
7. Back Light Button.

- **UNPACKING:** After removing the packing material, make sure the product is in perfect condition and that there are no visible damaged parts. If in doubt, do not use the multimeter and contact the dealer from whom it was purchased.

  The packaging materials (plastic bags, polystyrene, etc.), must be disposed of in an appropriate refuse collection container. These materials must not be left within the reach of children as they are potential sources of danger.

GETTING TO KNOW YOUR MULTIMETER

- OTHER METER MARKINGS

	Diode check.	Ω	Units of measuring resistance (OHMS).
	Indicates that the meter battery voltage has dropped excessively.		Caution.
10A⎓≂ mA⎓≂ μA⎓≂	Units of measuring current (AMPS).		Caution, risk of electric shock.
V⎓ V~	Units of measuring voltage (VOLTS).		Audible continuity range.

WARNING: Each time you use this instrument, inspect the test leads, connectors and probes for damage, e.g. cracks or breaks in the insulation. Any defective leads should be replaced. If the voltage to be measured is not known and the meter is not autoranging, set the selector switch to the highest range and reduce until a satisfactory reading is obtained. Always ensure that the probe plugs are inserted fully into the multimeter. If at any point you are uncertain what you are doing, please contact a qualified electrician.

- **DATA HOLD BUTTON:**

The Data Hold function allows the meter to "freeze" a measurement for later reference.

1. Press the DATA HOLD button to "freeze" the reading on the indicator. The indicator "HOLD" will appear in the display.
2. Press the DATA HOLD button to return to normal operation.

- **BACK LIGHT BUTTON:**

The BACK LIGHT button is only used to turn the back light on. To extend the battery life, the back light extinguish automatically after approximately 3 seconds.

WARNING: Risk of electrocution. High-voltage circuits, both AC and DC, are very dangerous and should be measured with great care.

1. ALWAYS turn the function switch to the OFF position when the meter is not in use.
2. If "OL" appears in the display during a measurement, the value exceeds the range you have selected. Change to a higher range.

NOTE: On some low AC and DC voltage ranges, with the test leads not connected to a device, the display may show a random, changing reading. This is normal and is caused by the high-input sensitivity. The reading will stabilise and give a correct measurement when connected to a circuit.

- **DC VOLTAGE MEASUREMENTS:**

CAUTION: Do not measure DC voltages if a motor on the circuit is being switched ON or OFF. Large voltage surges may occur that can damage the meter.

1. Set the function switch to the highest DC volt position.
2. Insert the black test lead banana plug into the negative (COM) jack.
   Insert the red test lead banana plug into the positive (V) jack.
3. Touch the black test probe tip to the negative side of the circuit.
   Touch the red test probe tip to the positive side of the circuit.
4. Read the voltage in the display. Reset the function switch to successively lower voltage positions to obtain a higher resolution reading. The display will indicate the correct decimal point and value. If the polarity is reversed, the display will show (-) minus before the value.

- AC VOLTAGE MEASUREMENTS:

WARNING: Risk of Electrocution. The probe tips may not be long enough to contact the live parts inside some 240V outlets for appliances because the contacts are recessed deep in the outlets. As a result, the reading may show 0 volts when the outlet actually has voltage on it. Make sure the probe tips are touching the metal contacts inside the outlet before assuming that no voltage is present.

CAUTION: Do not measure DC voltages if a motor on the circuit is being switched ON or OFF. Large voltage surges may occur that can damage the meter.

1. Set the function switch to the highest AC volt position.
2. Insert the black test lead banana plug into the negative (COM) jack.
   Insert the red test lead banana plug into the positive (V) jack.
3. Touch the black test probe tip to the negative side of the circuit.
   Touch the red test probe tip to the positive side of the circuit.
4. Read the voltage in the display. Reset the function switch to successively lower voltage positions to obtain a higher resolution reading. The display will indicate the correct decimal point and value.

- **DC CURRENT MEASUREMENTS:**
  CAUTION: Do not make current measurements on the 10A scale for longer than 30 seconds. Exceeding 30 seconds may cause damage to the meter and/or the test leads.
  1. Insert the black test lead banana plug into the negative (COM) jack.
  2. For current measurements up to 200mA DC, set the function switch to the highest DC mA position and insert the red test lead banana plug into the (mA) jack.
  3. For current measurements up to 10A DC, set the function switch to the 10A range and insert the red test lead banana plug into the (10A) jack.
  4. Remove power from the circuit under test, then open up the circuit at the point where you wish to measure current.
  5. Touch the black test probe tip to the negative side of the circuit.
     Touch the red test probe tip to the positive side of the circuit.
  6. Apply power to the circuit.
  7. Read the current on the display. For mA DC measurements, reset the function switch to successively lower mA positions to obtain a higher resolution reading. The display will indicate the correct decimal point and value.

- **RESISTANCE MEASUREMENTS:**
  WARNING: To avoid electric shock, disconnect power to the unit/circuit under test and discharge all capacitors before taking any resistance measurements.
  1. Insert the black test lead banana plug into the negative (COM) jack.
     Insert the red test lead banana plug into the positive jack.
  2. Set the function switch to the highest position.
  3. Touch the test probe tips across the circuit or part under test. It is best to disconnect one side of the part under test so the rest of the circuit will not interfere with the resistance reading.
  4. Read the resistance on the display and then set the function switch to the lowest position that is greater than the actual or any anticipated resistance. The display will indicate the correct decimal point and value.

- **CONTINUITY CHECK:**
  WARNING: To avoid electric shock, never measure continuity on circuits or wires that have voltage on them.
  1. Set the function switch to the position.
  2. Insert the black lead banana plug into the negative (COM) jack.
     Insert the red test lead banana plug into the positive ( ) jack.
  3. Touch the test probe tips to the circuit or wire you wish to check.
  4. If the resistance is less than approximately 30 , the audible signal will sound. If the circuit is broken (open), the display will indicate "1".

- **DIODE MEASUREMENT:**
  1. Connect the red test lead to the "V/ " jack socket and the black test lead to the "COM" jack socket.
  2. Set the selector switch to the position.
  3. Connect the red test lead to the anode of the diode and the black lead to the cathode.
  4. The forward voltage drop in mV will now be displayed. If the diode is reversed the figure "1" should show on the display.

- **DIODE TEST:**
  1. Insert the black test lead banana plug into the negative COM jack and the red test lead banana plug into the positive diode jack.
  2. Turn the rotary switch to the position.
  3. Touch the test probes to the diode under test. Forward voltage will indicate 400 to 700mV. Reverse voltage will indicate "I". Shorted devices will indicate near 0mV and an open device will indicate "I" in both polarities.

- **BATTERY TEST:**
  1. Insert the black test lead banana plug into the negative COM jack and the red test lead banana plug into the positive V jack.
  2. Select the 1.5V or 9V BAT position using the function select switch.
  3. Connect the red test lead to the positive side of the 1.5V or 9V battery and the black test lead to the negative side of the 1.5V or 9V battery.
  4. Read the voltage in the display.

	Good	Weak	Bad
9V battery	>8.2V	7.2 to 8.2V	<7.2V
1.5V Battery	>1.35V	1.22 to 1.35V	<1.22V

MAINTENANCE

The fuse rarely needs replacing, and almost always a blown fuse is the result of an operator error.

- **WARNING: If the resistance to be measured is part of a circuit, turn off and disconnect the power and discharge all capacitors before measurement.**

If the meter battery is in need of replacement [- +] will appear on the display.

BATTERY INSTALLATION

- **WARNING: To avoid electric shock, disconnect the test leads from any source of voltage before opening the casing.**
  1. Disconnect the test leads from the meter.
  2. Open the casing by loosening the screws at the rear.
  3. Open the casing gently, taking care not to damage the meter.
  4. Insert the battery into the holder, observing the correct polarity.
  5. Close and resecure the casing.
- **WARNING: To avoid electric shock, do not operate the meter until the casing is in place and fastened securely.**
- **Note:** If your meter does not function correctly, check the fuse and battery to ensure they are properly installed.

FUSE REPLACEMENT

WARNING: To avoid electric shock, disconnect the test leads from any source of voltage before opening the casing.

1. Disconnect the test leads from the meter.
2. Open the casing by loosening the screws at the rear.
3. Open the casing gently, taking care not to damage the meter.
4. Install the new fuse, ensuring the correct type and that the value matches the blown fuse.
5. Close and resecure the casing.

WARNING: To avoid electric shock, do not operate the meter until the casing is in place and fastened securely.

NOTES

NOTES

CONTACTS

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  Chandler's Ford,
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  SO53 1YF. U.K.

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- **General Enquiries:** (023) 8026 6355.
- **Fax:** (023) 8026 0784
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- **E-mail:** sales@drapertools.com

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