

DRAPER®

INSTRUCTIONS FOR **Digital Multimeter**

Stock No.78998 Part No.DMM10B

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



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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

Contents/Declaration 1
 Specification..... 2-4
 Guarantee/General Safety Instructions..... 5
 Getting to Know Your Multimeter..... 6-7
 Operation and Use 8-12
 Battery Installation/Fuse Replacement 13



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:- **78998.**
 Part No:- **DMM10B.**
 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. 78998
 Part No. DMM10B
 Battery type..... 1x 9V PP3
 Dimensions..... 195(H) x 92(W) x 38(D) mm
 Weight..... 380g

- **DC VOLTAGE (autoranging):** Input impedance 10M ,
 Overload protection 1000V DC or 700V AC RMS, except 200mV: 250V DC or AC RMS.

Range	Resolution	Accuracy
200mV	0.1mV	±0.5% rdg ± 2 dgts
2V	1mV	
20V	10mV	
200V	100mV	
1000V	1V	±0.8% rdg ± 2 dgts

- **AC VOLTAGE (autoranging):** Input impedance 10M ,
 Input protection 1000V DC or 700V AC RMS, Frequency range: 50-400Hz.

Range	Resolution	Accuracy
2V	1mV	±1.0% rdg ± 3 dgts
20V	10mV	±1.5% rdg ± 3 dgts
200V	100mV	±2.5% rdg ± 10 dgts
700V	1V	

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

Range	Resolution	DC Accuracy	AC Accuracy
2mA	1µA	±1.0% rdg ± 3 dgts	±1.2% rdg ± 3 dgts
20mA	10µA	±1.5% rdg ± 3 dgts	±2.0% rdg ± 3 dgts
200mA	100µA	±2.5% rdg ± 10 dgts	±3.0% rdg ± 10 dgts
20A	10mA		



SPECIFICATION

- **RESISTANCE (autoranging):** Input protection: 250V DC or 250V AC RMS.

Range	Resolution	Accuracy
200	0.1	$\pm 1.0\%$ rdg ± 4 dgts
2k	1	$\pm 1.0\%$ rdg ± 2 dgts
20k	10	$\pm 1.2\%$ rdg ± 2 dgts
200k	100	
2M	1k	
20M	10k	$\pm 2.0\%$ rdg ± 5 dgts

- **FREQUENCY:** Sensitivity: 200mV-10V RMS,
Overload protection: 250V DC or AC RMS.

Range	Resolution	Accuracy
20kHz	10Hz	$\pm 1.5\%$ rdg ± 5 dgts

- **TEMPERATURE:** Sensor: Type K thermocouple,
Input protection: 0.5A/250V fuse.

Range	Resolution	Accuracy
-20 to 760°C	1°C	$\pm 3.0\%$ rdg ± 3 dgts
-4 to 1400°F	1°F	

- **CAPACITANCE (autoranging):** Overload protection: 250V DC or 250V AC RMS.

Range	Resolution	Accuracy
2nF	1pF	$\pm 4.0\%$ rdg ± 10 dgts
20nF	10pF	$\pm 4.0\%$ rdg ± 3 dgts
200nF	0.1nF	$\pm 4.0\%$ rdg ± 3 dgts
2μF	1nF	
200μF	0.1μF	$\pm 4.0\%$ rdg ± 5 dgts



SPECIFICATION

- **DIODE CHECK:** Test current: 1 mA typical, Overload protection: 250V DC or AC RMS.

Open Circuit Voltage	Resolution	Accuracy
2.8V DC Typical	1mV	$\pm 10.0\%$ rdg ± 5 dgts

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

Audible Threshold	Resolution	Test Current
<50	~	<0.3mA

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.

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.

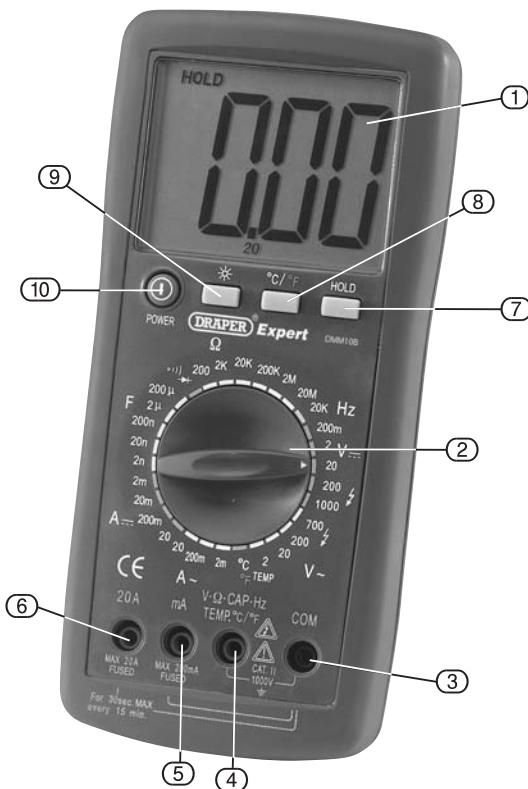
Draper Tools Limited.

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.
















- ① Liquid crystal display.
- ② Function and 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 V, Ω, CAP, Hz, °C, °F (Voltage, Resistance, Capacitance, Hertz, Temperature) jack socket. Plug in the red (positive) test lead.
- ⑤ mA (milliamp) jack socket. Plug in the red (positive) test lead for measuring to a maximum of 200mA.
- ⑥ 20A jack socket. Plug in the red (positive) test lead for measuring amperage to a maximum of 20A.
- ⑦ Data hold button.
- ⑧ Temperature °C/°F button.
- ⑨ Backlight button.
- ⑩ Power 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		Caution, risk of electric shock.
	Indicates that the meter battery voltage has dropped excessively.		Audible continuity range.
10A  mA  μA 	Units of measuring current (AMPS).	Hz	Units of measuring frequency (Hertz).
V  V 	Units of measuring voltage (VOLTS).	CAP	Units of measuring capacitance (pF: picofarads, nF: nanofarads and μF: microfarads).
	Units of measuring resistance (OHMS).	°F/°C	Units of measuring temperature (Fahrenheit and Celsius).
	Caution.		

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.

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

If "1" 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.

- **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 display. The indicator "HOLD" will appear.
2. Press the DATA HOLD button again to return to normal operation.

- **BACKLIGHT BUTTON:**

The backlight button is only used to turn the backlight on. To extend the battery life, the backlight will extinguish automatically after approximately 3 seconds.

- **°C/°F BUTTON:**

The °C/°F button is used to select °C or °F function when making temperature measurements. To set the rotary switch at TEMP position and "°C" is being displayed, the LCD display will show temperature for °C. To push the °C/°F switch, "°F" will be displayed at the same time the LCD display will show temperature for °F. To push it again will show for °C.

- **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 V DC position ("mV" will appear in the display).
2. Insert the black test lead banana plug into the negative (COM) jack and the red test lead banana plug into the positive (V) jack.
3. Touch the test probe tips to the circuit under test. Be sure to observe the correct polarity (red lead to positive, black lead to negative).
4. Read the voltage in the display. The display will indicate the proper 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 AC 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 V AC position.
2. Insert the black test lead banana plug into the negative (COM) jack and the red test lead banana plug into the positive (V) jack.
3. Touch the test probe tips to the circuit under test.
4. Read the voltage in the display. The display will indicate the proper decimal point, value and symbol (AC, V, etc.).

- **DC Current Measurements:**

Caution: Do not make current measurements on the 20A scale for longer than 30 seconds. Exceeding 30 seconds may cause damage to the meter and/or 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 mA position and insert the red test lead banana plug into the (mA) jack.
3. For current measurements up to 20A DC, set the function switch to the A range and insert the red test lead banana plug into the 20A 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. The display will indicate the correct decimal point and value.

- **AC Current Measurements:**

WARNING: To avoid electric shock, do not measure AC current on any circuit whose voltage exceeds 250V AC.

Caution: Do not make current measurements on the 20A scale for longer than 30 seconds. Exceeding 30 seconds may cause damage to the meter and/or test leads.

1. Insert the black test lead banana plug into the negative (COM) jack.
2. For current measurements up to 200mA AC, set the function switch to the mA range and insert the red test lead banana plug into the (mA) jack.
3. For current measurements up to 20A AC, set the function switch to the A position and insert the red test lead banana plug into the (20A) 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. The display will indicate the correct decimal point and value.

- Frequency Measurement:

1. Set the function switch to the 20kHz position.
2. Insert the black test lead banana plug into the negative (-) jack (COM) and the red test lead banana plug into the positive (+) jack (F).
3. Touch the test probe tips to the circuit under test.
4. Read the frequency on the display. The digital reading will indicate the correct decimal point and value.

- Capacitance Measurements:

WARNING: To avoid electric shock, disconnect power to the unit under test and discharge all capacitors before taking any capacitance measurements. Remove the batteries and unplug the line cords.

1. Set the function switch to the "CAP" position.
2. Insert the black test lead banana plug into the negative (-) jack (COM) and the red test lead banana plug into the positive (+) jack (CAP).
3. Touch the test leads to the capacitor to be tested. The display will indicate the correct decimal point and value.

- Temperature Measurements:

WARNING: To avoid electric shock, disconnect both test probes from any source of voltage before making a temperature measurement.

1. If you wish to measure temperature in °F set the function switch to the °F range. If you wish to measure temperature in °C, set the function switch to the °C range.
2. Insert the temperature probe into the negative (-) jack (COM) and the positive (+) jack (Temperature), making sure to observe the correct polarity.
3. Touch the Temperature Probe head to the part whose temperature you wish to measure. Keep the probe touching the part under test until the reading stabilizes (about 30 seconds).
4. Read the temperature on the display. The digital reading will indicate the correct decimal point and value.

WARNING: To avoid electric shock, be sure the thermocouple has been removed before changing to another measurement function.

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.

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