EN

Original Instructions
Version 3
May 2024

400 SERIES

DIGITAL MULTIMETER

92433

UK CA CE

1. Preface

1.1 Product Reference

User Manual for: 400 Series Digital Multimeter

Stock No: 92433

Part No: DMM404

Read this manual in full before using this product and retain it for future use. Always use the latest version of the manual. Please visit **drapertools.com/manuals** for the latest version.

1.2 Revisions

Version 1: November 2019
First release

Version 2: February 2023

Version 3: May 2024

2. Contents

3. Product Introduction

3.1 Intended Use

This device is designed to measure voltage, current and resistance across AC and DC circuits. Fitted with a large LCD backlit display screen, torch and an NCV (Non - contact voltage) sensor.

Any other application beyond the conditions established for use will be considered misuse. Draper Tools accepts no responsibility for improper use of this product.

Part of our core range, this product is suitable for regular use by enthusiasts and tradespersons alike.

3.2 Specification

Stock No.	**92433**
Part No.	**DMM404**
Multimeter rating:	CAT III, 1,000V/CAT IV 600V
Dimensions:	L 190 x W 90 x H 50mm
Battery Type:	1 x 9V (PP3)
Fuse Type:	FF20A/250V
Weight (approx.):	380g
Overload Protection:	250V DC or AC Peak

DC Voltage

Range	Accuracy	Resolution
600mV	±0.5% reading, +3 digits	0.1mV
6V		0.001V
60V		0.01mV
600V	±0.8% reading, +5 digits	0.1mV
1000V		1V

Input impedance: 10MΩ
Overload protection: 1000V DC or 750V AC peak.

AC Voltage

Range	Accuracy	Resolution
600mV	±1.2% reading, +5 digits	0.1mV
6V	±0.8% reading, +3 digits	0.001V
60V		0.01mV
600V	±1.0% reading, +10 digits	0.1mV
750V		1V

Input impedance: 10MΩ.
Overload protection: 1000V DC or 750V AC peak.
Frequency response: 40 ~ 1000Hz.
Display: True RMS (sine wave RMS calibration)

AC/DC Current

Range	Accuracy	Resolution
60uA	1% reading, +3 digits	0.01µA
600uA		0.1µA
6000uA		1µA
60mA		0.01mA
600mA		0.1mA
20A	±2% reading,+10 digits	0.01A

Maximum input current: 600mA DC or AC rms.
20A range: 20A DC or AC rms.

Resistance

Range	Accuracy	Resolution
600Ω	±0.8 to 1.2% reading, +3 digits	0.1Ω
6kΩ		0.001kΩ
60kΩ		0.01kΩ
600kΩ		0.1kΩ
6MΩ		0.001MkΩ
60MΩ		0.01MkΩ

Open circuit voltage: about 1.0V.

Diode

Range	Accuracy	Resolution
	Positive voltage	1mA typical/Reverse voltage 3V

Capacitance

Range	Accuracy	Resolution
9.999nF	±4% reading + 3 digits	0.001nF
99.99nF		0.01nF
999.9nF		0.1nF
9.999µF		0.001µF
99.99µF		0.01µF
999.9µF		0.1µF
9.999mF		0.001mF
99.99mF		0.01mF

Frequency

Range	Accuracy	Resolution
9.999Hz	± 1.0% reading + 3 digit	0.001Hz
99.99Hz		0.01Hz
999.9Hz		0.1Hz
9.999kHz		0.001kHz
99.99kHz		0.01kHz
999.9kHz		0.1kHz
9.999MHz		0.001MHz

Input voltage range: 200mV ~ 10V AC.

Duty cycle

Range	Accuracy	Resolution
0.1 - 99.9%	± 3.0%	0.1%

Transistor

Range	Base Current
0 – 1000hFE	10uA/Vce 2.8V

Temperature Measurement

Range	Accuracy	Resolution
-20°C–300°C	±1% +4 digits	1°C/1°F
301°C–1000°C	±1.9% +5 digits	1°C/1°F
-4°F–600°F	±1.2% +6 digits	11°C/1°F
601°F–1832°F	±1.9% +6 digits	1°C/1°F

Operating conditions: Ambient temperature: 18–50°C

4. Health and Safety Information

Important: Read all the Health and Safety instructions before attempting to use this product. Failure to read these instructions may result in serious injury or death.

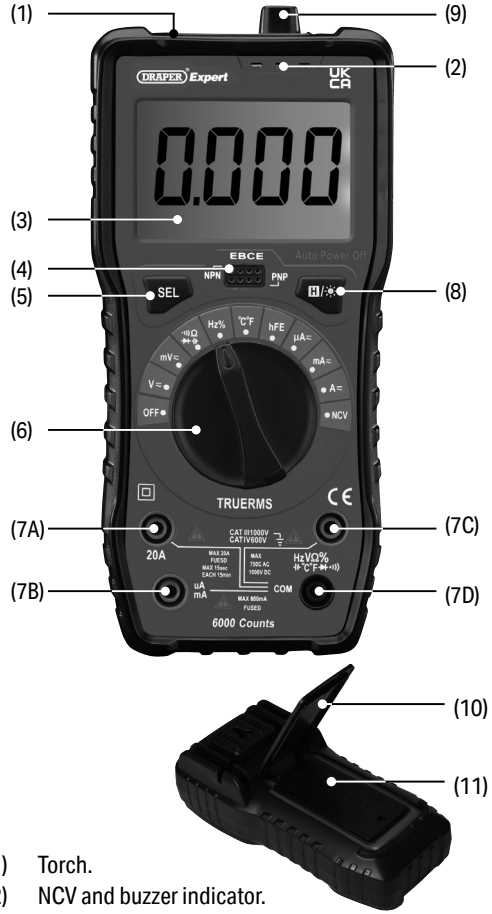
WARNING! Contact with live circuits can result in severe electrical shock. When measuring voltage above 30V, current above 10mA or AC power with an inductive load, take care not to touch the exposed contacts as they may give a serious electric shock.

- **ONLY** trained and competent personnel may operate this device.
- Use this product **ONLY** as instructed in this manual.
- Use **ONLY** accessories and spare parts supplied by Draper Tools.
  - **DO NOT** use any other leads with this product than those supplied. Contact Draper Tools for replacement options if the leads become damaged.
  - If the fuse must be replaced, use one with the same specification. Fuse replacement should only be carried out by suitably qualified personnel authorised by Draper Tools.
  - If the battery must be replaced, use one with the same specification.
- Observe all standard precautions and good practice when working with live electrical currents.
- Inspect the product for damage before every use, particularly the contact tips.
  - **DO NOT** use this product if the device or probe leads are damaged in any way or if there is evidence of battery leakage.
  - If battery acid comes into contact with your skin, wash it off immediately with plenty of clean water.
  - If battery acid comes into contact with your eyes, flush them with plenty of clean water and seek immediate medical attention.
- Ensure that the device is clean, dry and free from grease before use.
- Ensure that the function dial is in the correct position before taking a measurement.
- **DO NOT** use this product if it exhibits abnormal behaviour and have it checked by a qualified and authorised technician before next use.
- **DO NOT** exceed the maximum rated capacity per function for this device as it may expose you to a shock hazard.
- Ensure that the probe contacts are disconnected from the load or test circuit before moving the function dial.
- Assess any specific additional risks to the operator before each use.
- **DO NOT** expose this product to excessive ambient temperature, high humidity, flammable substances or environments that produce a strong magnetic field.
- **DO NOT** use this this product around explosive gases, vapours or dust.
- **DO NOT** immerse this device in water or expose it to wet conditions.
- **ALWAYS** wear protective insulated gloves while using this product.
- Keep your fingers behind the guards on the probes during use.
- **ALWAYS** remove the contact leads from the device before removing the rubber cover or opening the back panel.
- **DO NOT** operate this device with the rear housing open or missing and **DO NOT** use it if the rear housing cannot be closed properly.
- **NEVER** insert the probe contacts into the device terminals.
- **DO NOT** abuse, mutilate or burn the battery.
- Ensure the battery is fitted in the correct +/- orientation.
- Remove the batteries when the product is stored for extended periods.
- **DO NOT** attempt to repair this device; it contains no user-serviceable parts.
- Keep this product out of reach of children.

WARNING! ALWAYS ensure that the operator is not in contact with the ground while taking measurements, using insulating materials to prevent the current from earthing.

5. Identification and Unpacking

5.1 Product Overview



(1) Torch.
(2) NCV and buzzer indicator.
(3) LCD screen.
(4) Transistor test socket.
(5) Test mode select button (SEL).
(6) Function dial.
(7) Probe terminals
  (7A) 20A
  (7B) uA/mA
  (7C) Red (+) positive terminal
  (7D) COM (Common earth probe terminal)
(8) Reading hold/backlight button (H/☀).
(9) Non-contact voltage sensing area.
(10) Battery outer cover/stand.
(11) Battery compartment cover.

5.2 What's in the Box?

Carefully remove the product from the packaging and examine it for any signs of damage that may have occurred during shipment.

Before assembling the product, lay the contents out and check them against the parts listed below. If any part is damaged or missing, do not attempt to use the product. Please contact the Draper Helpline; contact details can be found at the back of this manual.

A. 1 x Storage case.
B. 1 x Negative (-) black probe contact.
C. 1 x Positive (+) red probe contact.
D. Temperature probe.
E. Magnetic hanging strap (in storage case).

5.3 Packaging

Keep the product packaging for the duration of the warranty period in case the product needs to be returned for repair.

WARNING! Keep packaging materials out of reach of children. Dispose of packaging correctly and responsibly and in accordance with local regulations.

6. Functions

6.1 LCD Display Explained

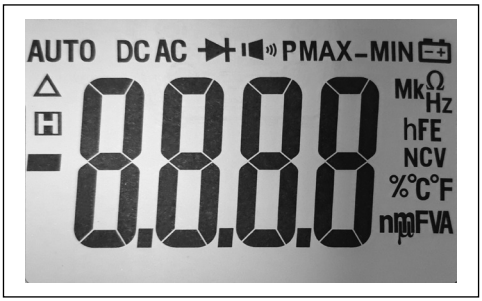


Fig. 1

Symbol	Description
AUTO	Automatic measuring range mode
DC	DC current
AC	AC current
	Diode, Continuity buzzer on/off
NCV	Non-contact AC voltage detect
hFE	Transistor test status
	Low battery display
°C / °F	Temperature measurement status
H	Data Hold
%	Percentage (duty ratio)
mV, V	Millivolt, volt (voltage)
A	Ampere (current)
nF, µF, mF	NaFala, micro-Farah, millifara
Ω, kΩ, MΩ	Ohm, kilo-ohm, mega-ohm (resistance)
Hz, kHz, MHZ	Hertz, kilohertz, megahertz (frequency)

6.2 The Function Dial

- Turn the function dial (6) and press the "**SEL**' button (5) to select the appropriate measurement type.

6.3 'SEL' Select Button

- The '**SEL**' button (5) allows switching between the different test modes, switch temperature between Celsius and Fahrenheit, diode and continuity and frequency and duty cycle measurements. In AC voltage mode can also switch to frequency mode.

6.4 Reading Hold/Torch button H/☀

- When taking measurements to retain the reading on the screen, press the '**HOLD/TORCH**' button (8) once to lock the value. To unlock press the **HOLD/TORCH** button again.
- To turn on the torch function, press and hold the **HOLD/TORCH**' (8) for 1- 2 seconds. The backlight for the screen will also come on. Press the button again to switch off or the light will turn off automatically after 15seconds.

6.5 Automatic Power OFF

- The Multimeter will automatically switch off after 15 minutes if no operation has occurred. The buzzer will sound one minute before it shuts down.

Important: Before operating this product, read and understand all the safety instructions listed in this manual.

Important: Inspect the device for signs of damage, particularly the probes and insulated leads. Replace faulty leads immediately.

If a negative value is shown on the display, check the polarity of the probes at the component contacts and the device terminals.

7.1 Installing the Battery

Important: Use ONLY 9V (Type PP3) batteries.

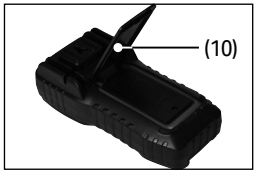


Fig. 2

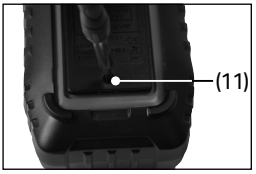


Fig. 3

Fig. 4

1. Lift the up the back cover (10) to access the battery compartment.
2. Unscrew the battery compartment (11) and remove the cover.
3. Install the battery, observing the polarity marked on the inside of the rear housing. Ensure the battery is fitted in the correct +/- orientation.
4. Refit the battery compartment door and tighten the screw securely.

7.2 Voltage Measurement

1. Turn the function dial (6) to the relevant voltage position and press the '**SEL**' button (5) to choose between AC or DC.
2. Connect the black (-) lead to the **COM** (7D) terminal and the red positive (+) to the red terminal (7C).
3. Position the probe contacts across the source of the circuit to be measured, observing the correct polarity.
4. Enable the power to the circuit to be measured. The voltage value is displayed on the LCD screen (3).

Important: DO NOT connect to voltages above 1000V DC or750V AC as there is a risk of electric shocks or damage to the meter. If the meter detects voltage outside this range an alarm will sound and ⚠ will be displayed on the screen

7.3 AC and DC Current Measurement

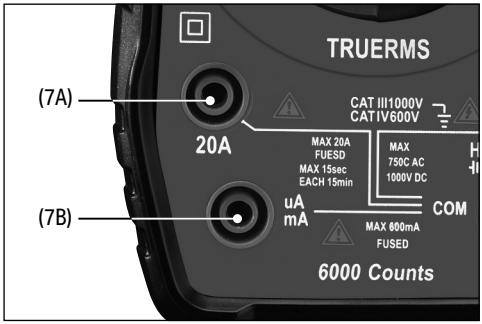


Fig. 5

1. Connect the black negative (-) lead to the '**COM**' terminal (7D). Connect the red positive (+) test lead to either the '2A' (7A) or uAmA' (7B) terminal.
2. Disconnect the circuit under test. Connect the black negative (-) lead to the disconnected end of the test circuit and the red positive (+) lead to the other end.
3. Connect the power to the circuit and the current value will be displayed on the LCD screen (3).

- If the display shows 'OL,' the input exceeds the selected range, and a higher range should be selected.

⚠ **WARNING!** Do not measure circuit current when the voltage between the open circuit voltage and the ground exceeds 250°C.

7.4 Resistance Measurement (Ω)

1. If the resistance to be tested is part of a circuit, switch the circuit off, disconnect the power and allow all capacitors to discharge before measurement.

   WARNING! NEVER measure resistance across a voltage source or on a powered circuit.

2. Connect the black (-) lead to the '**COM**' (7D) terminal and the red positive (+) to red terminal (7C).
3. Select the 'resistance' function on the dial.

- If the display shows '**OL**', the input exceeds the selected current range and a higher range should be selected.

7.5 Diode Test ( )

1. Connect the black (-) lead to the '**COM**' terminal (7D) and the red positive (+) to red terminal (7C).
2. Select the 'diode test function' on the dial (6) and press the '**SEL**' button (5) to switch to mode.
3. Touch the probe contacts against the contacts of the diode, observing the correct polarity.
4. The approximate forward voltage drop of the diode is displayed on the LCD screen (3); a typical diode functioning normally will deliver a reading of 0.5–0.7.

7.6 Continuity Buzzer Test ( )

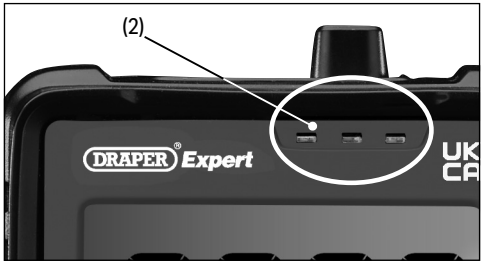


Fig. 6

1. Connect the black (-) lead to the '**COM**' terminal (7D) and the red positive (+) to red terminal (7C).
2. Select the 'buzzer' mode on the function dial (6) and then press the '**SEL**' button (5) and switch to mode.
3. Connect the test probes to the resistance of the circuit under test.

- If the resistance is less than 50Ω the buzzer may sound.
- If the test probes are open or the resistance measured is above 600Ω, '**OL**' will be displayed.
- Different number of indicator lights (2) will illuminate depending on the resistance detected.

7.7. Capacitance ( )

1. Connect the black (-) lead to the '**COM**' terminal (7D) and the red positive (+) to red terminal (7C).
2. Turn the dial to the 'capacitance' mode.
3. Completely discharge the capacitor before connecting the probes.
4. The current value is displayed on the LCD screen.

Note:

- When measuring capacitance, disconnect the power and allow all capacitors to fully discharge.
- When measuring large capacitance, it will take time for the reading to stabilise.
- When measuring polar capacitors, pay attention to the corresponding polarity to avoid damaging the Multimeter.

7.8 Frequency and Duty Cycle Measurement (Hz%)

1. Connect the black (-) lead to the '**COM**' terminal (7D) and the red positive (+) to red terminal (7C).
2. Turn the function dial to either the '**Hz%**' or '**AC**' mode.
3. In either mode press the '**SEL**' button (5) to choose the duty measurement and press again to return to the frequency mode.

7.9 Temperature Measurement (°C/°F)

1. Turn the function dial to '**°C/°F**' and press '**SEL**' button (5) to switch between Centigrade and Fahrenheit.
2. Connect the temperature probe (D) black (-) lead to the '**COM**' terminal (7D) and the red (+) to red terminal (7C).
3. The measured temperature value will be displayed on the screen (3).

- Maximum temperature measurement for K-type thermocouples is 250°C.

7.10 Transistor Testing

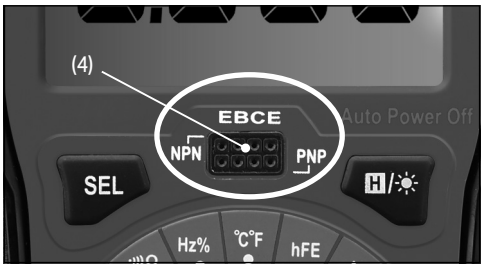


Fig. 7

WARNING! DO NOT apply voltages above 36VDC or RMS to the **'COM'** or **'hFE'** terminals.

1. Turn the function dial (6) to '**hFE**' position.
2. Determine whether the transistor is either type '**NPN**' or '**PNP**'. Then insert the transistor pins into the corresponding '**EBCE**' test holes (4).
3. The recorded measurement will be displayed on the screen.

7.11 Non- Contact AC Voltage Detection (NCV)

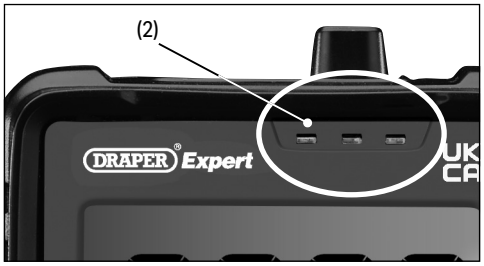


Fig. 8

1. Turn the function dial to the 'NCV' mode and NCV and '----' will be shown on screen.
2. Place the NCV zone close to the live line of AC voltage (less than 5mm) to be tested, the unit will beep and show the following:

- Green light on when signal is weak.
- Green/Amber lights on when medium signal detected.
- Green/Amber/Red lights all on when signal is strong.

8. Product Care and Disposal

Important: Disconnect the probes from the terminals and any other source of voltage before performing any maintenance on this product.

8.1 Maintenance and Storage

- Keep the product clean and free from dust, debris and grease.
- Use a dry cloth **ONLY** to clean the housing of this device.

CAUTION! DO NOT use abrasives, solvents or other aggressive chemicals as these may damage plastic or insulated parts.

- Replace the probes **IMMEDIATELY** if they are damaged in any way or the conductors are exposed; contact Draper Tools for replacement options.
- **Important:** Replacement probes must be rated CAT III 1,000V (10A).
- If the low battery indicator ( ) is shown on the display, replace the battery as soon as possible; see **7.1 Installing the Battery**.
- Remove the battery when storing the device for extended periods.
- Store the device in a cool, clean and dry environment, out of direct sunlight and out of reach of children.

8.2 Disposal

At the end of its working life, dispose of the product responsibly and in line with local regulations. Recycle where possible.

- **DO NOT** dispose of this product with domestic waste; most local authorities provide appropriate recycling facilities.

9. Warranty

Warranty period is 12months from date of purchase.

Visit **drapertools.com/warranty** for more information.

10. Explanation of Symbols


Read the instruction manual


WEEE – Waste Electrical & Electronic Equipment
Do not dispose of Waste Electrical & Electronic Equipment in with domestic rubbish


For indoor use only; do not expose to rain


Class II construction (Double insulated)


European conformity

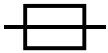

UK Conformity Assessed


Diode test


Temperature


Capacitance


Frequency


Fuse


Danger! High voltage/current


Voltage AC


Voltage DC


Current AC


Current DC


Resistance in Ohms


Warning!


Continuity test buzzer

Contact Details

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Please contact the Draper Tools Product Helpline for repair and servicing enquiries.