

DRAPER[®]



300 SERIES MULTIMETER

41822



IMPORTANT: Please read these instructions carefully to ensure the safe and effective use of this product and save these instructions for future reference. 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.

1. TITLE PAGE

1.1 INTRODUCTION:

USER MANUAL FOR:

SERIES 300 MULTIMETER

Stock no. 41822.

Part no. DMM301.

1.2 REVISIONS:

Date first published August 2017

As our user manuals are continually updated, users should make sure that they use the very latest version.

Downloads are available from: <http://www.drapertools.com/manuals>

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1.3 UNDERSTANDING THIS MANUALS SAFETY CONTENT:

WARNING! Information that draws attention to the risk of injury or death.

CAUTION! Information that draws attention to the risk of damage to the product or surroundings.

1.4 COPYRIGHT © NOTICE:

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3. GUARANTEE

3.1 GUARANTEE

Draper tools have been carefully tested and inspected before shipment and are guaranteed to be free from defective materials and workmanship.

Should the tool develop a fault, please return the complete tool to your nearest distributor or contact Draper Tools Limited, Chandler's Ford, Eastleigh, Hampshire, SO53 1YF. England.

Telephone Sales Desk: (023) 8049 4333 or Product Helpline (023) 8049 4344.

A proof of purchase must be provided with the tool.

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 period covering parts/labour is 12 months from the date of purchase except where tools are hired out when the guarantee period is 90 days from the date of purchase. 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.

Note: If the tool is found not to be within the terms of warranty, repairs and carriage charges will be quoted and made accordingly.

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 guarantee period.

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

Draper Tools Limited.

4.1 GENERAL SPECIFICATIONS

Fuse Protection for " **VΩmAHz** " Terminal Inputs: 600mA, 600V, FAST, Min. Interrupt Rating 10000A.

Fuse Protection for " **10A** " Terminal Inputs: 10A, 600V, FAST, Min. Interrupt Rating 10000A.

Display: 3 5/6-digit display, with a max. reading of 5999.

Over range Indication: " **OL** " shown on the screen.

Negative Polarity Indication: Negative sign " - " shown on the screen automatically.

Sampling Rate: About 2 to 3 times/sec.

Operating Temperature: 0°C to 40°C < 75%RH.

Temperature Coefficient: 0.2 x (specified accuracy)/°C (< 18°C or > 28°C).

Storage Temperature: -10°C to 50°C < 85%RH.

Operating Altitude: 0 to 2000 meters.

Battery: 9V battery, 6F22 or equivalent, 1 piece.

Low Battery Indication: " **⊖** " shown on the display.

Dimensions: 150 X 73 X 47mm.

Weight: About 228g (including battery and holster).

DC Voltage

Range	Accuracy	Resolution
6V	± (0.8% of rdg + 5 digits)	0.001V
60V		0.01V
600V	± (1.0% of rdg + 5 digits)	0.1V

Input Impedance: About 10MΩ

Overload Protection: 600V DC/AC rms.

4. INTRODUCTION

AC Voltage

Range	Accuracy	Resolution
6V	$\pm(1.0\% \text{ rdg} + 5 \text{ digits})$	0.001V
60V		0.01V
600V	$\pm(1.2\% \text{ rdg} + 5 \text{ digits})$	0.1V

- Input Impedance: About 10M Ω
- Overload Protection: 600V DC/AC rms.
- Frequency Range: 40 to 400Hz
- Response: Average, calibrated in rms of sine wave

DC Current

Range	Accuracy	Resolution
60mA	$\pm(1.0\% \text{ rdg} + 7 \text{ digits})$	0.01mA
600mA		0.1mA
6A	$\pm(1.5\% \text{ rdg} + 7 \text{ digits})$	1mA
10A		10mA

- Overload Protection:
Protection for "V Ω mAHz" terminal inputs: Fuse, 600mA/600V, Fast.
Protection for "10A" terminal inputs: Fuse, 10A/600V, Fast
- Max. Input Current:10A (For measurements > 2A: measurement duration < 10 secs, and interval > 15 minutes)

AC Current

Range	Accuracy	Resolution
60mA	$\pm(1.8\% \text{ rdg} + 10 \text{ digits})$	0.01mA
600mA		0.1mA
6A	$\pm(2.5\% \text{ rdg} + 10 \text{ digits})$	1mA
10A		10mA

- Overload Protection:
Protection for "V Ω mAHz" terminal inputs: Fuse, 600mA/600V, Fast
Protection for "10A" terminal inputs: Fuse, 10A/600V, Fast
- Max. Allowable Input Current: 10A (For measurements > 2A: measurement duration <10 secs, and interval > 15 minutes)
- Frequency Range: 40Hz ~ 400Hz
- Response: Average, calibrated in rms of sine wave


4. INTRODUCTION

Resistance


Range	Accuracy	Resolution
600Ω	±(1.0% rdg + 5 digits)	0.1Ω
6kΩ		0.001kΩ
60kΩ		0.01kΩ
600kΩ		0.1kΩ
6MΩ	±(1.5% rdg + 5 digits)	0.001MΩ
60MΩ	±(3.0% rdg + 10 digits)	0.01MΩ

- Open Circuit Voltage: <0.7V

Diode

Range	Resolution	Function
	The approx. forward voltage drop of the diode will be displayed.	Open Circuit Voltage: about 3V Test Current: about 0.8mA

Continuity Test

Range	Function
	The built-in buzzer will sound if the resistance is less than about 20Ω. The buzzer may or may not sound if the resistance is between 20Ω and 150Ω. The buzzer will not sound if the resistance is more than 150Ω.

- Open circuit voltage: approx. 0.7V

Capacitance (use Relative mode)

Range	Accuracy	Resolution
40nF	±(3.5% rdg + 20 digits)	0.01nF
400nF	±(2.5% rdg + 5 digits)	0.1nF
4μF	±(3.5% rdg + 5 digits)	0.00μF
40μF	±(4.0% rdg + 5 digits)	0.01μF
400μF	±(5.0% rdg + 5 digits)	0.1μF
4000μF	not specified	1μF

4. INTRODUCTION

Frequency

Range	Accuracy	Resolution
9.999Hz	$\pm(1.0\% \text{ rdg} + 5 \text{ digits})$	0.001Hz
99.99Hz		0.01Hz
999.9Hz		0.1Hz
9.999kHz		1Hz
99.99kHz		10Hz
999.9kHz		100Hz
9.999MHz	not specified	1kHz

- Input voltage: 1V rms ~ 20V rms.

Temperature

	Range	Accuracy	Resolution
°C	-20°C ~ 0°C	$\pm(6.0\% + 5^\circ\text{C})$	0.1°C
	0°C ~ 400°C	$\pm(1.5\% + 4^\circ\text{C})$	0.1°C
	400°C ~ 1000°C	$\pm(1.8\% + 5^\circ\text{C})$	1°C
°F	-4°F ~ 32°F	$\pm(6.0\% + 9^\circ\text{F})$	0.1°F
	32°F - 752°F	$\pm(1.5\% + 7.2^\circ\text{F})$	0.1°F
	752°F ~ 1832°F	$\pm(1.8\% + 9^\circ\text{F})$	1°F

Note:

1. Use K type thermocouple.
2. Accuracy does not include error of the thermocouple probe.
3. Accuracy specification assumes ambient temperature is stable to $\pm 1^\circ\text{C}$. For ambient temperature changes of $\pm 5^\circ\text{C}$, rated accuracy applies after 1 hour.

Duty Cycle

Range	Accuracy	Resolution
0.5% ~ 99.9%	$\pm(2.0\% \text{ rdg} + 7 \text{ digits})$	0.1%

- Input Voltage: 2Vp ~ 50Vp

- Frequency Range: 4Hz ~ 1kHz

Pulse Width

Range	Accuracy	Resolution
0.5 ~ 20ms	$\pm(2.0\% \text{ rdg} + 3 \text{ digits})$	0.1ms

- Input Voltage: 2Vp ~ 50Vp

4. INTRODUCTION

Engine Dwell

Range	Accuracy	Resolution
4CYL	$\pm(3^\circ)$	0.1°
6CYL	$\pm(3^\circ)$	0.1°
8CYL	$\pm(3^\circ)$	0.1°

- Overload Protection: 250V DC or rms AC

Dwell Angle

Number of Cylinders	Range	Resolution	Accuracy
4 cylinders	0 ~ 90°	0.1°	$\pm(2.5\% \text{ rdg} + 2 \text{ digits})$
5 cylinders	0 ~ 72°		
6 cylinders	0 ~ 60°		
8 cylinders	0 ~ 45°		

- Input Voltage: 2Vp ~ 50Vp

- Max. Allowable RPM of Engine: 20000RPM

Tach (rotation speed)

Range	Accuracy	Resolution
2-stroke engine: 60 ~ 20000RPM	$\pm(0.5\% \text{ rdg} + 3 \text{ digits})$	<10000RPM: 1RPM ≥10000RPM: 0.1kRPM
4-stroke engine: 120 ~ 20000RPM		

- Input Voltage: 2Vp ~ 50Vp

- Max. Allowable RPM of Engine: 20000RPM

4. INTRODUCTION

4.3 HANDLING & STORAGE

Care must still be taken when handling, dropping this machine will have an effect on the accuracy.

The environment will have a negative result on its operation if you are not careful. If the air is damp, components will rust. If the machine is unprotected from dust and debris; components will become clogged.

5. HEALTH & SAFETY INFORMATION


5.1 SAFETY PRECAUTIONS

This instrument complies with IEC1010 (International Electrotechnical Commission promulgated safety standards). Design and production using the pollution level 2 safety requirements.

 **Warning**

To avoid electrical shock or personal injury.
Please read the safety information and “warnings and precautions” before use.

Warning: When measuring voltage above 30V, current above 10ma, AC power with an inductive load. Use caution not to touch exposed contacts due to the risk of electric shock, only use approved probes or clamps.

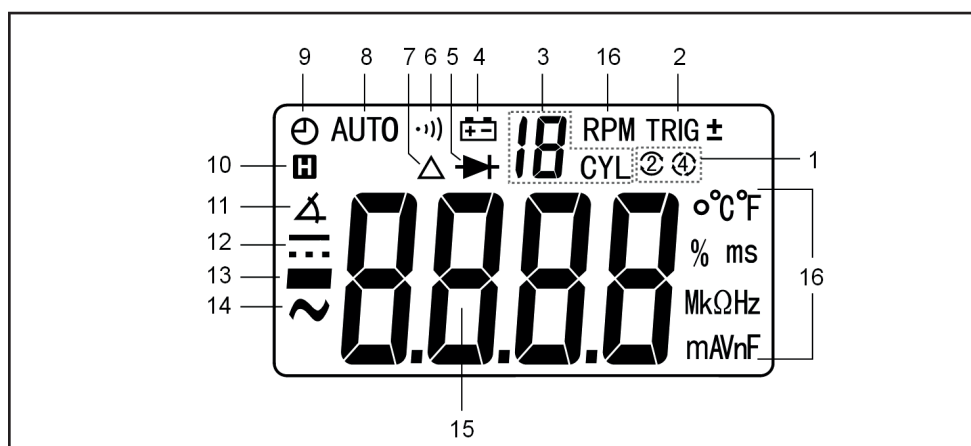
1. Before measuring, check whether the measurement function switch is in the correct position, check whether the test probe is connected correctly to avoid electric shock.
2. The meter is only to be used in conjunction with the supplied test leads to comply with safety standards. If the test leads are broken or damaged, replace the test leads of the same type or the same electrical specifications.
3. Do not use an unapproved fuse to replace the fuse inside the meter. Only replace with the same model or the same specifications of the fuse. Before changing, remove the test leads to ensure that there is no signal input.
4. Do not use unapproved batteries to replace the battery inside the meter. Replace only with the same model or the same electrical specifications of the battery. Before changing, remove the test leads to ensure that there is no signal input.
5. During electrical measurements, the body must not be directly in contact with the earth, use insulating materials to keep your body insulated from the earth.
6. Do not store or use in high temperature, high humidity, flammable, explosive and strong magnetic field environments.
7. Measurements exceeding the limit values of the instrument may damage the instrument and endanger the safety of the operator.
8. Do not attempt to calibrate or service the instrument.
9. When the LCD shows “”, please replace the battery.
10. Do not insert the test leads to be inserted into the current terminals to measure the voltage!

6. IDENTIFICATION



- ① LCD display window.
- ② Switch between functions.
- ③ Range switch button.
- ④ Measurement function range switch.
- ⑤ Probe sockets.
- ⑥ Relative mode.
- ⑦ Hold button.

6. IDENTIFICATION



- | | | | | | |
|---|------------------|--|---|--|----------------|
| ① | | 4-stroke engine measurement is selected. | ⑫ | | DC |
| | | 2-stroke engine measurement is selected. | ⑬ | | Negative sign. |
| ② | TRIG +
TRIG - | Positive (+) trigger is selected.
Negative (-) trigger is selected. | ⑭ | | AC |
| ③ | 18 CYL | Cylinder number display which shows the presently selected engine cylinder number. | | | |
| ④ | | The battery is low and must be replaced immediately. | | | |
| ⑤ | | Diode test is selected. | | | |
| ⑥ | | Continuity test is selected. | | | |
| ⑦ | | Relative mode is active. | | | |
| ⑧ | AUTO | Autorange mode is active. | | | |
| ⑨ | | Automatic power-off feature is enabled. | | | |
| ⑩ | | Data Hold is enabled. | | | |
| ⑪ | | Dwell angle measurement is selected. | | | |

7. UNPACKING & CHECKING

7.1 PACKAGING

Carefully remove the product from the packaging and examine it for any sign of damage caused during shipping. Lay the contents out and check them. If any part is damaged or missing, do not attempt to use the tool and contact the Draper Helpline immediately (see back page for details).

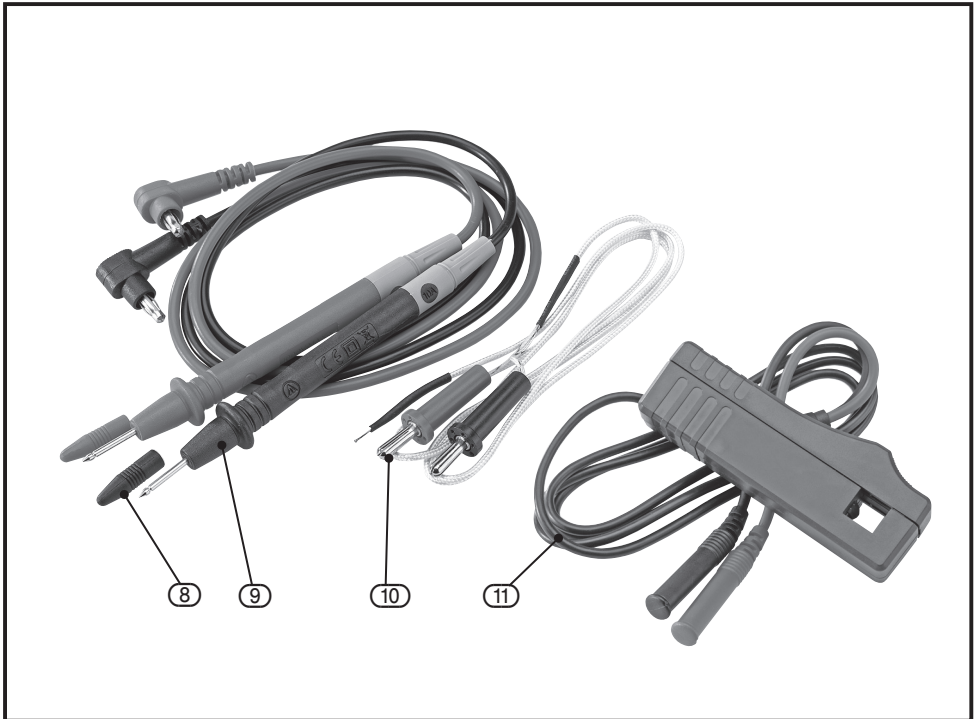
Retain the packaging material at least during the guarantee period: in case the machine needs to be returned for repair.

Warning! Some of the packaging materials used may be harmful to children, keep them out of reach from children.

Disposed of any packaging correctly and according to local regulations.

7.2 WHAT'S IN THE BOX?

As well as the product; there are several parts not fitted or attached to it.



⑧ Test probe caps

⑨ Test probe

⑩ Temperature probe

⑪ Inductive pick up

8. OPERATING INSTRUCTIONS

8.1 USING RELATIVE MODE

Selecting Relative mode causes the meter to store the present reading on the screen as a reference for subsequent measurements.

1. Press the "REL" button. The meter enters the Relative mode and stores the present reading on the screen as a reference for subsequent measurements, and "△" appears on the screen as an indicator. The screen reads zero.
2. When you perform a new measurement, the screen will show the difference between the reference and the new measurement.
3. Press the "REL" button again, the meter will exit the Relative mode and the symbol '△' will disappear.

△ Note:

1. When in Relative mode, the actual value of the object under test must not exceed the full-scale reading of the selected range. Use a higher range if necessary.
2. Relative mode is available only for voltage, current, resistance, capacitance, and temperature measurements.

8.2 MANUAL RANGING AND AUTORANGING

The meter defaults to autorange mode in measurement functions which have both autorange mode and manual range mode. When the meter is in autorange mode, "AUTO" is displayed.

1. Press the "RANGE" button. The meter enters the manual range mode, and "AUTO" turns off. Each subsequent press of the "RANGE" button increases the range. After the highest range, the meter returns to the lowest range.
2. To exit the manual range mode, press and hold down the "RANGE" button for about 2 seconds. The meter returns to the autorange mode.

8.3 DATA HOLD MODE

Press the "HOLD" button briefly to freeze the reading on the screen, "H" will appear on the screen as an indicator. To exit Data Hold mode, press briefly this button again "H" disappears.

8.4 TRIGGER + - SELECTION

Trigger + or - is to identify whether the on or off portion of the signal under test is of measuring interest. For example, as for a periodic square wave waveform whose period is 10ms, if you get a pulse width reading of 2ms in the trigger + (on portion), you then will get a pulse width reading of 8ms (10ms - 2ms) in trigger - (off portion).

To toggle between trigger + and -, press the "SEL" button.

△ Note : Trigger + - selection is available only for pulse width measurement functions.

8. OPERATING INSTRUCTIONS

8.5 MEASURING DC OR AC VOLTAGE

1. Connect the black test lead to the " **COM** " terminal and the red test lead to the " **VΩmAHz** " terminal.
2. Set the measurement function range switch to the **V** position. Then press the " **SEL** " button to select DC or AC voltage measurement, the screen will show the corresponding symbol.
3. Connect the test leads across the source or circuit to be tested.
4. Read the reading on the screen. For DC voltage measurements, the polarity of the red lead connection will be indicated as well.

⚠ Note:

To avoid electric shock to you or damages to the meter, do not apply a voltage higher than 600V DC or AC between the terminals.

8.6 MEASURING DC OR AC CURRENT

1. Connect the black test lead to the " **COM** " terminal. If the current to be measured is less than 600mA, connect the red test lead to the " **VΩmAHz** " terminal. If the current is between 600mA and 20A, connect the red test lead to the " **10A** " terminal instead.
2. Set the measurement function range switch to **A** or **mA** range position.

⚠ Note: If the red test lead is connected to the " **VΩmAHz** " terminal, the function switch must be set to the **mA** position. If the red test lead is connected to the " **10A** " terminal, the function switch must be set to the **A** position.

3. Press the " **SEL** " button to select DC or AC current measurement, the screen will show the corresponding symbol.
4. Turn off power to the circuit to be measured, and then discharge all capacitors.
5. Break the circuit path to be measured, and connect the test leads in series with the circuit.
6. Turn on power to the circuit, then read the reading on the screen.
For DC current measurements, the polarity of the red lead connection will be indicated as well.

⚠ Note:

If you don't know the magnitude of the current to be measured beforehand, select the highest range first and then reduce it range by range until satisfactory resolution is obtained.

8. OPERATING INSTRUCTIONS

8.7 MEASURING RESISTANCE (Ω)

1. Connect the black test lead to the " **COM** " terminal and the red test lead to the " **V Ω mAHz** " terminal.
2. Set the measurement function range switch to Ω position. Then press the " **SEL** " button to select resistance function (the symbols " Ω " and " \rightarrow " capacitance measurement unit do not appear on the screen).
3. Connect the test leads across the object to be tested.
4. Read the reading on the screen.

\triangle Note:

1. For measurements $> 1M\Omega$, the meter may take a few seconds to stabilize reading. This is normal for high resistance measurements.
2. When the input is not connected, i.e. at open circuit, " **OL** " will be displayed as over range indication.
3. Before measurement, disconnect all power to the circuit to be measured and discharged all capacitors thoroughly.

8.8 CONTINUITY TEST

1. Connect the black test lead to the " **COM** " terminal and the red test lead to the " **V Ω mAHz** " terminal.
2. Set the measurement function range switch to Ω position. Then press the " **SEL** " button until the symbol " \rightarrow " appears on the screen.
3. Connect the test leads across the circuit to be tested.
4. If the resistance is less than about 20Ω , the built-in buzzer will sound.

\triangle Note:

Before test, disconnect all power to the circuit to be tested and discharged all capacitors thoroughly.

8.9 MEASURING FREQUENCY

1. Connect the black test lead to the " **COM** " terminal and the red test lead to the " **V Ω mAHz** " terminal.
2. Set the measurement function range switch to **Hz %** position. Then press the " **SEL** " button until " **Hz** " appears on the screen.
3. Connect the test leads across the source or circuit to be tested.
4. Read the reading on the screen.

\triangle Note:

1. For frequency measurements, the range exchange is automatic, and the measurement range is: 0MHz - 10MHz.
2. The voltage of input signal should be between 1V rms and 20V rms. The higher the frequency, the higher the required input voltage.
3. For measurements $< 10Hz$, the amplitude of input signal must be more than 2V rms.

8. OPERATING INSTRUCTIONS

8.10 MEASURING DUTY CYCLE

1. Connect the black test lead to the " **COM** " terminal and the red test lead to the " **VΩmAHz** " terminal.
2. Set the measurement function range switch to **Hz %** position. Then press the " **SEL** " button until " % " appears on the display.
3. Connect the test leads across the signal source to be measured.
4. Read the reading on the display.

Note:

After you remove the measured signal, its reading may still remain on the screen. Pressing the " **SEL** " button twice will zero the display.

8.11 MEASURING CAPACITANCE

1. Set the measurement function range switch to $\Omega \rightarrow \frac{\mu}{1000}$ position. Then press the " **SEL** " button until the screen shows unit of capacitance.
2. Connect the Adapter to the " **COM** " and " **VΩmAHz** " terminals as shown in the figure.
3. If the screen shows a reading other than zero, press the " **REL** " button to zero the screen; the meter will enter Relative mode.
4. Make sure that the capacitor to be measured has been discharged thoroughly, and then insert the two leads of the capacitor into the two holes of the Adapter. (Ensure correct polarity connection when measuring electrolytic capacitor.)
5. Wait until the reading is stable, then read the screen.
(For high-capacity capacitors, it may take about 30 seconds for reading to stabilize.)

8.12 DIODE TEST

1. Connect the black test lead to the " **COM** " terminal and the red test lead to the " **VΩmAHz** " terminal. (Note: The polarity of the red lead is positive " + ".)
2. Set the measurement function range switch to $\Omega \rightarrow \frac{\mu}{1000}$ position. Then press the " **SEL** " button until the symbol " $\rightarrow|$ " appears on the display.
3. Connect the red test lead to the anode of the diode to be tested and the black test lead to the cathode of the diode.
4. The screen shows the approximate forward voltage drop of the diode. If the connection is reversed, " **OL** " will be shown instead.

8. OPERATING INSTRUCTIONS

8.13 MEASURING TEMPERATURE




1. Set the measurement function range switch to °C °F position. Then press the " SEL " button to select between °C and °F.
2. Connect the negative " - " plug of the K type thermocouple to the " COM " terminal and the positive " + " plug of the K type thermocouple to the " **VΩmAHz** " terminal.
3. Connect the sensing end of the thermocouple to the object to be measured.
4. Wait until the reading is stable, then read the screen.

Note:

1. When the measured temperature exceeds 1000°C /1832°F, the screen will show " **OL** ".
2. To avoid possible damage to the meter or other equipment, remember that while the meter is rated for -20°C to +1000°C and -4°F to 1832°F, the K Type Thermocouple provided with the meter is rated to 250°C. For temperatures out of that range, use a higher rated thermocouple.

The K Type Thermocouple provided with the meter is a present, it is not professional and can only be used for non-critical reference measurements. For accurate measurements, use a professional thermocouple.

8.14 MEASURING RPM


1. Set the measurement function range switch to  position.
2. If the engine to be tested is a 2-stroke engine, press the " SEL " button until the symbol "  " appears on the upper area of the screen.
If the engine to be tested is a 4-stroke engine, press the " SEL " button until the symbol "  " appears on the upper area of the screen.
3. Connect the negative (black) output plug of the inductive pick up to the " **COM** " terminal and the positive (red) output plug of the inductive pick up to the " **VΩmAHz** " terminal.
4. Clamp the inductive pick up to a spark plug wire with the arrow mark on the inductive pick up pointing to the spark plug. Make sure that the pick up jaws are completely closed.
5. Start the engine and read the reading on the screen.

Note :

1. The input voltage must be between 2Vp and 50Vp. If the voltage is too low, it will be impossible to make measurement.
2. If the engine's rotation speed is too low, the stability of reading will decrease.
3. The polarity of the input voltage must be correct; otherwise it will be impossible to make measurement.
4. The inductive pick up will become hot and the reading will become unstable after the measurement lasts for a period of time; in this condition, remove the inductive pick up from the spark plug wire to stop the measurement and wait until the inductive pick up cools down, then you can resume the measurement.

8. OPERATING INSTRUCTIONS

8.15 MEASURING DWELL ANGLE

1. Connect the black test lead to the " **COM** " terminal and the red test lead to the " **VΩmAHz** " terminal.
2. Set the measurement function range switch to  position. Then press the " **SEL** " button until the displayed number (**4, 5, 6** or **8**) of cylinders matches the engine under test.
3. Connect the black test lead to chassis or the negative terminal of the vehicle battery, and connect the red test lead to the low voltage terminal of the distributor or the negative terminal of the ignition coil.
4. Start the engine and read the reading on the display.

Note :

1. The input voltage must be between 2Vp and 50Vp. If the voltage is too low, it will be impossible to make measurement.
2. Reading's stability will decrease if the rotation speed of the engine is too low.
3. The polarity of the input voltage must be correct; otherwise it will be impossible to make measurement.

8.16 MEASURING PULSE WIDTH

1. Connect the black test lead to the " **COM** " terminal and the red test lead to the " **VΩmAHz** " terminal.
2. Set the measurement function range switch to **PULSE**^{ms} position.
3. Press the " **SEL** " button to select positive (+) trigger or negative (-) trigger, the screen will show the corresponding symbol.
4. Connect the test leads as shown in the figure. Then read the reading on the screen.

8.17 AUTO POWER OFF

1. After fifteen minutes without any operation the meter will automatically switch off.
2. To disable auto power off, press and hold down any button while rotating the rotary switch from " **OFF** " position to other switch position.

9.1 BATTERY REPLACEMENT

⚠ WARNING

Before attempting to open the battery cover of the meter, be sure that test leads have been disconnected.

10. EXPLANATION OF SYMBOLS

10.1 KEYS EXPLANATIONS

- **"SEL" button:**

Used to switch the meter between (or among):

1. AC and DC current measurements.
2. AC and DC voltage measurements.
3. Resistance, continuity, diode and capacitance test functions.
4. Frequency and duty cycle measurements.
5. Fahrenheit and Celsius measurements.
6. + trigger and - trigger (for pulse width measurement function only).
7. 2-stroke and 4-stroke engine measurements (for RPM measurement function only)
8. 4-cylinder, 5-cylinder, 6-cylinder and 8-cylinder engine measurements (for dwell angle measurement function only).

- **"RANGE" button:**

Used to switch the meter between autorange mode and manual range mode as well as to select desired manual range.

- **"REL" button:**

Used to enter or exit Relative mode.

- **"HOLD" button:**

Press this " HOLD " button briefly to enter or exit Data Hold mode.

Press and hold down this button for about 2 secs to turn on or off the backlight.

10. EXPLANATION OF SYMBOLS

10.2 EXPLANATION OF SYMBOLS



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



For indoor use.
Do not expose to rain.



Class II construction
(Double insulated)



Conforms to all relevant safety standards.



Earth



Fuse



Back light



Warning!
Read instruction manuals before operating and servicing this equipment.



Diode test



Dwell angle



Tachometer



Max reading hold



Attention.



High voltage / current!
Danger.



Temperature.



Voltage AC



Voltage DC



Current DC



Current AC



Resistance in Ohms



Continuity test buzzer



Data hold / Screen lock



Auto power off



Low battery display

11.1 DISPOSAL

- At the end of the machine's working life, or when it can no longer be repaired, ensure that it is disposed of according to national regulations.
- Contact your local authority for details of collection schemes in your area.

In all circumstances:

- Do not dispose of power tools with domestic waste.
- Do not incinerate.
- Do not abandon in the environment.
- Do not dispose of WEEE* as unsorted municipal waste.



* Waste Electrical & Electronic Equipment.

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For aftersales servicing or warranty repairs, please contact the
Draper Tools Helpline for details of an agent in your local area.

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