



**DRAPER**<sup>®</sup>

# 400 SERIES **CLAMP METER**

41911



**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

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## 1.1 INTRODUCTION:

USER MANUAL FOR:

### SERIES 400 CLAMP METER

Stock no. 41911.

Part no. DCM401.

## 1.2 REVISIONS:

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Date first published March 2017

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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

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### 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

Use of environmental conditions: 600V CAT.III Pollution Degree: II.

Altitude <2000m.

Working temperature and humidity: 0 ~ 40°C.

(<80% RH, <10 °C is not considered).

Storage temperature and humidity: -10 ~ 60°C.

(<70% RH, removing the battery).

Temperature coefficient: 0.1 Accuracy / °C.

(<18 °C or > 28 °C).


Measuring between earth terminal and the maximum allowable voltage:

600V DC or 600V AC RMS.

Sampling rate: about 3 times / sec.

Display: 3 3/4 digit LCD display.

Over-range indication: LCD will display "OL".

Low battery indication: When the battery voltage is lower than the normal operating voltage, "  " will be displayed on the LCD.

Input polarity indication: Auto shows " —."

Power: DC1.5V X3 SIZE AAA.

Dimensions: 208mm × 78mm × 35mm

Weight: less than 340g (with battery)

Maximum jaw opening size: 36mm

## DC Voltage

Range	Accuracy	Resolution
400mV	±(0.8% rdg + 3 digit)	0.1mV
4V		0.001V
40V		0.01V
400V		0.1V
600V	±(1.0% rdg + 3 digit)	1V

Input impedance: 10MΩ.

Max. input voltage: 600V DC or AC RMS.

## 4. INTRODUCTION

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### AC Voltage

Range	Accuracy	Resolution
400mV	$\pm(1.5\% \text{ rdg} + 10 \text{ digit})$	0.1m
4V	$\pm(1.5\% \text{ rdg} + 5 \text{ digit})$	0.001V
40V		0.01V
400V		0.1V
600V		1V

Input Impedance : 10M $\Omega$

Maximum Input Voltage : 600V DC or AC RMS

Frequency Response : 40Hz~400Hz, Sinusoidal RMS (Average Responding)

Notice : To AC Voltage 400mV need manually Range .

### Resistance

Range	Accuracy	Resolution
400 $\Omega$	$\pm(1.2\% \text{ rdg} + 3 \text{ digit})$	0.1 $\Omega$
4k $\Omega$		0.001k $\Omega$
40k $\Omega$		0.01k $\Omega$
400k $\Omega$		0.1k $\Omega$
4M $\Omega$	$\pm(2.0\% \text{ rdg} + 5 \text{ digit})$	0.001M $\Omega$
40M $\Omega$		0.01M $\Omega$

Overload protection : 600V DC or AC RMS.



### Capacitance

Range	Accuracy	Resolution
5nF	$\pm(3.0\% \text{ rdg} + 10 \text{ digit})$	0.001nF
50nF		0.01nF
500nF		0.1nF
5 $\mu$ F		0.001 $\mu$ F
50 $\mu$ F		0.01 $\mu$ F
200 $\mu$ F		0.1 $\mu$ F

Overload protection : 600V DC or AC RMS.

## 4. INTRODUCTION

### Diode and Continuity Test

Function	Range	Resolution	Accuracy
Diode 	1V	0.001V	Shows the approximate forward voltage drop of the diode.
	When the built-in buzzer sounds, the measured resistance is less than 50Ω.		Open circuit voltage: about 0.5V
Overload protection: 600V AC or DC RMS.			

### Frequency/Duty

Range	Accuracy	Resolution
10Hz	±(0.8% rdg + 3 digit)	0.01Hz
100Hz		0.1Hz
1kHz		0.001kHz
10kHz		0.01kHz
100kHz		0.1kHz
1MHz		1kHz
10MHz		10kHz
0.1~99.9%	±(3.0% rdg + 3 digit)	

Input impedance : 10MΩ.

Maximum input voltage : 600V 600V DC or AC RMS.

### AC Current

Range	Accuracy	Resolution
4A	±(3.5% Rdg + 20 digit) ≤0.5A ±(3.0% Rdg+ 10 digit)	0.001A
40A	±(3.0% Rdg+ 10 digit) ≤5A ±(2.5% Rdg+ 10 digit)	0.01A
400A	±(2.5% Rdg+ 10 digit)	0.1A
600A	±(1.5% Rdg+ 5 digit)	1A

Frequency: 50Hz ~ 60Hz.

Maximum input current: Full value 120%, ≤ 60 seconds

### Temperature

Range	Accuracy	Resolution
-20~1000°C	±(3.0% rdg + 3 digit)	1°C

Overload protection: 600V DC AC RMS.

# 5. HEALTH & SAFETY INFORMATION

## **Warning**

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

This is an AC-DC current digital clamp meter (hereinafter referred to as the clamp meter). The whole circuit design is based on LSI A / D converter with full-scale overload protection circuit and frequency measurement function.


The Clamp Meter can be used to measure the AC and DC voltage, AC and DC current, resistance, capacitance, frequency, duty cycle, diodes and temp.

### **5.1 SAFETY PRECAUTIONS**

The instrument strictly follows the GB4793 electronic measuring instrument safety requirements IEC61010-1 and IEC1010-2-032 safety standards for the design and production, in line with double insulation, over-voltage CAT III 600V and pollution level 2 safety standards.

#### **Safe working habits**

To avoid possible electric shock or personal injury, and to avoid damage to the instrument or the object to be measured, use the meter in the following ways:

- Inspect the instrument. Do not use the instrument if the case is damaged. Check for cracks or missing plastic parts. Pay particular attention to the insulating layer of the connector.
- Inspect the test leads for insulation damage or bare metal. Check the continuity of the test leads. If the test leads are damaged, replace them before using the instrument.
- Use the instrument to measure a known voltage to make sure the instrument operates normally. Do not use if the instrument is working abnormally. Protection facilities may have been damaged. If in doubt, the instrument should be sent for maintenance.
- Do not apply any voltage beyond the rated voltage indicated on the meter between any terminal and earth ground.
- Warning: When working above 30V use caution not to touch exposed contacts due to risk of electric shock. Only use the approved probes or clamps.
- Measurements must be made with the correct jack, function and range.
- Do not use the instrument near explosive gases, vapours or dust.
- When using the test leads, keep your fingers behind the test lead protector.
- When connecting, first connect the common test lead, and then connect the live test lead. When disconnect, the live test lead and then disconnect the common test lead.
- Before you test the resistance, continuity and diodes, you must first cut off the power, and discharge all the capacitors.
- If the meter is not used in accordance with the instructions, the safety protection provided by the instrument may be impaired or invalidated.
- Ensure the instrument is switched off when opening the battery cover.
- When the battery under voltage indicator  lights up, immediately replace the battery. When the battery power is low, the meter may produce incorrect readings, resulting in electric shock and personal injury. DO NOT mix new and old batteries and do not use re-chargeable batteries.
- Before opening the battery cover, the test leads must be removed from the instrument.
- Please use a soft cloth to clean instrument case, do not use abrasives or solvents.

## 6. IDENTIFICATION



- |   |                                      |
|---|--------------------------------------|
| ① Measurement clamp head.   | ⑤ Measuring function selection dial. |
| ② Inspection light.   | ⑥ Back light & work light.           |
| ③ Protection Guard: Protects the user's hand from touching the danger zone. | ⑦ Function buttons.                  |
| ④ Clamp trigger.  | ⑧ Display.                           |
|   | ⑨ Probe sockets.                     |

# 6. IDENTIFICATION

## 6.1 LCD (Liquid-crystal display) - FIG. 1

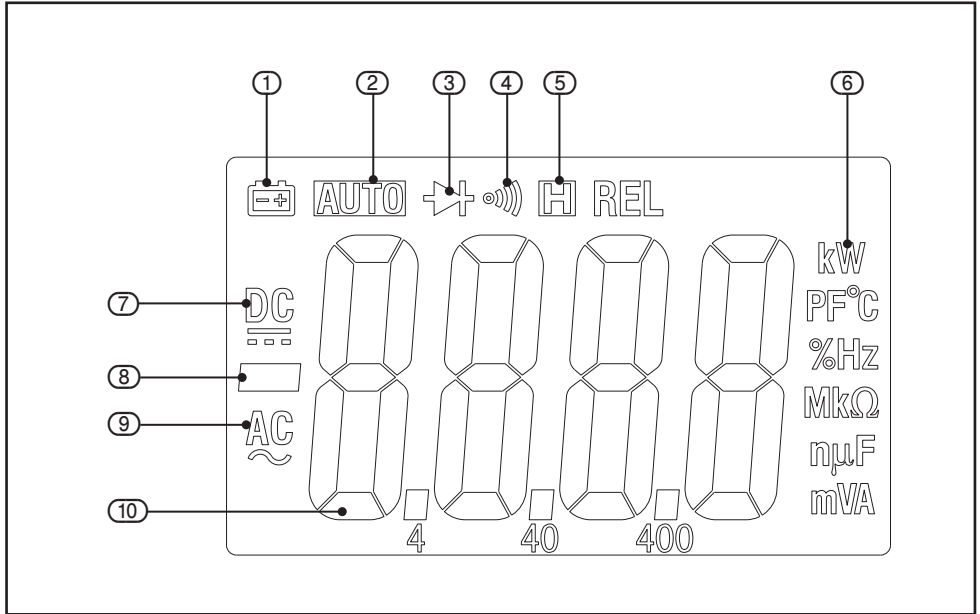


FIG.1

- ① Battery low indicator.
- ② Automatic range indicator.
- ③ LED indicator.
- ④ Continuity checking indicator.
- ⑤ Data hold indicator.
- ⑥ Units of measurement indicator.
- ⑦ DC signal measurement indicator.
- ⑧ Negative indicator.
- ⑨ AC signal indicator.
- ⑩ Numerical display.

# 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).

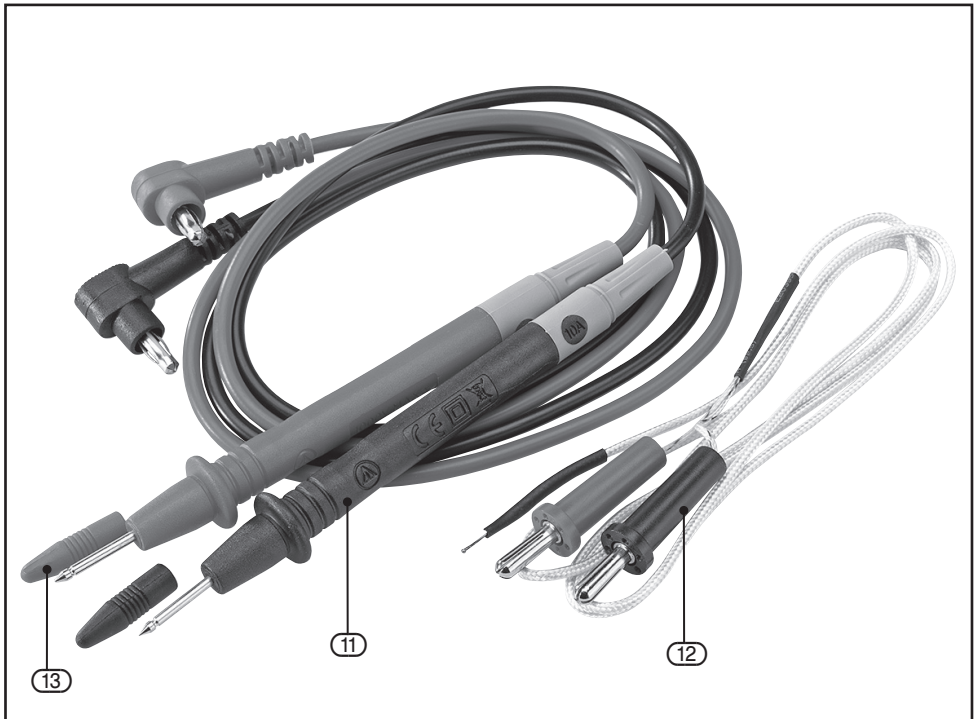
Retain the packaging material at least during the guarantee period: in case the machine needs to be returned for repair.

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.



11 Test probe.

13 Test probe caps.

12 Temperature probe.

# 8. OPERATING INSTRUCTIONS

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## 8.1 BACK LIGHT AND INSPECTION LIGHT.

Press and hold the \* button to switch on and off the back light/inspection light.

Note: The inspection light will only come on while in AC current function.

## 8.2 AUTOMATIC SHUTDOWN.

If the meter is not used for approx. 30 minutes the meter will automatically shut down. The meter will give a warning buzz approx. 1 minute before.

## 8.3 HOLDING READINGS.

Press and "hold" button to hold the reading while taking a measurement, the value will be held on the display press the "hold" button again to return to the normal reading function.

## 8.4 AC & DC VOLTAGE MEASUREMENT:

 **Warning**

**Risk of electric shock.**

**When measuring high voltage, extra care should be taken to avoid electrical shock.**

**Do not measure any voltage above 600V DC or AC rms.**

1. Rotate the measurement function selection dial to the DC voltage measurement.
2. Press the "SEL" button to select AC or DC voltage measurement function.
3. Connect the black lead to the COM probe socket and the red lead to the INPUT socket.
4. The measured value is read from the LCD.

## 8.5 AC CURRENT MEASUREMENT:

 **Warning**

**Risk of electric shock. YOU MUST NOT measure current using the probes.**

**Remove the test leads from the meter when measuring with the clamp head.**

1. Rotate the measurement function selection dial to the appropriate current.
2. Press the trigger to open the clamp, pass the wire to be measured into the centre of the clamp, and then slowly release the trigger until the clamp is fully closed.
3. The measured value is read from the LCD.

Note: The instrument can only measure one current conductor at a time.

If two or more current conductors are measured at the same time, the measurement will be inaccurate.

## 8. OPERATING INSTRUCTIONS

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### 8.6 RESISTANCE MEASUREMENT:

#### Warning

#### **Risk of electric shock.**

**When measuring the impedance on the line, make sure that the circuit power is off and the capacitors on the circuit are fully discharged.**

1. Rotate the measurement function selection dial to the resistance ( $\Omega$ ) position and ensure that the power to the circuit under test is off.
2. Press the "SEL" button to select the resistance ( $\Omega$ ) measurement function.
3. Connect the black lead to the COM probe socket and the red lead to the input probe socket.
4. The measured value is read from the LCD.

Note: When there is no input (e.g. open circuit), the display will show "OL" indicating that the measured value is out of range. If the measured resistance is greater than  $1M\Omega$ , it may take a few seconds for the meter to stabilize the reading. This is normal for high impedance measurements.

### 8.7 CAPACITANCE MEASUREMENT:

#### Warning

#### **Risk of electric shock.**

**To avoid electrical shock, the capacitor should be fully discharged before measuring.**

1. Rotate the measurement function selection dial to the capacitance ( $\pm()$ ) position, and ensure that the power is cut off to the circuit under test.
2. Press the "SEL" button to select the capacitance ( $\pm()$ ) measurement.
3. Connect the black test lead to the COM probe socket and the red test lead to the INPUT probe socket.

Note: The measured value is read from the LCD.

A. When measuring large capacitance it can take a short time for a stable reading.

### 8.8 CONTINUITY MEASUREMENT:

#### Warning

#### **Risk of electric shock.**

**Make sure the circuit power is off, and the circuit capacitors completely discharged.**

1. Rotate the measurement function selection dial to the continuity ( $\rightarrow$ ) measurement position.
2. Press the "SEL" button to select the continuity ( $\rightarrow$ ) measurement function.
3. Connect the black test lead to the COM probe socket and the red test lead to the INPUT probe socket.
4. If the measured resistance is less than  $50\Omega$ , the buzzer will sound.

# 8. OPERATING INSTRUCTIONS



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## 8.9 DIODE TEST:

**⚠ Warning**

**Risk of electric shock.**

**When measuring diodes in line, make sure that the circuit power is off and the capacitors on the circuit are fully discharged.**

1. Rotate the measurement function selection dial to the diode, (  ) position, press the "SEL" button to select the diode (  ) measurement function.
2. Connect the black test lead to the COM probe socket and the red test lead to the INPUT probe socket.
3. Connect the black and red pen test leads to the anode and cathode of the diode.
4. The measured value is read from the LCD. If the test leads polarity is reversed, the meter will display "OL" This can be used to distinguish between the anode and cathode of the diode.

## 8.10 FREQUENCY/DUTY CYCLE MEASUREMENTS:

**⚠ Warning**

**Risk of electric shock.**

**When measuring high voltage, extra care should be taken to avoid electrical shock.**

**Do not attempt to use this meter on a voltage higher than the AC250V rms value.**

1. Rotate the measurement function dial to the voltage or current measurement range.
2. Press the "Hz /%" key to select the frequency or duty cycle measurement function.
3. Connect the black and red pen test leads to the anode and cathode of the diode.
4. The measured value is read from the LCD.

## 8.11 TEMPERATURE MEASUREMENT:

1. Rotate the measurement function dial to the temperature measurement function.
2. Connect the black lead of the temperature probe to the COM probe socket and the red lead of the temperature probe to the INPUT socket.
3. The measured value is read from the LCD.

### 9.1 REPLACEMENT BATTERY

#### Warning

**To avoid false readings that may result in electric shock or personal injury, replace the battery as soon as the “” symbol appears on the meter display.**

Follow these steps to replace the battery:

1. Turn off the meter.
2. Remove all test leads from the input jacks.
3. Loosen the screw that secures the battery cover with a screwdriver.
4. Remove the battery cover.
5. Disconnect and remove the old battery
6. Replace with three new AAA batteries, pay attention to the battery positive and negative. Do not mix new with old batteries and do not use re-chargeable batteries.
7. Attach the battery cover and tighten the screw.

# 10. EXPLANATION OF SYMBOLS

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## 10.1 KEY EXPLANATIONS

### Button Operation

#### "SEL" button:

Function selection key, press "SEL" button, with the rotary switch measurement function to work in a trigger way.

#### "Hz /%" button:

Frequency / duty cycle selection key, in voltage or current range, press this key can make the selection on voltage / frequency / duty cycle or current / frequency / duty cycle measurement mode to work in a trigger way.

#### "RAN" button:

Automatic / manual range switch button, preset defaulted as auto range. Press this button to switch to manual range. In the manual range, press this button that means jump upwards one section, if the highest section jumps to the lowest section. Press and hold this button for more than 2 seconds, that is, switch back to automatic range. Frequency and capacitance measurement without manual range to trigger mode.

#### "HOLD" button:

Data Hold button, press the "HOLD" button, the reading will be locked and the "H" symbol is displayed on the LCD screen simultaneously. Then press the "HOLD" button to return to normal measurement mode to trigger mode.

#### "☀️" Key:

Backlit keys and work lights button press "☀️" to turn on the backlight and work lights automatically turn off after about 15 seconds to trigger mode.

# 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.



Attention.



Temperature.



Back light.



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



Diode test.



Low battery display.



Voltage AC.



Voltage DC.



Current AC.



Current DC.



Resistance in Ohms.



Continuity test buzzer.



Data hold / Screen lock.



Auto power off.



Inspection light  
Work light.



Clamp size.



Capacitance.



Frequency.

## 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.



## CONTACT US

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Service/Warranty Repair Agent:

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

YOUR DRAPER STOCKIST

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