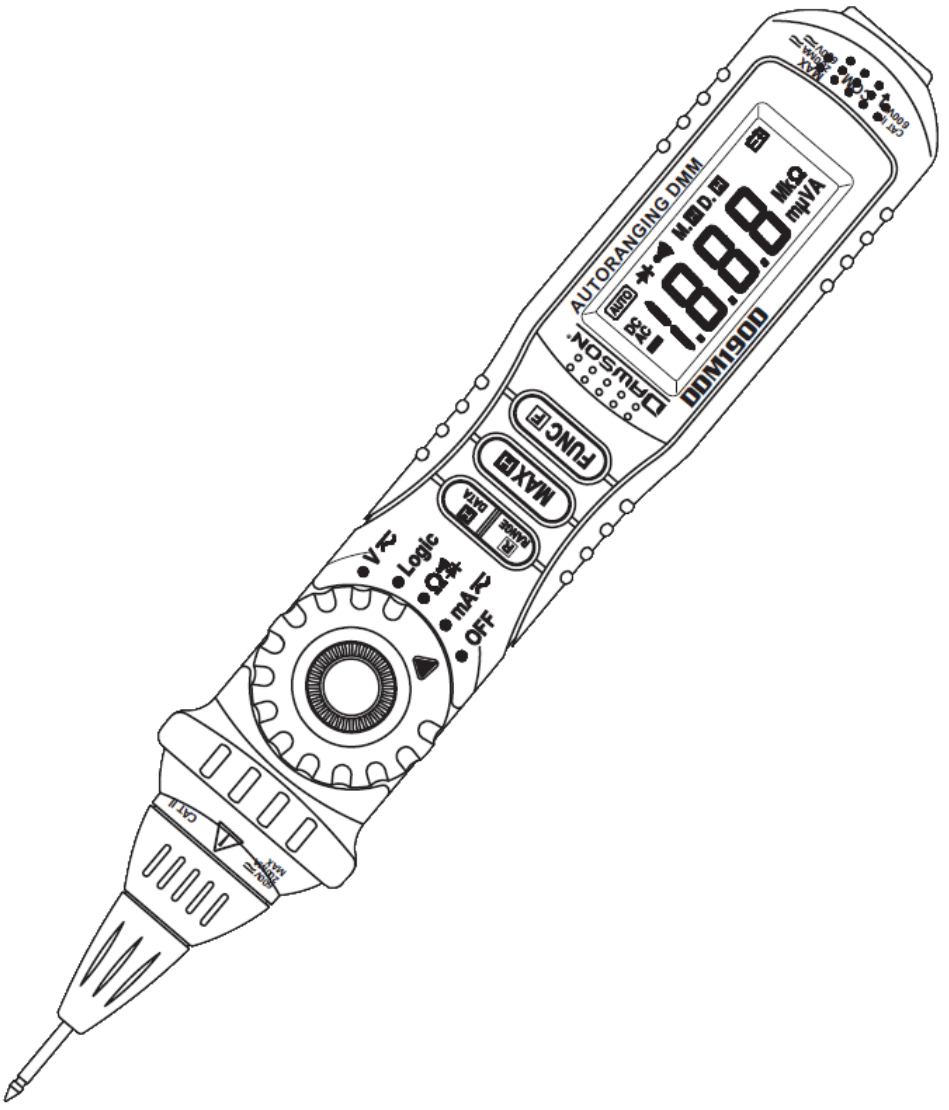
Dawson DDM190D

Digital Multimeter

User's Manual



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LIMITED WARRANTY AND LIMITATION OF LIABILITY

This instrument from Dawson Tools Inc. will be free from defects in workmanship and material for three years from the date of original purchase. This warranty does not cover defects resulting from damage caused by the user such as drops, neglect, misuse, unauthorized alteration, usage outside of specified conditions, contamination, or improper repair/maintenance. To receive service on the instrument if it becomes necessary during the warranty period, contact your nearest Dawson authorized service center at (800) 898-6991 or visit www.DawsonTools.com to obtain a return authorization (within the US only). A return authorization is necessary before returning any instrument to Dawson; no service will be provided without a return authorization. The user is responsible for properly packing the unit and charges such as shipping, freight and insurance charges. The extent of Dawson's liability is limited solely to the repair/replacement of the instrument. The above warranty in its entirety is inclusive and no other warranties, written or oral, are expressed or implied.

Out of the Box

Check the Meter and accessories thoroughly before using the Meter. Contact your local distributor if the Meter or any components are damaged or malfunction.

Accessories

- Test Leads 1pc
- Alligator Clip & cable 1pc
- 1.5V AAA Battery 2pcs
- Case 1pc
- User's Manual 1pc

Safety Information

⚠ WARNING

TO REDUCE THE RISK OF FIRE, ELECTRICAL SHOCK, PRODUCT DAMAGE OR PERSONAL INJURY, PLEASE FOLLOW THE SAFETY INSTRUCTIONS DESCRIBED IN THE USER MANUAL. READ THE USER MANUALS BEFORE USING THE METER.

⚠ WARNING

TO ENSURE SAFE OPERATION AND LIFE OF THE METER, DO NOT PLACE THE METER IN ANY ENVIRONMENT WITH HIGH PRESSURE, HIGH TEMPERATURE, DUST, EXPLOSIVE GAS OR VAPOR.

- Avoid shaking, dropping or any kind of impacts when using or transporting the Meter.
- To avoid electric shock or personal injury, repairs or servicing not covered in this manual should be performed only by qualified personnel.
- Avoid direct exposure to sunlight to ensure extended life of the Meter.
- Do not place Meter in a strong magnetic field; this may cause false readings.
- Use only the batteries indicated in the Technical Spec.
- Avoid exposing batteries to humidity. Replace batteries as soon as the low battery indicator appears.
- Please keep the original packing for future shipping purposes (ex. Calibration)
- After opening the box, check for any damage during delivery.

Safety Symbols

	Important safety information, please refers to the user's manual
	Earth ground
	Indicates compliance with requirements for double insulation
	Fuse must be replaced with ratings specified in the manual.

⚠ Important Safety Information

- Never use the Meter to measure voltages that might exceed 600V DC/AC above earth ground in category II installations.
- Always be careful when working with voltage above 60V DC or 30VAC RMS. Keep fingers behind the probe barriers while measuring.
- Inspect test leads and probes for cracks, breaks or crazes on the insulation before using the Meter.
- Repair or maintenance should be implemented by trained personnel.

Certification

- **CAT II**: This meter has meet IEC1010-1 standard with an overvoltage category (CAT II) and pollution2.
- CEThe Meter is compiled to EMC requirements.

Introduction

Overview

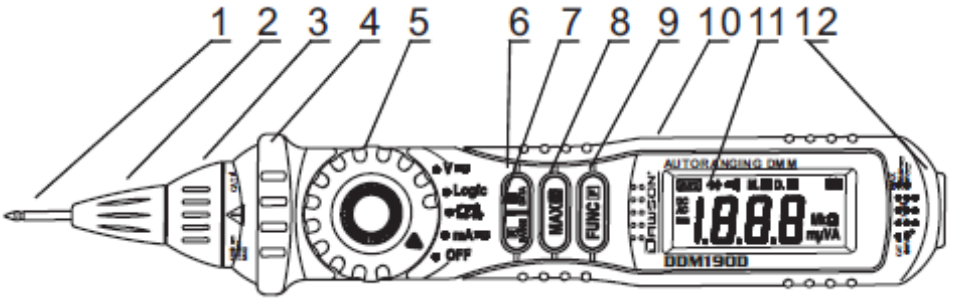
The DAM190D is a portable pen-type digital multimeter featuring 5V logic level test, DC/AC voltage and current measurement, auto/manual range, maximum and hold reading, auto power off, and LCD built in for easy reading. The slim and lightweight design with retractable probe is mobile and ideal for both professionals and hobbyists.

Figures and Components

Buttons and Components

1. Retractable Probe
2. Rotatable Probe knob
3. LED Indicator
4. Protective Ring
5. Rotary Switch
6. **DATA-H (Hold)** Button
7. **RANGE** Button
8. **MAX.H (Hold)** Button
9. **FUNC**. Button
10. Panel
11. LCD Display
12. **COM** Jack

Front Panel



Buttons and Components Description

RANGE Button	Choose auto or manual range
FUNC.F Button	Switch between AC/DC or between resistance, continuity or diode
DATA-H Button	Data reading hold Disable auto power off.
MAX.H Button	Measure and hold for maximum reading
Rotary Switch	To select different functions
Probe	Input terminals for V/A/Ω/⊣▶⊢/ and Logic
COM	Common terminal
Probe knob	Rotate the knob to retract probe
Protective Ring	Keep hand behind the ring for safety

Display Description

AC	Alternating Current
DC	Direct Current
	AC or DC
	Diode
	Buzzer
M.H	Maximum reading Hold
D.H	Data hold
AUTO	Auto range
	Low battery indicator

Using the Meter

Preparation

- Select a function and a range for the item to be measured using the rotary switch and "**RANGE**" button. In manual range, if the range to be measured is unknown, start off with the highest range.

- In manual range, '**OL**' is displayed when overload occurs. Choose a higher range if possible to acquire correct reading.
- To perform measurement, first connect the test lead to common (COM), then connect the probe tip of the Meter to the circuit to be tested.
- If the battery voltage is less than 2.4V, "  "is displayed, please change a new battery.

DC/AC Voltage Measurement

⚠ WARNING

USE CAUTION WHEN MEASUREING HIGH VOLTAGE CIRCUITS TO AVOID ELECTRICAL SHOCK AND INJURY. DO NOT TEST VOLTAGES HIGHER THAN DC/AC 600V.

- Rotate the probe knob clockwise to extend the probe from the Meter.
- Insert the black test lead or test clip in the "**COM**" jack.
- Set the rotary switch to the "**V**⎓" position.
- Press the "**FUNC.F**" button to switch between DC and AC measurements. Manual range can be

chosen by pressing the "**RANGE**" button. Hold "**RANGE"** to go back to Auto range.

- Connect the probe tip of the Meter and tip of the test lead (or test clip) across the power source or load.
- Read the measurement from LCD display. The polarity of the Meter's probe will be indicated.

NOTE:

In small voltage range, the Meter may show unsteady reading when test leads are not connected to the circuit, this is normal because of the sensitivity of the Meter. When the Meter is connected to the circuit, true readings will be displayed...

DC/AC Current Measurement

⚠ **WARNING**

USE CAUTION WHEN MEASUREING HIGH VOLTAGE CIRCUITs TO AVOID ELECTRICAL SHOCK AND INJURY. DO NOT TEST VOLTAGES HIGHER THAN DC/AC 600V.

- Rotate the probe knob clockwise to extend the probe from the Meter.

- Insert the black test lead or test clip in the “**COM”** jack.
- Set the rotary switch to the “**mA**⎓” position.
- Press the "**FUNC.F**" button to switch between DC and AC measurements. Manual range can be chosen by pressing the “**RANGE**” button. Hold “**RANGE”** to go back to Auto range.
- Connect the probe tip of the Meter and tip of the test lead (or test clip) across the power source or load.
- Read the measurement from LCD display. The polarity of the Meter’s probe will be indicated.

Resistance Measurement

⚠ **WARNING**

TO AVOID ELECTRICAL SHOCK AND INJURY POWER OFF THE CIRCUIT AND DISCHARGE THE CAPACITANCE BEFORE MEASURING RESISTANCE.

- Rotate the probe knob clockwise to extend the probe from the Meter.
- Insert the black test lead or test clip in the “**COM”** jack.

- Set the rotary switch to the "Ω" position. Manual range can be chosen by pressing the "**RANGE**" button. Hold "**RANGE"** to go back to Auto range.
- Connect the tip of the Meter probe and test lead (or test clip) across the resistance or circuit under measurement and read of the reading from LCD.

NOTE:

- The Meter may take a few seconds to reach steady reading if the measuring resistance is above 1MΩ.
- When the input is not connected (i.e. an open circuit) the figure 'OL' will be displayed.

Diode Test

- Rotate the probe knob clockwise to extend the probe from the Meter.
- Insert the black test lead or test clip in the "**COM"** jack.
- Set the rotary switch to the "⏭" position. Press "**FUNC**." to choose diode measurement; "⏭" is displayed.
- Connect leads to the circuit terminals.
- Read the measurement from the display.

NOTE:

The Meter shows the forward voltage drop. If the lead connection is reversed, "**OL**" is displayed.

Continuity

⚠ **WARNING**

TO AVOID ELECTRICAL SHOCK AND INJURY POWER OFF THE CIRCUIT AND DISCHARGE THE CAPACITANCE BEFORE MEASURING CONTINUITY.

- Rotate the probe knob clockwise to extend the probe from the Meter.
- Insert the black test lead or test clip in the "**COM"** jack.
- Set the rotary switch to the "•))) " position. Press "**FUNC.**" to choose continuity test; "•))) " appears on LCD.
- Connect leads to the circuit terminals.
- If continuity exists (i.e. resistance is less than 50Ω), built-in buzzer will sound.
- If the result is an open circuit (or the circuit resistance measured is higher than 200Ω) "**0L**" is displayed.

Logic Test

NOTE:

The logic test will only work for 5V Signals.

Make sure the retractable probe is stored back in the Meter.

- Insert the black test lead or test clip in the "**COM"** jack.
- Set the rotary switch to the "**LOGIC**" position.
- Connect the black test clip to the GND(-) of the circuits being measured.
- Hold the "**FUNC**" button and touch the probe tip to the circuit. Observe the logic state from LED indicator; Red LED light expresses high level/logic "1" and orange LED light expresses low level/logic "0". If the reading is between 1.5-3.5V, neither light will be on.
- You can also see " △" or " ▽" on the LCD display; " △" expresses high level/logic "1" and " ▽ "expresses low level/logic "0".

Data Hold

- To hold the reading of a measurement, press "**DATAH**" button once. "**D.H**" will appear on the LCD, reading will be held. Press again to cancel holding value.

Maximum and Hold

- To show the maximum value of the measurement and hold that value, press "**MAX.H**" button once. "**MAX.H**" will appear on the LCD, reading will be held. Press again to cancel holding maximum value.

Auto Off

- When not in use, the Meter will automatically turn off after 15 minutes. After auto off, press any button to bring the power back on. The Meter will beep 5 times 1 minute before and a long beep right before it turns off.
- Hold "**DATA.H**" button followed by turning on the Meter to disable auto off.

Specifications

General Specification

- Auto and Manual Range.
- Max. Voltage between Terminals and Earth Ground: 600V DC or AC
- Maximum Operating Altitude: 7000 Ft (2000m).
- Display: 0.79 In. (20mm) LCD
- Maximum Number: 1999
- Polarity Indication: '-'Indicates negative polarity.
- Overload Indication: Display 'OL'
- Sampling Time: Approx. 0.4 second/time
- Low Battery Indication: "  "
- Auto Power Off: 15 min.
- Power Supply: 1.5V × 2 AAA battery
- Operating Temperature: 32°F To 104°F(0℃ To 40℃)
- Storage Temperature: 10°F To 122°F(-10℃ To 50℃)
- Dimension: 8.2x1.5x1.14 in. (208×38×29mm)
- Weight: Approx. 3.9oz (110g) including battery

Technical Specification

DC Voltage

Range	Resolution	Accuracy
200mV	0.1mV	± (0.7% + 2 counts)
2V	0.001V	
20V	0.01V	
200V	0.1V	
600V	1V	

- Input Impedance: 10MΩ
- Overload Protection:
  - 200mV range: 250V DC or AC rms
  - 2V to 600V ranges: DC 600V or AC 600V rms
- Max. Input Voltage: 600V DC

AC Voltage

Range	Resolution	Accuracy
200mV	0.1mV	±(0.8% + 3 counts)
2V	0.001V	

20V	0.01V	±(0.8% + 3 counts)
200V	0.1V	
600V	1V	±(1.0% + 3 counts)

- Input Impedance: 10MΩ
- Overload Protection:
  - 200mV range: 250V DC or AC RMS
  - 2V-600V ranges: DC 600V or AC 600V rms.
- Frequency Range: 40 to 400Hz
- Response: Average (sine wave RMS)
- Maximum Input Voltage: 600V AC RMS

DC Current

Range	Resolution	Accuracy
20mA	0.01mA	±（1.5% + 3 digits）
200mA	0. 1 mA	

- Overload Protection: Resettable fuse.

AC Current

Range	Resolution	Accuracy
20mA	0.01mA	±（2.0% + 3 digits）
200mA	0. 1 mA	

- Overload Protection: Resettable fuse.
- Frequency Range: 40 to 200Hz
- Response: Average

Resistance

Range	Resolution	Accuracy
200Ω	0.1Ω	±(1.0% + 3 counts)
2kΩ	0.001kΩ	±(1.0% + 1 counts)
20kΩ	0.01kΩ	±(1.0% + 1 counts)
200kΩ	0.1kΩ	±(1.0% + 1 counts)
2MΩ	0.001MΩ	±(1.0% + 1 counts)
20MΩ	0.01MΩ	±(1.0% + 5 counts)

- Open Circuit Voltage: 0.25V
- Overload Protection: 250V DC or AC RMS

Diode

	Resolution	Function
	0.001V	reads diode forward voltage

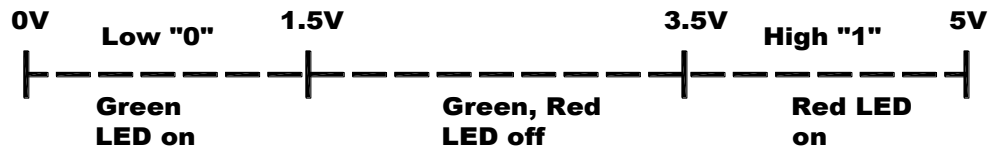
- Forward DC Current: 1mA
- Reversed DC Voltage: 1.5V
- Overload Protection: 250V DC or RMS AC

Continuity

	Function
	If resistance is lower than 50Ω built-in buzzer will make sound.

- Open circuit voltage: 0.5V
- Overload Protection: 250V DC or RMS AC

Logic Test

Range


- Input Impedance: approx. 1MΩ
- Overload Protection: 250V DC or RMS AC

Maintenance and Repair

Repair

Please follow the steps closely if the Meter is not functioning properly:

- Check batteries; replace with new batteries if low battery indicator "  " appears.
- Follow User's Manual to confirm all procedures.
- Before sending Meter back for repair, include a description of the problems encountered. Remove batteries and pack Meter well to avoid damage in delivery, Dawson does not cover damage due to delivery.
- Repair or service not covered in this manual should be performed only by the authorized service center or qualified personnel.

Test Leads Replacement

> ⚠ **WARNING**
>
> **REPLACE THE TEST LEADS WITH IDENTICAL OR COMPATIBLE LEADS. LEAD SPEC： 600V 10A.**

Replace new leads if the current leads are worn.

Replacing Batteries

Follow these steps to replace batteries:

- Turn off the Meter.
- Loosen the battery compartment door screw, and remove the door from the case bottom.
- Remove the batteries and replace the batteries with new batteries.
- Reattach the battery compartment door to the case bottom and tighten the screw.

Contact Dawson

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Do not recycle

(Back page)

Features

- LCD Display
- Auto And Manual Range
- Auto Power Off
- Logic Level Test
- Diode Test
- Audible Continuity
- MAX Display
- Retractable Tip
- Data Hold
- Battery Low Indicator