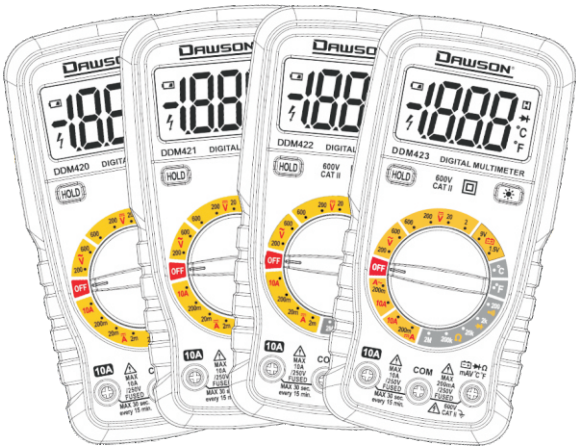


Digital Multimeter

Instruction Manual

for

DDM420 DDM421 DDM422 DDM423



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Introduction

These meters are small, handheld, reliable 2000 count digital multimeters. Their small design make them easy to use with one hand while still being a professional grade meter. They feature (on certain models) AC/DC voltage, AC/DC current, resistance, continuity, diode, battery test, and temperature measurements. (See table below for which features apply to each model)

Measurement features of the types of this series:

Features	DDM 420	DDM 421	DDM 422	DDM 423
AC Voltage measurement $V\sim$	●	●	●	●
DC Voltage measurement V_m	●	●	●	●
DC current measurement A_m	●	●	●	●
AC current measurement $A\sim$				●
Resistance measurement Ω	●	●	●	●
Diode measurement $\rightarrow $	●	●	●	●
Temperature measurement $^{\circ}C$				●
Continuity measurement $\Rightarrow $		●	●	●

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Features	DDM 420	DDM 421	DDM 422	DDM 423
Data hold	●	●	●	●
Backlight			●	●
Battery Test			●	●

1. Display

3 1/2 digit (2000 count), 15mm, 7 segment display.

2. Backlight

Press the backlight button to turn on the backlight for 5 seconds. Press the button again to turn it off manually.

3. Function/Range switch

Move the switch to select different functions and ranges.

4. $V\Omega mA^{\circ}F^{\circ}C$ input jack

5. Data Hold

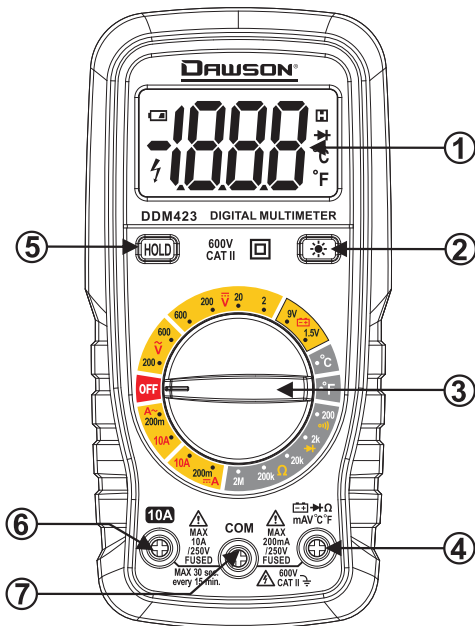
Press the HOLD button to keep the current reading on the display. The H symbol will appear on the display to indicate the reading is being held. Press the button again to release the hold.

6. 10A jack

7. COM jack

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FRONT PANEL



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Safety Information

DDM420, 421, 422, 423 digital multimeters are designed to meet EN61010-1 600V CAT II safety rating and a pollution degree of 2. Please read the instruction manual carefully to ensure the safe and accurate use of the meter.

Safety Symbols

	Important safety information. Read the manual.
	Danger; high voltage
	Ground.
	Double insulation (class II safety equipment)
	Replace fuse with one of the same specifications.

Cautions

- In order to fully comply with safety standards, only use the test leads supplied with the meter. If the leads need to be replaced, replacement leads need to be of the same type and electrical specifications.
- Do not exceed the input limits specified for each range.
- Do not touch the input jacks during measurement.
- When range of measurement is unknown, start with the highest range first, then adjust as needed.
- Remove test leads from any circuit before switching functions or ranges.
- Before making resistance, continuity, diode or battery test measurements, completely discharge all capacitors first.
- Always use caution when working with voltages above 60V DC or 30V AC rms. Keep fingers behind probe barriers at all times.

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Maintenance

- Before removing the rear cover, disconnect the test leads from any circuit.
- When replacing fuses, only use fuses that have the same specifications listed:
 - F1: 10A H 250V
 - F2: 250mA H 250V
- Replace the rear cover and secure before continuing to use the meter.
- Clean meter using a damp cloth or mild detergent only. Do not use chemical solutions.
- Stop using the meter and send in for service if any abnormality is observed.

Specifications

Accuracy: $\pm\%$ of reading + digits at an ambient temperature between 18°C and 28°C and relative humidity of less than 80%. Guaranteed for a period of one year.

General features:

Maximum voltage between input and the ground	CATII 600V
Fuse	F1 10A H 250V F2 250mA/250V
Power	9V battery, NEDA 1604 or 6F22
Maximum display value	1999
Over-range indication	“ OL ”
Polarity display	“-” for negative polarity
Operating temperature	0°C to 40°C
Storage temperature	-10°C to 50°C

Low voltage indication	"  "on the display
Dimensions	150mm × 74mm ×47mm
Weight	about 305g

DC Voltage

Range	Resolution	Accuracy
200mV	100µV	±0.5% of reading , ±3 digits
2V	1mV	±0.5% of reading , ±3 digits
20V	10mV	±0.5% of reading , ±3 digits
200V	100mV	±0.5% of reading , ±3 digits
600V	1V	±0.8% of reading , ±5 digits

Overload protection: 200mV range: 250V DC or AC rms;
all other ranges: 600V DC or AC rms.

DC Current

Range	Resolution	Accuracy
20µA	0.01µA	±1% of reading , ±3 digits
200µA	0.1µA	±1% of reading , ±3 digits
2mA	1µA	±1% of reading , ±3 digits
20mA	10µA	±1% of reading , ±5 digits
200mA	100µA	±1.5% of reading , ±5 digits
10A	10mA	±3% of reading , ±10 digits

Overload protection: F1: 10A H 250V; F2: 200mA H 250V.
When measuring current exceeding 2A, do not measure for longer than 2 minutes continuously. Wait 10 minutes before continuing measurement.
DDM422: no 20µA or 200µA positions.
DDM423: no 20µA, 200µA, 2mA, or 20mA positions.

AC Voltage

Range	Resolution	Accuracy
200V	100mV	±1.2% of reading , ±10 digits
600V	1V	±1.2% of reading , ±10 digits

Overload protection: 600V DC or AC rms
Frequency range: 40Hz to 400Hz
Display: Average (effective value of sinusoid)

AC Current(DDM423 only)

Range	Resolution	Accuracy
200mA	0.1mA	±1.0% of reading +3 digits
10A	10mA	±3% of reading +12 digits



Overload protection: F1: 10A H 250V; F2: 200mA H 250V.
When measuring current exceeding 2A, do not measure for longer than 2 minutes continuously. Wait 10 minutes before continuing measurement.

Resistance

Range	Resolution	Accuracy
200Ω	0.1Ω	±0.8% of reading , ±5 digits
2kΩ	1Ω	±0.8% of reading , ±2 digits
20kΩ	10Ω	±0.8% of reading , ±2 digits
200kΩ	100Ω	±0.8% of reading , ±2 digits
2MΩ	1kΩ	±1.0% of reading , ±5 digits

Maximum open circuit voltage: 2.9V
Overload protection: 250V DC or AC rms

Diode and Continuity measurement

Range	Description
	When the measured resistance is less than 50Ω, the buzzer will sound.
	Displays the diode's approximate forward-biased voltage.

Overload protection: 250V DC or AC rms.
The DDM420 has no continuity position

Temperature measurement

Range	Resolution	Measurement	Accuracy
°C	1°C	-20°C to 0°C -0°C to 400°C 400°C to 1000°C	±10%Range, ±2 digits ±1.0%Range, ±3 digits ±2.0%Range
°F	1°F	-4°F~32°F 32°F~752°F 752°F~1832°F	±1.0%Range, ±2 digits ±1.0%Range, ±3 digits ±2.0%Range

Overload protection: F250mA H 250V fuse
The DDM420, 421, 422 have no temperature position.



Battery Test

Position	Resolution	Accuracy
9V	0.01V	±(0.8% of reading +7 digits
1.5V	0.001V	±(3.0% of reading +10 digits

Overload protection: F250mA H 250V fuse
The DDM420 and 421 have no battery test position.

Instructions

Preparation:

- Turn the instrument on to check the battery; if it's low, the "" symbol will appear on the display and the battery should be replaced.
- The "" symbol next to the input jacks indicates the input voltage or current should not exceed the specified limits to protect the internal circuitry
- Before measurement, turn the rotary switch to the proper function and range.

DC Voltage

- Insert the red test lead into the "**VΩmA**" jack and the black test lead into the COM jack.
- Turn the rotary switch to the "**V~**" position and appropriate range and connect the leads to the circuit under test.
- The display will show the measured voltage and the polarity of the red lead will be indicated.


Note

- When the value to be measured is unknown beforehand, select the highest range first and lower the range accordingly.
- If the display shows 'OL', it indicates the input exceeds the selected range. Move the rotary switch to a higher range.
- Do not measure a voltage that may exceed 600V.The meter is capable of indicating a higher voltage, but can damage the meter.
- Take extra precautions when measuring high voltages to avoid injury or damage to the meter.

DC Current

- Insert the red test lead into the 200mA jack for current measurements less than 200mA, and in the 10A jack for measurements above 200mA, and the black test lead into the COM jack.
- Turn the rotary switch to the "**A~**" position and appropriate range and connect the leads in series to the circuit under test.
- The display will show the measured current and the polarity of the red lead will be indicated.

Note

- When the value to be measured is unknown beforehand, select the highest range first and lower the range accordingly.
- If the display shows "OL", it indicates the input exceeds the selected range. Move the rotary switch to a higher range.
- The "" symbol next to the input jacks indicates the max. input current of 200mA or 10A depending on the input jack used. Exceeding this limit will blow the fuse.

AC Voltage

- Insert the red test lead into the "**VΩmA**" jack and the black test lead into the COM jack.
- Turn the rotary switch to the "**V~**" position and appropriate range and connect the leads to the circuit under test.
- The display will show the measured voltage and the polarity of the red lead will be indicated.

Note: Refer to DC Voltage for applicable notices.

AC Current (DDM423 only)

- Insert the red test lead into the 200mA jack for current measurements less than 200mA, and in the 10A jack for measurements above 200mA. Insert the black test lead into the COM jack.
- Turn the rotary switch to the A~ position and appropriate range and connect the leads in series to the circuit under test.
- The display will show the measured current and the polarity of the red lead will be indicated.

Note: Refer to DC Current for applicable notices.


Resistance

- Insert the red test lead into the "**VΩHz**" jack and the black test lead into the COM jack.
- Turn the rotary switch to the Ω position and appropriate range and connect the leads to the circuit under test.
- The display will show the measured resistance.


Note

- If the display shows 'OL' after connecting the leads, it indicates the resistance exceeds the selected range. Move the rotary switch to a higher range. It may take a couple seconds for the display to stabilize for measurements above 1MΩ; this is normal.
- When the circuit is open or leads not connected, the display will show 'OL'
- Turn off all power and discharge all capacitors before making resistance measurements.

Diodes

- Insert the red test lead into the "**VΩmA**" jack and the black test lead into the COM jack.
- Turn the rotary switch to the "" position and connect the red lead to the anode (+) and the black lead to the cathode (-) of the diode.
- The approximate forward-biased voltage drop will be displayed.

Continuity (DDM421, 422 and 423 only)

- Insert the red test lead into the "**VΩmA**" jack and the black test lead into the COM jack.
- Turn the rotary switch to the "" position and connect the leads to the circuit under test.
- If the measured resistance is less than 50Ω, the buzzer will sound.

Temperature

- Insert the "+" end of the thermocouple into the °F/°C jack and the "-" end into the COM jack.
- Turn the rotary switch to either the °C or °F position and place

- the tip of the thermocouple on the surface of the the object to be measured.
- The measured temperature will be displayed. If the thermocouple is disconnected, the display will show an approximate room temperature.

Replacing the battery/fuse

- When replacing the fuse, make sure the rotary switch is in the OFF position and the test leads are disconnected from the meter.
- Remove the two screws from the back of the meter and remove the back cover.
- Replace only with fuses of the following specifications:
F1: 10A/250V F2: 250mA/250V
- To replace the battery, follow steps 1 and 2. Remove old battery and replace with a new one.
- Replace the back cover and tighten the screws before using the meter again.



To avoid electric shock and damage to the meter, make sure test leads are disconnected before opening the back cover. Make sure the back cover is securely fastened before using the meter.

Accessories

- User's manual: 1 piece
- Test leads: 1 pair
- 9V battery: 1 piece
- Type-K thermocouple: 1 piece (DDM423 only)

