



# velleman DVM68N Auto-Range Digital Multimeter User Manual

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velleman®

velleman DVM68N Auto-Range Digital Multimeter



## Product Information

The DVM68N is a multimeter designed for measuring various electrical parameters such as DC voltage, AC voltage, resistance, AC current, DC current, capacity, frequency, continuity, diodes, and transistors (amplification hFE). It is a versatile device suitable for both personal and professional use.

## Important Environmental Information

This product is marked with a symbol indicating that it should not be disposed of as unsorted municipal waste. To protect the environment, it is recommended to take the device to a specialized recycling company or return it to your distributor or local recycling service. Always follow the local environmental rules and regulations.

## Warning and Safety Precautions

Caution should be exercised when using this device to avoid injury or death. It is important to follow the safety guidelines provided in the user manual and adhere to standard safety precautions when dealing with electrical circuits. This device is not intended for commercial or industrial use. Only use it if you are familiar with electrical circuits and testing procedures.

## Maintenance

To ensure the longevity of your DVM68N multimeter, follow these maintenance suggestions:

- Keep the device clean and free from dust or dirt.
- Avoid exposing the multimeter to extreme temperatures or humidity.
- If not in use for a month or more, remove the batteries to prevent possible leakage.

## Product Usage Instructions

### Power On and Function Changing

To power on the multimeter or change its function, press and hold the Power Switch button for over 3 seconds.

### Auto Ranging

To enable auto-ranging, press the Range Control Button once. The display will show "R-H" to indicate auto-ranging mode.

### Manual Ranging

To switch to manual ranging mode, press the Range Control Button for less than 1 second.

### Data Hold Function

The Data Hold button allows you to freeze the display at the current reading. Press the button to activate data holding, and the "D-H" symbol will appear on the display. Press the button again to cancel data holding. Note that data holding is automatically canceled when rotating the function switch.

### AC/DC Current Selection

Use the AC/DC Current or "/" Selecting button to toggle between AC and DC current measurements.

### Terminal Descriptions

- **COM Terminal:** This terminal is used as the return terminal for all measurements. Connect the black test lead or the COM plug of an optional clamp to this terminal.
- **V/ /F/Cx Terminal:** This terminal is used for voltage, resistance, frequency, capacitance, diode, and continuity measurements. Connect the red test lead or the + plug of an optional clamp to this terminal.
- **mA/ Terminal:** Use this terminal for current measurements in the range of 0.1 A to 400mA. Connect the red test lead or the + plug of an optional clamp to this terminal.
- **A Terminal:** This terminal is used for current measurements in the range of 400mA to 10A. Connect the red test lead to this terminal.

Refer to the user manual for detailed instructions on using specific functions and interpreting measurement results.

DVM68N – AUTO-RANGE DIGITAL MULTIMETER

## Introduction & Features

To all residents of the European Union  
Important environmental information about this product



This symbol on the device or the package indicates that disposal of the device after its lifecycle could harm the environment.

Do not dispose of the unit (or batteries) as unsorted municipal waste; it should be taken to a specialized company

for recycling.

This device should be returned to your distributor or to a local recycling service.

Respect the local environmental rules.

If in doubt, contact your local waste disposal authorities.

Thank you for buying the DVM68N! Please read the manual thoroughly before bringing this device into service. If the device was damaged in transit, don't install or use it and contact your dealer.

Your DVM68N is an auto-ranging professional digital multimeter with a 3  $\frac{3}{4}$  digit LCD display. It is ideally suited for field, lab, shop, and home applications. By using the latest in IC and display technology to significantly reduce the number of discrete internal components, the multimeter gives you superb measuring capability as well as the highest possible reliability.

It is capable of performing functions:

- DC Voltage
- AC Current
- Frequency
- AC Voltage
- DC Current
- Continuity
- Resistance
- Capacity

Also diodes and transistors (amplification hFE) can be tested.

### **Warning**

Use extreme caution in the use of this device. Improper use of this device can result in injury or death. Follow all safeguards suggested in this owner's manual in addition to normal safety precautions in dealing with electrical circuits. Do not use this device if you are unfamiliar with electrical circuits and testing procedures.

Not for commercial or industrial use.

### **A word about safety**

This multimeter is designed to ensure the safest operation possible. However, safe operation depends on you, the operator. Make sure you follow these simple safety rules:

- Never apply a voltage to the multimeter that exceeds the limits given in the specifications. Never apply more than 1000V DC or 750V rms AC between an input jack and ground.
- Use extreme caution when working with voltages above 60V DC or 30V AC rms.
- Always discharge filter capacitors in the power supply circuit under test before you attach test leads.
- Never connect to a source of voltage when you select DCA, ACA, resistance measurement, continuity check or capacitance function.
- Always turn off power and disconnect the test leads before you replace the batteries or fuse.
- Never operate the multimeter unless the battery cover is in place and fully closed.



When carrying out measurements on TV or switching power circuits, always remember that there may be high amplitude voltages pulses at test points which can damage the meter.

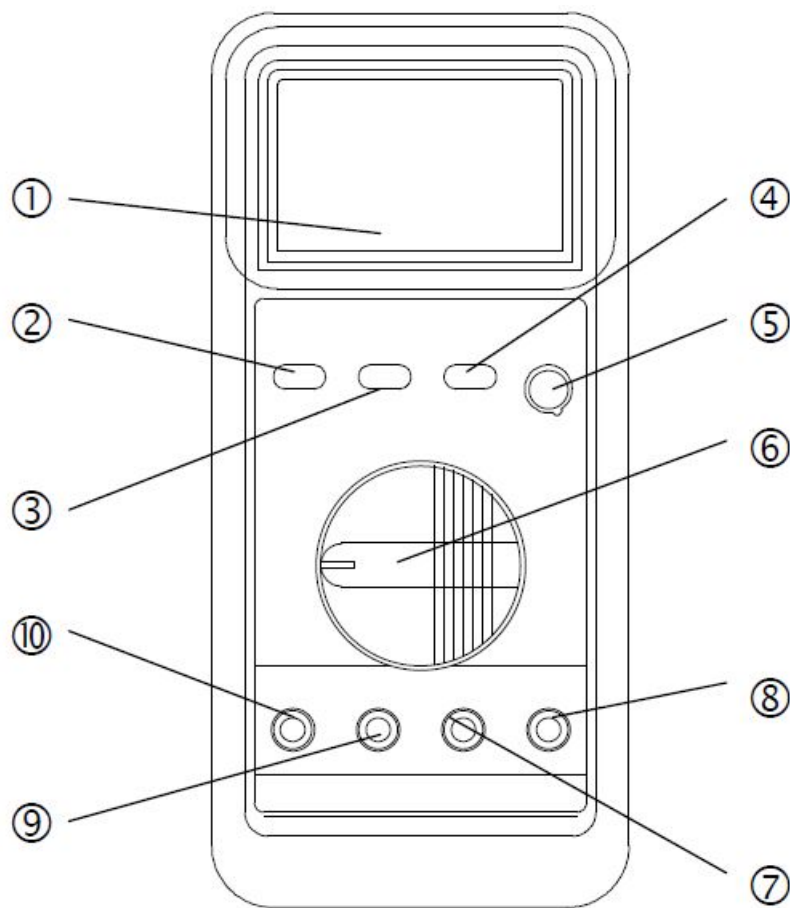
### **Maintenance**

Your DVM68N is an example of superior design and craftsmanship. The following suggestions will help you care for the multimeter so you can enjoy it for years:

- Keep the multimeter dry. If it gets wet, wipe it dry immediately.
- Use and store the multimeter only in normal temperature environments. Temperature extremes can shorten the life of electronic devices or damage batteries.
- Handle the multimeter gently and carefully. Dropping it can damage the circuit boards and case and can improper functioning.
- Use only fresh batteries of the required size and type. Always remove old or weak batteries.  
If you do not plan to use the multimeter for a month or more, remove the batteries. This protects the multimeter from possible leakage.
- Disconnect the test probes before opening the multimeter.
- Replace blown fuses only with same size and type :
  - F1: F 500mA/250V
  - F2: F 10A/250V
- If any faults or abnormalities are observed, do not use this device and let it check by authorised personnel.
- Never use the meter unless the back cover is in place and fastened fully.
- To clean the meter, use a damp cloth and mild detergent only, do not use abrasives or solvents.

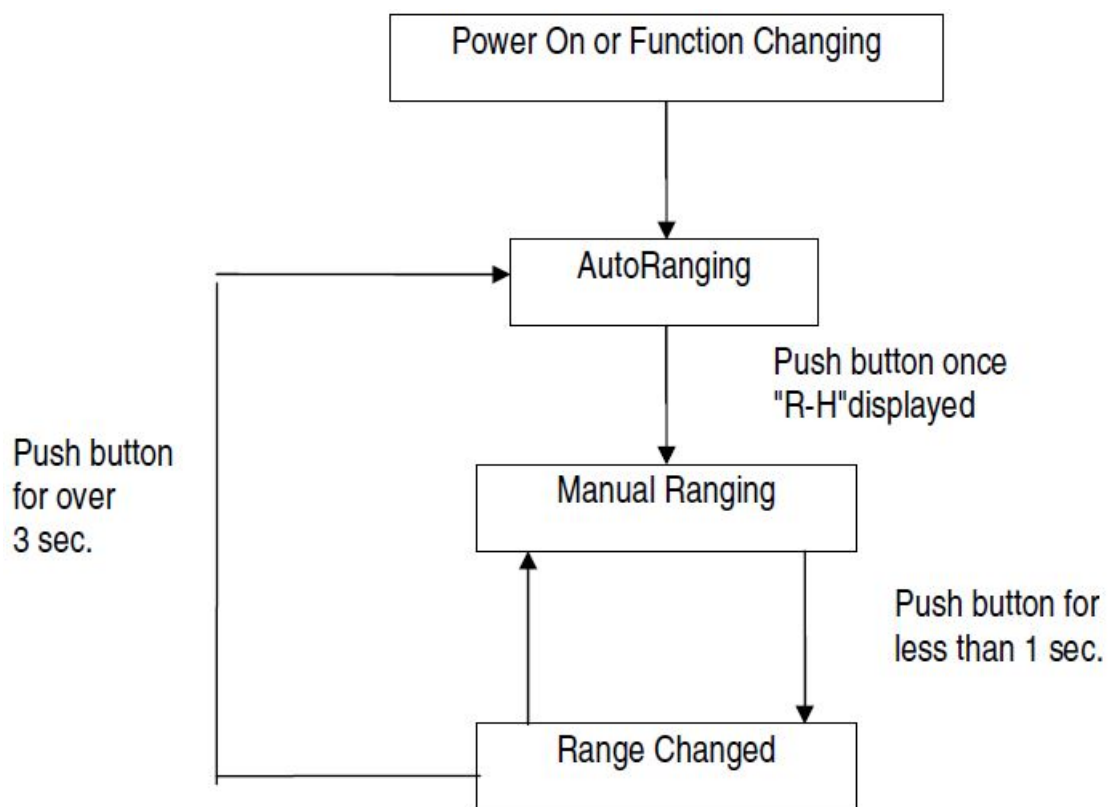
## Description of the front panel

1. Display
2. Range Control Button
3. Data Hold button
4. AC/DC Current of  Selecting Button
5. Socket for Transistor Test
6. Function Switch/Power Switch
7. V/ $\Omega$ /F/Cx Input Jack
8. COM Input Jack
9. mA/ Input Jack
10. 10A Input Jack



### Range Control Butto

Range for AC/DC voltage, AC/DC current ( $\mu\text{A}$  and  $\text{mA}$  only), Resistance and Frequency measuring can be selected manually or auto-range. Push this button as following to choose range the desired mode or range.






### DATA HOLD button

When this button is pushed, the display will show the last reading and " D-H " symbol will appear until the button is pushed again.


Data holding will be cancelled automatically when the function switch is rotated.

### AC/DC Current or Selecting button

Push this button to select AC or DC current measuring function when the function switch is set at  $\mu\text{A}$ , mA, A positions.

Push this button to select  or  measuring when the function switch is set at  position.

### Terminals


Terminal	Description
COM	Return terminal for all measurements. Receives the black test lead or the COM plug of the optional clamp.
V/ $\Omega$ /F/Cx	Input for voltage, resistance, frequency, capacitance, diode and continuity measurements. Receives the red test lead or the + plug of the optional clamp.
mA 	Input for 0.1 $\mu\text{A}$ to 400mA current measurements. Receives the red test lead or the + plug of the optional clamp.
A	Input for 400mA to 10A current measurements. Receives the red test lead.

### Battery Saver

The DVM68N enters the SLEEP mode and blanks the display if the meter is on but not used for 30 minutes. Press HOLD or rotate the rotary switch to wake the meter up. To disable the SLEEP mode, hold down the key while turning the meter on.

## Operating instructions

### Measuring Voltage

1. Connect the black test lead (-) to the COM jack and the red test lead (+) to the V/ $\Omega$ /F/Cx jack.
2. Set the function switch at V  or V~ range to be used and connect test leads across the source or load under measurement.
3. Read LCD display. The polarity of red connection will be indicated when making a DC measurement.

### Measuring Current

1. Connect the black test lead (-) to the COM jack and the red test lead (+) to the mA jack for a maximum of 400mA.

For a maximum of 10A, move the red lead to the A jack.

2. Set the function switch at  $\mu\text{A}$ , mA or A range to be used and push



/ ~ button to select DCA or ACA mode.

3. Connect test leads IN SERIES with the load in which the current is to be measured.
4. Read LCD display. The polarity of red lead connection will be indicated when making a DC measurement.

### Measuring Resistance

1. Connect the black test lead (-) to the COM jack and the red test lead (+) to the V/ $\Omega$ /F/Cx jack.
2. Set the function switch at  $\Omega$  range to be used and connect test leads across the resistance under measurement.

#### Remarks:

1. For measurements in the 40M $\Omega$  range, it may take a few seconds to stabilize reading. This is normal for high resistance measuring.
2. When the input is not connected, i.e. at open circuit, the figure "OL" will be displayed for the overrange condition.
3. When checking in-circuit resistance, be sure the circuit under test has all power removed and all capacitors are fully discharged.

### Measuring Capacitance

1. Connect the black test lead (-) to the COM jack and the red test lead (+) to the V/  $\Omega$ /F/Cx jack.
2. Set the function switch at CAP position to be used.
3. Connect test leads across the capacitor under measurement and be sure that the polarity of connection is observed.

#### Remarks:

To avoid electrical shock and/or damage to the instrument, disconnect circuit power and discharge all high-voltage capacitors before measuring capacitance. Use the dc voltage function to confirm that the capacitor is discharged.

Capacitance is the ability of a component to store an electrical charge. The unit of capacitance is the farad (F). Most capacitors are in the nanofarad to microfarad range. The meter's capacitance ranges are 4.000nF, 40.00nF, 400.0 $\mu\text{F}$ , 4.000 $\mu\text{F}$ , 40.00 $\mu\text{F}$  and 200.0 $\mu\text{F}$ .

#### To measure capacitance:

1. Set the rotary switch to the CAP range.
2. Connect the black and red test leads to the COM and Cx terminals respectively. You can also measure the capacitance by using the special multi-function socket.
3. Connect the test leads to the capacitor being measured and read the displayed value.

#### Some tips for measuring capacitance:



- The meter may take a few seconds to stabilize the reading. This is normal for high-capacitance measuring.
- To improve the accuracy of measurements less than 4nF, subtract the residual capacitance of the meter and leads.

## Measuring Frequency


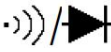
1. Connect the black test lead (-) to the COM jack and the red test lead (+) to the V/ $\Omega$ /F/Cx jack.
2. Set the function switch at the Hz position and connect test leads across the source or load under measurement.

### Remark:

The input voltage should be between 600mV and 3V rms AC. If the voltage is more than 10V rms, reading may be out of the accuracy range.

Max. input voltage: 250V.

## Continuity & Diode Test

1. Connect the black test lead to the COM jack and the red test lead to the V/ $\Omega$ /F/Cx jack.
2. Set the function switch at  position and push the  button to select continuity or diode test mode.
3. In continuity testing, if continuity exists (i.e. resistance less than about 50 $\Omega$ ), built-in buzzer will sound.
4. If diode test mode is selected, connect the red and black to the anode and cathode of the diode under test. The forward voltage drop of this diode in V will be displayed.


## Transistor Test


1. Set the function switch at hFE position.
2. Identify whether the transistor is NPN or PNP type and locate emitter, base and collector lead. Insert leads of the transistor to be tested into proper holes of the testing socket on the front panel.
3. LCD display will show the approximate hFE value at the test condition of base current 10  $\mu$ A and Vce 2.8V.

## Specifications

Accuracy is specified for a period of one year after calibration and at 18°C to 28°C with relative humidity to 75%.

## General

- **Max. voltage between terminal and earth** 1000V DC or 750V AC rms (sinus)
- **Display** 3  $\frac{3}{4}$  digit LCD, 3 readings / sec
- **Fuse protection**  $\mu$ A & mA range : F 500mA/250V  $\varnothing$ 5 $\times$ 20  
A range : F 10A/250V  $\varnothing$ 6.3 $\times$ 32
- **Power Supply** 9V  battery (type 6F22)
- **Ranging method** Auto / Manual
- **Polarity indication** " – " displayed
- **Overrange indication** " OL " displayed automatically

- **Low Battery indication** ”  ” displayed
- **Operating temperature** 0°C to 40°C (32°F to 122°F)
- **Storage temperature** -10°C to 60°C (14°F to 140°F)
- **Dimensions** 91 x 189 x 31.5 mm
- **Weight** 310 g (incl. battery)

## DC Voltage

Range	Resolution	Accuracy
400mV	0.1mV	± (0.7% of rdg + 2 digits)
4V	1mV	
40V	10mV	
400V	100mV	
1000V	1V	± (0.8% of rdg + 2 digits)

- **Input impedance:** 10M
- **Max. input voltage:** 1000V DC or 750V AC rms

## AC Voltage

Range	Resolution	Accuracy
400mV	0.1mV	± (3.0% of rdg + 3 digits)
4V	1mV	± (0.8% of rdg + 3 digits)
40V	10mV	
400V	100mV	
750V	1V	± (1.0% of rdg + 2 digits)


- **Input impedance:** 10M
- **Max. input voltage:** 1000V DC or 750V AC rms
- **Frequency range:** 40Hz ~ 200Hz for 4V range, 40Hz ~ 1kHz for other ranges
- **Response:** average, calibrated in rms of sine wave

## Resistance

Range	Resolution	Accuracy
400.0O	0.1O	± (1.2% of rdg + 2 digits)
4.000kO	1O	
40.00kO	10O	
400.0kO	100O	
4.000MO	1kO	
40.00MO	10kO	± (2.0% of rdg + 5 digits)

- **Overload protection:** 250V DC or 150V AC rms
- **Open circuit voltage;** approx. 250mV

### Diode

Range	Resolution	Function
	1mV	Display read approx. forward voltage of diode

- **Forward DC current:** approx. 1mA
- **Reversed DC voltage:** approx. 1.5V
- **Overload protection:** 250V DC or 150V AC rms

### Audible Continuity

Range	Continuity beeper
	≤ 50O

- **Open circuit voltage:** approx. 0.5V
- **Overload protection:** 250V DC or 250V AC rms

### Transistor

Range	Description	Test condition
hFE	Display read approx. hFE value (0 ~ 1000) of transistor under test (all types)	Base current approx. 10μA, Vce approx. 2.8V

### Capacitance

Range	Resolution	Accuracy
4nF	1pF	± (5.0% of rdg + 5 digits)
40nF	10pF	± (3.0% of rdg + 3 digits)
400nF	100pF	
4μF	1nF	
40μF	10nF	
200μF	100nF	

- **Overload protection:** 250V DC or 250V AC rms

## Frequency

Range	Resolution	Accuracy
9.999Hz	0.001Hz	± (2.0% of rdg + 5 digits)
99.99Hz	0.01Hz	
999.9Hz	0.1Hz	
9.999kHz	1Hz	
99.99kHz	10Hz	
199.9kHz	100Hz	
> 200kHz	100Hz	Unspecified @ > 200kHz

- **Overload protection:** 250V DC or 250V AC rms
- **Input voltage range:** 0.6V ~ 3V AC rms (input voltage must be enlarged with increasing frequency under measurement)
- **Frequency response:** 10Hz ~ 200kHz, sine wave; 0.5Hz ~ 200kHz, square wave

## Current (with optional clamp)

Range	Resolution	Accuracy
DC40A	0.1A/1mV	± (0.8% of rdg + 3 digits)
DC400A	1A/1mV	± (0.8% of rdg + 3 digits)
AC40A	0.1A/1mV	± (1.0% of rdg + 3 digits)
AC400A	1A/1mV	± (1.0% of rdg + 3 digits)

- **Input impedance:** 1M $\Omega$
- **Max. input voltage:** 250V DC or 250V AC rms

## DC Current

Range	Resolution	Accuracy
400μA	0.1μA	± (1.2% of rdg + 3 digits)
4000μA	1μA	
40mA	0.01mA	
400mA	0.1mA	
10A	10mA	± (3.0% of rdg + 5 digits)

- **Overload protection:** F10A/250V fuse for A range; F500mA/250V fuse for A and mA ranges
- **Max. input current:** 400mA DC or 400m AC rms for A and mA ranges; 10A DC or 10A AC rms for A ranges  
For measurements > 5A, 4 minutes max. ON to measure 10 minutes OFF

## AC Current

Range	Resolution	Accuracy
400μA	0.1μA	± (1.5% of rdg + 5 digits)
4000μA	1μA	
40mA	0.01mA	
400mA	0.1mA	
10A	10mA	± (3.0% of rdg + 7 digits)

Overload protection: F10A/250V fuse for A range; F500mA/250V fuse for A and mA ranges

Max. input current: 400mA DC or 400m AC rms for A and mA ranges; 10A DC or 10A AC rms for A ranges

Frequency range: 40Hz ~ 1kHz

Response: average, calibrated in rms of sine wave

## Accessories

Test leads

Battery (9V)

Operation Manual

Holster

### How to use the holster

The holster is used to protect the meter and to make the measurement more comfortable. The following figures show how to use the holster to:

1. Support the meter with a standard angle. (fig. a)
2. Support the meter with a small angle using the little stand.(fig. b)
3. Hang the meter on the wall using the little stand. (fig. c)

Take the little stand off from the back side of the large stand and insert it into holes located upper on the holster.

4. Hold test leads. (fig. d)

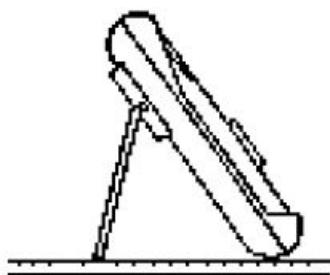


fig. a



fig. b

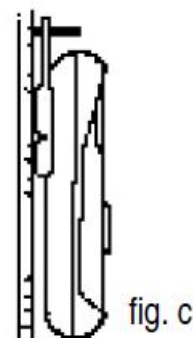


fig. c

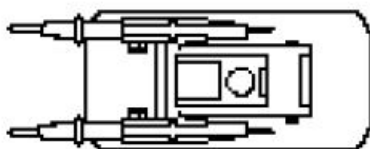



fig. d

## Battery and fuse replacement

If the sign “ ” appears on the LCD display, it indicates that the battery should be replaced. Remove screws on the back cover and open the case. Replace the exhausted battery with a new one.

Fuse rarely needs replacement and blows usually as a result of the operator's error. Open the case as mentioned above and take the PCB assembly out from the case. Replace the blown fuse with ratings specified.

F1: F 500mA/250V F2: F 10A/250V


### Remark:

Before attempting to open the case, be sure that test leads have been disconnected from measurement circuit to avoid electric shock.

For more info concerning this product, please visit our website [www.velleman.eu](http://www.velleman.eu).

The information in this manual is subject to change without prior notice.

## Documents / Resources

 <b>DVM68N</b> <small>AUTORANGE DIGITAL MULTIMETER DIGITAL AUTO-RANGE DIGITAL MULTIMETER DIGITAL AUTO-RANGE DIGITAL MULTIMETER DIGITAL AUTO-RANGE DIGITAL MULTIMETER DIGITAL AUTO-RANGE DIGITAL MULTIMETER</small>	<a href="#">velleman DVM68N Auto-Range Digital Multimeter</a> [pdf] User Manual DVM68N, DVM68N Auto-Range Digital Multimeter, Auto-Range Digital Multimeter, Digital Multi meter, Multimeter
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## References

-  [Customer Domain](#)
-  [Velleman – Wholesaler and developer of electronics](#)