

DVM3218

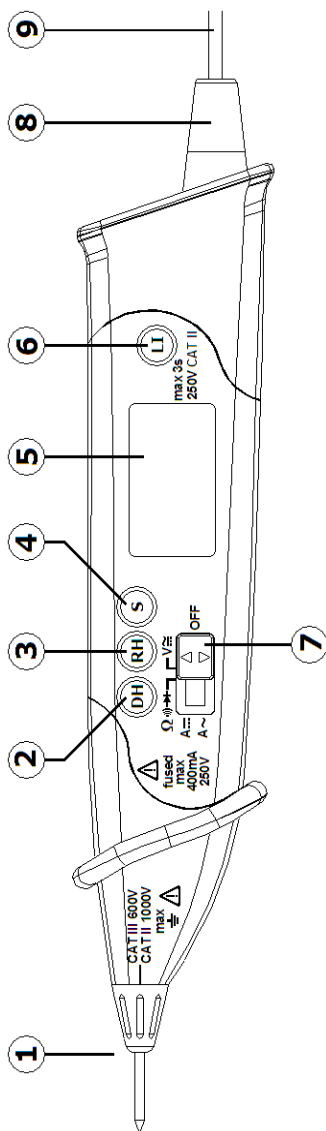
PEN-TYPE DIGITAL MULTIMETER
DIGITALE PENMULTIMETER
STYLO MULTIMÈTRE NUMÉRIQUE
MULTÍMETRO DIGITAL TIPO BOLÍGRAFO
DIGITALMULTIMETER IM STIFTDESIGN



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1	test pin
2	Data Hold (DH)
3	Range Hold (RH)
4	range Select (S)
5	Display
6	Low Input impedance (LI)
7	function switch
8	release knob
9	COM probe

1	testsonde
2	Hold-functie (DH)
3	Range-functie (RH)
4	bereikinstelling (S)
5	lcd-scherm
6	lage impedantie (LI)
7	functieschakelaar
8	wartel
9	COM-sonde

1	pointe de touche
2	fonction Hold (DH)
3	fonction Range (RH)
4	sélection de plage (S)
5	afficheur LCD
6	faible impédance (LI)
7	sélecteur de fonction
8	manchon
9	sonde COM

1	punta de medición
2	función Hold (DH)
3	función Range (RH)
4	selector de rango (S)
5	pantalla LCD
6	débil impedancia (LI)
7	selector de función
8	prensaestopas
9	sonda COM

1	Messspitze
2	Hold-Funktion (DH)
3	Range-Funktion (RH)
4	Einstellknopf (S)
5	LCD-Display
6	niedrige Impedanz (LI)
7	Funktionsschalter
8	Kabelverschraubung
9	COM-Sonde



User manual

1. Introduction

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 choosing Velleman! 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.






Refer to the **Velleman® Service and Quality Warranty** on the last pages of this manual.

For more info concerning this product and the latest version of this user manual, please visit our website www.velleman.eu.
















2. Used symbols

	This symbol indicates: Read instructions Not reading the instructions and manual can lead to damage, injury or death.
	This symbol indicates: Danger A hazardous condition or action that may result in injury or death
	This symbol indicates: Risk of danger/damage Risk of a hazardous condition or action that may result in damage, injury or death
	This symbol indicates: Attention; important information Ignoring this information can lead to hazardous situations.
	AC (Alternating Current)
	DC (Direct Current)
	Both AC and DC
	Double insulation (class II-protection)
	Earth
	Fuse
	Diode
	Continuity

3. Safety Instructions

	Read this manual thoroughly. Familiarise yourself with the functions of the device before actually using it.
	Only use the device for its intended purpose. Using the device in an unauthorized way will void the warranty. Damage caused by disregard of certain guidelines in this manual is not covered by the warranty and the dealer will not accept responsibility for any ensuing defects or problems.
	Follow the instructions below to guarantee a safe use of the meter and all its functionalities.
	During use of the meter, respect all directives concerning protection against electroshocks and misuse. Never exceed the indicated limits.
	WARNING: To avoid electrical shock always disconnect the test leads prior to opening the housing.

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	Remark: refer to the warning on the back of the meter
	Keep the device away from children and unauthorised users.
	Protect this device from shocks and abuse. Avoid brute force when operating.
	Avoid cold, heat and large temperature fluctuations. When the unit is moved from a cold to a warm location, leave it switched off until it has reached room temperature. This to avoid condensation and measuring errors.
	This is an installation category CAT III 600V / CAT II 1000V measuring instrument. Never use this equipment in a higher category than indicated. Refer to §4 Overvoltage /installation category.
	Pollution degree 2-device. For indoor use only. Keep this device away from rain, moisture, splashing and dripping liquids. Not for industrial use. Refer to §5 Pollution degree.
	Before each use, make sure the test probes are in good condition. Always place your fingers behind the protective edges of the test probes while measuring! Never touch free terminals when the meter is connected to a circuit.
	Make sure the meter is in the appropriate measuring range before connecting it to a test circuit.
	Risk of electric shock during operation. Be very careful when measuring live circuits. Use extreme caution when measuring voltages higher than 60Vdc or 30Vac rms.
	Do not measure circuits that may contain voltages > 1000V
	Do not measure current in circuits with voltages > 250V
	Do not conduct resistance, diode or continuity measurements on live circuits.
	Do not perform low impedance measurements on voltages higher than 250V CAT II. Max. measuring time is 3s.
	When carrying out measurements on a TV set or switching power circuits, always be aware that high amplitude voltage pulses at the test points might damage the meter.
	Do not replace internal parts yourself. Replace damaged or lost accessories by identical ones with the same specifications. Order spare accessories e.g. test probes at your dealer.
	Switch off the meter and remove test probes prior to replacing the battery or fuses.
	All modifications of the device are forbidden for safety reasons. Damage caused by user modifications to the device is not covered by the warranty.

4. Overvoltage/installation category

DMMS are categorized depending on the risk and severity of transient overvoltage that might occur at the point of test. Transients are short-lived bursts of energy induced in a system, e.g. caused by lightning strike on a power line.

The existing categories according EN 61010-1 are:

CAT I	A CAT I-rated meter is suitable for measurements on protected electronic circuits which are not directly connected to mains power, e.g. electronics circuits, control signals...
CAT II	A CAT II-rated meter is suitable for measurements in CAT I-environments and mono-phase appliances which are connected to the mains by means of a plug and circuits in a normal domestic environment, provided that the circuit is at least 10m apart from a CAT III- or 20m apart from a CAT IV-environment. E.g. household appliances, portable tools...
CAT III	A CAT III-rated meter is suitable for measurements in CAT I- and CAT II-environments, as well as for measurements on (fixed) mono- or poly-phased appliances which are at

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	least 10m apart from of a CAT IV-environment, and for measurements in or on distribution level equipment (fuse boxes, lighting circuits, electric ovens).
CAT IV	A CAT IV-rated meter is suitable for measuring in CAT I-, CAT II- and CAT III-environments as well as on the primary supply level. Note that for all measurements on equipment for which the supply cables run outdoors (either overhead or underground) a CAT IV meter must be used.

Warning:

This device was designed in accordance with EN 61010-1 installation category CAT III 600V / CAT II 1000V. This implies that certain restrictions in use apply that are related to voltages and voltage peaks which can occur within the environment of use. Refer to the table above.

This device is suitable for measurements up to 1000V:


- Protected electronic circuits that are not directly connected to mains power, e.g. electronics circuits, control signals, circuits behind isolating transformer...
- circuits that are directly connected to mains power, but limited to:
 - measurements on mono-phase appliances that are connected to the mains by means of a plug
 - mono-phase appliances and circuits directly connected to the mains in a normal domestic environment, provided that the circuit is at least 10m apart from a CAT III- or 20m apart from a CAT IV-environment. E.g. household appliances, portable tools, light circuits at more than 10m from a distribution board ...

This device is suitable for measurements up to 600V:

- measurements in/on low-voltage distribution boards (distribution boards behind meter box)
- measurements on (fixed) mono- or poly-phased appliances and circuits except in CAT IV-environments (e.g. mains outlets, electric ovens, lighting circuits, bus bars, low-voltage distribution boards and circuit breakers).

This device is NOT suitable for:

- Voltages above 1000V
- Measurements on distribution equipment and outdoor installations including meter boxes and equipment/circuits outside or remote from the domestic environment e.g. circuits in sheds, garden houses and free-standing garages , or circuits using underground wiring e.g. garden lighting, pool-pump...

	This device is only suitable for measurements up to 600V in CAT III and up to 1000V in CAT II .
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5. Pollution degree

IEC 61010-1 specifies different types of pollution environments, for which different protective measures are necessary to ensure safety. Harsher environments require more protection, and the protection against the pollution which is to be found in a certain environment depends mainly on the insulation and the enclosure properties. The pollution degree rating of the DVM indicates in which environment the device may be used.

Pollution degree 1	No pollution or only dry, nonconductive pollution occurs. The pollution has no influence (only to be found in hermetically sealed enclosures).
Pollution degree 2	Only nonconductive pollution occurs. Occasionally, temporary conductivity caused by condensation is to be expected (home and office environments fall under this category).
Pollution degree 3	Conductive pollution occurs, or dry nonconductive pollution occurs that becomes conductive due to condensation that is to be expected (industrial environments and environments exposed to outside air - but not in contact with precipitation).
Pollution degree 4	The pollution generates persistent conductivity caused by conductive dust or by rain or snow. (exposed outdoor environments and environments where high humidity levels or high concentrations of fine particles occur)

Warning:

This device was designed in accordance with EN 61010-1 **pollution degree 2**. This implies that certain restrictions in use apply that are related to pollution which can occur within the environment of use. Refer to the table above.



This device is only suitable for measurements in Pollution degree class 2 environments.

6. Description

Refer to the illustration on page 2 of this manual.

Symbol	Description
	Low battery. Warning: To avoid false readings, which could lead to possible electric shocks or personal injury, replace the battery as soon as the battery indicator appears.
	negative value
	Indicator for alternating (current or voltage)
	Indicator for direct (current or voltage)
	The meter is in diode test mode.
	The meter is in continuity check mode.
	Manual ranging mode enabled
	data hold function enabled
μmVA $\text{Mk}\Omega$	Measurement units.
OL	Overrange indication

Key	Mode	Description
S	All	Select resistance, diode, continuity or capacity test. Select DC or AC current.
DH	All	Press to enter and exit the data hold mode.
RH	V, Ω , A	Press to enter the manual ranging mode and select the range (press multiple times to browse through the available ranges). Press and hold for 2 seconds to return to auto-ranging mode.
LI	V	Press and hold to reduce meter impedance from 10M Ω to 40K Ω . (max. 3s, <250V CAT II)
switch	OFF	switch off the meter
	V	voltage measurement
	Ω	resistance / continuity / diode measurement
	A / A	current measurement

7. Operation

Refer to the illustration on page 2 of this manual.



Risk of electric shock during operation. Be very careful when measuring live circuits.



Before measuring, always make sure the meter and/or test probes are not damaged and verify the connections, selected function and range.


Use measuring probes that are suitable for the selected measuring mode.

- Never exceed the limit value for protection. This limit value is listed separately in the specifications for each range of measurement.
- Only use the meter in the indicated overvoltage/installation category. Never measure voltages that might exceed the indicated category values.
- Disconnect the test leads from the tested circuit before selecting a different function.
- When carrying out measurements on a TV set or switching power circuits, always remember that high amplitude voltage pulses at the test points might damage the meter.
- Always be careful when working with voltages above 60Vdc or 30Vac rms. Keep your fingers behind the probe barriers at all times during measurement.
- Do not measure current in circuits with voltages > 250V
- Never perform resistance, diode or continuity measurements on live circuits. Make sure all capacitors in the circuit are discharged.


General

- Screw the desired test pin [1] firmly on the meter.
- Switch the meter on by moving the function switch [8] to the desired function.
- Select the desired range within the function by pressing the range select button [4].

"Hold" Function:

Press the "DH" button [2] to freeze the value onto the display. The  symbol appears on the display. Press again to resume normal operation.

"Range" function:

Press the "RH" button [3] to switch between automatic and manual range selection. When switching on the meter it will be in auto-ranging mode. The meter chooses the most suitable range for the selected function. When desired the range can be selected manually by pressing the "RH" button; the  icon is shown on the display. Press multiple times to scroll through the available ranges. To return to auto-ranging press and hold the "RH" button for 2 seconds.

"Select" button:

Press the "S" button [4] to select the desired range within the selected function.

Automatic battery saving mode:

This function switches the meter to battery saving mode after ± 8 min. Push any button or move the function switch to reactivate the meter.

7.1 Voltage measurements

Do not measure circuits where voltages > 600V CAT III or > 1000V CAT II may reside.



Always be careful when working with voltages above 60Vdc or 30Vac rms. Keep your fingers behind the probe barriers at all times during measurement. Do not touch unused terminals when the meter is linked to a circuit which is being tested.

- Set the function switch to $V \approx$ and press the **S** button [4] to choose between AC measurements **AC** or **DC** measurements.
- Connect the COM probe [9] and test pin [1] to the circuit under test.
- The measured value appears on the display.
- When desired, select a range manually with the **RH** button [3].
- Press the **LI** button [6] to lower the input impedance from 10M Ω to $\pm 400K\Omega$. This enables the detection of induced (ghost) voltages from nearby energized circuits. **DO NOT** use this feature in circuits where voltages higher than 250V (CAT II) may occur and do not press the **LI** button longer than 3s. In case of ghost-voltages the meter reading will be close to 0 V, while normal voltages will still read a considerable value (however incorrect as the low impedance of the meter is shunted with the impedance of the circuit under test).

Notes:

- For DC-measurements: when a negative polarity is present at the red test pin [1], the indicated value is preceded by a "-" sign.
- When the measured value is higher than the selected range limit, the display will show "OL". Select a higher range.

7.2 Current measurements

Do not measure current in circuits with voltages > 250V



Current measurements: max. 400mA.



Always be careful when working with voltages above 60Vdc or 30Vac rms. Keep your fingers behind the probe barriers at all times during measurement.

- Set the function switch to $A \approx / A \sim$.
- Select the AC or DC range with the **S** button [4] (**AC** = alternating current, **DC** = direct current).
- Connect the COM probe [9] and test pin [1] in series with the circuit.
- Read the measured value from the display.

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- When desired, select a range manually with the **RH** button [3].

Notes:

- For DC-current measurements, when a negative polarity is present at the red test pin [1], the indicated value is preceded by a “-” sign.
- When the measured value is higher than the selected range limit, the display will show “OL”. Select a higher range.

7.3 Resistance measurements

Do not perform resistance measurements on live circuits.

- Set the function switch to $\Omega \rightarrow \blacktriangleleft$.
- When necessary, push the **S** button [4] to select resistance measurement (Ω).
- Connect the COM probe [9] and test pin [1] to the circuit/component under test.
- The measured value appears on the display.
- When desired, select a range manually with the **RH** button [3].

Notes:

- Never perform resistance measurements on a live circuit and make sure all capacitors are completely discharged.
- For resistance measurements above $1M\Omega$ the meter needs a few seconds to stabilize the read-out.
- Should the measured resistance exceed the selected range or in case of an open circuit, the display will show “OL”.

7.4 Continuity & diode test

Do not perform continuity or diode measurements on live circuits.

- Set the function switch to $\Omega \rightarrow \blacktriangleleft$.

Continuity test

- Press the **S** button [4] until the \rightarrow symbol appears on the display.
- Connect the COM probe [9] and test pin [1] to the circuit under test.
- When the measured resistance is less than 35Ω a continuous beep is produced and the resistance value is showed on the display. Should the measured resistance exceed the 400Ω or in case of an open circuit, the display will show “OL”.

Diode test

- Press the **S** button [4] until the \blacktriangleleft symbol appears on the display.
- Connect the test pin [1] to the anode; connect the COM probe [9] to the cathode of the diode. The meter will display the approximate forward voltage drop. If the lead connection is reversed, the meter will display “OL”.

Notes:

- Never perform continuity or diode measurements on a live circuit and make sure all capacitors are completely discharged.
- Measuring diodes that are part of a circuit might produce faulty results. Consider disconnecting them from the circuit.

8. Cleaning and maintenance

Do not replace internal parts yourself. Replace damaged or lost accessories by identical ones with the same specifications. Order spare accessories e.g. test probes at your dealer.

**WARNING:**

To prevent fire, use proper fuses



Switch off the meter and remove COM probe [9] and test pin [1] prior to replacing the battery or fuses.



WARNING: To avoid electrical shock **always** disconnect the COM probe [9] and test pin [1] prior to opening the housing.

Remark: refer to the warning on the back of the meter

a. General maintenance:

- Wipe the device regularly with a moist, lint-free cloth. Do not use alcohol or solvents.

b. Fuse Replacement

- Remove COM probe [9] and test pin [1] from the circuit under test.
- Switch off the multi-meter.
- Unscrew the test pin [1] and remove the front cover.
- Remove the fuse from the fuse holder and replace it with a new fuse of the same type and with the same specifications (F500mA/250V, Ø 5 x 20mm).
- Close the cover and re-install the test pin [1].

c. Battery Replacement

- Replace the battery as soon as the " + " indication appears on the display.
- Remove COM probe [9] and test pin [1] from the circuit under test.
- Switch off the multi-meter.
- Unscrew the release knob [8] and remove the back cover.
- Replace the batteries by 2 new batteries of the same type and with the same specifications (1.5V – LR44).
- Close the battery compartment carefully and tighten the release knob [8].

Notes:

- Do not try to repair or calibrate the meter yourself; contact your dealer.
- Replace damaged accessories immediately; order them at your local dealer.
- Do not use the meter when it is damaged.

9. Technical specifications

This device is not calibrated when purchased!

Regulations concerning environment of use:

- Use this meter only for measurements in CAT I, CAT II and CAT III environments (see §4)
- Use this meter only in a pollution degree 2 environment (see §5)

Ideal temperature	18-28°C
Ideal relative humidity	75%
Max. altitude	2000m
Overvoltage/installation category	CAT III 600V / CAT II 1000V
Pollution degree	Pollution degree 2
Operating temperature	0°C~40°C (RH<80%)
Storage temperature	-10°C~60°C (RH<70, store without batteries!)
fuses	mA range F500mA / 250V, 5 x 20mm
Overrange indication	yes ('OL')
Low battery indication	yes (+)
Polarity indication	'-' automatic indication
"Hold" function	yes
Backlight function	no
Automatic switch off	yes
Power	2 x 1.5V LR44 batteries V13GA (incl.)
Dimensions	230 x 35 x 20mm
Weight	±200g
Accessoires	manual / batteries

9.1 Voltage

Function	Range	Resolution	Accuracy
DC-voltage $\overline{\text{V}}$	340.0 mV	0.1mV	$\pm 0.8\%$
	3.400 V	1mV	$\pm 1.0\%$
	34.00 V	10mV	
	340.00 V	100mV	
	600 V	1V	$\pm 1.2\%$
AC voltage $\sim\text{V}$	3.400 V	1mV	$\pm 1.2\%$
	34.00 V	10mV	
	340.0 V	100mV	
	600 V	1V	$\pm 1.5\%$

Max. input voltage: 1000V $\overline{\text{V}}$

Input impedance: 10M Ω (<100pF)

9.2 Current

Function	Range	Resolution	Accuracy
DC $\overline{\text{A}}$	34.00 mA	0.01mA	$\pm 1.5\%$
	340.0 mA	0.1mA	
AC \sim	34.00 mA	0.01mA	$\pm 1.8\%$
	340.0 mA	0.1mA	$\pm 2.0\%$

Overload protection: F500mA/250V fuse

Max. Input current: 400mA

9.3 Resistance

Function	Range	Resolution	Accuracy
Resistance Ω	340.0 Ω	0.1 Ω	$\pm 0.8\%$
	3.400 k Ω	1 Ω	$\pm 1.2\%$
	34.00 k Ω	10 Ω	
	340.0 k Ω	100 Ω	
	3.400 M Ω	1k Ω	$\pm 2.0\%$
	34.00 M Ω	10k Ω	$\pm 3.0\%$

overload protection: 500V

9.4 Diode/continuity

Range	Description	Test Condition
$\overline{\text{D}}$	Built-in buzzer sounds if resistance < $\pm 35\Omega$	-
$\overline{\text{C}}$	Display reads approx. forward voltage of diode	Open circuit voltage: 3.4V

Use this device with original accessories only. Velleman nv cannot be held responsible in the event of damage or injury resulted from (incorrect) use of this device.

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

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