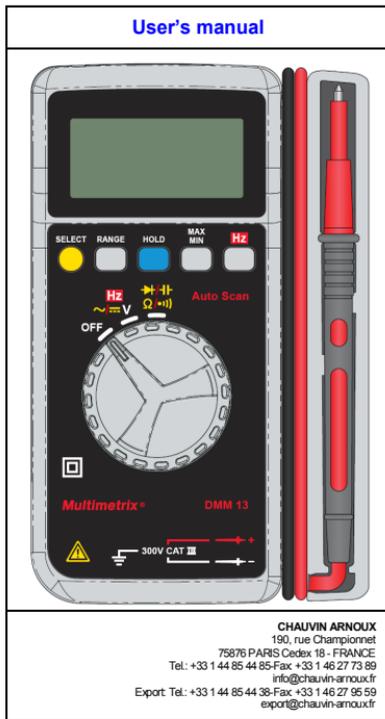


DMM 13 Multimeter



User's manual

CHAUVIN ARNOUX
190, rue Championnet
75978 PARIS Cedex 18 - FRANCE
Tel: +33 1 44 85 44 85-Fax: +33 1 46 27 73 89
info@chauvin-arnoux.fr
Expt. Tel: +33 1 44 85 44 38-Fax: +33 1 46 27 95 59
expt@chauvin-arnoux.fr

You have just acquired a **DMM13** multimeter and we thank you for your confidence.

PRECAUTIONS FOR USE

This device is compliant with safety standards IEC61010-1 and 61010-2-033 for voltages up to 300V in category III (or 600V in category II) at an altitude below 2,000m, indoors, with a degree of pollution of not more than 2.

These safety instructions are intended to ensure the safety of persons and proper operation of the device. If the device is used other than as specified in this data sheet, the protection provided by the device may be impaired. The operator and/or the responsible authority must carefully read and clearly understand the various precautions to be taken in use.

- If you use this instrument other than as specified, the protection it provides may be compromised, thereby endangering you.
- Do not use the instrument in an explosive atmosphere or in the presence of flammable gases or fumes.
- Do not use the instrument on networks of which the voltage or category exceeds those mentioned.
- Do not exceed the rated maximum voltages between terminals or with respect to earth.
- Do not use the instrument if it seems to be damaged, incomplete, or poorly closed.
- Before each use, check the condition of the insulation on the leads, housing, and accessories. Any item of which the insulation is deteriorated (even partially) must be set aside for repair or scrapping.
- Use leads and accessories rated for voltages and categories at least equal to those of the instrument. If not, an accessory of a lower category reduces the category of the combined multimeter + accessory to that of the accessory.
- Observe the environmental conditions of use.
- Do not modify the instrument and do not replace components with "equivalents". Repairs and adjustments must be done by approved qualified personnel.
- Replace the battery as soon as the  symbol appears on the display unit. Disconnect all leads before opening the battery compartment cover.
- Use personal protective equipment when conditions require.
- Keep your hands away from the unused test probes of the device.
- When handling the test probes, crocodile clips, and accessories, keep your fingers behind the physical guard.
- Disconnect the test probes from the measurement circuit before changing functions.

MEASUREMENT CATEGORIES

CAT II: Circuits directly connected to the low-voltage installation.
Example: power supply to electro-domestic devices and portable tools.

CAT III: Power supply circuits in the installation of the building.
Example: distribution panel, circuit-breakers, machines or fixed industrial devices.

CAT IV: Circuits supplying the low-voltage installation of the building.
Example: power feeders, counters and protection devices.

For best results from your instrument:

- read these operating instructions carefully;
- comply with the precautions for use.

Meaning of the symbols used:

-  Risk of danger. The operator agrees to refer to these instructions whenever this danger symbol appears.
-  Battery
-  The CE marking indicates conformity with European directives.
-  Double insulation or reinforced insulation.
-  Selective sorting of wastes for the recycling of electrical and electronic equipment within the European Union. In conformity with directive WEEE 2002/96/EC: this equipment must not be treated as household waste.
-  DC- Direct current
-  AC- Alternating current
-  AC and DC- Alternating and direct current
-  Earth
-  Instructions that must be read and understood

1. PRESENTATION

This is an instrument for the measurement of electrical quantities that groups the following functions:

- AC or DC voltage measurement
- Frequency measurement
- Resistance measurement, continuity measurement with buzzer (diode test)
- Capacitance measurement
- Automatic determination of the quantity to be measured from the setting of the switch.
- Test probe: 1 red (+) and 1 black (-).



1.1 The switch

The switch has three positions. To access the various functions, set the switch to the corresponding positions. Each active position is confirmed by an audible signal. The functions are described in the table below.

OFF	Stop
V/Hz	AC or DC voltage measurement/Frequency measurement Automatic detection of the AC or DC voltage to be measured.
	Resistance measurement, continuity measurement with buzzer, or diode test and capacitance measurement. Automatic detection of the quantity to be measured.

When switched on, the multimeter is in "SCAN" mode (automatic detection) and analyzes the input signals to determine what quantity is to be measured.

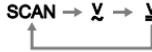
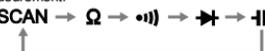
In this mode, the "RANGE", "HOLD", and "MAX MIN" keys are deactivated.

1.2 The keypad

Here are the functions of the keys of the keypad:

- "SEL" (SELECT) key

The "SEL" key is used to access the functions of the "RANGE", "HOLD", and "MAX MIN" keys and choose the quantity to be measured manually (stops the "SCAN" mode). Press the "SEL" key repeatedly to obtain the following functions according to the setting of the rotary switch:

V	DC voltage/AC voltage Functions obtained: 
	Resistance measurement/continuity measurement/diode test/capacitance measurement. Functions obtained: 

DEUTSCHLAND - Chauvin Arnoux GmbH
Straßburger Str. 34 - 77694 Kehl / Rhein
Tel.: (07851) 99 26-0 - Fax: (07851) 99 26-60

ESPAÑA - Chauvin Arnoux Ibérica S.A
C/ Roger de Flor N° 293, Planta 1 - 08025 Barcelona
Tel.: 902 20 22 26 - Fax: 934 591 443

ITALIA - Amra SpA
Via Sant'Ambragio, 23/25 - 20050 Bareggia di Macherio (MI)
Tel.: 039 245 75 45 - Fax: 039 481 561

ÖSTERREICH - Chauvin Arnoux GmbH
Slamastrasse 29 / 2 / 4 - 1230 Wien
Tel.: 01 61 61 961-0 - Fax: 01 61 61 961-61

SCANDINAVIA - CA Mätssystem AB
Box 4501 - SE 18304 TÄBY
Tel.: +46 8 50 52 68 00 - Fax: +46 8 50 52 68 10

SCHWEIZ - Chauvin Arnoux AG
Einsiedlerstraße 535 - 8810 Horgen
Tel.: 044 727 75 55 - Fax: 044 727 75 56

UNITED KINGDOM - Chauvin Arnoux Ltd
Waldeck House - Waldeck Road - Maidenhead SL6 8BR
Tel.: 01628 788 888 - Fax: 01628 628 099

Middle East - Chauvin Arnoux Middle East
P.O. BOX 60-154 - 1241 2020 JAL EL dIB (Beirut) - LEBANON
Tel.: (01) 89 04 25 - Fax: (01) 89 04 24

CHINA - Shanghai Pu-Jiang - Enerdis Instruments Co. Ltd
3 F., 3 rd Building - N° 381 Xiang de Road - 200081 SHANGHAI
Tel.: +86 21 65 21 51 96 - Fax: +86 21 65 21 61 07

USA - Chauvin Arnoux Inc. - d.b.a AEMC Instruments
200 Foxborough Blvd. - Foxborough - MA 02035
Tel.: (508) 698-2115 - Fax: (508) 698-2118

- "RANGE" key

Your multimeter has a range change function that is normally automatic but can be made manual. After the quantity to be measured is chosen manually ("SEL" key), the default mode is automatic range change: the "AUTO" message is then displayed.

- Briefly press the "RANGE" key to change to manual mode: the "AUTO" message is then replaced by "MANU".
- Successive brief presses are used to reach the desired range.
- Hold the "RANGE" key down for 2 seconds to return to the automatic range change mode: the "MANU" message reverts to "AUTO".

"HOLD" key

In the "HOLD" mode, the device freezes the display of the last value measured.

- Pressing the "HOLD" key briefly during a measurement freezes the display: the message **D-H** is then displayed.
- A second brief press on the "HOLD" key is used to return to the normal measured value display refresh mode: the message **D-H** disappears from the display unit.

"MAX MIN" key

The device records the maximum and minimum values of the measurements made. The automatic range change does not change the range when this mode is entered; if the maximum values exceed the display range (indicated by the "OL" message), the appropriate higher range must be chosen manually before reactivating the "MAX MIN" mode.

Successive brief presses on the "MAX MIN" key produce, in order, the following actions:

- 1st press: the device records and displays the maximum value measured. The "AUTO" message is replaced by "MANU" and the "MAX" message is displayed.
- 2nd press: the device records and displays the minimum value measured; the "MAX" message is replaced by "MIN".
- 3rd press: the device records the maximum and minimum values measured simultaneously; it is the value currently measured that is displayed; the "MAX" and "MIN" messages blink simultaneously on the display unit.
- Additional presses serve to display the values recorded one by one by reproducing the actions of the previous successive presses.

Press the "MAX MIN" key for two seconds to exit from the mode: the "MANU", "MAX", and "MIN" messages are replaced by "AUTO", indicating that the device once again changes range automatically.

"Hz" (Hertz) key

When the switch is set to "VHz", a brief press on the "Hz" key displays the frequency of the voltage being measured.

A 2nd press restores the display of the voltage being measured.

1.3 The display unit



SCAN	Automatic search for the quantity to be measured
AUTO	Automatic range change
MANU	Manual range change
D-H	(Data Hold) Freezes the display
•)	Continuity test function
A.P.O.	(Auto Power Off) automatic switching off activated
▶	Diode test function
MAX MIN	Display of the maximum and minimum values
≡	DC measurement and display
~	AC measurement and display
⚡	Presence of hazardous voltage above 30V
—	Display of a negative value
⊕	Low battery indicator (battery must be replaced)
Hz	(Hertz) unit of frequency
MΩ	(ohm, kilo-ohm, Megohm) unit of resistance
V	(Volt) unit of voltage
μF	(milliFarad, nanoFarad, microFarad) units of capacitance

The "OL" message (OverLoad) indicates an overshoot of the measurement or display capacity. A display of dashes indicates waiting for the determination and selection of the quantity to be measured.

1.4 The leads and test probes

The multimeter is equipped with 2 leads (1 red and 1 black), each terminated by a test probe of the same colour. The leads and test probes are not detachable (they are permanently connected) and, when not in use, can be stowed in the compartments provided for them on the right side of the device.

The tips of the test probes (once taken out of their compartments by pressing on them with a finger), allow voltage, resistance, continuity, diode test, and capacitance measurements.

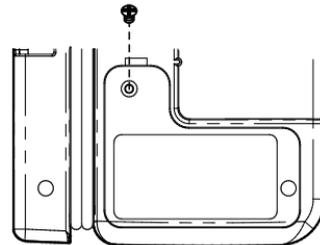
The test probes have physical guards that show the operator where the hand grip part ends, beyond which the fingers must not be placed.

2. USE

2.1 Commissioning

Place the batteries supplied with the device as follows:

- Using a cross-headed screwdriver, unscrew the screw of the compartment cover on the back of the housing and open the cover.
- Place the 2 batteries in their compartment, with the correct polarities.
- Close the cover and screw it back to the housing.



2.2 Starting up and check of operation

We recommend performing this procedure at the time of commissioning and, if the device is used only occasionally, each time it is used.

- Hold the "HOLD" key down and switch the instrument on by turning the switch from "OFF" to "Ω".
- Keep the "HOLD" key pressed and check that the various symbols and segments are correctly displayed (the 1st digit on the left may be a "6" or an "8").
- Releasing the "HOLD" key restores the normal display for the function chosen.
- If the device is set to the resistance measurement function ("Ω"), check that the display indicates "A.P.O" (for auto power off), "SCAN" (for automatic search for the quantity to be measured), dashes "—" (to indicate search in progress).
- Withdraw the two leads from their compartment and establish a good contact between the metallic parts of the two test probes; the value measured and displayed must change from "—" to "0.0Ω" accompanied by the message **•||)** (the value displayed may not be exactly zero, but must remain very close to zero).
- The instrument is operational when the various states described above have been checked and are correct. The rotary switch can then be set to the desired function or to "OFF" to switch the instrument off.

2.3 Deactivating Auto Power Off

- In order to extend the life of the batteries, the device switches itself off automatically approximately 10 minutes after it is switched on if no key or change of function has been activated.

- The device warns that it is about to switch off by emitting 3 series of 2 audible beeps and, if no action is taken, then emits a long beep and switches itself off.
- When the multimeter has switched itself off automatically, it can be reactivated by any action on a key or on the rotary switch.
- Automatic switching off can be deactivated by holding down the "Hz", "MAX MIN", or "R-H" key while switching on.
- To eliminate the slight residual drain of the batteries in the sleep mode, it is always best to switch the device "OFF".

2.4 DC voltage measurement (V)

- !** For optimum safety, measurements of voltages between 300V and 600V must be made only on category III installations or on circuits of which the possible overvoltage levels are known to be less than those of category III. The instrument has 4 measurement ranges: 600mV, 6.0V, 60V, 600V. The 600mV range can be used only in the manual range change mode, by repeated presses on the "RANGE" key. The other ranges can be used in either the manual or the automatic range change mode.
- Withdraw the test probes and leads from their compartment.
 - Switch the instrument on in the "V" setting.
 - Apply the metallic part of the black test probe on the (assumed) negative part of the circuit to be tested.
 - Apply the metallic part of the red test probe on the (assumed) positive part of the circuit to be tested.
 - Read the measurement result (after stabilization).

Display of the "-" sign in front of the numerical value indicates that the value measured is negative (the test probes are reversed with respect to the polarity of the voltage)

2.5 AC voltage measurement (V)

- !** For optimum safety, measurements of voltages between 300V and 600V must be made only on category III installations or on circuits of which the possible overvoltage levels are known to be less than those of category III. The instrument has 4 measurement ranges: 600mV, 6.0V, 60V, 600V. The 600mV range can be used only in the manual range change mode, by repeated presses on the "RANGE" key. The other ranges can be used in either the manual or the automatic range change mode.
- Withdraw the test probes and leads from their compartment.
 - Switch the instrument on in the "V" setting.
 - Apply the metallic part of the black test probe on the part of the circuit to be tested (assumed) closest to the earth potential.
 - Apply the metallic part of the red test probe on the part of the circuit to be tested (assumed) farthest from the earth potential.
 - In the "SCAN" mode, if the voltage to be measured is greater than 0.5V, the multimeter automatically determines if an AC or DC measurement must be made.
 - If necessary, press the "SEL" key briefly to force an AC voltage measurement (display of the  symbol instead of )
 - Read the measurement result (after stabilization).

2.6 Frequency measurement (Hz)

- !** For optimum safety, measurements of voltages between 300V and 600V must be made only on category III installations or on circuits of which the possible overvoltage levels are known to be less than those of category III. The instrument has 3 measurement ranges: 600,0Hz, 6,000kHz and 60,00kHz.
- Measurement of the frequency of the voltage measured: start the AC voltage measurement method, then press the "Hz" key (display of the "Hz" symbol instead of "V").
 - Read the measurement result after stabilization.

2.7 Resistance measurement (Ω)

- !** Resistance, continuity, diode test, and capacitance measurements must be made only on circuits completely disconnected from any power supply, and after any capacitors have been discharged.

The instrument has 6 measurement ranges: 600,0Ω, 6,000kΩ, 60,00kΩ, 600,0kΩ, 6,000 MΩ and 60,00 MΩ. All of the ranges can be used with either automatic or manual range change.

- Withdraw the test probes and leads from their compartment.
- Switch the instrument on and set to .
- Apply the metallic tips of the test probes to the terminals of the resistance or of the circuit to be tested.
- In the "SCAN" mode, the multimeter automatically determines the nature of the quantity to be measured.
- If necessary, press the "SEL" key briefly to change to the desired measurement mode.
- Read the measurement result (after stabilization).

2.8 Continuity measurement (Ω)

- !** Resistance, continuity, diode test, and capacitance measurements must be made only on circuits completely disconnected from any power supply and after any capacitors have been discharged.

The instrument indicates continuity by emitting a steady sound when the resistance measured is less than 30Ω. The value displayed is the value measured in ohms.

- Withdraw the test probes and leads from their compartment.
- Switch the instrument on and set to .
- Apply the metallic tips of the test probes to the terminals of the resistance or of the circuit to be tested.
- In the "SCAN" mode, the multimeter can automatically determine and select the continuity mode when the resistance measured remains low; otherwise press the "SEL" key briefly until the continuity symbol "" appears
- Read (if necessary) the measurement result (after stabilization).

2.9 Diode measurement (Ω)

- !** Resistance, continuity, diode test, and capacitance measurements must be made only on circuits completely disconnected from any power supply, and after any capacitors have been discharged.

The instrument indicates the voltage across the terminals of the semiconducting junction.

- Withdraw the test probes and leads from their compartment.
- Switch the instrument on and set to .
- Apply the metallic tips of the test probes to the terminals of the diode or circuit to be tested.
- In the "SCAN" mode, the multimeter can automatically determine and select the diode test mode when the voltage measured is less than approximately 0.8V, otherwise, press the "SEL" key briefly until the diode test symbol "" appears.
- The test probes must be applied to the terminals of the diode or junction to be tested according to the following polarities.
 - forward direction (conducting): apply the black probe to the cathode and the red probe to the anode. Read the measurement result (after stabilization), see figure A (the threshold voltage of a silicon diode is between 0.5V and 0.7V; it is between 0.2 and 0.3V for a germanium diode. High-voltage diodes, some Zener diodes, and LEDs cannot be tested by this method).
 - reverse direction (non-conducting): apply the black probe to the anode and the red probe to the cathode. Read the measurement result (after stabilization), see figure B (a diode or junction in good condition causes the display of "OL").
- With some types of diode, a measured value outside the stated voltage ranges does not necessarily mean that the diode or junction is defective.

3. CHARACTERISTICS

3.1 General conditions

Quantity of influence	Reference conditions
Temperature	23°C ±5°C
Relative humidity	45% to 75%
Supply voltage	2,8V ±0,3V
Frequency range of the applied signal	45-400Hz
Sine wave	pure
Peak factor of the applied AC signal	√2
AC magnetic field	none
Electric field	none

3.2 Characteristics under the conditions of use

Sampling rate: approximately 3 measurements per second
The uncertainties are expressed in ± (x% L + y digit).

3.2.1 DC voltage measurement

Range	Resolution	Measurement uncertainties	Input resistance
600.0mV	0.1mV	1.0%+3	approx. 10 MΩ
6.000V	0.001V		
60.00V	0.01V		
600.0V	0.1V		

3.2.2 AC voltage measurement

Range	Resolution	Measurement uncertainties		Input resistance
		45-60Hz	60-400Hz	
600.0mV	0.1mV	1.5%+5	-	approx. 10 MΩ
6.000V	0.001V	1.5%+5		
60.00V	0.01V			
600.0V	0.1V			

3.2.3 Resistance measurement

Range	Resolution	Measurement uncertainties	Voltage maximum applicable
600.0Ω	0.1Ω	1.0%+5	600V
6.000kΩ	0.001kΩ		
60.00kΩ	0.01kΩ		
600.0kΩ	0.1kΩ		
6.000MΩ	0.001MΩ	2.0%+5	
60.00MΩ	0.01MΩ	3.0%+5	

3.2.4 Continuity measurement

Range	Resolution	Observation	No-load voltage
600.0 Ω	0.1Ω	The buzzer is actuated at values <= 30Ω	approx. 0.8V

3.2.5 Diode test

Range	Resolution	Measurement uncertainties	No-load voltage
2.000V	0.001V	1.0%+5	approx. 2.0V

3.2.6 Capacitance measurement

Range	Resolution	Measurement uncertainties	Remarks
6.000nF	0.001nF	2.5%+50	
60.00nF	0.01nF	2.5%+8	
600.0nF	0.1nF	2.5%+5	
6.000μF	0.001μF		
60.00μF	0.01μF		
600.0μF	0.1μF		
6.000mF	0.001mF	3.0%+5	
60.00mF	0.01mF	4%+5	

3.2.7 Frequency measurement

Range	Resolution	Measurement uncertainties	Notes
6.000kHz	0.001kHz	0.1%+3	
60.00kHz	0.01kHz		

Sensitivity			
Range	Minimum input signal (sine wave)		
	10Hz~5.999kHz	6.00kHz~59.99kHz	
600mV	60mV	-	
6.0V	0.3V	3V	
60V	2V	6V	
600V	20V	60V	

3.3 Environmental conditions

Environmental conditions	in use	in storage
Temperature	0°C to +50°C 32°F~122°F	-10°C to +60°C 14°F~140°F
Relative humidity (RH)	≤80% without condensation	≤70% without condensation
Altitude	<2.000m	up to 10,000m

3.4 Constructive characteristics

Housing	Rigid polycarbonate shell with moulded elastomer covering	
Screen	LCD display	Dimension: L 41 x H 18mm
Dimension	H 130 x L 81 x P 24mm	
Weight	150g (without battery)	

3.5 Power supply

Batteries:	2x1.5V (AAA)
Mean battery life	>250 hours
Auto power off delay	After approximately 10 minutes without action on the switch and/or on the keys

3.6 Compliance with international standards

Electric safety	Compliant with standards IEC61010-1 and IEC61010-2-033 300V CAT III.
Protection class	Class 2, double insulation
Electromagnetic compatibility	Compliant with standard EN61326-1
Level of protection of the housing	Housing: IP40 (according to the standard IEC60529)

4. MAINTENANCE

The instrument has no parts that can be replaced by personnel who are not trained and approved. Any non-approved repair or other work, or replacement of a part by an "equivalent", may severely compromise safety.

4.1 Cleaning

- Disconnect the unit completely and turn the rotary switch to OFF.
- Use a soft cloth, dampened with soapy water. Rinse with a damp cloth and dry rapidly with a dry cloth or forced air.
- Dry perfectly before putting back into use.

4.2 Replacement of the batteries

The  symbol indicates that the batteries are spent. When this symbol appears on the display unit, the batteries must be replaced. The measurements and specifications are no longer guaranteed.

To replace the batteries, proceed as follows:

- Disconnect everything connected to the device;
- Set the switch to OFF;
- using a cross-headed screwdriver unscrew the screw of the battery compartment cover on the back of the housing and open the cover;
- Always replace both batteries;
- Close the cover and screw it back down.

4.3 Repair

Return the instrument to your distributor for any work to be done, whether under the warranty or not.

If you have to ship the instrument, it is best to use its original packaging and to state as clearly as possible, in a note attached to the equipment, the reasons for the transfer.

5. WARRANTY

The equipment is warranted against defects of materials or workmanship, in accordance with the general terms of sale.

During the warranty period (1 year), the instrument must be repaired only by the manufacturer, who reserves the right to choose between repairing it or replacing it, entirely or partially.

If the equipment is sent back to the manufacturer, carriage is paid by the customer.

The warranty does not apply in the following cases:

- Inappropriate use of the equipment or use with incompatible equipment;
- Modifications made to the equipment without the explicit permission of the manufacturer's technical staff;
- Work done on the device by a person not approved by the manufacturer;
- Adaptation to a particular application not anticipated in the definition of the equipment or not indicated in the user's manual;
- Damage caused by shocks, falls, or floods.

6. DELIVERY CONDITION

The DMM13 multimeter is delivered in a blister pack with:

- 2 1.5V batteries
- a user manual in several languages