PRECAUTIONS FOR USE

This device complies with safety standard IEC-61010-1 for voltages up to 600V in category IV, at an altitude below 2000m, indoors, with a pollution level of not more than 2.
Failure to observe the safety instructions may cause an electric shock, fire, explosion, or destruction of the instrument and of the installations.

- 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 and currents between terminals or with respect to earth.
- Do not use the instrument if it appears to be damaged, incomplete, or not properly closed.
- Before each use, check the condition of the insulation on the leads, housing, and accessories. Any element of which the insulation is deteriorated (even partially) must be set aside for repair or scrapped.
- Use leads and accessories rated for voltages and categories at least equal to those of the instrument.
- 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 terminals of the instrument.
- When handling probes or contact tips, keep your fingers behind the guards.

MEASUREMENT CATEGORIES

Definitions of the measurement categories according to standard IEC 61010-1:

CAT I: Circuits not directly connected to the network and specially protected.

Example: protected electronic circuits.

CAT II: Circuits directly connected to the low-voltage installation.

Example: power supply to household electrical appliances and portable tools.

CAT III: Power supply circuits in the installation of the building.

Example: distribution panel, circuit-breakers, fixed industrial machines or devices.

CAT IV: Circuits supplying the low-voltage installation of the building.

Example: power lines, meters, and protection devices.

Thank you for purchasing a **C.A. 5233** multimeter.
For best results from your device:

- **Read** this user manual attentively;
- **Observe** the precautions for its use.

Meaning of the symbols used on the instrument:

⚠	Risk of danger. The operator agrees to refer to these instructions whenever this danger symbol appears.
	Fuse.
9V	9V battery.
CE	The CE marking indicates compliance with European directives.
⧈	Double or reinforced insulation.
	Selective sorting of wastes for the recycling of electrical and electronic equipment within the European Union.In conformity with directive DEEE 2002/96/EC: this equipment must not be treated as household waste.
~	AC – Alternating current.
≂	AC or DC – Alternating or direct current.
⏚	Earth.

CONTENTS

1. PRESENTATION

The C.A 5233 is a TRMS digital multimeter, specially designed to combine in a single instrument the various functions and measurements of the following electrical quantities:

- AC voltmeter with low input impedance (voltage measurements in the fields of electricity and electrical engineering);
- AC or DC voltmeter with high input impedance (voltage measurements in the field of electronics);
- Measurement of frequency and duty cycle;
- Ohmmeter;
- Continuity test with buzzer;
- Diode test;
- Ammeter;
- Capacitance meter;
- Thermometer in °C or °F by measurement and linearization of the voltage across the terminals of a type K thermocouple;
- Contact-free detection of presence of network voltage (NCV function, presence of phase).

Figure 1 : the C.A 5233 multimeter

Item	Designation	See §
1	Display unit	1.1
2	Function keys	1.2
3	Switch	1.3
4	Terminals	1.4

1.1 THE DISPLAY UNIT

The display unit allows :

- An analog display of the parameter measured, in the form of a bargraph, associated with a 6,000-point digital display.
- Comfortable reading of the information thanks to the backlighting of the screen.

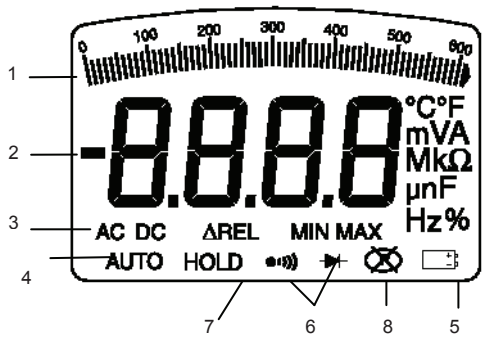


Figure 2 : the display

Item	Function	See §
1	Bargraph	
2	Display (values and units of measurement)	3.1
3	Nature of the measurement (AC or DC)	3.2.1
4	Automatic measurement range selection mode	3.2.2
5	Low battery indicator	5.2
6	Audible continuity test Diode test	3.1.3 3.1.4
7	Display of the modes selected	1.2
8	Non-Permanent Mode : automatic switching off of the device activated	3.2.1

1.1.1 The symbols on the display unit

The display unit uses the following symbols:

Symbol	Designation
AC	Alternating current
DC	Direct current
AUTO	Automatic change of range (see § 1.1.3)
HOLD	Storage and display of stored values
MAX	Maximum RMS value
MIN	Minimum RMS value
REL	Relative value
O.L	Overshoot of measurement capabilities (see §1.1.2)
V	Volt
Hz	Hertz
%	Duty Cycle
F	Farad
°C	Degrees Celsius
°F	Degrees Fahrenheit
A	Ampere

Ω	Ohm
n	Prefix, nano-
µ	Prefix, micro-
m	Prefix, milli-
k	Prefix, kilo-
M	Prefix, Mega-
	Audible continuity test
	Diode test
	Non-Permanent Mode (automatic switching off activated)
	Low battery indicator

1.1.2 Overshoot of measurement capabilities (O.L.)

The **O.L.** (*Over Load*) symbol is displayed when the signal measured exceeds the range of the device.

1.1.3 Automatic change of measurement range (Auto-Range)

The **AUTO** symbol on the display unit indicates that the instrument automatically changes the measurement range to make the measurement. You can change the range manually by pressing RANGE (see § 3.2.2).

1.2 THE KEYS

The keypad has six keys: MODE AC/DC, RANGE, MAX/MIN, HOLD, Hz %, et ΔREL. Here are the keys of the keypad.

Figure 3 : the keys on the keypad

Item	Function	See §
1	Selection of the type of measurement ≂ (AC or DC), •))), **°C**, **°F** or ⊣▶⊢. Activation or de-activation of the automatic switching off of the device at start-up.	3.2.1
2	Manual selection of the measurement range.	3.2.2
3	Activation or de-activation of the MAX/MIN mode.	0
4	Hold of display of the measured value. Activation or de-activation of the blue back-lighting of the screen (☼) (press > 2s).	0
5	Frequency and duty cycle measurement in V AC and A AC	3.2.5
6	Measurement of the relative value	3.2.6

1.3 THE SWITCH

The switch has seven positions. The functions are described in the table below :

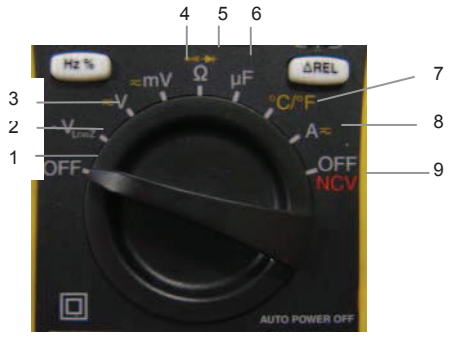


Figure 4 : the switch

Item	Function	See §
1	OFF mode – Powers down the multimeter	2.3
2	AC voltage measurement at low input impedance (V_{LowZ})	3.1.1

3	AC or DC voltage measurement (V)	3.1.1
4	AC or DC voltage measurement (mV)	3.1.1
5	Resistance measurement Continuity test Diode test	3.1.2 3.1.3 3.1.4
6	Capacitance measurement	3.1.5
7	Temperature measurement in °C or °F	3.1.6
8	AC or DC current measurement	3.1.7
9	NVC (Non-Contact Voltage) + Partial OFF mode of the multimeter (NCV function active)	3.1.8

1.4 THE TERMINALS

The terminals are used as follows :

Figure 5 : the terminals

Item	Function
1	Current measurement terminal (10 A)
2	Cold point terminal (COM)
3	Hot point terminal (+)

2. USE

2.1 FIRST USE

Insert the battery provided with the instrument as follows:

1. Using a screwdriver, unscrew the four screws (a, b, c, and d) holding the cover (item 1) on the back of the housing;
2. Place the battery in its compartment (item 2); watch out for the polarity;
3. Screw the cover back onto the housing. Put the stand back in place.

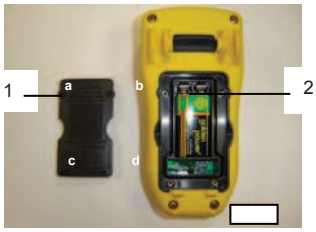


Figure 6 : access to the battery

2.2 POWERING UP THE MULTIMETER

The switch is set to OFF. Turn the switch to the function of your choice. All segments of the display unit light for a few seconds (see figure 2, § 1.1) the screen corresponding to the chosen function then appears. The multimeter is now ready for measurements.

2.3 POWERING DOWN THE MULTIMETER

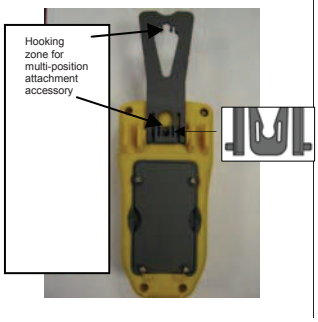
The multimeter can be switched off manually, by setting the switch to OFF, it will also switch itself off automatically if left unused for 15 minutes. At the 14th minute, 5 beeps warn that the multimeter is about to be switched off. To reactivate the instrument, press any key on the keypad.

***Nota** : the OFF NCV position does not completely switch off the multimeter; it remains active for contact-free detection of the presence of the network voltage (NCV).*

2.4 THE PROP

The prop can be placed in either of two positions according to how it is to be used: to suspend the multimeter from a hook (position 1) or to stand it in an inclined position on a support (position 2). To change the position of the prop, proceed as follows:

Position 1 : raise the stand



Position 2 : lower the stand

3. FUNCTIONS

3.1 FUNCTIONS OF THE SWITCH

To access to the functions of the switch, set the switch to ~V LoZ, ≂V, ≂mV, Ω, µF, °C/°F, A≂, NCV or OFF.

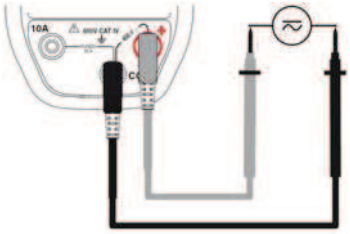
3.1.1 Voltage measurement

The instrument measures :

- the AC voltage at low input impedance (VLowZ);
- direct voltages (DC);
- alternating voltages (AC).

To measure a voltage, proceed as follows:

1. Set the switch to ~V LoZ, ≂V or ≂mV ; when set to ~V LoZ the device is in AC mode only ;
2. For ≂V or ≂mV, select AC or DC by pressing MODE AC/DC. As default, the device is in DC mode. Depending on your selection, the screen displays AC or DC.
3. Connect the black lead to the **COM** terminal and the red lead to **"+"**;
4. Place the contact tips on the terminals of the circuit to be measured;



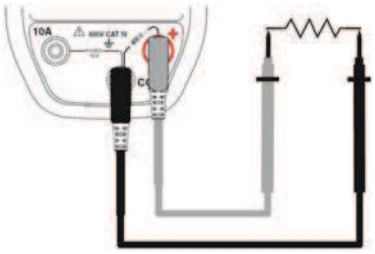
The measured voltage is displayed on screen.

3.1.2 Resistance measurement

***Attention** : all resistance measurements must be made in the absence of any voltage.*

To measure a resistance, proceed as follows:

1. Set the switch to Ω ;
2. Connect the black lead to the **COM** terminal and the red lead to **"+"**;
3. Place the contact tips on the terminals of the component or circuit to be measured;



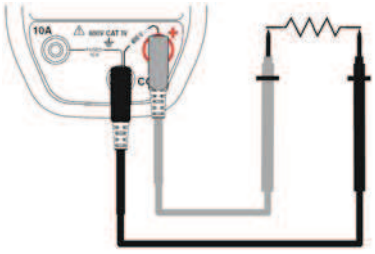
The measured resistance is displayed on screen.

3.1.3 Continuity test with buzzer

***Attention** : all continuity measurements must be made in the absence of any voltage.*

To test electrical continuity, proceed as follows :

1. Set the switch to ;
2. Press . The symbol is displayed ;
3. Connect the black lead to the COM terminal and the red lead to “+”;
4. Place the contact tips on the terminals of the component or circuit to be tested;



The buzzer indicates continuity; the measured resistance is displayed on screen.

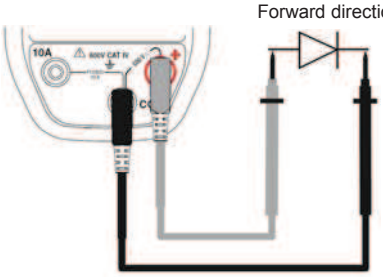
3.1.4 Diode test

***Attention** : all diode test measurements must be made in a power-off condition.*

To test a diode, proceed as follows :

1. Set the switch to ;

2. Press MODE twice. The ⊣◀ symbol is displayed ;
3. Connect the black lead to the **COM** terminal and the red lead to **"+"**;
4. Place the contact tips on the terminals of the component;



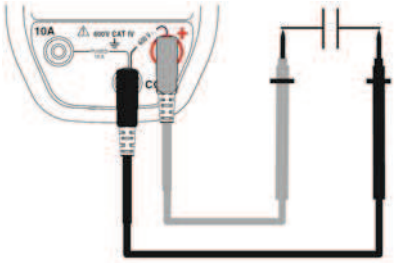
The voltage across the terminals of the component is displayed on screen.

3.1.5 Capacitance measurement

***Attention** : all capacitance measurements must be made in a power-off condition. Observe the connection polarity (+ to the red terminal, - to the black terminal)*

To measure the capacitance, proceed as follows :

1. Make sure that the capacitor to be measured is discharged;
2. Set the switch to µF ;
3. Connect the black lead to the **COM** terminal and the red lead to **"+"**;
4. Place the contact tips on the terminals of the component;



The measured capacitance is displayed on screen.

3.1.6 Temperature measurement

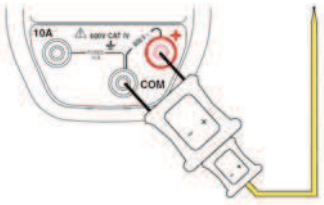
To measure the temperature, proceed as follows :

1. Set the switch to °C/°F T° ;
2. Press MODE/ACDC to select the temperature unit and scale (°C or °F) ;

Remark : *the default is °C.*

3. Connect the temperature probe adapter (item 1) to the **COM** and **"+"** terminals, observing the polarity;
4. Connect the temperature probe (item 2) to the adapter, observing the polarity;

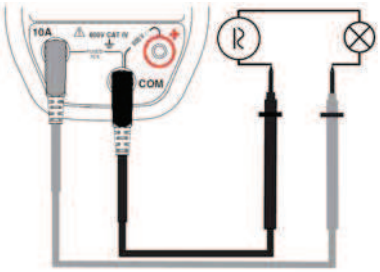
Nota : *if the probe is disconnected or open-circuit, the display unit indicates OL.*



The thermocouple temperature indication is displayed on screen.

3.1.7 Current measurement

1. Set the switch to A≂ ;
2. Select AC or DC by pressing MODE/ACDC. As default, the device is in DC mode. According to your selection, the screen displays DC or AC ;
3. Connect the black lead to the **COM** terminal and the red lead to **"10A"** ;
4. Connect the multimeter in series in the circuit.



The measured current is displayed on screen.

3.1.8 Non-Contact Voltage NCV

1. Set the switch to OFF NCV;
2. Move the C.A 5231 (NCV detection zone) close to the potentially live conductor(s) (presence of phase);
3. If a network voltage of 230V is present (Europe model), the back-lighting lights red; otherwise, it remains off.

3.2 FUNCTIONS OF THE KEYS

The functions of the MODE AC/DC, RANGE, MAX/MIN, HOLD, Hz %, and ΔREL keys can be accessed by successive short or long presses. Each press is confirmed by an audible signal.

3.2.1 The MODE AC/DC key

This key is used to select the type of measurement and the display mode to deactivate the automatic switching off of the device, at start-up, in combination with the switch. A long press during start-up, while turning the OFF switch to any position, deactivates automatic switching off. The symbol is not displayed. As default, automatic switching off is activated and the symbol is displayed.

***Remark** : the Dc mode is activated as default.*

Each press of this length…		…serves to
short	≂V ≂mV A≂	Change the nature of the measurement AC or DC.
		Select the continuity test or diode test mode.
		To display the temperature in degrees Celsius (°C) or in degrees Fahrenheit (°F).

3.2.2 The RANGE key

This key is used to choose a measurement range manually. The range defines the maximum measurement span of which the device is capable.

***Remark** : the Auto-range mode is activated as default.*

Each press of this length…		…serves to
short	~V ≂V ≂mV A≂	To change the measurement range manually (span and resolution).
Long (> 2 sec)		To return to Auto-range mode.

***Remark 1** : the continuity test and diode test modes are not Auto-range.*

***Remark 2** : the Capacitance Measurement mode µF is Auto-range only.*

3.2.3 The MAX/MIN key

This key is used to store and display, successively, the current, maximum, and minimum TRMS values.

The MODE AC/DC, RANGE, HOLD, Hz %, and ΔREL keys are inactive in the MAX/MIN mode.
The AUTO mode is deactivated.

Each press of this length…		…serves to
1st short		activate MAX/MIN storage.
short	~V, V, mV, Ω, µF, °C/°F T°, A	at each press, to view in turn the MAX, MIN, and current value. ***Remark:*** the MAX value is displayed as default.
Long (> 2 sec)		Exit from the MAX/MIN mode.

3.2.4 The HOLD key

This key is used to hold the display of the measured value, and to activate/deactivate the backlighting of the screen.

Each press of this length…		…serves to
court	~V, V, mV, Ω, µF, °C/°F T°, A	➢ To hold the display of the measured value ; ➢ To exit from the HOLD mode.
long (> 2 sec)		to activate/deactivate the backlighting of the screen. Note: the backlighting is switched off at the end of 10 seconds.

3.2.5 The Hz % key

This key is used to display the frequency of the AC signal measured, along with the duty cycle.

It is inactive in DC mode.

Each press of this length…		…serves to
short	~V, V, mV, A	➢ to display the frequency, to display the duty cycle, ➢ to exit from the Hz % mode

3.2.6 The ΔREL key

This key is used to display the value relative to a reference stored when the key was pressed.

For example, if the value stored when the key was pressed = 10V and the current value is 11.5V, the display in relative mode will be 11.5 - 10 = 1.5V.

Note: *the Auto-Range mode is deactivated.*

Each press of this length…		…serves to
short	~V LowZ, ≂V, ≂mV, Ω, µF, °C/°F T°, A≂	➢ to display the relative value ; ➢ to exit from the ΔREL mode.
long (> 2 sec)		To deactivate automatic switching off.

4. CHARACTERISTICS

4.1 REFERENCE CONDITIONS

Quantities of influence	Reference conditions
Temperature :	23 °C ± 2 °C
Relative humidity :	45 % to 75 %
Supply voltage :	8.5 V ± 0.5 V

4.2 CHARACTERISTICS AT THE REFERENCE CONDITIONS

The uncertainty is expressed in the form x% of the reading + y counts, from 10% to 100% of each measurement range.

4.2.1 Direct voltages

The input impedance is 10MΩ.

■ **mV DC**

Range	Resolution	Uncertainty (±)
60 mV	0.01 mV	1 % + 12 cts
600 mV	0.1 mV	0.6 % + 2 cts

■ **V DC**

Range	Resolution	Uncertainty (±)
600 mV	0.1 mV	0.6 % + 2 cts
6 V	0.001 V	0.2 % + 2 cts
60 V	0.01 V	
600 V	0.1 V	
1000 V *	1 V	

** According to safety rules, 1000V range is limited to 600V.*

4.2.2 Alternating voltages

The input impedance is 10 MΩ.

■ **mV AC True RMS**

Range	Resolution	Uncertainty (±) 45 Hz to 60 Hz	Uncertainty (±) 60 Hz to 1 kHz
60 mV	0.01 mV	2 % + 12 cts	2.5 % + 12 cts
600 mV	0.1 mV	2 % + 3 cts	2.5 % + 3 cts

■ **V AC True RMS**

Range	Resolution	Uncertainty (±) 45 Hz to 60 Hz	Uncertainty (±) 60 Hz to 1 kHz
6 V	0.001 V	2 % + 3 cts	2.5 % + 3 cts
60 V	0.01 V		
600 V	0.1 V		
1000 V *	1 V		

** According to safety rules, 1000V range is limited to 600V.*

4.2.3 Alternating voltages at low impedance (V AC LowZ True RMS)

The input impedance is 270kΩ.
A low input impedance serves to eliminate the effects of interference voltages due to the supply network, and makes it possible to measure an AC voltage with a minimum of error.

Range	Resolution	Uncertainty (±)
6 V	0.001 V	45 Hz à 60 Hz 2 % + 10 cts

** According to safety rules, 1000V range is limited to 600V.*

4.2.4 Frequency (V AC or A AC)

Range	Resolution	Uncertainty (±)	Sensitivity
10 to 3000 Hz	0.01 Hz	0.5 %	15 V RMS

4.2.5 Duty Cycle

Range	Resolution	Uncertainty (±)	Frequency
0.1 to 99.9 %	0.1 %	1.2 % + 2 cts	5 Hz to 150 kHz

4.2.6 Resistance

Range	Resolution	Uncertainty (±)
600 Ω	0.1 Ω	2 % + 2 cts
6 kΩ	0.001 kΩ	0.3 % + 4 cts
60 kΩ	0.01 kΩ	
600 kΩ	0.1 kΩ	
6 MΩ	0.001 MΩ	
60 MΩ	0.01 MΩ	0.5 % + 20 cts

4.2.7 Continuity test

Range	Resolution	Uncertainty	Measurement current
600 Ω	0.1 Ω	Audible signal < 20 Ω	< 0.35 mA

4.2.8 Diode test

Range	Resolution	Uncertainty (±)	Open-circuit voltage	Measurement current
2.8 V	0.001 V	1 % + 2 cts	< 2.8 V	< 0.9 mA

4.2.9 Capacity

Range	Resolution	Uncertainty (±)
40 nF	0.01 nF	3.5 % + 4 cts
400 nF	0.1 nF	
4 µF	0.001 µF	
40 µF	0.01 µF	
400 µF	0.1 µF	
1000 µF	1 µF	5 % + 5 cts

4.2.10 Temperature (type K thermocouple)

The uncertainty does not include the K thermocouple.

Range	Resolution	Uncertainty (±)
- 20 to 760 °C	1°C	2 % + 5°C
- 4 to 1400 °F	1°F	2 % + 9°F

4.2.11 Max/Min

Capture time: 400 ms
Add an uncertainty of ± (0.5% + 2 pts) to the uncertainty of the function and of the range used.

4.2.12 DC current (10 A DC)

Range	Resolution	Uncertainty (±)	Protection
6 A	0.001 A	1.5 % + 3 cts	Fast-blow fuse F10 A/600 V/50 kA 6.3x32
10 A*	0.01 A		

**15 A for a maximum of 60 seconds.*

4.2.13 AC current (10 A AC)

Range	Resolution	Uncertainty (±)	Protection
6 A	0.001 A	40 Hz to 1 kHz 2 % + 3 cts	Fast-blow fuse F10 A/600 V/50 kA 6.3x32
10 A*	0.01 A		

**15 A for a maximum of 60 seconds.*

4.3 ENVIRONMENTAL CONDITIONS

Environmental conditions	In use	In storage
Temperature :	0 °C to +50 °C	-20 °C to +70 °C
Relative humidity (HR) :	90 % at 40 °C	50 % at 60 °C

4.4 CHARACTERISTICS OF CONSTRUCTION

Dimension :	H 155 x W 75 x D 55 mm
Weight :	320 g (with the battery and the fuse)
Bargraph :	61 segments, refresh interval 30 ms
Measurement acquisition:	3 times per second

4.5 POWER SUPPLY

Power supply :	9 V LF22/6LR61 battery
Battery life :	> 100 hours at room temperature
Automatic switching off time :	15 minutes of non-use

4.6 COMPLIANCE WITH INTERNATIONAL STANDARDS

Electrical safety :	Application of safety rules as per standard EN-61010-1. 1000V CAT-III - 600V CAT-IV. Pollution level 2. Double insulation.
Electromagnetic compatibility :	Compliant with standard EN-61326 Residential environment
Mechanical strength :	Free fall: 1m (in accordance with standard IEC-68-2-32)
Degree of protection of the housing :	IP54 as per EN 60529

4.7 VARIATIONS IN DOMAIN OF USE

Quantity of influence	Range of influence	Influence
Temperature	0°C to + 50°C	V AC : 0.5%L/10°C mV DC : 0.5%L/10°C Ω (R>20 MΩ) : 0.5%L/10°C µF (C>50 µF) : 5%L/10°C
Frequency	1 to 3 kHz	V AC : 10%L + 1ct

5. MAINTENANCE

For maintenance, use only the replacement parts specified.

5.1 CLEANING

- Disconnect all leads from the instrument and set the switch to **OFF**.
- Use a soft cloth, dampened with soapy water. Rinse with a damp cloth.
- Dry thoroughly with a dry cloth or forced air before using again.

5.2 REPLACING THE BATTERY

The ▭ symbol indicates that the battery is low and must be changed. When this symbol appears on the display unit, the instrument continues to operate for a few minutes, then switches itself off.

To replace the battery, proceed as follows:
1. Set the switch to OFF ;
2. Disconnect the measurement leads from the input terminals;
3. using a screwdriver, unscrew the four screws of the battery compartment cover on the back of the housing (see 2.1) ;
4. Replace the old battery (see §2.1) ;
5. Screw the cover back onto the housing. Put the stand back in place.

5.3 REPLACING THE FUSE

To replace the fuse, proceed as follows :
1. Follow the steps 1 to 3 of the procedure described above (§ 5.2) ;
2. Remove the blown fuse using a screwdriver;
3. Insert an identical fuse, then screw the cover back onto the housing.

5.4 METROLOGICAL CHECK

Like all measuring or testing devices, the instrument must be checked regularly.
This instrument should be checked at least once a year. For checks and calibrations, contact one of our accredited metrology laboratories (information and contact details available on request), at our Chauvin Arnoux subsidiary or the branch in your country.

5.5 REPAIR

For all repairs before or after expiry of warranty, please return the device to your distributor.

6. WARRANTY

Except as otherwise stated, our warranty is valid for twelve months starting from the date on which the equipment was sold. Extract from our General Conditions of Sale provided on request.

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.

7. TO ORDER

- **The C.A 5233**

The multimeter is delivered with :

- 1 pair of leads, red and black
- 1 9V alkaline battery
- 1 temperature probe (type K thermocouple)
- 1 adapter for type K temperature probe
- 1 user manual

C.A 5233	P01196733