

C.A 6422











C.A 6424



Earth testers

Thank you for purchasing a **C.A 6422 or C.A 6424 earth tester**.

- To obtain the best service from your instrument:
- **read** this user manual carefully,
- **comply** with the precautions for use.

	WARNING, risk of DANGER! The operator must refer to these instructions whenever this danger symbol appears.
	WARNING, risk of electric shock. The voltage applied to parts marked with this symbol may be hazardous.
	Useful information or tip.
	Earth.
	Battery.
	Ammeter clamp.
	The product is declared recyclable following a life cycle analysis in accordance with standard ISO 14040.
	The CE marking indicates conformity with European LVD and EMC directives.
	Chauvin Arnoux has adopted an Eco-Design approach in order to design this appliance. Analysis of the complete life-cycle has enabled us to control and optimize the effects of the product on the environment. In particular this appliance exceeds regulation requirements with respect to recycling and reuse.
	The rubbish bin with a line through it means that in the European Union, the product must undergo selective disposal in compliance with Directive WEEE 2012/19/EU.

Definition of measurement categories

- Measurement category IV corresponds to measurements taken at the source of low-voltage installations.
Example: power feeders, counters and protection devices.
- Measurement category III corresponds to measurements on building installations.
Example: distribution panel, circuit-breakers, machines or fixed industrial devices.
- Measurement category II corresponds to measurements taken on circuits directly connected to low-voltage installations.
Example: power supply to electro-domestic devices and portable tools.

PRECAUTIONS FOR USE

This instrument is compliant with safety standard IEC 61010-2-030 for voltages up to 600V in category IV.

Do not use the instrument for measurements on circuits that are not in measurement categories II, III, or IV or that might be connected inadvertently to circuits that are not in measurement categories II, III, or IV.

- The operator and/or the responsible authority must carefully read and clearly understand the various precautions to be taken in use. Sound knowledge and a keen awareness of electrical hazards are essential when using this instrument.
- If you use this instrument other than as specified, the protection it provides may be compromised, thereby endangering you.
- Do not use the instrument on networks of which the voltage or category exceeds those mentioned.
- 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.
- Before using your instrument, check that it is perfectly dry. If it is wet, it must be thoroughly dried before it can be connected or used.
- Use only the leads and accessories supplied. The use of leads (or accessories) of a lower voltage or category limits the voltage or category of the combined instrument and leads (or accessories) to that of the leads (or accessories).
- Use personal protection equipment systematically.
- When handling the leads, test probes, and crocodile clips, keep your fingers behind the physical guard.
- All troubleshooting and metrological checks must be performed by competent and accredited personnel.

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1. FIRST START-UP

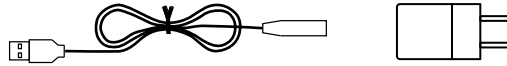
1.1. DELIVERY CONDITION

The C.A 6422 is delivered in a cardboard box with:

- 6 LR6 or AA batteries,
- 1 multilingual getting started guide.

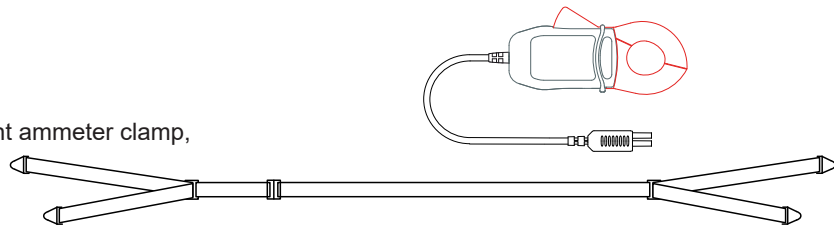
The C.A 6424 is delivered in a cardboard box with:

- 6 rechargeable NiMH batteries,
- 1 carrying bag,
- 1 mains-USB adapter (5V, 2A)
- 1 USB-shaver cord
- 1 multilingual getting started guide



1.2. ACCESSORIES

- Carrying bag,
- G72 leakage current measurement ammeter clamp,
- Carrying handle,
- Four-point hands-free strap,
- Earth measurement kit, 15m,
- Expert earth measurement kit, 50m.

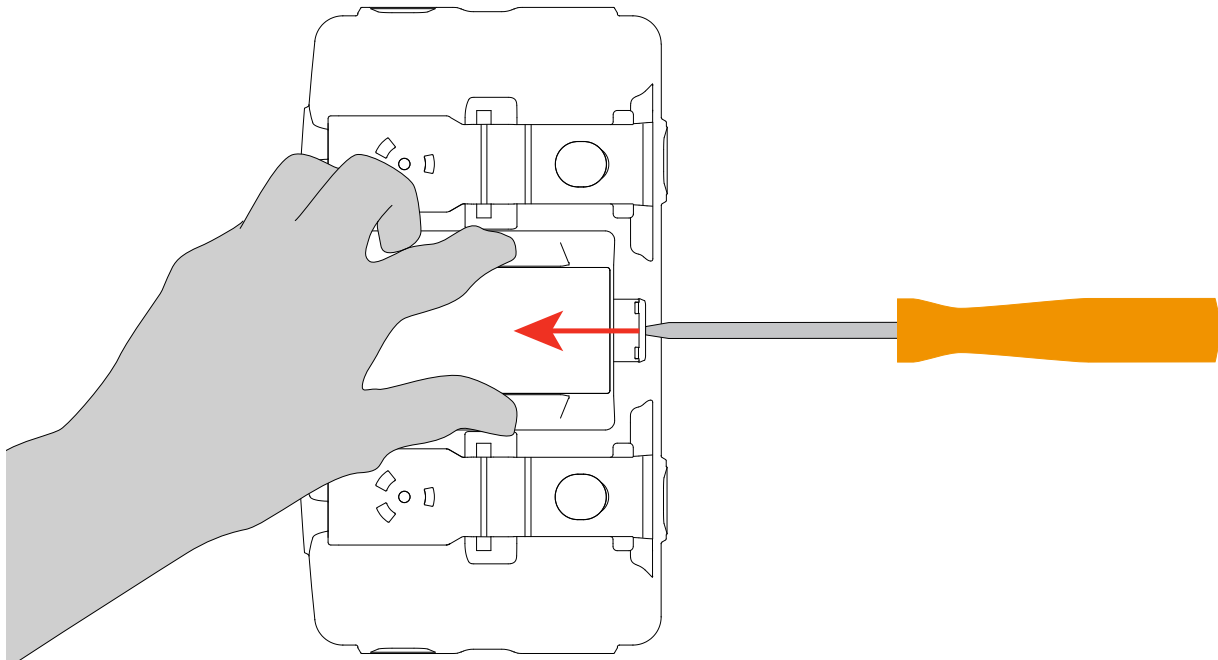


For the accessories and spares, consult our web site:

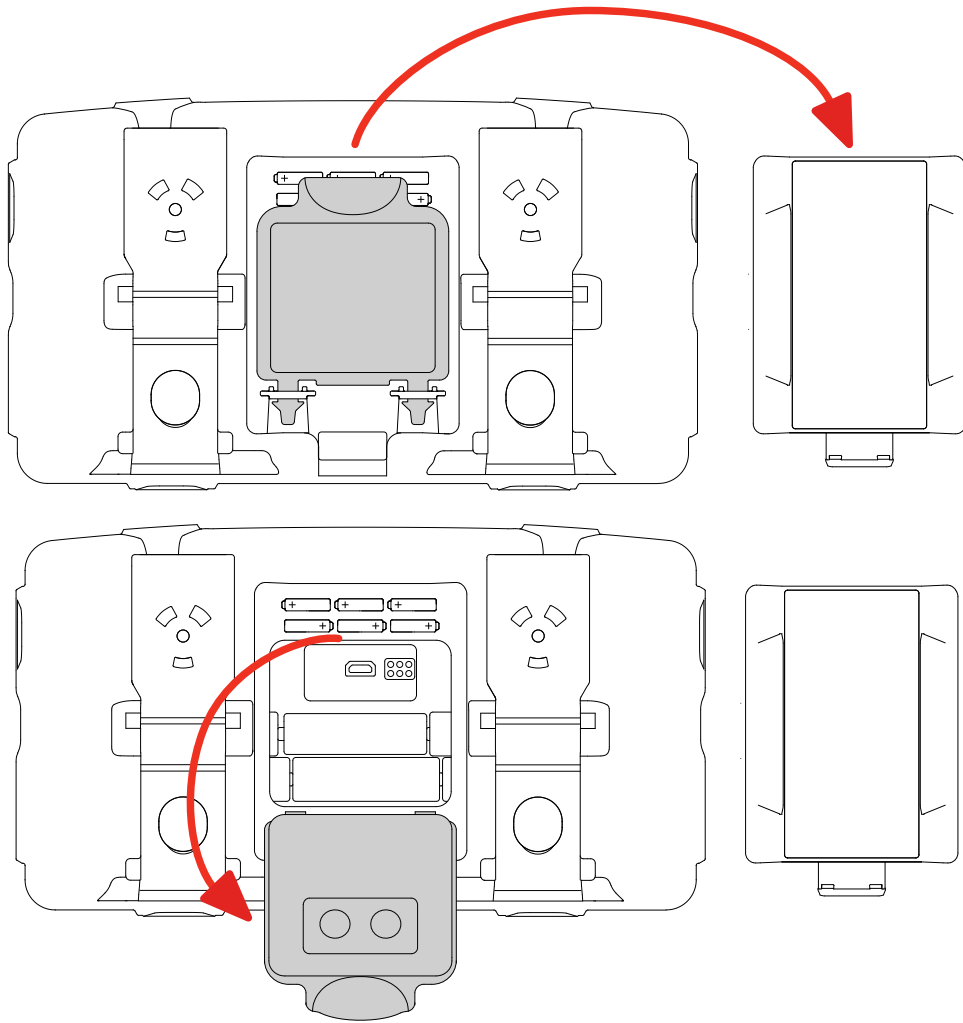
www.chauvin-arnoux.com

1.3. INSERTING THE BATTERIES

- Open the battery compartment cover. Place your fingers on either side of the cover, insert a tool in the latching system, and lever up.




- Remove the battery compartment cover, then raise the rubber plug.



- Insert the 6 primary batteries provided (C.A 6422) or the 6 rechargeable batteries (C.A 6424), with the polarities as indicated.
- Put the rubber plug back in place. Push it in correctly.
- Put the battery compartment cover back in place; make sure that it is completely and correctly closed.


1.4. PRIMARY BATTERIES IN THE C.A 6424 OR RECHARGEABLE BATTERIES IN THE C.A 6422

If you use primary batteries in your C.A 6424, the battery life will be longer, but the battery level indicator reading will be off.

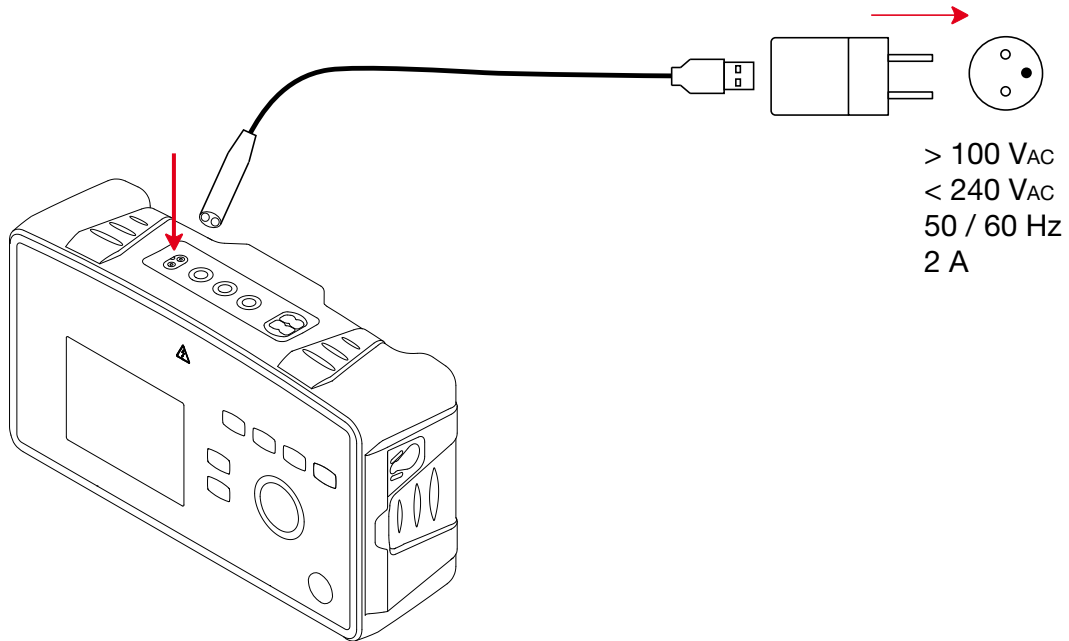
If you use rechargeable batteries in your C.A 6422, it will indicate a low battery  and actual battery life will be shorter.

1.5. CHARGING THE BATTERY (C.A 6424)

Before the first use, start by fully charging the battery. The charging must be done between 0 and 40°C.

 Do not charge if there are primary batteries in the instrument.

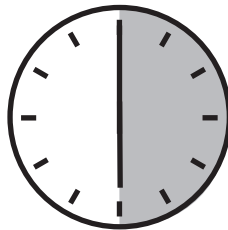
- Connect one end of the shaver USB cable (provided) to the terminal block of the C.A 6424 and the other end to a wall outlet using the mains-USB adapter (provided).



- The instrument is switched on and the display unit indicates the progress of the charging.



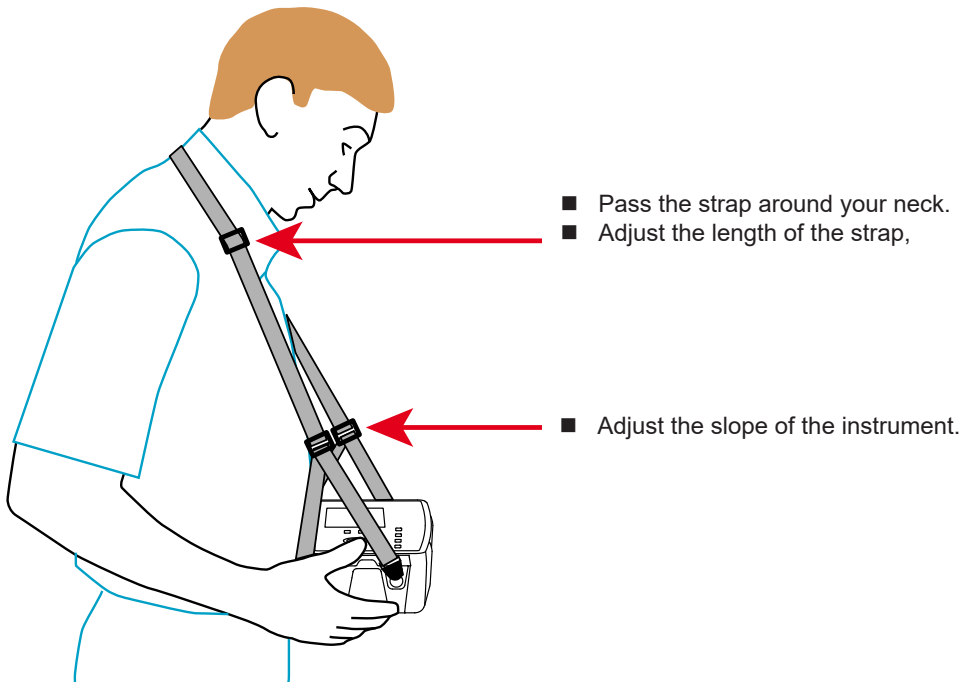
Charging takes approximately 6 hours.



- Once charging is over, disconnect the plug. The instrument is ready to be used.

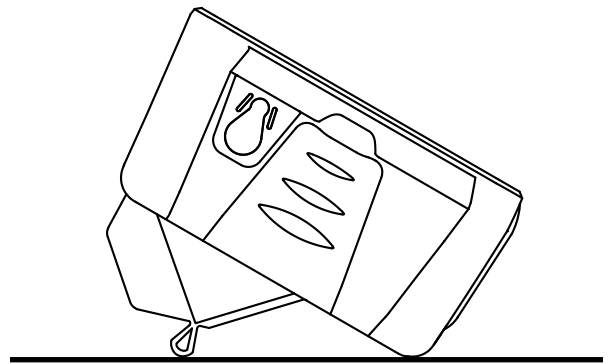
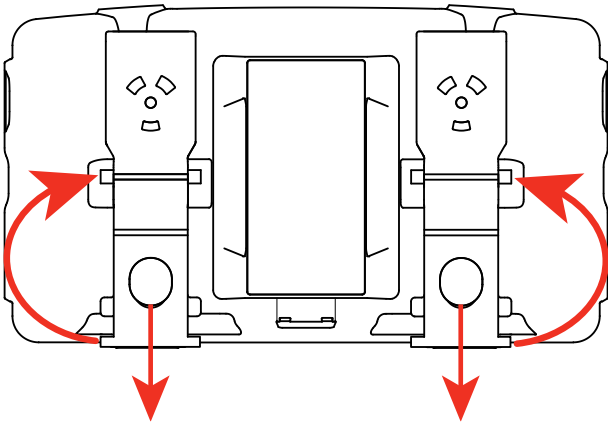
1.6. CARRYING THE DEVICE

- The 4-point hands-free strap (optional) will let you use the device while leaving your hands free. Snap the four fasteners of the strap onto the four lugs on the device.



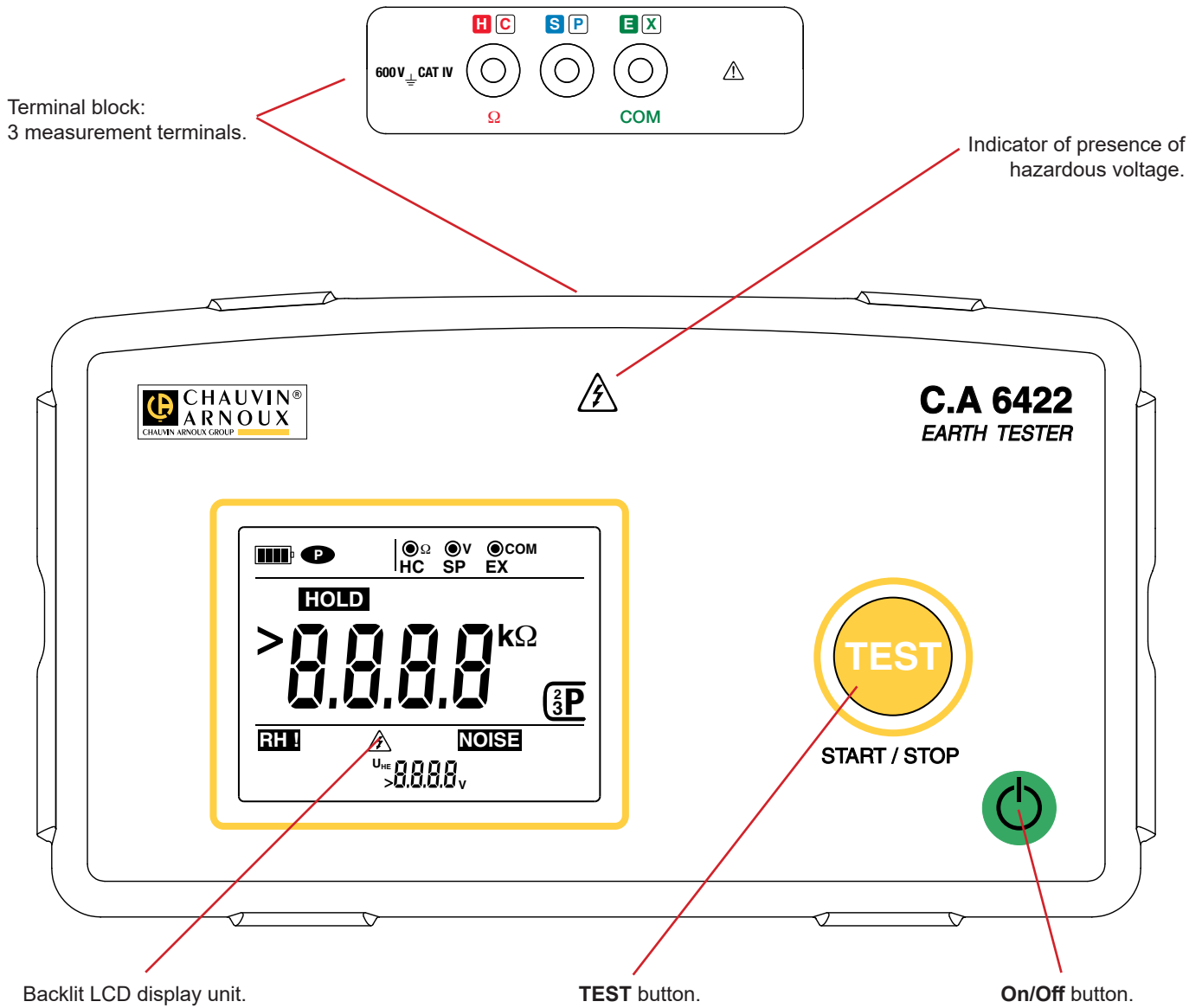
1.7. USE ON A DESKTOP

Pull the props out, then fold them and put them in the other location.

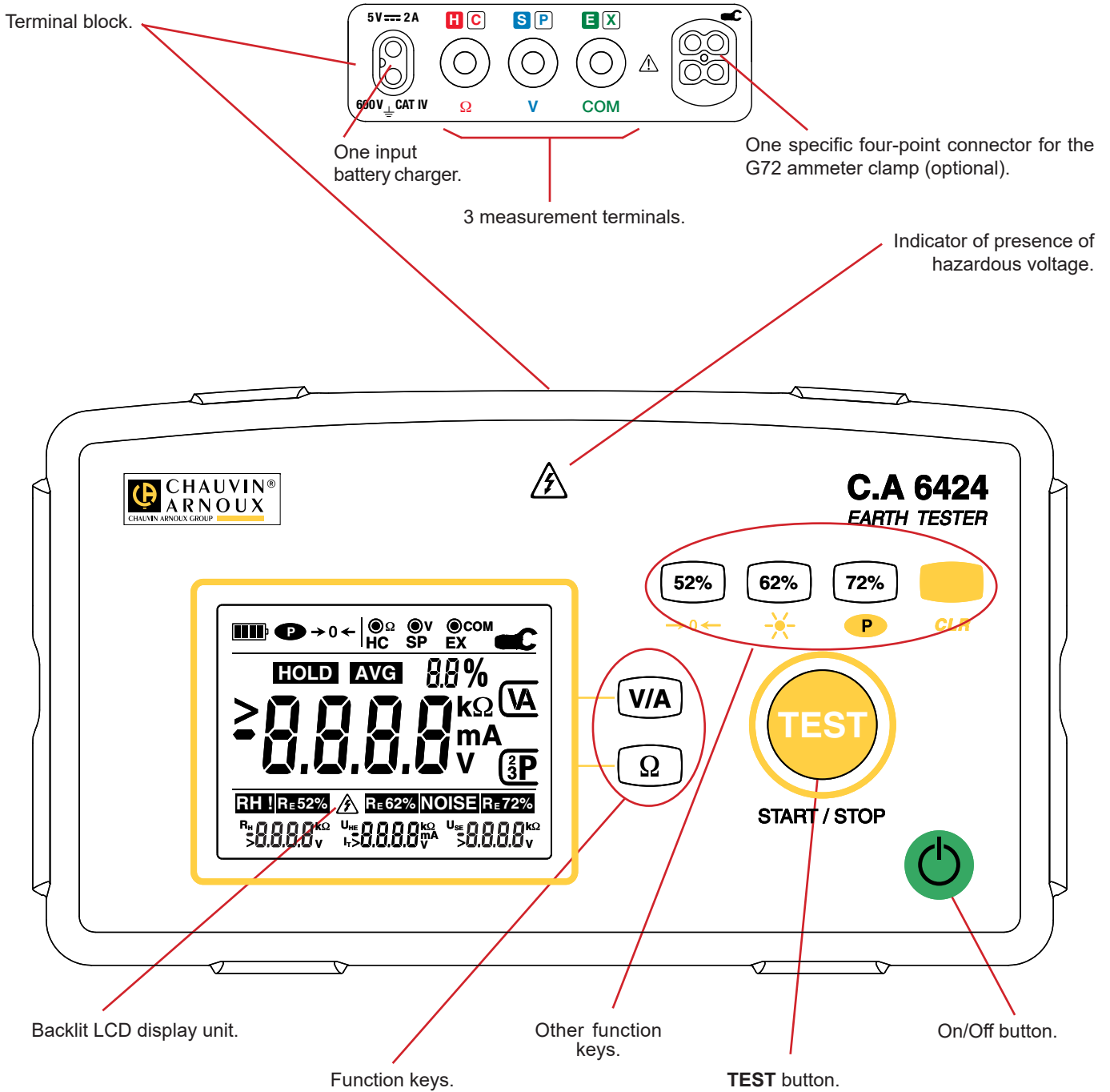


2. PRESENTATION OF THE DEVICES

2.1. C.A 6422



2.2. C.A 6424





2.3. FUNCTIONS OF THE INSTRUMENTS



C.A 6422 and C.A 6424 earth testers are portable measuring instruments with LCD displays. They are powered by batteries. They can both be powered by rechargeable batteries, but only the C.A 6424 can recharge them.

These instruments are used to check the safety of electrical installations. They can be used to test a new installation before it is powered up, to check an existing installation, whether in operation or not, or to diagnose a malfunction in an installation.

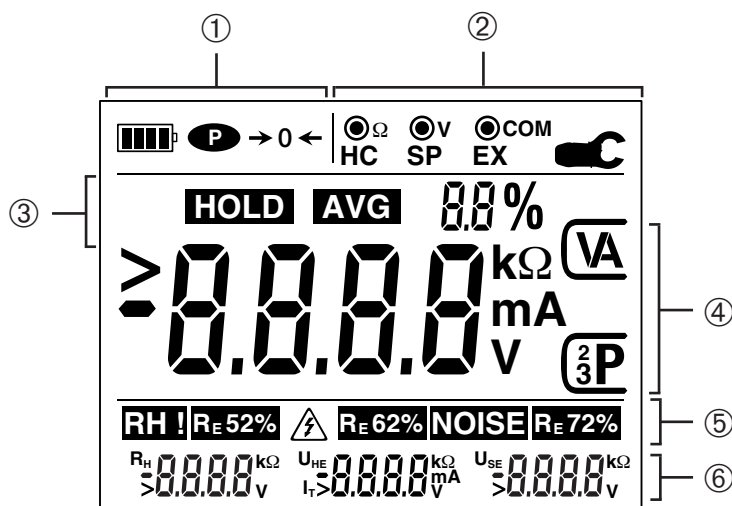
	C.A 6422	C.A 6424
Earth resistance measurement (with three rods)	✓	✓
Voltage measurement	✗	✓
Resistance measurement	✓	✓
Mean of the earth measurements at 52, 62, and 72%	✗	✓
Detection of R_H too high	✓	✓
Detection of R_E too high	✓	✓
Detection of a spurious voltage on U_{SE}	✓	✓
Measurement of AC current with an ammeter clamp (optional)	✗	✓

2.4. KEYS AND BUTTONS

Buttons	Function
	A long press on the On/Off button switches the instrument on. A second long press switches it off.
TEST	Pressing the TEST button starts earth measurements in automatic mode. A long press on the TEST button starts earth measurements in permanent mode. Pressing the TEST button during a measurement stops the measurement. At the end of the measurement, pressing the TEST button serves to exit from the frozen measurement display.
 + TEST	Keeping the On/Off and TEST buttons pressed for more than 5 seconds when switching on changes the names of the H, S, E terminals to C, P, X.

Keys of the C.A 6424	Function
V/A	The key can be pressed to make voltage measurements, or current measurements if an ammeter clamp is connected. In this latter case, a second press forces voltage measurements.
Ω	The key can be pressed to make resistance measurements, or earth resistance measurements by pressing the TEST button.
52% → 0 ←	Pressing the key stores in memory the value of the measurement with the S rod at 52% of the distance. Pressing the yellow key, then the 52% key, activates or deactivates compensation of the measurement leads. A press on the yellow key, then a long press on the 52% key, serves to compensate the resistance of the leads for the resistance measurement.
62% 	Pressing the key stores the value of the measurement with the S rod at 62% of the distance. Pressing the yellow key, then the 62% key, switches on the backlighting for one minute, or switches the backlighting off.
72% 	Pressing the key stores the value of the measurement with the S rod at 72% of the distance. Pressing the yellow key, then the 72% key, deactivates automatic switching off of the instrument.
yellow CLR	Pressing the yellow key gives access to the second functions of the 52%, 62%, and 72% keys. A long press on the yellow key erases the values stored in memory.

2.5. DISPLAY UNIT



- 1 Indicates the condition of the battery, whether auto off is activated or not, and the compensation of the leads.
- 2 Indicates which terminals to connect
- 3 In a 3P earth measurement, **HOLD** indicates that the measurement is frozen, **AVG** indicates that the measurement displayed is the average of 3 measurements, and the % indicates the range of variation in the averaged measurements.
- 4 Main display
- 5 Indicates the errors on the measurement and on the earth measurements in memory (C.A 6424)
- 6 Provides complementary information about the earth measurement (C.A 6424)

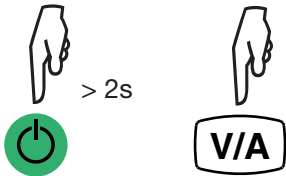
3. USE

3.1. VOLTAGE MEASUREMENT (C.A 6424)

The instrument measures the RMS (Root Mean Square) voltage.

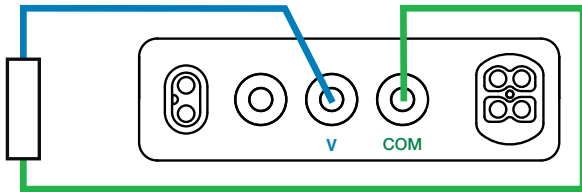
RMS (Root Mean Square): square root of the arithmetic mean of the squares of the instantaneous values of the signal.

3.1.1. MAKING A MEASUREMENT



Long-press the **On/Off** button to switch the instrument on.
Then press the **V/A** key.
The instrument indicates that it is in voltage measurement mode by displaying V.

Connect one end of the leads to the **V** and **COM** terminals and the other end to the object to be measured.



The measurement is displayed.

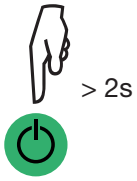


3.1.2. ERROR INDICATION

If the measurement departs from the measurement range, the instrument so reports by displaying **>700.0V**.

3.2. RESISTANCE MEASUREMENT (2P)

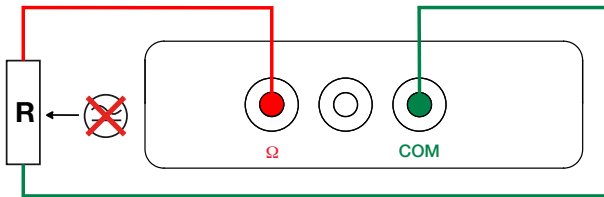
3.2.1. MAKING A RESISTANCE MEASUREMENT WITH THE C.A 6422



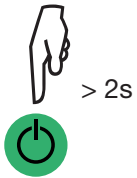
Long-press the **On/Off** button to switch the instrument on.
It indicates that it is in resistance measurement mode by displaying **2P**.

Use the leads to connect the device to be tested to the Ω and **COM** terminals of the instrument.

The measurement is displayed.



3.2.2. MAKING A RESISTANCE MEASUREMENT WITH THE C.A 6424



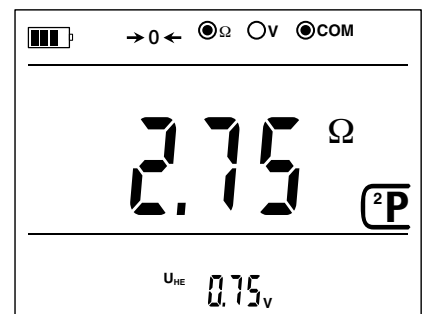
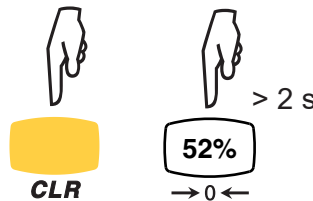
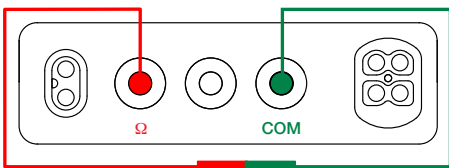
Long-press the **On/Off** button to switch the instrument on.
It indicates that it is in resistance measurement mode by displaying **2P**.



If the C.A 6424 is already on but in voltage or current measurement mode, press the Ω key to switch to resistance measurement.

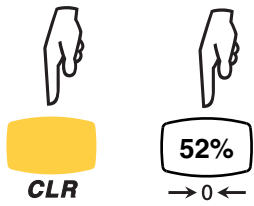
For a more accurate measurement, compensate the leads.

Connect the leads between the Ω and **COM** terminals and short-circuit them. Press the yellow key, then long-press the **52%** key.



The $\rightarrow 0 \leftarrow$ symbol blinks during the compensation. When it is done, the display unit indicates **00.00 Ω** .

If it displays **Err**, the compensation could not be done, either because the value to be compensated exceeded 5Ω or because the leads were disconnected during the compensation.

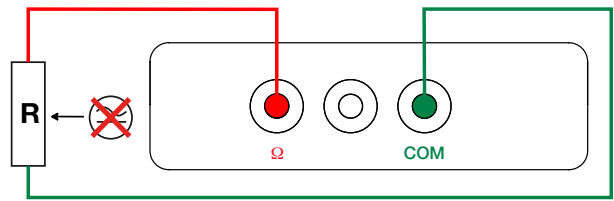


Pressing the $\rightarrow 0 \leftarrow$ key deactivates or reactivates the compensation of the leads.

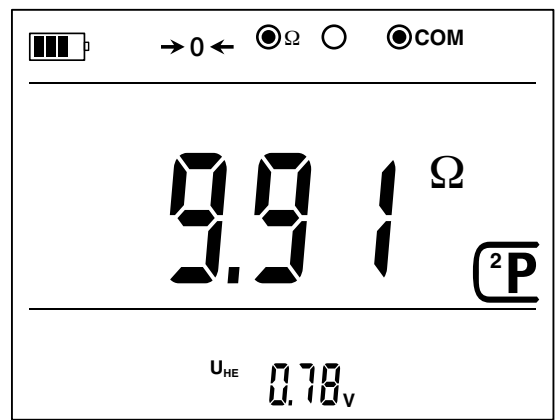
Once the compensation has been done, you can make resistance measurements.

Use the leads to connect the device to be tested to the Ω and **COM** terminals of the instrument.

 The object to be tested must not be live.



The measurement is displayed.




The instrument displays the measured value minus the compensation.

The value displayed may be negative if the leads used for the measurement are not the ones that were compensated. In this case, redo the compensation.

The compensation of the leads is preserved after an auto-off of the instrument but not after it is switched off.

3.2.3. ERROR INDICATION

- If the measurement departs from the measurement range, the instrument so reports by displaying **>99.99k Ω** .
- If there is a spurious voltage $U_{HE} > 3\text{ V}$ between the Ω and **COM** terminals, the **NOISE** symbol blinks.
- If the spurious voltage between the Ω and **COM** terminals $U_{HE} > 50\text{ V}$, the  indicator blinks and the measurement is impossible.

3.3. EARTH RESISTANCE MEASUREMENT

This function is used to measure an earth resistance when the electrical installation to be tested is not live (new installation, for example). It uses two auxiliary rods, with the third rod being constituted by the earth electrode to be tested (whence the name "3P").

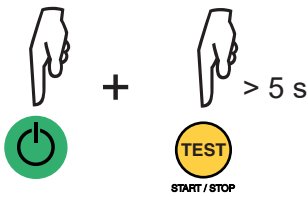
It can be used on an existing electrical installation, but the power must be cut off (main RCD). In all cases, new or existing installation, the earthing strip of the installation must be open during the measurement.

3.3.1. DESCRIPTION OF THE MEASUREMENT PRINCIPLE

The device generates between the H and E terminals a square wave at a frequency of 128 Hz and an amplitude of 10 V peak. It measures the resulting current, I_{HE} , along with the voltage present between the S and E terminals, U_{SE} . It then calculates the value of $R_E = U_{SE} / I_{HE}$.

3.3.2. DESIGNATIONS OF THE TERMINALS

The names of the measurement terminals can be changed from H S E to C P X.

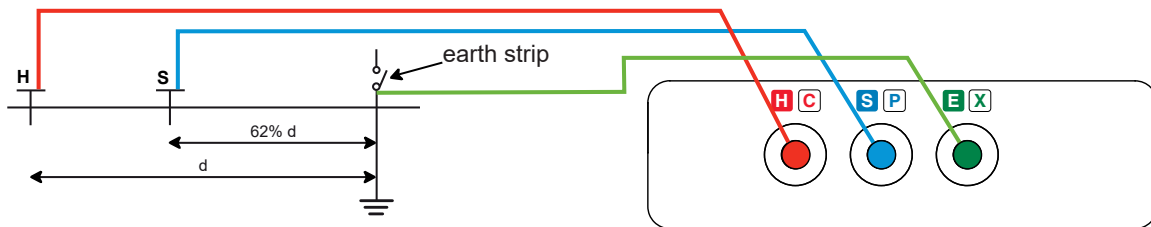


To do this, keep the **On/Off** and **TEST** buttons pressed for more than 5 seconds when switching on; the names of the H, S, E terminals become C, P, X. This information is preserved even if the instrument is switched off.

3.3.3. MAKING A MEASUREMENT

There are several measurement methods. We recommend using the "62%" method.

- Plant the H and S rods aligned on the earth electrode. The distance between the S rod and the earth electrode must be approximately 62% of the distance between the H rod and the earth electrode. In order to avoid electromagnetic interference, we recommend paying out the full length of the cables, placing them as far apart as possible, and avoiding loops.



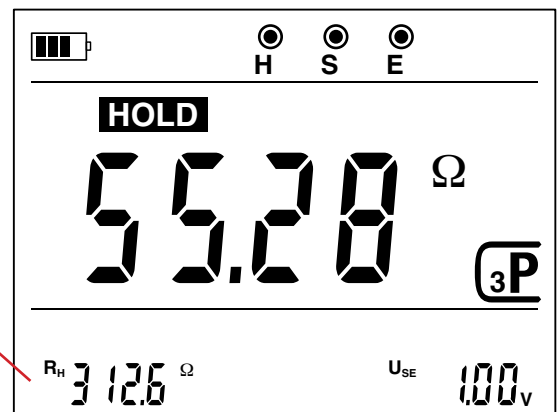
- Connect the cables to the H and S terminals. Power down the installation and disconnect the earth strip. Then connect the E terminal to the earth electrode to be tested.



- Press the **TEST** button to make a measurement in automatic mode.

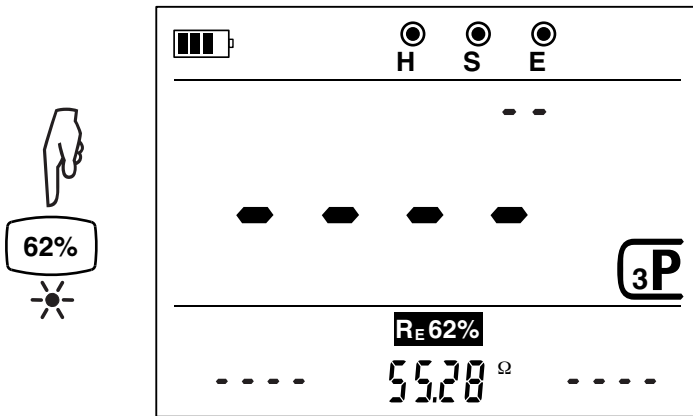
The **TEST** button blinks red, then the measurement is displayed. It remains frozen (**HOLD**) until you press the **TEST** button again.

The values of R_H and U_{SE} are displayed only for the C.A 6424.

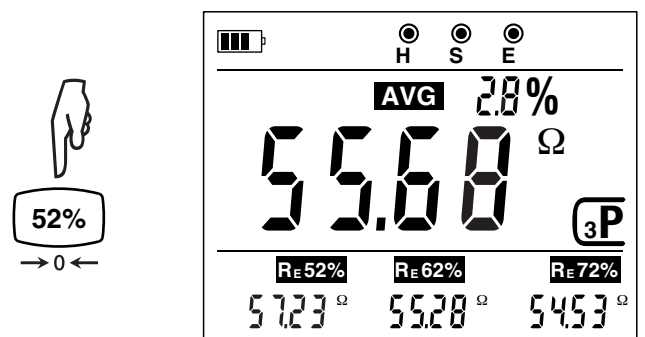
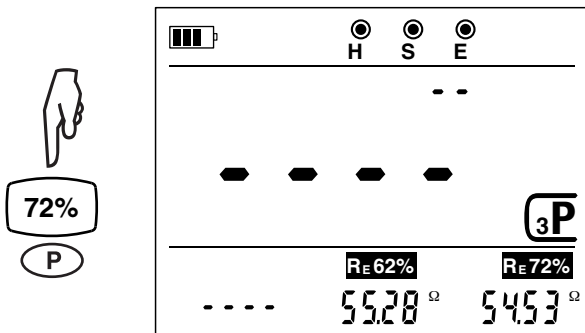
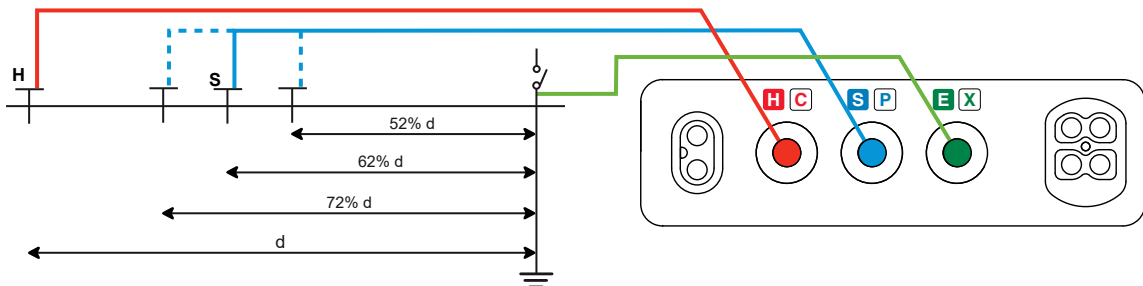


3.3.4. AVERAGE OF THE MEASUREMENTS (C.A 6424)

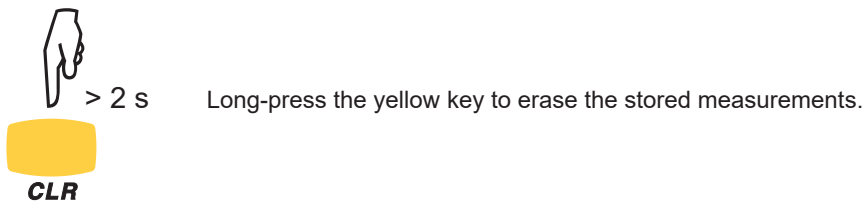
At the end of the measurement made with the S rod at 62% of the distance d between the H rod and the earth electrode, press the **62%** key to store the value in memory.



Move the S rod towards the H rod by 10% of d and make another measurement. Press the **72%** key to store it. Then move the S rod again by 10% of d , but towards the earth electrode. Make another measurement and press the **52%** key to store it.



The instrument immediately calculates the mean of the 3 measurements and the percent difference between the lowest value and the highest value. For the measurement to be valid, the difference must not exceed 5%.



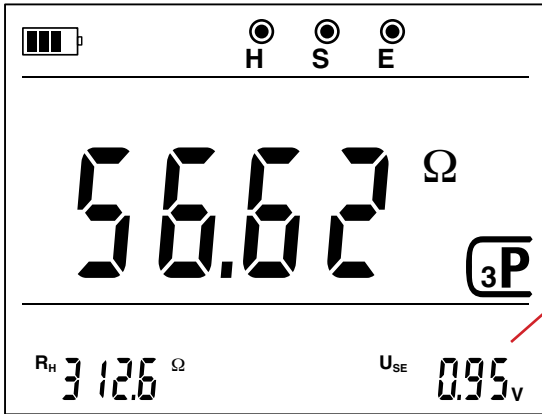
3.3.5. MEASUREMENT IN PERMANENT MODE

- Plant the H and S rods and connect the instrument as explained earlier.



> 2 s

- Long-press the **TEST** button to make a measurement in permanent mode.



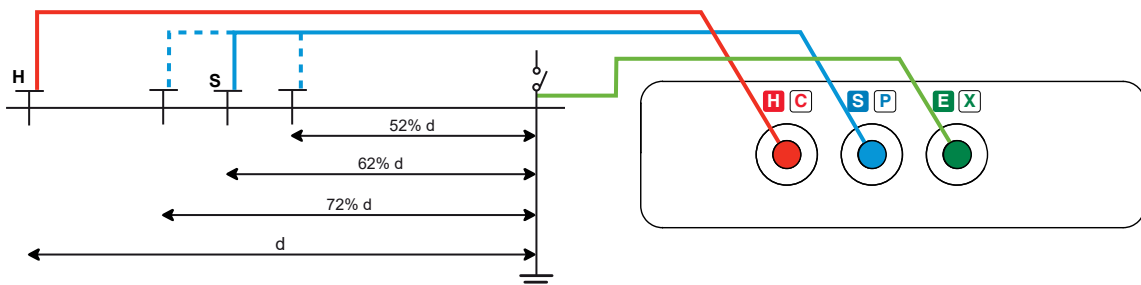
The **TEST** button blinks red, then the measurement is displayed immediately.

The values of R_H and U_{SE} are displayed only for the C.A 6424.

Press the **TEST** button again to stop the measurement.

3.3.6. VALIDATION OF THE MEASUREMENT

To validate your measurement, move the S rod towards the H rod by 10% of d and make another measurement. Then move the S rod, again by 10% of d , but towards the earth electrode.

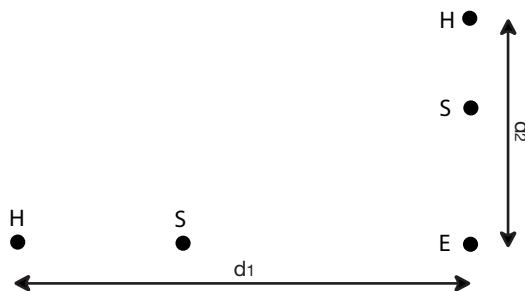


The 3 measurement results must be the same to within a few percent. If this is the case, the measurement is valid. If not, it is because the S rod is in the zone of influence of the earth electrode.

Calculating the percent difference is easy with a C.A 6424.

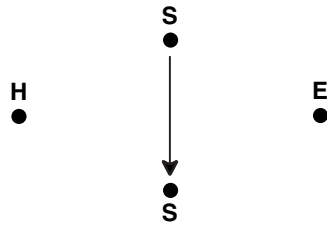
3.3.7. POSITIONING OF THE AUXILIARY RODS

To make sure that your earth measurements are not distorted by interference, we recommend repeating the measurement with the auxiliary rods placed at a different distance and in another direction (for example rotated 90° from the first alignment).



If you find the same values, your measurement is reliable. If the measured values are substantially different, it is probable that they were influenced by earth currents or a groundwater artery. It may be useful to drive the rods deeper.

If the in-line configuration is not possible, you can plant the rods in a triangle. To validate the measurement, move the S rod on either side of the line HE.




Avoid routing the connecting cables of the earth rods near or parallel to other cables (transmission or power supply), metal pipes, rails, or fences, this in order to avoid the risk of cross-talk with the measurement current.

3.3.8. AT THE END OF THE MEASUREMENT



At the end of the measurement, do not forget to reconnect the earth strip before restoring power to the installation.

3.3.9. ERROR INDICATION

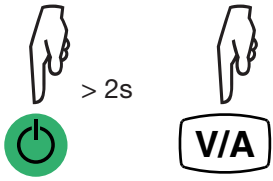
- If the measurement departs from the measurement range, the instrument so reports by displaying **>3.000kΩ** for the C.A 6422 and **>60.00kΩ** for the C.A 6424.
- If the resistance of the S rod is greater than 50kΩ, the **⊙ S** (or **⊙ P**) symbol blinks.
- If the resistance of the H rod is greater than 15kΩ, the **RH !** symbol blinks.
- If the amplitude of one of the voltages, U_{SE} or U_{HE} , is between 3V and 50V, the **NOISE** symbol is displayed.
- If U_{SE} or $U_{HE} > 50$ V, the  indicator blinks and the measurement is impossible.

To reduce the resistance of the rods H (or S), you can add one or more rods, two meters apart, in the H (S) circuit of the circuit. You can also drive the rods deeper and firmly pack the earth around them, or sprinkle a little water on them.


3.4. CURRENT MEASUREMENT (C.A 6424)

To make current measurements, AC only, with the C.A 6424, you must have a G72 ammeter clamp (optional).

3.4.1. MAKING A MEASUREMENT

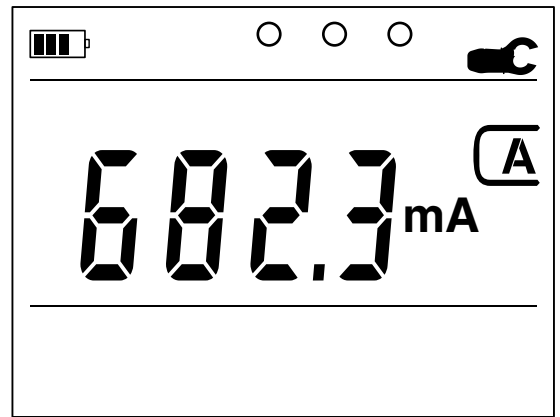
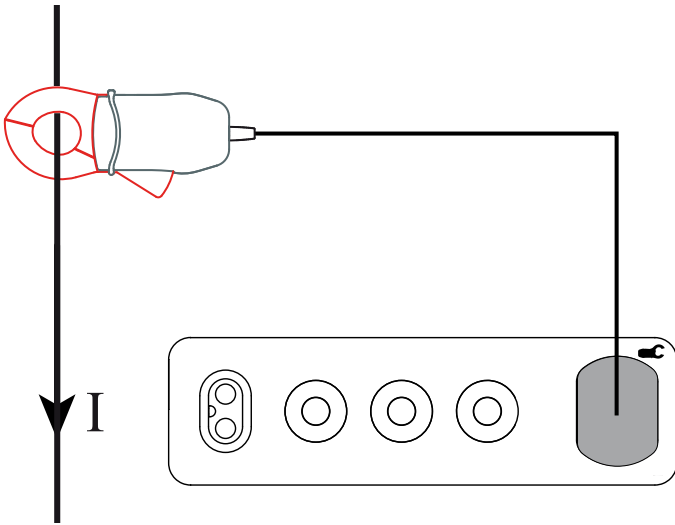


Long-press the **On/Off** button to switch the instrument on.
Then press the **V/A** key.


Connect the clamp to the specific input. The instrument indicates that it is in current measurement mode by displaying **A** and the  symbol is displayed.

Actuate the trigger to open the clamp and place it on the conductor to be measured. Release the trigger.

The measurement is displayed.



3.4.2. ERROR INDICATION

If the measurement departs from the measurement range, the instrument so reports by displaying **>70.00A**.
If another ammeter clamp is connected, the instrument displays **Err** and the  symbol blinks.

4. TECHNICAL CHARACTERISTICS

4.1. GENERAL REFERENCE CONDITIONS

Quantity of influence	Reference values
Temperature	23 ± 2 °C
Relative humidity	45 to 75%RH
Supply voltage	C.A 6422: 8 ± 0.2 V C.A 6424: 6 ± 0.2 V
Frequency	45 to 65 Hz
Electric field	< 0.1V/m
Magnetic field	< 40A/m

The **intrinsic uncertainty** is the error defined under the reference conditions.

The **operating uncertainty** includes the intrinsic uncertainty plus the effects of variation of the quantities of influence (supply voltage, temperature, interference, etc.) as defined in standard IEC 61557-5.

The uncertainties are expressed in % of the reading (R) and in number of display points (pt):
± (a% L + b pt)



The C.A 6424 is not designed to make measurements when the charger is connected.

4.2. ELECTRICAL CHARACTERISTICS

4.2.1. VOLTAGE MEASUREMENTS

Particular reference conditions:

$$\text{Peak factor} = \sqrt{2}$$

U_{HE} voltage measurements

Measurement range	0.1 - 600.0 V
Resolution	0.1 V
Intrinsic uncertainty	± (1% L + 1 pt)

4.2.2. RESISTANCE MEASUREMENTS (2P)

Particular reference conditions:

External voltage between the H and E terminals: zero.

Resistance of the leads: ≤ 0.1 Ω.

Measurement range	0.05 - 99.99 Ω	80.0 - 999.9 Ω	0.800 - 9.999 kΩ	8.00 - 50.00 kΩ
Resolution	0.01 Ω	1 Ω	10 Ω	100 Ω
Intrinsic uncertainty	± (2% L + 10 pt)	± (2% L + 2 pt)	± (2% L + 1 pt)	± (2% L + 1 pt)
U _{HE} no-load voltage	±10 V _{peak}			

The compensation of the leads of the C.A 6424 may result in a negative reading of as much as 5Ω.

4.2.3. EARTH RESISTANCE MEASUREMENTS (3P)

Particular reference conditions:

Resistance of the E lead: $\leq 0.1 \Omega$

R_H (rod + lead) $\leq 100 \Omega$

R_S (rod + lead) $\leq 1 \text{ k}\Omega$

Spurious voltages on U_{HE} and $U_{SE} \leq 0.01 \text{ V}$

Earth measurements with the C.A 6422

Measurement range	0.50 - 99.99 Ω	80.0 - 999.9 Ω	0.800 - 2.000 $\text{k}\Omega$
Resolution	0.01 Ω	0.1 Ω	1 Ω
Intrinsic uncertainty	$\pm (1\% L + 10 \text{ pt})$	$\pm (1\% L + 2 \text{ pt})$	$\pm (1\% L + 1 \text{ pt})$
Measurement frequency	128 Hz or 256 Hz		
No-load voltage	$\pm 10 \text{ V}_{\text{peak}}$		

Earth measurements with the C.A 6424

Measurement range	0.50 - 99.99 Ω	80.0 - 999.9 Ω	0.800 - 9.999 $\text{k}\Omega$	8.00 - 50.00 $\text{k}\Omega$
Resolution	0.01 Ω	0.1 Ω	1 Ω	10 Ω
Intrinsic uncertainty	$\pm (1\% L + 10 \text{ pt})$	$\pm (1\% L + 2 \text{ pt})$	$\pm (1\% L + 1 \text{ pt})$	$\pm (1\% L + 1 \text{ pt})$
Measurement frequency	128Hz, or 256Hz if the spurious voltage is at 128Hz			
No-load voltage	$\pm 10 \text{ V}_{\text{peak}}$			

The measurement current is a square signal of not more than 20mA.

Rod resistance measurements R_H (C.A 6424)

Measurement range	0.050 - 9.999 $\text{k}\Omega$	8.00 - 49.99 $\text{k}\Omega$
Resolution	1 Ω	10 Ω
Intrinsic uncertainty	$\pm (10\% L + 1 \text{ pt})$	$\pm (10\% L + 1 \text{ pt})$

Voltage measurements U_{SE} (C.A 6424)

Measurement range	0.10 - 99.99 V_{ac}	80.0 - 600.0 V_{ac}
Resolution	0.01 V	0.1 V
Intrinsic uncertainty	$\pm (2\% L + 2 \text{ pt})$	$\pm (2\% L + 2 \text{ pt})$

The instrument is protected up to 600V between any two of the three input terminals.

4.2.4. CURRENT MEASUREMENT (C.A 6424)

Particular reference conditions:

Peak factor = $\sqrt{2}$

Measurement range	0.5 - 999.9 mA	0.800 - 9.999 A	8.00 - 60.00 A
Resolution	0.1 mA	1 mA	10 mA
Intrinsic uncertainty	$\pm (1\% L + 4 \text{ pt})$	$\pm (1\% L + 2 \text{ pt})$	$\pm (1\% L + 2 \text{ pt})$

4.3. VARIATIONS IN THE RANGE OF USE

4.3.1. VOLTAGE MEASUREMENT (C.A 6424)

Quantities of influence	Limits of the range of use	Variation of the measurement	
		Typical	Maximum
Temperature	-10 to + 50 °C	± 0.2%L	± (0.5%L + 1 pt)
Relative humidity	10 to 90%RH	-	± 2%L
Frequency	DC à 440 Hz	-	-3 dB
Peak factor	1.4 to 3 (up to 300 V)	-	± 1%L
DC and 50/60Hz common mode rejection	0 to 600 Vac	65 dB	50 dB

4.3.2. RESISTANCE MEASUREMENT (2P)

Quantities of influence	Limits of the range of use	Variation of the measurement	
		Typical	Maximum
Temperature	-10 to + 50 °C	± (25 ppm L + 10 mΩ/°C)	± (200 ppm L + 20 mΩ/°C)
Relative humidity	10 to 90%RH	± 1%L	± 2%L
Supply voltage	C.A 6422 : 6.0 to 9.6 V C.A 6424 : 6.0 to 7.6 V	-	± (2%L + 1 Ω)
50/60Hz voltage superposed on the test voltage	0 to 3 V 3 to 25 V	± (0.5%L + 0.5 Ω) ± (2%L + 5 Ω)	± (2%L + 1 Ω) ± (4%L + 10 Ω)

4.3.3. EARTH MEASUREMENT (3P)

Quantities of influence	Limits of the range of use	Variation of the measurement	
		Typical	Maximum
Temperature	-10 to + 50 °C	± 1%L	± 2%L
Relative humidity	10 to 90%HR	-	± 2%L
Supply voltage	C.A 6422: 6.0 to 9.6 V C.A 6424: 6.0 to 7.6 V	-	± (2%L + 1 Ω)
Voltage in series between S and E, 50/60Hz	0 to 3 V	± (0.5%L + 0.2 Ω)	± (1%L + 1 Ω)
	3 to 25 V	± (2%L + 8 Ω)	± (4%L + 20 Ω)
Voltage in series between H and E, 50/60Hz	0 to 3 V	± (0.5%L + 0.2 Ω)	± (1%L + 1 Ω)
	3 to 25 V	± (20%L + 10 Ω)	± (30%L + 20 Ω)
Rod resistance R_s	0 to 50 kΩ	-	± (2%L + 1 Ω)
Rod resistance R_H	$R_H < 100 \times R_E$ and $R_H < 50 \text{ k}\Omega$	± (2%L + 2 pt)	± (10%L + 5 pt)

4.3.4. CURRENT MEASUREMENT (C.A 6424)

Quantities of influence	Limits of the range of use	Variation of the measurement	
		Typical	Maximum
Temperature	-10 to + 50 °C	± 250 ppm L	± 500 ppm L
Relative humidity	10 to 90%HR	± 0%L	± 1%L
Frequency	DC to 440 Hz	-	-3 dB
Peak factor	1.4 to 3 (up to 30 A)	± 0%L	± 1%L

4.4. INTRINSIC UNCERTAINTY AND OPERATING UNCERTAINTY

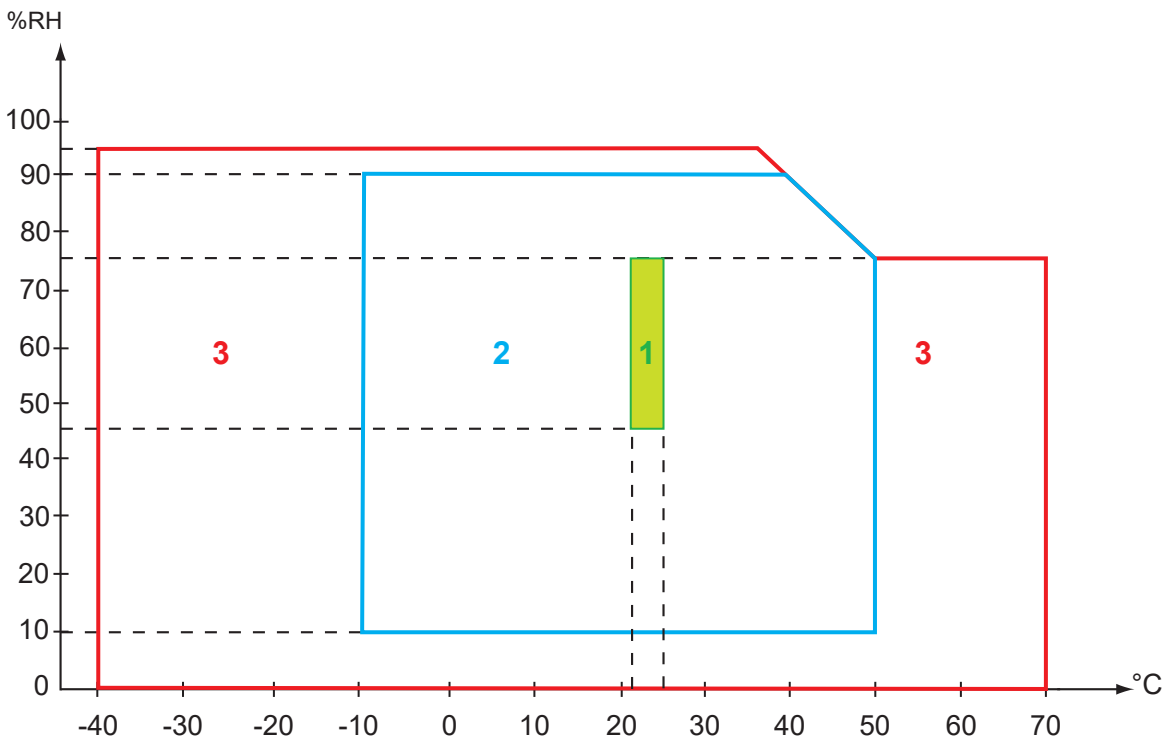
The earth testers comply with standard IEC-61557 part 5, which requires that the operating uncertainty, called B, be less than 30%.

In earth measurement, $B = \pm (|A| + 1,15 \sqrt{E_1^2 + E_2^2 + E_3^2 + E_4^2 + E_5^2 + E_7^2 + E_8^2})$

- with A = Intrinsic uncertainty
- E_1 = influence of the reference position $\pm 90^\circ$.
- E_2 = influence of the supply voltage within the limits indicated by the manufacturer
- E_3 = influence of the temperature between 0 and 35°C.
- E_4 = influence of the interference voltage in series mode (3 V at 16,6; 50; 60 and 400 Hz)
- E_5 = influence of the resistance of the rods from 0 to 100 x R_A but $\leq 50 \text{ k}\Omega$.
- E_7 = influence of the network frequency from 99 to 101% of the nominal frequency.
- E_8 = influence of the network voltage from 85 to 110% of the nominal voltage.

The uncertainty of operation of the instrument is $\leq 15\% + 1 \Omega$.

4.5. ENVIRONMENTAL CONDITIONS



- 1 = Reference range, 21 to 25°C.
- 2 = Operating range, -10 to +50°C.
- 3 = Storage range (without batteries), -40 to +70°C.

Range for recharging of the rechargeable batteries, 5 to 25°C.

Indoor and outdoor use.
 Altitude < 2,000 m
 Pollution degree 2

4.6. POWER SUPPLY

The C.A 6422 is powered by 6 LR6 or AA primary batteries.

The C.A 6424 is powered by 6 Ni-MH rechargeable batteries.
 The charging time is approximately 6 hours.



During charging, the instrument cannot make measurements.

4.6.1. LIFE BETWEEN CHARGES

Typical life between charges of the device:

Function	C.A 6422 on primary batteries	C.A 6424 on rechargeable batteries
Voltage / Current	> 80 h	> 50 h
Resistance	> 2,500 measurements from 5 s to 100 Ω	> 2,000 measurements from 5 s to 100 Ω
Earth, 3P	> 2,000 measurements from 100 Ω	> 1,500 measurements from 100 Ω
Instrument off	> 1 year	> 1 year

4.7. MECHANICAL CHARACTERISTICS

Dimensions (L x D x H) 223 x 126 x 70mm
Weight approximately 1 kg

Inrush protection IP65 when not in operation, per IEC 60 529. The terminals are IP20 when not connected and IP40 when connected
IK 04 per IEC 50102

Free fall test 1 metre per IEC 61010-1

4.8. CONFORMITY TO INTERNATIONAL STANDARDS

The device is in conformity with IEC 61010-2-030, 600V CAT IV, pollution degree 2.
Assigned characteristics: measurement category IV, 600 V with respect to earth.

The device is compliant with IEC 61557 parts 1 and 5.

Instrument protected by reinforced insulation.

4.9. ELECTROMAGNETIC COMPATIBILITY (CEM)

The device is in conformity with standard IEC 61326-1.

5. MAINTENANCE



Except for the batteries, the instrument contains no parts that can be replaced by personnel who have not been specially trained and accredited. Any unauthorized repair or replacement of a part by an “equivalent” may gravely impair safety.

5.1. CLEANING

Disconnect everything connected to the instrument and switch it off.

Use a soft cloth, dampened with soapy water. Rinse with a damp cloth and dry rapidly with a dry cloth or forced air. Do not use alcohol, solvents, or hydrocarbons.

5.2. REPLACING THE BATTERIES

- Disconnect everything connected to the instrument and switch it off.
- Turn the instrument over and follow the instructions of §1.3.



Spent batteries must not be treated as ordinary household waste. Take them to the appropriate recycling collection point.

6. WARRANTY

Except as otherwise stated, our warranty is valid for **24 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.

FRANCE

Chauvin Arnoux Group
190, rue Championnet
75876 PARIS Cedex 18
Tél : +33 1 44 85 44 85
Fax : +33 1 46 27 73 89
info@chauvin-arnoux.com
www.chauvin-arnoux.com

INTERNATIONAL

Chauvin Arnoux Group
Tél : +33 1 44 85 44 38
Fax : +33 1 46 27 95 69

Our international contacts
www.chauvin-arnoux.com/contacts

