


# C.A 6630 Battery Tester


## *User's manual*

Please familiarise yourself with the following international electrical symbols:

- Meaning of the  symbol:

Warning: refer to the operating instructions before using the instrument.

Failure to properly observe or execute instructions preceded by this symbol in this user's manual may cause bodily injury or damage the instrument and the installations.

- Meaning of the  symbol:

The instrument is protected by double insulation or reinforced insulation. It does not need to be connected to the protective earth terminal for electrical safety.

- Meaning of the  symbol:

Danger! Risk of electric shock.

The voltage of parts identified by this symbol is likely to be  $\geq 120\text{VDC}$ .

- Meaning of the ~ symbol:

Alternating current.

You have just purchased a C.A 6630 battery tester, and we thank you for your confidence.

For best results with your instrument:

- Read this user's manual carefully before starting or using the C.A 6630 for the first time
- Observe the safety procedures and instructions.

## **OPERATING AND SAFETY INSTRUCTIONS**

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- Observe the recommended operating conditions: temperature, humidity, altitude, degree of pollution, etc.
- Use only accessories supplied with the instrument, and compliant with the safety standards in force.
- Use only batteries of the recommended type and rating to power the instrument, failure to do so may damage the instrument and render the warranty void.
- Switch the instrument off when not in use.
- Before opening the instrument, check that all the terminals are disconnected and that the instrument is switched off.
- All repairs and metrological checks must be carried out by only qualified approved personnel.



- Do not measure DC voltages greater than 50V, failure to do so may damage the instrument and render the warranty void.
- Do not measure AC voltages, failure to do so may damage the instrument and render the warranty void.
- After carrying out measurements on a high-voltage battery and before carrying out further measurements, short-circuit the measurement cords to eliminate any DC capacitive charge, liable to damage a low-voltage battery.

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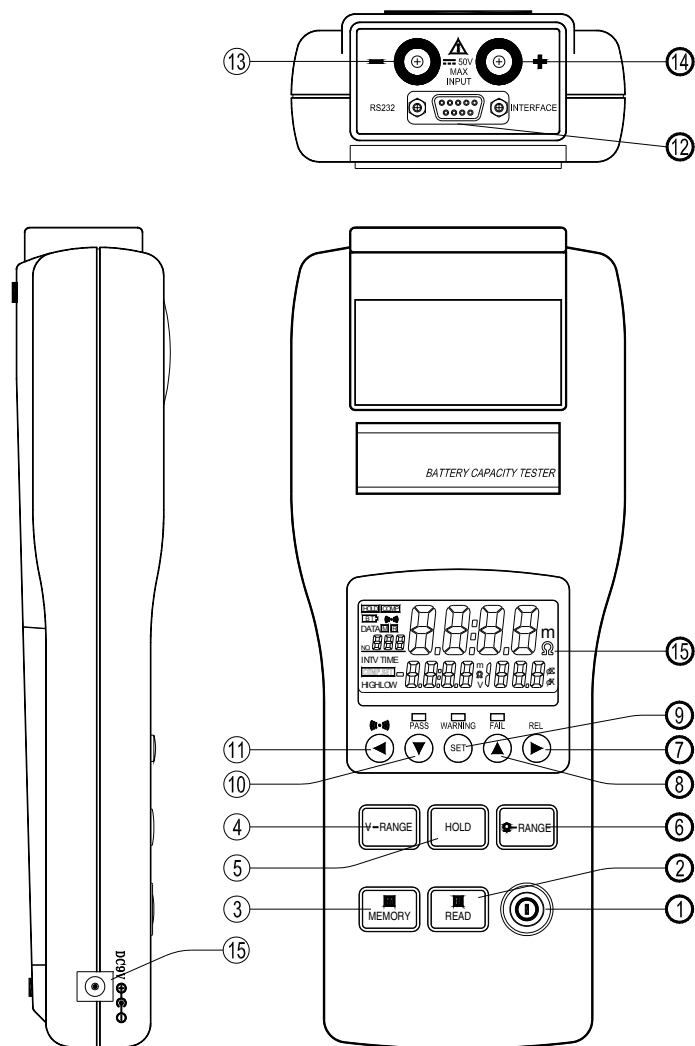
## 1 - GENERAL DESCRIPTION

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### **The tester**

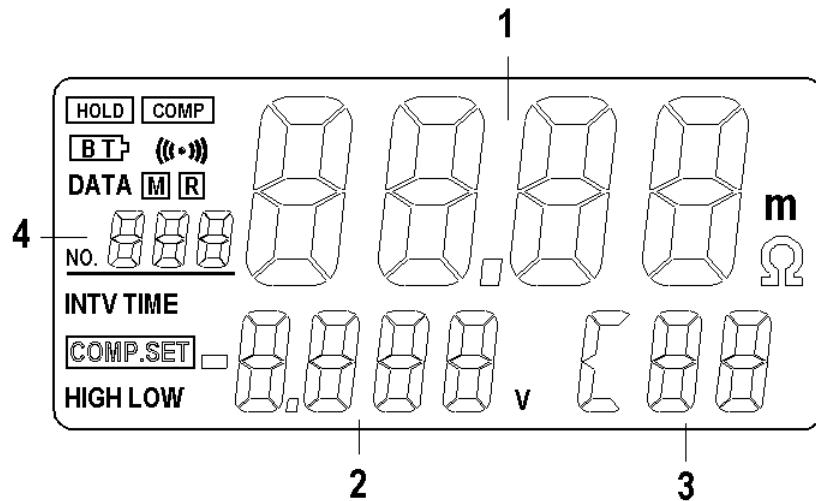
- This battery tester is designed to measure the internal resistance and the open-circuit voltage of nickel/cadmium, lithium/ion, and hybrid nickel/metal batteries.
  - Its double display unit allows simultaneous reading of the internal resistance and of the voltage.
  - For the internal resistance measurement, this tester uses the 4-wire method. This method eliminates the resistance of the measurement cords as a factor and so gives more precise results.
  - To interpret the result and detect deterioration of a battery rapidly, this tester has 99 reference values (comparator function). The measurement result is thus compared to the theoretical value.
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## 2 - DESCRIPTION



- |    |                 |  |
|----|-----------------|--|
| 1  | <b>ⓘ</b>        | On/Off button  |
| 2  | <b>R</b> READ   | Read stored data   |
| 3  | <b>M</b> MEMORY | - Store measurement results in memory<br>- <i>If pressed for 2s</i> : activation/deactivation of the data logger mode                                  |
| 4  | <b>V-RANGE</b>  | Selection of voltage range (4V, 40V)   |
| 5  | <b>HOLD</b>     | - Activation/deactivation of the HOLD function<br>- <i>If pressed for 2s</i> : programming of the time interval between recordings in data logger mode |
| 6  | <b>Ω- RANGE</b> | Selection of resistance range (40mΩ, 400mΩ, 4Ω, 40Ω)   |
| 7  | <b>▶</b>        | - Moves the cursor to the right  |
|    | <b>REL</b>      | - Zero adjustment of result (lead compensation)  |
| 8  | <b>▲</b>        | Increments the displayed value   |
| 9  | <b>SET</b>      | - Activation/deactivation of the comparator function<br>- <i>If pressed for 2s</i> : access to the parameter settings of the 99 comparators            |
| 10 | <b>▼</b>        | Decrements the displayed value   |
| 11 | <b>◀</b>        | - Moves the cursor to the left   |
|    | <b>⋈)</b>       | - Activation/deactivation of the warning beep  |
| 12 | <b>RS-232</b>   | Communication interface  |
| 13 | <b>- Input</b>  | Input for connection of the black measurement lead   |
| 14 | <b>Input +</b>  | Input for connection of the red measurement lead   |

## Display unit



- 1 Displays the resistance measured or the resistance limit settings of the comparator function
- 2 Displays the voltage measured or the voltage limit settings of the comparator function
- 3 Number of the comparator activated (of the 99 programmed).
- 4 Number of the memory location.

### Symbols:

$m\Omega$  : unit of resistance

V : unit of voltage

**HOLD** : HOLD function activated: the result remains held on the display unit

**COMP** : comparator function activated

**BT** : low battery level indicator

**•••** : warning beep activated

DATA **R** : activation of manual memory Read mode

DATA **M** : activation of manual Memory storage mode

**M** : data logger mode in use; this symbol flashes each time a sample is stored.

INTV : sets parameters of data logger mode: time interval between 2 samples (1~255s)

**COMP.SET** : activation of comparator parameter settings

HIGH : high resistance and voltage limits of the comparator

LOW : low resistance limit of the comparator

### LEDs:

These are lit when the measurement result is compared to a comparator.

**PASS**  
(green LED) : indicates that the battery tested is OK (lies within the limits of the comparator).

**WARNING**  
(yellow LED) : indicates that the battery tested is in an intermediate condition (deteriorating).

**FAIL**  
(red LED) : indicates that the battery tested is deteriorated

### 3 - SPECIFICATIONS

#### 3.1 – General specifications

- Resistance measurement by the 4-wire AC method.
- LCD screen with two display units, information and/or warning symbols and result rating LEDs.
- The instrument switches off automatically after 30 minutes without using keys.
- Zero adjustment function: compensation of circuit, voltage displayed 0 V.
  
- Comparator function: the parameters of 99 comparators can be set and recorded in the instrument (high and low resistance limits and adjustment of voltage threshold point).
- Upon comparison of the measured result with the selected comparator, the rating LEDs light up, and are accompanied where appropriate by a warning beep.
- Possibility of storing measurement results: 999 locations for manual storage and 9600 locations for the automatic storage of samples in data logger mode.
- Short-circuit voltage on terminals: 3.5Vpp max.
- Operating conditions: 0 °C to +40 °C with 80% relative humidity (RH) (no condensation)
- Storage conditions: -10 °C to +50°C with 80% relative humidity (RH) (no condensation)
- Power supply to the instrument / battery: 6 x 1.5V batteries (AA type)
- Maximum demand: 1.0VA
- Operating battery life: 7 hours (approx.).
- Maximum operating altitude: 2000m.
- Dimensions : 250mm x 100mm x 45mm
- Weight: 500g (approx.) (batteries included)

#### 3.2 – Electrical specifications

The measurement accuracy depends on the measurement conditions.

- The accuracy of measurements is guaranteed under the following conditions:

Temperature : 23°C +/- 5°C

Humidity: 80% RH maximum (without condensation).

Zero adjustment: after adjustment of the zero / compensation for each range.

- Resistance measurement

Temperature coefficient: ( $\pm 0.1\%$  of reading  $\pm 0.5$  digits) / °C

Frequency of measurement current: 1kHz  $\pm 10\%$

Measurement voltage: 1.5mVAC

<b>Range</b>	<b>Resolution</b>	<b>Measurement current</b>	<b>Accuracy</b>
40mΩ	10μΩ	37.5mA approx.	±(1% of reading ± 8 digits)
400mΩ	100μΩ	3.75mA approx.	
4Ω	1mΩ	375μA approx.	
40Ω	10mΩ	37.5μA approx.	

- Voltage measurement

Temperature coefficient ( $\pm 0.1\%$  of reading  $\pm 0.5$  digits) / °C

Maximum voltage on the inputs: 50VDC maximum, no AC voltage

Maximum voltage between inputs and earth: 60VDC and AC maximum.

<b>Range</b>	<b>Resolution</b>	<b>Accuracy</b>
4V	1mV	±(0.1% of reading ± 6 digits)
40V	10mV	



**Do not apply voltages greater than those specified above to the input terminals of the instrument, as this is liable to damage the instrument.**

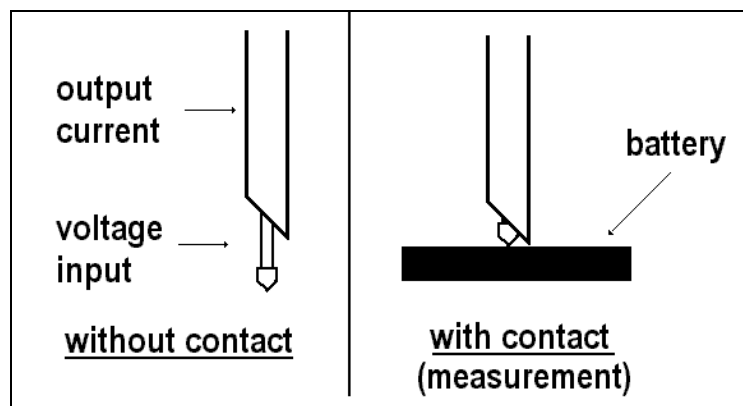
## 4 – CARRYING OUT A MEASUREMENT

### 4.1 – Preparation

- To ensure your safety, the following safety procedures must be observed when using your C.A 6630:
- before opening the instrument to replace the batteries, disconnect the measurement leads from the battery being tested.
  - do not mix old and new batteries, nor batteries of different types and specifications
  - note and observe the polarity of the batteries before inserting them in the instrument
  - do not short-circuit or damage used batteries or expose them to a naked flame. As this may cause them to explode.

### 4.2 – Operating the instrument

- connect the red measurement lead to the "+" terminal of the instrument and the black measurement lead to the "-" terminal of the instrument
- switch the C.A 6630 on by pressing key ①
- connect the red contact tip to the positive terminal of the battery to be tested and the black contact tip to the negative terminal of the battery to be tested.



- select the resistance and voltage ranges using the **V-RANGE** and  **$\Omega$ -RANGE** keys.
- read the measurement results (resistance and DC voltage) directly on the display unit.

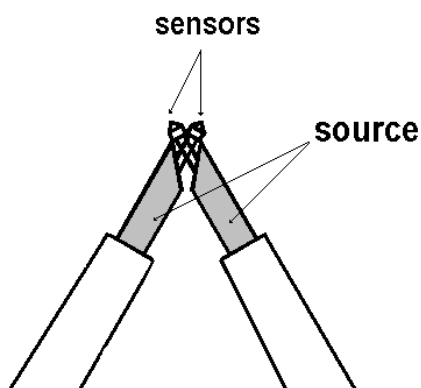
#### **Remarks:**

- if the reading is Outside the Limits for the range (resistance and voltage), "OL" lights.
- in case of malfunction of the AC test current, "----" is displayed.

### 4.3 – Zero adjustment (REL)

The zero adjustment (or measurement lead compensation) function serves to quantify the influence of the measurement leads and deduct it from the measurement results.

The results of the zero adjustment will then be taken as the measurement zero (origin).



- short-circuit the red and black measurement contact tips as shown opposite
- press the REL key: **REL** is then displayed and the resistance and voltage values are set to zero
- the connections to the battery to be tested can now be carried out.

#### **Warning:**

The lead compensation applies only to the measurement range selected beforehand and only until the instrument is switched off.

## 5 – USING THE COMPARATOR FUNCTION

### 5.1 – Comparator

The comparator function enables you to compare the measured values to programmed reference values (high and low limits for the internal resistance and a high limit for the battery voltage level).

This comparison offers an evaluation of the measurement result, indicated by the lighting of one of the LEDs (PASS, WARNING, FAIL) and the possible activation of a warning beep.

### 5.2 – Setting the comparator parameters

99 comparators or reference values can be parameterised and stored.

To parameterise a comparator:

1 - switch the C.A 6630 on by pressing the key **ⓘ**

2 - press the SET key for 2 seconds. **COMP.SET** is then displayed to allow access to the comparator parameter setting mode.

3 - use the **▲** and **▼** keys to select the number of the comparator (between 01 and 99).

4 - once a comparator number has been selected, adjust the limit values using the **▶** key:

- **1<sup>st</sup> press:** low resistance limit – the first 2 digits flash  
- use the **Ω-RANGE** key to select the range  
- use the **▲** & **▼** keys to set the values of these 2 digits
- **2<sup>nd</sup> press:** low resistance limit – the last 2 digits flash  
- use the **▲** & **▼** keys to set the values of these 2 digits
- **3<sup>rd</sup> press:** high resistance limit – the first 2 digits flash  
- use the **Ω-RANGE** key to select the range  
- use the **▲** & **▼** keys to set the values of these 2 digits
- **4<sup>th</sup> press:** high resistance limit – the last 2 digits flash  
- use the **▲** & **▼** keys to set the values of these 2 digits
- **5<sup>th</sup> press:** high voltage limit – the first 2 digits flash  
- use the **V-RANGE** key to select the range  
- use the **▲** & **▼** keys to set the values of these 2 digits
- **6<sup>th</sup> press:** high voltage limit – the last 2 digits flash  
- use the **▲** & **▼** keys to set the values of these 2 digits

To programme the parameters of the next comparator, repeat steps 3 & 4 of the procedure above.

To exit from the parameter set mode, press the SET key.

### 5.3 – Comparator results

Interpreting the comparator results:

<b>Resistance voltage</b>	<i>low resistance limit</i>		<i>high resistance limit</i>
	low value	intermediate value	high value
low value	<b>WARNING LED + beep</b> <b>Warning!</b>	<b>WARNING LED + beep</b> <b>Warning!</b>	<b>FAIL LED + beep</b> <b>Battery Not OK!</b>
<i>high voltage limit</i> →	<b>PASS LED</b> <b>Battery OK!</b>	<b>WARNING LED + beep</b> <b>Warning!</b>	<b>FAIL LED + beep</b> <b>Battery Not OK!</b>
high value			

## 5.4 – Activating / deactivating the comparator function

- 1 - press SET to activate the comparator function. **COMP** is displayed, indicating that the comparison will be made once the measurement has been carried out.
- 2 - the comparator used is the last one selected before the instrument was last switched off. To select another one from among the 99 possible, press ▲ and ▼.
- 3 - to activate the warning beep accompanying the **WARNING** and **FAIL** ratings of the comparator, press **•••**. This same symbol appears on the display unit. To deactivate it, press **•••** again.
- 4 - to deactivate the comparator function, press **SET** again.

## 6 – USING THE MEMORY STORE FUNCTION

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### 6.1 – Manual storage (999 locations)

#### 6.1.1 – *Storing measurement data in the memory*

To store a measurement result in the memory: after the measurement has been carried out, press **M** **MEMORY**; "DATA **M** NO XXX" is then displayed for 1 second, indicating the number of the location where the result has been stored.

#### 6.1.2 – *Reading stored data*

To read stored data, press the **R** **READ** key; "DATA **R** NO XXX" is then displayed.  
To select the location, press ▲ and ▼.  
To exit the memory read mode, press **R** **READ** again.

### 6.2 – Continuous data storage: Data Logger mode (9600 locations)

- 1 - press the **HOLD** key for 2 seconds: **INTV** is then displayed.  
Adjust the time interval (from 1 to 255 seconds) between 2 samples using the ▲ and ▼ keys.  
To exit this program, press **SET**.
- 2 - to activate the **data logger mode**, press the **M** **MEMORY** key for 2 seconds: **M** is then displayed and flashes each time a sample is stored.
- 3 - to stop the **data logger mode**, press the **M** **MEMORY** key.

**Warning: the data recorded in data logger mode cannot be read directly from the C.A 6630 itself. The recorded measurements must be transferred firstly to a PC (software supplied with the instrument).**

### 6.3 – Erasing stored data

When the memory is full, "Full" is displayed, indicating that further storage is impossible.  
To erase the stored data:

- 1 - switch the C.A 6630 off by pressing key **ⓘ**
- 2 - then hold the **M** **MEMORY** key down while switching the C.A 6630 back on (**ⓘ** key). **Clr** is then displayed to confirm the deletion of the stored data.

## 7 – MAINTENANCE

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For maintenance, use only the specified spare parts. The manufacturer cannot be held liable for any accidents that occur following maintenance and repairs carried out by anyone other than its after-sale service department or approved repair and maintenance professionals.

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## **7.1 – Replacing the batteries**

The appearance of the **BT** symbol on the display unit indicates that the battery charge is too low for carrying out further measurements.

The batteries must then be replaced: 6 x 1.5V batteries (AA type).

Battery replacement procedure:

- disconnect all measurement leads
- switch the instrument off
- open the battery compartment on the rear panel of the instrument (1 screw to be unscrewed)
- replace the used batteries with new batteries of equivalent specifications
- close the battery compartment

## **7.2 – Storing the instrument**

If the instrument is to be stored for a period of more than 2 months, remove the batteries.

## **7.3 – Cleaning**

It is imperative that the instrument be disconnected from any source of electricity.

Use a soft cloth, dampened with soapy water. Rinse with a wet cloth and dry quickly using a dry cloth or propulsed air dryer. Do not use alcohol, hydrocarbons, or other solvents.

## **7.4 – Metrological checks**

**As with all measuring and testing instruments, a periodic check is necessary.**

We recommend you have this instrument checked at least once a year. For checks and calibration services, contact our COFRAC-accredited metrology laboratories or your local MANUMESURE agency.

Information and contact address available upon request from:

## **7.5 – Warranty**

Our warranty applies, except where otherwise stated, for twelve months as of from the date the equipment is made available (extract from our General Terms & Conditions of Sale, available upon request).

## **7.6 – After-sale service**

**Repair under warranty and out of warranty.**

Send your instrument to one of the MANUMESURE regional agencies approved by Amperis Products  
Information and contact address available upon request: Tel. 34.982.20.99.20 - Fax 34.982.20.99.11

**Repairs & maintenance outside mainland France.**

For all repair & maintenance work, under warranty or out of warranty, return the instrument to your distributor.

## **8 – TO ORDER**

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### **C.A 6630 Battery tester**

**P01.1913.03**

Delivered with

- 1 set of 2 x 1m measurement leads with retractable contact tip ends
- 1 data transfer software for exporting memory data to PC.
- 1 apparatus/PC connecting lead.