

**Earth and resistivity testers: comprehensive,  
accurate and suitable for all-terrain use**

**C.A 6470N      TERCA 3**

**INDUSTRY & HOUSING**

**4 in 1:** *Earth • Resistivity • Coupling • Continuity*

**Earth and  
resistivity testers**



**C.A 6471**

**INDUSTRY**

**5 in 1:** *Earth • Selective earth  
• Resistivity • Coupling • Continuity*

**Measurement of earth networks  
in parallel without disconnecting  
the earth and without rods..**

- Possibility of selecting the measurement frequency
- Automatic calculation of resistivity and coupling

# C.A 6470N TERCA 3 & C.A 6471

## – Multi-function testers

- 3-pole and 4-pole measurements
- Selective 4-pole measurements, 2 clamps (C.A 6471 only)
- Resistivity (Wenner + Schlumberger methods)
- Earth coupling
- Continuity & resistance

## – Measurements possible even with highly resistive soils

## – Improved measurement quality due to high rejection of disturbance voltages

## – Excellent accuracy and resolution

## – Standard software for data recovery and processing of the results



## EARTH MEASUREMENTS

### EARTH MEASUREMENT WITH 3P METHOD

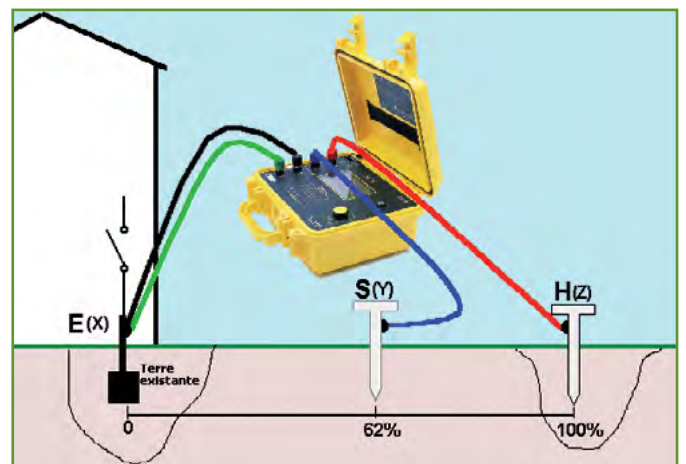
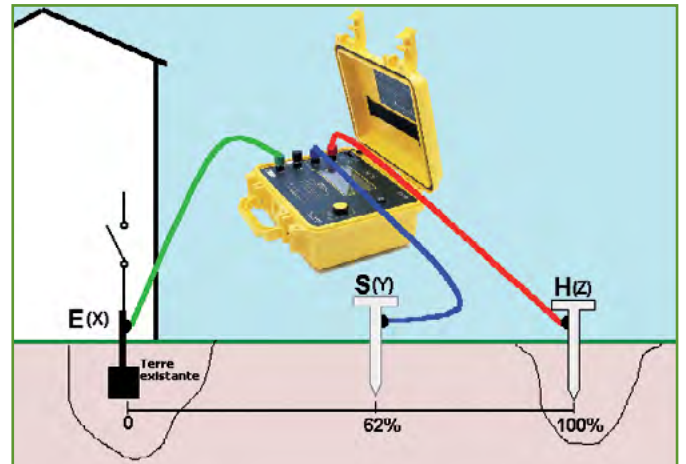
The 3P method is the traditional method using rods to measure the resistance of an existing earth connection. The C.A 6470N & C.A 6471 can also be used to measure the resistances of the auxiliary rods RS and RH, as well as any disturbance voltages.

Suitable for all types of measurement environments, even the most difficult, this method guarantees measurement of auxiliary-rod resistances up to 100 k $\Omega$  and disturbance voltages of 60 V<sub>peak</sub>.

### 4P AND SELECTIVE 4P EARTH MEASUREMENT

The 4P measurement method is particularly suitable for measuring very low earth resistances.

If there are several resistances connected in parallel, it is possible to use the instrument with a clamp-on ammeter to carry out **selective measurements**, in order to avoid the effect of the parallel earth connections. **This "selective 4P" measurement method saves considerable time because it is no longer necessary to disconnect the earth resistance before measuring it.**



The 4P measurement method is more accurate and can be used to measure low earth resistances.

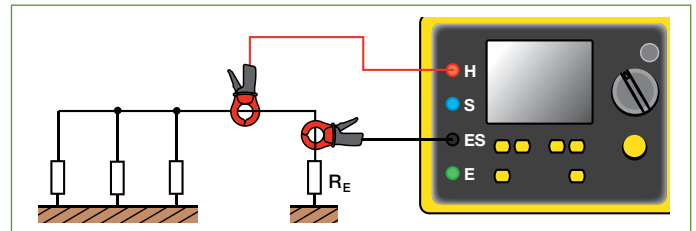
The results obtained with this measurement method are ideal for the requirements of energy distributors such as EDF.



## EARTH LOOP MEASUREMENT WITH 2 CLAMPS

In the event of a system with parallel earth connections, 2 clamp-on ammeters can be used with the C.A 6470N & C.A 6471 to provide accurate earth resistance measurements. The principle of this method involves placing 2 clamps around the earth conductor tested and connecting each of them to the instrument. One clamp injects a known signal (32 V / 1,367 Hz) while the other clamp measures the current flowing in the loop.

This method **saves considerable time** when earth testing because it is no longer necessary to set up auxiliary rods or disconnect the earth connections, which is often time consuming.



## MEASUREMENT OF EARTH COUPLING

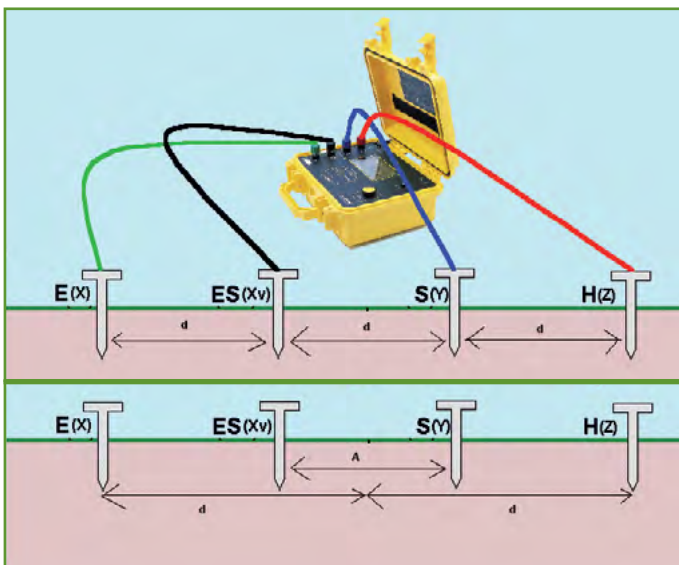
To estimate the reciprocal influence of 2 normally unrelated earth resistances, you must calculate the coupling coefficient, which should be as low as possible.

The operator takes 3 successive measurements (2 classic

earth measurements using the classic 3P –  $R_1$  &  $R_2$  method, and 1 earth measurement using the 2P –  $R_{1-2}$  method.

The instrument then **automatically** calculates the coupling resistance:  $R_c = (R_1 + R_2 - R_{1-2}) / 2$ .

## SOIL RESISTIVITY MEASUREMENT



**Wenner method:**  
the distances between the 4 rods are identical:  
(d)  $\rho W = 2 \cdot \pi \cdot d \cdot R_{S-SE}$

**Schlumberger method:**  
the distance between the 2 central rods S & ES is A  
the distance between the 2 outer rods E & H is 2d  
 $\rho S = (\rho \cdot (d^2 - A^2) / 4) \cdot R_{S-SE} / 4$

When it is possible to choose the position of the earth connection, resistivity measurements can be used to check the soil and determine where the earth resistance will be lowest (optimization of building costs).

The C.A 6470N and C.A 6471 **automatically** calculate soil resistivity using the Wenner or Schlumberger methods as soon as the distances between the rods have been entered.

The resistances of the rods  $R_E$ ,  $R_{ES}$ ,  $R_S$  and  $R_H$  can also be measured.

**Reminder: soil resistivity ( $\rho$ ) calculation methods**

		C.A 6470N	C.A 6471
<b>3P method</b>	Range	0.01 $\Omega$ to 99.9 k $\Omega$	
	Resolution	0.01 to 100 $\Omega$	
	Measurement frequency	41 to 512 Hz	
	Coupling measurement	yes	
<b>4P method</b>	Range	0.001 to 99.99 k $\Omega$	
	Resolution	0.001 to 10 $\Omega$	
	<b>Selective 4P</b>	–	yes
<b>Earth measurement with 2 clamps</b>	Range	–	0.01 to 500 $\Omega$
	Resolution	–	0.01 to 1 $\Omega$
	Measurement frequency	–	Auto: 1611 Hz Manual: 128 Hz, 1367 Hz, 1611 Hz, 1758 Hz
<b>Resistivity</b>	Test method	Wenner and Schlumberger with automatic calculation	
	Range	0.01 to 99.9 k $\Omega$	
	Measurement frequency	41 to 128 Hz	
<b>DC resistance measurement</b>	Type of measurement	2 wires or 4 wires	
	Range	0.12 $\Omega$ to 99.9 k $\Omega$	0.001 $\Omega$ to 99.9 k $\Omega$
	Measurement current	> 200 mA DC	
<b>Memory</b>	512 memory locations		
<b>Communication</b>	optical / USB link		
<b>Dimensions / weight</b>	272 x 250 x 128 mm / 3 kg		
<b>Electrical safety</b>	50 V CAT IV		

## STATE AT DELIVERY

### • C.A 6470N ..... P01126506

Delivered with 1 external mains charger, data export software + optical / USB communication lead, 5 operating manuals (one per language) on CD-ROM, 5 simplified operating manuals, each in a different language, 5 descriptive labels, each in a different language.

### • C.A 6471 ..... P01126505

Delivered with 1 external mains charger, data export software + optical / USB communication lead, 2 C182 clamps with 2 safety leads, 5 operating manuals (one per language) on CD-ROM, 5 simplified operating manuals, each in a different language, 5 descriptive labels, each in a different language, 1 carrying bag.

## ACCESSORIES / SPARES

### • Adapter for battery recharging on vehicle cigarette lighter ..... P01102036

### • GB mains power cable ..... P01295253

### • Set of 10 fuses:

### type F 0.63 A – 250 V – 5x20 mm – 1.5 kA ..... AT0094

### • Adapter for battery recharging from mains ..... P01102035

### • Battery pack ..... P01296021

### • Optical / RS communication cable ..... P01295252

### • Optical / USB communication cable ..... HX0056-Z

### • Earth kit for 3P method, 50 m ..... P01102021

Comprising 2 T-shaped rods, 2 reels of cable (50 m red, 50 m blue), 1 cable winder (10 m green), 1 mallet, 5 spade lug /  $\varnothing$  4 mm banana plug adapters, 1 carrying bag.

### • Earth kit for 3P method, 100 m ..... P01102022

Comprising 2 T-shaped rods, 2 reels of cable (100 m red, 100 m blue), 1 cable winder (10 m green), 1 mallet, 5 spade lug /  $\varnothing$  4 mm banana plug adapters, 1 carrying bag.

### • Earth kit for 3P method, 150 m ..... P01102023

Comprising 2 T-shaped rods, 2 reels of cable (150 m red, 150 m blue), 1 cable winder (10 m green), 1 mallet, 5 spade lug /  $\varnothing$  4 mm banana plug adapters, 1 carrying bag.

### • Earth and resistivity kit, 100 m ..... P01102024

Comprising 4 T-shaped rods, 4 reels of cable (100 m red, 100 m blue, 100 m green, 30 m black), 1 cable winder (10 m green), 1 mallet, 5 spade lug /  $\varnothing$  4 mm banana plug adapters, 1 prestige carrying bag with specially-designed compartment for the C.A 647x.

### • Earth and resistivity kit, 150 m ..... P01102025

Comprising 4 T-shaped rods, 4 reels of cable (150 m red, 150 m blue, 100 m green, 30 m black), 1 cable winder (10 m green), 1 mallet, 5 spade lug /  $\varnothing$  4 mm banana plug adapters, 1 prestige carrying bag with specially-designed compartment for the C.A 647x.

### • Additional resistivity kit (100 m) ..... P01102030

(standard carrying bag containing 2 reels of cable (100 m green, 30 m black) and 2 T-rods.

### • C.A647X continuity kit (m $\Omega$ position) ..... P01102037

Comprising 4 cables 1.5 m long terminated by  $\varnothing$  4 mm banana plugs, 4 crocodile clips, 2 test probes.

### • DataView® PC software ..... P01102095

### FOR THE C.A 6471 ONLY

### • MN82 clamp (diam. 20 mm)

(delivered with 1 cable 2 m long

for ES terminal connection) ..... P01120452

### • C182 clamp (diam. 20 mm)

(delivered with 1 cable 2 m long

for ES terminal connection) ..... P01120333

For assistance and ordering

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