

Electrical installation testing

The risks linked to incorrect use of electricity may include:

- life-threatening danger for people,
- threat of damage to electrical installations and property,
- harmful effects on systems operation and equipment life spans.

So the purpose of electrical installation testing is primarily to ensure that people and goods are kept safe and are protected in the event of a fault. It also facilitates preventive maintenance of installations, preventing serious faults which might prove expensive (production shutdown, etc.).

To guarantee people's safety with regard to these installations and the electrical equipment connected to them, standards have naturally been developed and updated to take changes into account. The IEC 60364 standard and its various national equivalents published in each European country, such as NF C 15-100 in France or VDE 100 in Germany, specify the requirements concerning electrical installations in buildings. Chapter 6 of this standard describes the requirements for testing the compliance of an installation.

The effectiveness of the safety measures implemented can only be guaranteed if regular tests prove they are operating correctly. This is why the standards cover not only the initial verifications when installations are commissioned, but also periodic testing whose frequency depends on the type of installation and equipment, its use and the legislation in the country involved. In addition, the tests must be carried out with measurement instruments that comply with the IEC 61-557 European standard ensuring user safety and reliable measurements.

The electrical testing is divided into 2 parts:

1. Visual inspection to guarantee that the installation complies with the safety requirements (presence of an earth electrode, protective devices, etc.) and does not show any visible evidence of damage.
2. Measurements

There are 4 main measurements required:

1. Earth
2. Insulation
3. Continuity
4. Tests of protective devices

1. EARTH

To guarantee safety on residential or industrial electrical installations, there must be an earth electrode.

If there is no earth electrode, it may endanger people's lives and damage electrical installations and property.

When a large enough area is available to set up stakes, you should measure the earth with the traditional 3-pole method, also known as the 62 % method.

When the 62 % method is not applicable, however, other methods can be used. There are many methods for measuring the earth, some more suitable than others, depending on the neutral system, the type of installation (residential, industrial, urban, rural, etc.), the possibility of cutting off the power, the area available for planting stakes, etc.

2. CONTINUITY

The purpose of continuity measurement is to check the continuity of the protective conductors and the main and supplementary equipotential bonds. The test is carried out using a measurement instrument capable of generating a no-load voltage of 4 to 24 V (DC or AC) with a minimal current of 200 mA.

The resistance measured must be lower than a threshold specified by the standard applicable to the installation tested, which is usually 2Ω . As the resistance value is low, the resistance of the measurement leads must be compensated, particularly if very long leads are used.

3. INSULATION

Good insulation is essential to prevent electric shocks. This measurement, usually carried out between active conductors and the earth, involves injecting a DC voltage, measuring the current and thus determining the insulation resistance value.

The power must be switched off and the installation must be disconnected before performing this test to ensure that the test voltage will not be applied to other equipment electrically connected to the circuit to be tested, particularly devices sensitive to voltage surges.

According to the IEC 60364 standard, the minimum insulation resistance values must be as follows:

Rated voltage of circuit V	DC test voltage V	Insulation resistance M
LV secondary switchboard or LV main switchboard	250	≥ 0.5
Less than or equal to 500 V including LV main switchboard	500	≥ 1.0
Greater than 500 V	1,000	≥ 1.0

4. TESTS OF PROTECTIVE DEVICES

- Fuses / Circuit-breakers


To check the specifications of the protective devices such as fuses or circuit-breakers, a fault loop impedance measurement is carried out to calculate the corresponding short-circuit current. A visual inspection can then be used to check that the sizing is correct.

- Residual current devices (RCDs)

RCDs, which detect earth leakage currents, can be tested using two methods:

- the basic test, also called a pulse test, which determines the trip time (in milliseconds)
- the step test, which determines the trip time and trip current, thus detecting any RCD ageing.

Installation tester selection guide



	C.A 6030	C.A 6454	C.A 6456	C.A 6114	C.A 6115N	C.A 6116
Insulation						
Bipolar				■	■	■
Automatic L-N-PE					■	
100 / 250 / 500 V				■	■	
50 / 100 / 250 / 500 / 1,000 V						■
RCD Tests						
Non-trip test	■			■	■	■
Trip time	■			■	■	■
Trip current	■			■	■	■
Earth						
2P / 3P method without voltage			■			■
1P live-line method	■	■	■	■	■	■
1-clamp selective method		■	■		■	
Loop impedance & resistance						
L-PE	■	■	■	■	■	■
L-L		■	■	■	■	■
L-N		■	■	■	■	■
Ip-p calculation	■	■	■	■	■	■
Continuity						
Manual				■	■	
Manual automatic						■
Phase rotation	■			■	■	■
Current / Leakage current	■	■	■		■	■
Active power						■
Harmonic						■
Voltage	■	■	■	■	■	■
Frequency	■	■	■	■	■	■
Wiring polarity: Test + Reversal	■	■	■	■	■	■
Alarms	■	■	■	■	■	■
Memory	■	■	■	■	■	■
Communication output	■	■	■	■	■	■
Display	■	■	■	■	■	■
LCD screen	■	■	■	■	■	
Graphic screen						■
Power supply						
Batteries	■	■	■			
Rechargeable batteries				■	■	■
Software						
DataView®						■
Others	■	■	■	■	■	■
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Installation tester

> C.A 6030

- Comprehensive, accurate testing of RCD status
- Earth loop measurement



Specifications

Voltage	
Frequency	
Wiring polarity: testing + reversal	
RCD tests	
	Rated voltage / frequency of the installation
	$I\Delta n$
	Non-trip time
	Trip time
	Trip current
L-PE loop (without RCD tripping)	
	Rated voltage / frequency of the installation
	Range
	Accuracy
	Measurement current
Calculation of short-circuit current (I_{sc})	
Live-line earth measurement (1 stake) (without tripping RCD > 30 mA)	
	Rated voltage / frequency of the installation
	Range
	Accuracy
	Measurement current
Phase rotation	
Current / leakage current (Using a current clamp option)	
	MN20 clamp
	C172 clamp
	C176 clamp
Compensation of cables	
Alarms	
Storage	
Communication output	
Power supply	
Electrical safety	
Display	
Dimensions	
Weight	

C.A 6030

C.A 6030

	2 to 550 V (DC or RMS) as soon as the instrument is connected
	15.3 Hz to 450 Hz as soon as the instrument is connected
	Yes
	90 to 550 V / 15.3 to 65 Hz
	10 / 30 / 100 / 300 / 500 mA
	+ variable from 6 mA to 650 mA
	1/2 $I\Delta n$
	$I\Delta n$, 2 $I\Delta n$, 5 $I\Delta n$, 150 mA, 250 mA
	Step mode
	Z and R measurement
	90 to 550 V /
	15.3 to 65 Hz
	0.1 Ω to 4,000 Ω
	10% R + 15 counts
	0.1 to 0.5 $I\Delta n$
	Until 40 kA
	90 to 550 V /
	15.3 to 65 Hz
	0.1 Ω to 4,000 Ω
	10% R + 15 counts
	0.1 to 0.5 $I\Delta n$
	90 < voltage present < 550 V
	5 mA to 20 A
	5 mA to 20 A
	50 mA to 200 A
	Yes
	In each function
	1,000 measurements
	Optical interface
	6 x 1.5 V batteries
	IEC 61010-1 600 V CAT III
	4,000-count backlit LCD screen
	211 x 108 x 60 mm
	0.9 kg

State at delivery

- C.A 6030:** Delivered in "neckstrap" bag with an accessories bag containing 1 measurement lead with Euro mains plug, 1 measurement lead with 3 separate cables, 3 crocodile clips / 3 test probes, data transfer software + 1 optical communication cable and 1 operating manual in 5 languages

References to order

- C.A 6030** > P01191511
- C.A 6030 EURO + 1P Loop kit** > P01299921

Accessories / Spares

- C172 current clamp > P01120310
- C176 clamp > P01120330
- MN20 current clamp > P01120440
- Serial printer No. 5 > P01102903
- 1P loop kit > P01102020
- 3 crocodile clips (red/white/yellow) > P01101905
- 3 test probes (red/white/yellow) > P01101906
- Optical / RS232 connection cable > P01295252
- 10 m H green cable winder > P01102026
- 1 Earth T-rod > P01102031
- 100 m reel of green cable > P01295266
- 33 m reel of green cable > P01295268
- Standard carrying bag > P01298066

Installation testers

C.A 6454 & C.A 6456

> C.A 6454

■ Installation testing by loop measurement

> C.A 6456

■ Universal earth tester for any installation



Specifications

Voltage	
Frequency	
Wiring polarity: testing + reversal	
Loops	
Rated voltage / frequency of the installation	
L-PE loop (without RCD trip > 30 mA)	
Range	
Accuracy	
Measurement current	
L-L / L-N / L-PE loops (High current)	
Range	
Accuracy	
Measurement current	
Calculation of short-circuit current (Isc)	
Earth measurement with power on	
Rated voltage / frequency of the installation	
Earth with power on (1P)	
(without RCD trip > 30 mA)	
Range	
Accuracy	
Measurement current	
Earth measurement with power on (1 piquet)	
(high current)	
Range	
Accuracy	
Measurement current	
Selective earth measurement	
Range	
Accuracy	
Measurement current	
Earth with power off with stakes	
(2P / 3P method)	
Range	
Accuracy	
Current / leakage current	
(Using a current clamp option)	
MN20 clamp	
C172 clamp	
C176 clamp	
Compensation of cables	
Alarms	
Storage	
Communication output	
Power supply	
Electrical safety	
Display	
Dimensions	
Weight	

■ C.A 6454

■ C.A 6456

2 to 550 V (DC or RMS) as soon as the instrument is connected	
15.3 Hz to 450 Hz as soon as the instrument is connected	
Yes	
90 to 550 V / 15.3 to 65 Hz	
Z and R measurement	
0.1 Ω to 4,000 Ω	
15 % R + 5 counts	
6 mA – 9 mA – 12 mA	
Z and R measurement	
0.1 Ω to 4,000 Ω	
10 % R + 7 counts	
5 A	
Until 40 kA	
90 to 550 V / 15.3 to 65 Hz	
0.1 Ω to 4,000 Ω	
15 % R + 5 counts	
6 mA – 9 mA – 12 mA	
0.1 Ω to 4,000 Ω	
10 % R + 7 counts	
5 A	
0.1 Ω to 4,000 Ω	
15 % R + 10 counts	
5 A	
-	0.1 Ω to 4,000 Ω
-	2 % R + 5 counts
5 mA to 20 A	
5 mA to 20 A	
50 mA to 200 A	
Yes	
In each function	
1,000 measurements	
Optical interface	
6 x 1.5 V batteries	
IEC 61010-1 600 V CAT III	
4,000-count backlit LCD screen	
211 x 108 x 60 mm	
0.9 kg	

States at delivery

> **C.A 6454 / C.A 6456:** Delivered in "neckstrap" bag with an accessories bag containing 1 measurement lead with Euro mains plug, 1 measurement lead with 3 separate cables, 3 crocodile clips / 3 test probes, data transfer software + 1 optical communication cable and 1 operating manual in 5 languages

References to order

- > **C.A 6454** > P01123511
- > **C.A 6456** > P01123512
- > **C.A 6454 EURO** + 1P Loop kit > P01299917
- > **C.A 6456** + 3P earth kit (50 m) > P01123513

Accessories / Spares

> For the C.A 6454 & C.A 6456

- C172 current clamp > P01120310
- C176 clamp > P01120330
- MN20 current clamp > P01120440
- Serial printer No. 5 > P01102903
- 1P loop kit > P01102020
- 3 crocodile clips (red/white/yellow) > P01101905
- 3 test probes (red/white/yellow) > P01101906
- Optical / RS232 connection cable > P01295252

> For the C.A 6454 only

- 10 m H green cable winder > P01102026
- 1 Earth T-rod > P01102031
- 100 m reel of green cable > P01295266
- 33 m reel of green cable > P01295268
- Standard carrying bag > P01298066

Installation tester

C.A 6114

■ The essential tests in compliance with the applicable international standards (IEC 60364-6, NF C 15-100, VDE 100, etc.) in a single instrument

■ Easy to use: tests from a simple mains socket



Specifications

Voltage	10 to 440 V _{AC} /DC
Frequency	15.3 to 450 Hz
Insulation	
Method	bipolar
Test voltage	100 / 250 / 500 V
Measurement range	5 k Ω to 600 M Ω
Accuracy	$\pm 6\%$ R ± 1 count

RCD test

Rated voltage	95...145 V / 175...300 V
Rated frequency of the installation	15.3...17.5 Hz / 45...65 Hz
I Δ n	10 / 30 / 100 / 300 / 500 mA
Non-trip test	1/2 I Δ n
Trip time	I Δ n, 2 I Δ n, 5 I Δ n, 150 mA, 250 mA + step mode
Trip current	Step mode

Earth with power on (1P method)

Rated voltage	95...145 V / 175...300 V
Rated frequency of the installation	15.3...17.5 Hz / 45...65 Hz
Measurement range	0.15 Ω to 10 k Ω
Accuracy	$\pm 10\%$ R ± 3 counts

Loops

Rated voltage	95...145 V; 175...300 V; 330...440 V
Rated frequency of the installation	15.3...17.5 Hz; 45...65 Hz

L-PE loops measurement (without RCD trip > 30 mA)

Measurement range	Z and R measurement
Accuracy	0.2 Ω to 200 Ω
Measurement current	$\pm 5\%$ R ± 3 counts
	6 mA - 9 mA - 12 mA

L-L / L-N / L-PE loops measurements (high current)

Measurement range	Z and R measurement
Accuracy	0.08 Ω to 200 Ω
Measurement current	$\pm 5\%$ R ± 3 counts
	5 A

Calculation of short-circuit current (I_{sc})

Measurement range	Until 30 kA
Accuracy	
Measurement current	

Phase rotation

Voltage	if 20 V _{AC} < voltage present < 440 V _{AC}
Frequency	15.3...450 Hz

Alarms

Storage

Communication output

Power supply

Electrical safety

Display

Dimensions

In each function

800 measurements

RS232

NiMH battery with built-in charger

IEC 61010-1 - Cat. III 300 V

295 x 230 x 108 mm

2.1 kg

State at delivery

> **C.A 6114** delivered with an accessories bag containing 1 x 2.5 m cable with 2P+E mains plug for measurement or charging, 1 x 2.5 m measurement cable with 3 separate leads, 3 test probes and 3 crocodile clips (red, yellow, white), 1 x 3 m green lead with test probe and 1 operating manual in 5 languages



Accessories / Spares

CA 611X UTILITY application software	> P01101902
Remote-control probe no. 2	> P01101942
Serial printer No. 5	> P01102903
Adapter for parallel printer	> P01101941
1P loop kit	> P01102020
3 crocodile clips (red/white/yellow)	> P01101905
3 test probes (red/white/yellow)	> P01101906
2P+E test lead (F/D)	> P01295123
Tripod lead	> P01295132
DB9F-25F x 2	> P01295172
Battery pack	> P01296018
Rigid bag no. 3	> P01298031
Bag no. 3	> P01298032



Reference to order

> **C.A 6114**

> P01145431

Installation tester

C.A 6115N

> Multi-function electrical installation tester

- The essential tests in compliance with the applicable international standards (IEC 60364-6, NF C 15-100, VDE 100, etc.) in a single instrument
- Easy to use: tests from a simple mains socket
- All RCD calibres tested from 6 mA to 1,000 mA
- Connection to a current clamp (current / leakage current / selective earth measurement)



State at delivery

- > **C.A 6115N (F)** delivered with an accessories bag containing 1 x 2.5 m cable with 2P+E mains plug for measurement or charging, 1 x 2.5 m measurement cable with 3 separate leads, 3 test probes and 3 crocodile clips (red, yellow, white), 1 x 3 m green cable with test probe, 1 operating manual in 5 languages

Reference to order

- > **C.A 6115N** > P01145411B

Specifications

Voltage	
Frequency	
Insulation	
Method	bipolar + automatic
Test voltage	100 / 250 / 500 V
Measurement range	5 k Ω to 600 M Ω
Accuracy	\pm 6% R \pm 1 count

RCD test

Voltage	95...145 V / 175...300 V
Frequency of the installation	15.3...17.5 Hz / 45...65 Hz
I Δ n	10 / 30 / 100 / 300 / 500 mA + variable from 6 mA...1 A
Non-trip test	1/2 I Δ n
Trip time	I Δ n, 2 I Δ n, 5 I Δ n, 150 mA, 250 mA + step mode
Trip current	Step mode

Earth with power on

Voltage	95...145 V / 175...300 V
Frequency of the installation	15.3...17.5 Hz / 45...65 Hz
1P method earth measurement	
Measurement range	0.15 Ω to 10 k Ω
Accuracy	\pm 10% R \pm 3 counts

Selective 1P method earth measurement (Using a current clamp - optional)

Measurement range	0.7 Ω to 10 k Ω
Accuracy	\pm 15% R \pm 10 counts

Loops

Rated voltage	95...145 V; 175...300 V; 330...440 V
Rated frequency of the installation	15.3...17.5 Hz; 45...65 Hz

L-PE loop (without RCD trip > 30 mA)	
Measurement range	Z and R measurement 0.2 Ω to 200 Ω
Accuracy	\pm 5% R \pm 3 counts
Measurement current	6 mA - 9 mA - 12 mA

L-L / L-N / L-PE loops measurements (high current)

Measurement range	Z and R measurement 0.08 Ω to 200 Ω
Accuracy	\pm 5% R \pm 3 counts
Measurement current	5 A

Calculation of short-circuit current (I_{sc})

Measurement range	until 30 kA
Accuracy	0.16 Ω to 2 k Ω
Measurement current	\pm 5% R \pm 4 counts I > 200 mA until 10 Ω

Phase rotation

Voltage	If 20 V _{AC} < voltage present < 440 V _{AC}
Frequency	15.3...450 Hz

Current / leakage current

MN21 clamp	Using a current clamp (option)
C103 clamp	4 mA...100 A
	4 mA...300 A

Alarms

Storage

Communication output

Power supply

Electrical safety

Dimensions

Weight

	In each function
	800 measurements
	RS232
	NiMH battery with built-in charger
	IEC 61010-1 - Cat. III 300 V
	295 x 230 x 108 mm
	2.1 kg

Accessories / Spares

CA 611X UTILITY application software	> P01101902	DB9F-25F x 2	> P01295172
Remote-control probe no. 2	> P01101942	Battery pack	> P01296018
Serial printer No. 5	> P01102903	Rigid bag no. 3	> P01298031
Adapter for parallel printer	> P01101941	Bag no. 3	> P01298032
1P loop kit	> P01102020	C103 current clamp	> P01120303
3 crocodile clips (red/white/yellow)	> P01101905	MN21 mini current clamp	> P01120418
3 test probes (red/white/yellow)	> P01101906		
2P+E test lead (F/D)	> P01295123		
Tripod lead	> P01295132		

Installation tester

C.A 6116



> Functions

- The essential tests according to the applicable international standards (IEC 60364-6, NF C 15-100, VDE 100, XP C 16 600, etc.) in a single instrument
- All types of earth measurements (3-pole method with stakes, 1-stake method, selective method)
- Automatic continuity measurement helping to save time in the field
- Power and Harmonics function for initial assessment of energy quality on the installation
- Multiple voltages for insulation measurements (50 / 100 / 250 / 500 / 1,000 V) suitable for all types of installation
- All RCD calibres tested from 6 mA to 1,000 mA
- Connection to a current clamp (current measurement / leakage current / selective earth)

> Interface

- User-friendly thanks to its extra-wide screen for comfortable reading
- A large number of audio signals and visual symbols for interpretation of the measurements according to the standards
- Contextual help included for each function
- Hierarchically-structured storage based on the Site / Part / Object, with the possibility of customizing measurement campaigns directly on the instrument or via the ICT software (delivered as standard)
- Multilingual instrument (5 languages available)

> Software

- ICT software delivered as standard, providing a complete solution for report generation by allowing users to:
 - transfer the data stored in the C.A 6116
 - make a visual check in accordance with the standards
 - prepare measurement campaigns and then transfer them into the C.A 6116

Compatible with the DataView® software which is capable of producing reports in compliance with the applicable standards (IEC 60364-6, VDE 100, etc.)

Accessories



EARTH KITS

- 50 m 3P earth kit > P01102021
- 100 m 3P earth kit > P01102022
- 15 m earth kit (red/green/blue) > P01102017
- 30 m black 1P earth kit > P01102018

CURRENT CLAMPS

- MN77 current clamp (5 mA ...20 A) > P01120460
- C177 current clamp (5 mA... 20 A) > P01120335
- C177A current clamp (0.020 A...200 A) > P01120336

OTHERS

- Continuity pole > P01102084
- DataView® software > P01102095

Spares

- Standard carrying bag > P01298056
- PA 30 W mains power pack > P01102057
- Battery pack NiMH 35 WH > P01296024
- USB-A USB-B lead > P01295293
- Screen-protection film (x 3) > P01102094
- 4-point strap > P01298073
- Remote-control probe > P01102092



Installation tester



C.A 6116

C.A 6116

Specifications

Voltage	
Frequency	
Insulation	

Rated voltage	Utest: 50 / 100 / 250 / 500 / 1,000 Vdc
Range	0.01 MΩ to 2 GΩ
Accuracy	±(5% of measurement + 3 cts)

RCDs

Installation voltage	90 V to 550 V
Installation frequency	15.3 Hz to 17.5 Hz / 45 Hz to 65 Hz
IΔn	10/30/100/300/500/650/1,000 mA or variable at ½IΔn – Duration: 1,000 ms or 2,000 ms
No-trip test	at ½IΔn / 2 IΔn (selective) / 5 IΔn
Measurement of tripping time	Step mode 0.3 IΔn to 1.06 IΔn in steps of 3.3% IΔn
Test in step and pulse modes	

Earth

3P earth	Range Accuracy Others	0.50 to 4 kΩ ±(2% of measurement + 2 cts) Auxiliary stake resistance measurement (up, to 40 kΩ)
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Earth with power on

Installation voltage / Frequency	90 to 550 V / 15.3 to 17.5 Hz - 45 to 65 Hz
1P earth	
High-current mode with tripping (TRIP)	
Range	0.10 Ω to 3,999 Ω
Accuracy	±(5% of measurement + 2 cts)
Test current	5 A
Mode without tripping (NO TRIP)	
Range	0.20 Ω to 3,999 Ω
Accuracy	±(5% of measurement + 3 cts)
Test current	6 mA – 9 mA – 12 mA (by default)

1P selective earth

Range	0.20 Ω to 3,999 Ω
Accuracy	±(10% of measurement + 10 cts)

Loops

Installation rated voltage	90 V to 550 V
Installation rated frequency	15.3 Hz to 17.5 Hz / 45 Hz to 65 Hz

L-PE loops (Zs)

(without RCD trip > 30 mA)		Z and R measurement
Measurement range	0.2 Ω to 200 Ω	0.2 Ω to 200 Ω
Accuracy	±5% R + 3 cts	±5% R + 3 cts
Measurement current	6 mA – 9 mA – 12 mA	6 mA – 9 mA – 12 mA

L-L / L-N / L-PE loops measurements (high current)

Measurement range	0.08 Ω to 200 Ω	Z and R measurement
Accuracy	±5% R + 3 cts	0.08 Ω to 200 Ω
Measurement current	5 A	±5% R + 3 cts
		5 A

Calculation of short-circuit current (Isc)

	0.1 to 40 kA
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Continuity

Measurement range	0 Ω to 399.9 kΩ
Accuracy	±(1.5% of measurement + 2 cts)
Test current	I > 200 mA up to 39.99 Ω and 12 mA up to 399.9 kΩ with buzzer

Phase rotation

Voltage	20 to 550 V _{AC}
Frequency	15.3 Hz to 17.5 Hz / 45 Hz to 65 Hz

Current

with MN77 clamp	5 mA to 19.99 A
with C177 clamp	5 mA to 19.99 A
with C177A clamp	0.05 to 199.9 A

Active power

(with optional C177A clamp)	0 to 110 kW single-phase - 0 to 330 kW three-phase
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Harmonics (with optional C177A clamp)

	Simultaneous display of voltage and current waveforms.
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Phase rotation

	20 to 550 V _{AC}
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Alarms

	In each function
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	4,000 measurements
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	SITE/PART/OBJECT hierarchical storage with customizable names
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	Large 5.7" backlit graphic screen, 320 x 240 counts
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	via USB for data transfer and report creation
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	Rechargeable battery
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	IP 53
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	IEC 61010-1 – 600 V CAT III – 300 V CAT IV – IEC 61557
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	280 x 190 x 128 mm
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	2.4 kg
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State at delivery

- > **C.A 6116** tester delivered with 1 USB cable, 1 three-pin/mains lead, 1 three-pin lead / 3 safety leads, 3 test probes (Ø 4 mm), 3 crocodile clips, 2 straight/elbowed safety leads (3 m), remote-control probe, mains power pack, wrist strap, 4-point strap for extra comfort, carrying bag, data export software, 5 safety connectors and 5 operating manuals (1 per language).

References to order

> C.A 6116

Version EURO	> P01145450
Version GB	> P01145450A
Version IT	> P01145450B
Version CH	> P01145450C
Version US	> P01145450D

Technical overview

INSULATION

To ensure that electrical equipment and installation operate correctly in total safety, all the conductors are insulated: sheathing for cables, varnish for windings. When the quality of these insulating materials diminishes, leakage currents may flow from one conductor to the other and, depending on the extent of the insulation faults (the worst being a short-circuit), may cause serious damage.

Equipment with faulty insulation may break down, burn or cause a fault on the installation itself, thus triggering protective devices and shutting down the whole installation...

Furthermore, some particularly sensitive installations (operating theatres in hospitals, chemical industries, etc.) are built using an IT-type neutral system (cf. IEC 60364-6), which tolerates an initial line-earth insulation fault and only shuts down the installation if a second fault occurs.

Measurements are needed to prevent and prepare for the hazards linked to insufficient or damaged insulation. These measurements concern both the electrical equipment and the installations to which it is connected. These measurements are carried out during commissioning on new or reconditioned items, and then repeated regularly to monitor their evolution over time.

I - INSULATION RESISTANCE MEASUREMENT AND DIELECTRIC TESTING

These two concepts, which characterize the quality of an insulant, require further explanation as they are too frequently confused.

■ **Dielectric strength testing**, also called "breakdown testing", measures an insulant's ability to withstand a medium-duration voltage surge without sparkover occurring. In reality, this voltage surge may be due to lightning or the induction caused by a fault on a power transmission line. The main purpose of this test is to ensure that the construction rules concerning leakage paths and clearances have been respected. This test is often performed by applying an AC voltage but can also be done with a DC voltage. This type of measurement requires a dielectrometer. The result obtained is a voltage value usually expressed in kilovolts (kV). Dielectric testing may be destructive in the event of a fault, depending on the test levels and the available energy in the instrument. For this reason, it is reserved for type tests on new or reconditioned equipment: only equipment that passes the test will be put into service.

■ **Insulation resistance measurement**, however, is non-destructive under normal test conditions. Carried out by applying a DC voltage with a smaller amplitude than for dielectric testing, it yields a result expressed in $k\Omega$, $M\Omega$, $G\Omega$ or $T\Omega$. This resistance indicates the quality of the insulation between two conductors and provides a good idea of the risks of leakage currents. Because it is non-destructive, it is particularly useful for monitoring insulant ageing during the operating life of electrical equipment or installations. This measurement is performed using an insulation tester, also called a megohmmeter.

II- MEASURING LEVELS OF INSULATION

In concrete terms, first of all the installation or equipment is checked to ensure that no voltage is present in it. Then a DC test voltage is applied and the insulation resistance value is read. When measuring an insulation in relation to the earth, you are advised to place the positive pole of the test voltage on the earth to prevent earth polarization problems when carrying out multiple tests.

All the standards concerning electrical installations or equipment specify the measurement conditions and minimum thresholds to be respected for insulation measurements.

III- INSULATION MEASUREMENT APPLICATIONS

A) Insulation measurement on electrical installations

■ Insulation test before powering up

Before powering up a new installation; its insulation must be tested.

Two types of measurements are required:

- Verification of the conductors: this checks that none of the conductors, cut-off devices or connection equipment has suffered damage liable to cause an insulation fault. This is done before commissioning the installation, with all the receivers disconnected.
- Verification of the whole installation in relation to the earth.

■ Verification of insulation after powering up

After powering up the installation, the insulation should be checked regularly to make sure there is no substantial drift away from the initial values.

Because the method used is the same as for testing before powering up, the installations must be switched off.

In both cases, the insulation will be considered acceptable if the insulation resistance measured is greater than the threshold specified by the applicable standard for the installation tested (NF C 15-100 in France, VDE 100 in Germany, European standard IEC 60364, etc.).

B) Insulation measurement on motors, transformers, etc.

Whether on electrical installations or on machines, the quality of the insulating materials deteriorates as time passes due to the stresses affecting the equipment. This deterioration reduces the electrical resistivity of the insulants, leading in turn to an increase in the leakage currents and causing incidents which may be serious in terms of the safety of people and property, but also in terms of production stoppage costs in industry.

So, in addition to the measurements during commissioning of new or renovated equipment, regular insulation testing of installations and equipment helps to prevent such incidents by organizing preventive maintenance designed to detect ageing and therefore prevent premature deterioration of the insulation properties before they reach a level liable to cause the incidents described above.

Deterioration of the equipment may occur naturally, but it is often also accelerated by external contaminants such as dust, oil, etc. It is therefore strongly recommended to monitor their insulation over time.

To carry out this preventive maintenance effectively, the Chauvin Arnoux range of megohmmeters proposes the following functions:

- PI, DAR and DD quality ratios for a quick assessment of insulation quality, with the added advantage that they are not particularly influenced by temperature, making them easy to use without requiring correction of the results
- Automatic calculation of the insulation resistance at a reference temperature (C.A 6549)
- Method based on the influence of test voltage variation (step voltage measurement)

CRITERIA FOR CHOOSING AN INSULATION TESTER

Here are a few tips to help you choose an insulation tester that matches your requirements.

■ The application.

What type of equipment will you be testing: electrical installations, switchgear, telephony, etc.?

Rated operating voltage, manufacturer recommendations, dedicated standards?

Test voltage: 50 – 100 – 250 – 500 – 1,000 – 2,500 – 5,000 VDC?

Measurement range: $k\Omega$, $M\Omega$, $G\Omega$?

■ User comfort.

Reading mode: needle display with logarithmic scale, digital LCD, analogue bargraph?

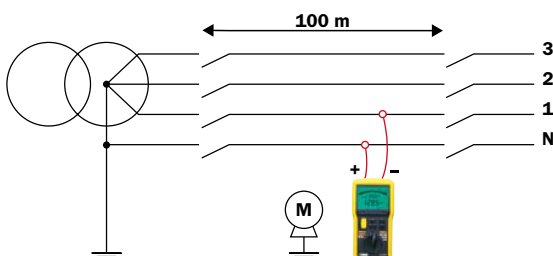
User-friendly features: programmable alarm thresholds, backlighting, remote control probe?

■ Operating mode.

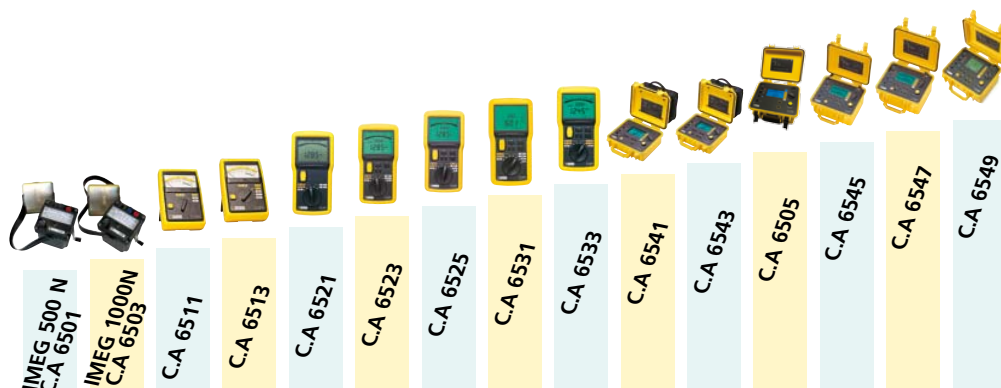
Hand-cranked generator, normal or rechargeable batteries?

Other measurements required: continuity, current, voltage, etc.?

Single-function or multi-function instrument, for testing installations or machines?



Insulation testers selection guide



	IMEG 500 N C.A 6501	IMEG 1000N C.A 6503	C.A 6511	C.A 6513	C.A 6521	C.A 6523	C.A 6525	C.A 6531	C.A 6533	C.A 6541	C.A 6543	C.A 6505	C.A 6545	C.A 6547	C.A 6549
Test voltage (Vdc)															
50															
100															
250															
500	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1,000		■		■		■				■	■			■	■
2,500															
5,000															
variable 50 to 5,100															
Max. measurement value															
200 MΩ	■														
400 MΩ															
1 GΩ			■	■											
2 GΩ					■	■	■								
5 GΩ		■													
20 GΩ									■						
4 TΩ										■	■				
10 TΩ														■	■
Continuity	■		■	■	■	■	■			■	■				
Resistance	■			■			■	■	■	■	■				
Capacitance								■		■	■	■	■	■	■
AC/DC current								■				■	■	■	■
Chronometer							■				■	■	■	■	■
Test duration programming										■	■	■	■	■	■
Quality ratios										■	■	■	■	■	■
R (time)										■	■		■	■	■
Voltage ramp															■
R. calculation (Tref)															■
Memorization															■
RS 232											■			■	■
Display															
Analogue	■	■	■	■											
LCD+bargraph					■	■	■	■	■	■	■	■	■	■	■
Graphic															■
Alimentation															
Magneto	■	■													
Batteries			■	■	■	■	■	■	■	■					
Rechargeable battery											■	■	■	■	■
Page	46	46	47	47	48	48	48	49	49	50	51	53	54	54	55

Analogue insulation testers



C.A 6501 & C.A 6503

- > **C.A 6501 & C.A 6503: on-site version**
 - rugged plastic casing suitable for use in all conditions
- > **IMEG 500N & IMEG 1000N: reinforced version**
 - mechanically-reinforced metal casing specially designed for difficult environments
 - delivered in site-proof case

■ C.A 6501 ■ IMEG 500 N

■ C.A 6503 ■ IMEG 1000 N

Specifications

Insulation (*calibre MΩ*)

Test voltages (DC)
Range
Accuracy

500 V
From 0.5 to 200 MΩ
2.5 % of end-of-scale

250 V / 500 V / 1,000 V
From 1 to 5,000 MΩ
2 % of end-of-scale

Resistance

Range
Accuracy

From 45 to 500 kΩ
2.5 % of end-of-scale

-
-

Continuity

Range
Accuracy

From 0 to 100 Ω
2 % of end-of-scale

-
-

Voltage

Range
Frequency
Accuracy

0...600 V_{AC}
45 to 450 Hz
3 % of end-of-scale

0...600 V_{AC}
45 to 450 Hz
2 % of end-of-scale

Display

Analogue

Dimensions

120 x 120 x 130 mm

Weight

1.06 kg

Power supply

Magneto allowing a stable test voltage

Protection rating

IP 54 with cover

IP 52 without cover

Electrical safety

IEC 61010 -600 V CAT II / 300 V CAT III

States at delivery

- > **IMEG 500N** delivered in site-proof casing with 1 operating manual, 2 elbowed/straight PVC leads 1.5 m long (red/black), 2 crocodile clips (red/black), 1 black test probe.
- > **IMEG 1000N** delivered in site-proof casing with 1 operating manual, 3 elbowed/straight PVC leads 1.5 m long (red/black/blue), 3 crocodile clips (red/black/blue), 1 black test probe.
- > **C.A 6501** delivered in carrying bag with 1 operating manual, 2 elbowed/straight PVC leads 1.5 m long (red/black), 2 crocodile clips (red/black), 1 black test probe.
- > **C.A 6503** delivered in site-proof casing with 1 operating manual, 3 elbowed/straight PVC leads 1.5 m long (red/black/blue), 3 crocodile clips (red/black/blue), 1 black test probe.

References to order

- > **IMEG 500N** > P01132501A
- > **IMEG 100N** > P01132502A
- > **C.A 6501** > P01132503
- > **C.A 6503** > P01132504

Accessories / Spares

- C.A 846 thermohygrometer > P01156301Z
- C.A 861 K thermocouple > P01650101Z
- 0.2 A fuses > P02297302
- Set of 2 crocodile clips (red/black) > P01102052Z
- Set of 2 test probes (red/black) > P01102051Z
- Set of 2 leads 1.5 m long (red/black) > P01295283Z
- 5 crocodile clips (red, black, white, yellow, green/yellow) > P01101849
- 3 safety leads 1.5 m long (red, blue, black) > P01295171

Digital insulation testers

C.A 6511 & C.A 6513

> C.A 6511

- Simple to use
- Rugged shockproof sheath
- Insulation 500 V, continuity 200 mA

> C.A 6513

- Simple to use
- Rugged shockproof sheath
- Insulation 100 V, continuity 200 mA & resistance



Specifications

	C.A 6511	C.A 6513
Insulation		
Test voltage (DC)	500 V	500 V / 1,000 V
Range	0,1 to 1,000 MΩ	
Accuracy	± 5 % of end-of-scale	
Resistance		
Range	-	0 to 1,000 Ω
Accuracy	-	± 3 % of end-of-scale
Continuity		
Range	-10 to +10 Ω	
Accuracy	± 3 % of end-of-scale	
Test current		
Current reversal	Yes	
Voltage		
Range	0...600 Vac	
Frequency	45 to 400 Hz	
Accuracy	3 % of end-of-scale	
Display	Analogue	
Dimensions	167 x 106 x 55 mm	
Weight	500 g	
Power supply	4 x 1.5 V batteries	
Electrical safety	IEC 61010 600 V CAT III	



Accessories / Spares

> For the C.A 6511 & C.A 6513

- | | |
|---------------------------------------|--------------|
| C.A 861 + K couple | > P01650101Z |
| C.A 846 | > P01156301Z |
| Set of 2 crocodile clamps (red/black) | > P01102052Z |
| Set of 2 test probes (red/black) | > P01102051Z |
| Set of 2 leads 1.5 m long (red/black) | > P01295283Z |
| 1.5 V LR6 ALK battery | > P01296033 |
| 1.5 V LR6 ALK batteries (x 12) | > P01296033A |
| 1.5 V LR6 ALK batteries (x 24) | > P01296033B |
| 1.6 A fuse | > P01297022 |
| Shockproof sheath no. 13 | > P01298016 |

States at delivery

> C.A 6511 and C.A 6513

Delivered mounted in its shockproof sheath with 2 elbowed/straight PVC leads 1.5 m long (red/black), 1 black test probe, 1 red crocodile clip, 1 operating manual, 4 x 1.5 V LR6 batteries

References to order

- | | |
|------------|-------------|
| > C.A 6511 | > P01140201 |
| > C.A 6513 | > P01140301 |

Digital insulation testers



Specifications

Insulation

Test voltage	250 V
	500 V
	1,000 V

Accuracy 200 kΩ to 2 GΩ

Voltage test / Safety

Voltage alert indicator

Test inhibition

Continuity

Range	0.0 to 19.99 Ω
Measurement current	≥ 200 mA up to 20 Ω
Current inversion	Yes
Cable compensation	Yes
Buzzer	Yes

Resistance

Range

Alarms

Timer

Display

Backlighting

Power supply

Dimensions

Weight

Electrical safety

C.A 6521, C.A 6523 & C.A 6525

- > **C.A 6521, 2 in 1**
 - Dual analogue and digital display
- > **C.A 6523, 3 in 1**
 - Dual analogue and digital display
 - Programmable alarm thresholds
- > **C.A 6525, 3 in 1**
 - Programmable alarm thresholds
 - Chronometer to test insulation quality

■ C.A 6521

■ C.A 6523

■ C.A 6525

50 kΩ to 2 GΩ	-	50 kΩ to 2 GΩ
100 kΩ to 2 GΩ	100 kΩ to 2 GΩ	100 kΩ to 2 GΩ
-	200 kΩ to 2 GΩ	200 kΩ to 2 GΩ

±3 % of value ±2 counts

0 to 600 V_{AC/DC}

Yes > 25 V

Yes > 25 V

0.0 to 19.99 Ω

≥ 200 mA up to 20 Ω

Yes

Yes

Yes

0 to 400 kΩ

Yes

Yes

0 to 15 min

LCD + Bargraph

Yes

Yes

6 x LR6 batteries

211 x 108 x 60 mm

830 g

IEC 61010 300 V CAT II - IEC 61557

States at delivery

> The **C.A 6521, C.A 6523 and C.A 6525** are delivered with a special bag for "hands-free" use containing 1 set of 2 leads 1.5 m long, 1 crocodile clip, 1 black test probe, 6 x 1.5 V LR6 batteries and 1 operating manual

References to order

- > **C.A 6521** > P01140801D
- > **C.A 6523** > P01140802D
- > **C.A 6525** > P01140803D

Accessories / Spares

- Remote-control probe > P01101935
- C.A 846 > P01156301Z
- C.A 861 + K thermocouple > P01650101Z
- Carrying bag for "hands-free" use > P01298049
- Set of 5 fuses 0.63 A > P01297078
- 1.5 V LR6 ALK battery > P01296033
- Test probes (red + black) > P01102051Z
- Crocodile clips (red + black) > P01102052Z
- Elbowed-straight safety leads (red + black) 1.5 m long > P01295283Z

Digital insulation testers

C.A 6531 & C.A 6533

> C.A 6531 & C.A 6533

- Specially designed for Telecoms & Electronics
- Dedicated to equipment or installations using low currents



Specifications

Insulation

		■ C.A 6531	■ C.A 6533
Test voltage	50 V	10 kΩ to 400 MΩ	10 kΩ to 2 GΩ
	100 V	20 kΩ to 400 MΩ	20 kΩ to 2 GΩ
	250 V	-	50 kΩ to 20 GΩ
	500 V	-	100 kΩ to 20 GΩ
Accuracy 200 kΩ to 4 GΩ		±3 % of value ±2 counts	
Voltage test / Safety		0 to 600 V _{ac} /bc	
Voltage alert indicator		Yes > 25 V	
Test inhibition		Yes > 25 V	
Capacitance		0 to 4,000 nF*	-
AC/DC current measurement		0 to 400 mA	-
Resistance			
	Range	0 to 40 kΩ	0 to 400 kΩ
Alarms		Yes	Yes
Display		LCD + Bargraph	
Backlighting		Yes	
Power supply		6 x LR6 alkaline batteries	
Dimensions		211 x 108 x 60 mm	
Weight		830 g	
Electrical safety		IEC 61010 - 600 V - CAT III	

*also calculates the line length on the basis of the capacitance per unit length

Accessories / Spares

Remote-control probe	> P01101935
C.A 846	> P01156301Z
C.A 861 + K thermocouple	> P01650101Z
Carrying bag for "hands-free" use	> P01298049
Set of 5 fuses 0.63 A	> P01297078
1.5 V LR6 ALK battery	> P01296033
Test probes (red + black)	> P01102051Z
Crocodile clips (red + black)	> P01102052Z
Elbowed-straight safety leads (red + black) 1.5 m long	> P01295283Z

States at delivery

- > **C.A 6531:** same state at delivery as the C.A 6521 + 2 wire grips
- > **C.A 6533:** same state at delivery as the C.A 6521 + 2 wire grips, 1 blue crocodile clamp and 1 guarded safety lead 1.5 m long

References to order

- > **C.A 6531** > P01140804B
- > **C.A 6533** > P01140805

Digital insulation tester



C.A 6541

- > **Special on-site 1,000 V insulation tester**
- Large measurement range up to 4 T Ω
- Automatic calculation of insulation quality ratios (DAR – PI)
- Ultra-rugged site-proof case
- Storage of results

■ C.A 6541

Specifications

Insulation

Test voltage	50 V	2 k Ω to 200 G Ω
	100 V	4 k Ω to 400 G Ω
	250 V	10 k Ω to 1 T Ω
	500 V	20 k Ω to 2 T Ω
	1,000 V	40 k Ω to 4 T Ω

Accuracy	2 k Ω to 400 G Ω	± 5 % of value ± 3 counts
	400 G Ω to 4 T Ω	± 5 % of value ± 10 counts

Programmable test duration

DAR (1 min/30 sec)	0.000 to 9.999
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PI (10 min/1 min)	0.000 to 9.999
-------------------	----------------

Customizable PI	Time from 30 s to 59 min as required
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Voltage test / Safety	0 to 1,000 V _{AC/DC}
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Voltage alert indicator	Yes > 25 V
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Test inhibition	Yes > 25 V
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Smooth function	Yes
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Continuity

Range	0.01 to 39.99 Ω
Measurement current	≥ 200 mA up to 20 Ω

Resistance

Range	0.01 to 400 k Ω
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Capacitance

Range	0.005 to 4.999 μ F
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Storage – Communication

Storage of R(t)	20-kbyte memory
Storage of measurements	20 measurement results
Direct report printing	No
Communication port	No
PC software	No

Display	Giant LCD + bargraph
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Power supply	8 x LR14 batteries
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Dimensions	270 x 250 x 110 mm
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Weight	3.4 kg
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Electrical safety	IEC 61010 600 V CAT III – IEC 61557
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Accessories / Spares

Remote control probe	> P01101935
C.A 846 thermo-hygrometer	> P01156301Z
C.A 861 thermometer + K thermocouple	> P01650101Z
AN1 artificial neutral box	> P01197201
Bag No. 6 for accessories	> P01298051
Crocodile clips	
(red, black, blue, white, yellow, green/yellow)	> P01101849
1.5 V LR14 alkaline battery	> P01296034
Fuse F 2.5 A, 1,200 V, 8 x 50 mm, 15 kA (set of 5)	> P01297071
Fuse F 0.1 A, 660 V-6, 3 x 32 mm, 20 kA (set of 10)	> P01297072

State at delivery and reference

- > **C.A 6541** > P01138901
- Delivered with an accessories bag containing a set of 2 leads 1.5 m long (red/black), 1 black guarded lead 1.5 m long, 3 crocodile clips (red/blue/black), 1 test probe (black), 1 simplified operating manual, 1 complete operating manual in 5 languages, 1 mains power cable 2 m long, 1 communication cable

Digital insulation tester

C.A 6543

> Special on-site 1,000 V insulation tester

- Large measurement range up to 4 TΩ
- Automatic calculation of insulation quality ratios (DAR - PI)
- Ultra-rugged site-proof case
- Storage of results

Specifications

Insulation

Test voltage	50 V	2 kΩ to 200 GΩ
	100 V	4 kΩ to 400 GΩ
	250 V	10 kΩ to 1 TΩ
	500 V	20 kΩ to 2 TΩ
	1,000 V	40 kΩ to 4 TΩ
Accuracy	2 kΩ to 400 GΩ	±5 % of value ±3 counts
	400 GΩ to 4 TΩ	±5 % of value ±10 counts
Programmable test duration		1 to 59 min
DAR (1 min/30 sec)		0.000 to 9.999
PI (10 min/1 min)		0.000 to 9.999
Customizable PI		Time from 30 s to 59 min as required
Voltage test / Safety		0 to 1,000 V _{AC/DC}
Voltage alert indicator		Yes > 25 V
Test inhibition		Yes > 25 V
Smooth function		Yes
Continuity		
	Range	0.01 to 39.99 Ω
	Measurement current	≥ 200 mA up to 20 Ω
Resistance		
	Range	0,01 to 400 kΩ
Capacitance		
	Range	0.005 to 4.999 μF
Storage - Communication		
	Storage of R(t)	128-kbyte memory
	Storage of measurements	Up to 1,500 measurement results
	Direct report printing	On local printer - fixed format
	Communication port	RS 232
	PC software	DataView® (option)
Display		Giant LCD + bargraph
Power supply		NiMH rechargeable battery
Dimensions		270 x 250 x 110 mm
Weight		3.4 kg
Electrical safety		IEC 61010 600 V CAT III - IEC 61557

C.A 6543



Accessories / Spares

Remote control probe	> P01101935
C.A 846 thermo-hygrometer	> P01156301Z
C.A 861 thermometer + K thermocouple	> P01650101Z
AN1 artificial neutral box	> P01197201
Bag No. 6 for accessories	> P01298051
Crocodile clips	
(red, black, blue, white, yellow, green/yellow)	> P01101849
1.5 V LR14 alkaline battery	> P01296034
Fuse F 2.5 A, 1,200 V, 8 x 50 mm, 15 kA (set of 5)	> P01297071
Fuse F 0.1 A, 660 V-6, 3 x 32 mm, 20 kA (set of 10)	> P01297072
Serial printer No. 5	> P01102903
Series-parallel adapter	> P01101941
MegohmView software	> P01101938A
DataView® software	> P01102058
1.5 m safety leads (red, blue, black)	> P01295171
RS 232 cable PC DB 9F - DB 25F x 2	> P01295172
RS 232 cable for printer DB 9F - DB 9M No. 01	> P01295173
2P EUR mains power cable	> P01295174

State at delivery and reference

- > **C.A 6543** > P01138902
 Delivered with an accessories bag containing a set of 2 leads 1.5 m long (red/black), 1 black guarded lead 1.5 m long, 3 crocodile clips (red/blue/black), 1 test probe (black), 1 simplified operating manual, 1 complete operating manual in 5 languages, 1 mains power cable 2 m long, 1 communication cable

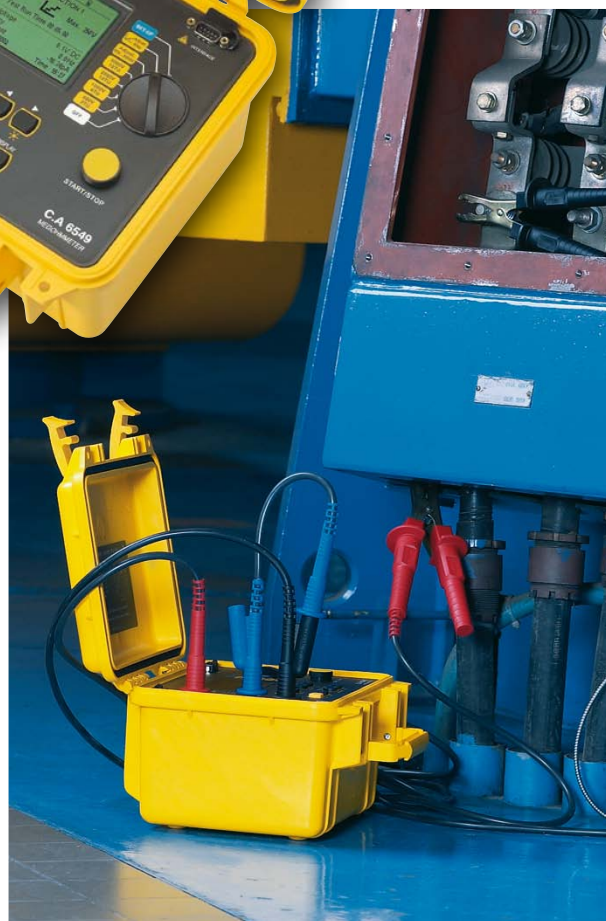
Accessories / Spares

- GB mains power cable > P01295253
 Battery pack > P01296021

The insulation experts at 5 kV



- Large measurement range from 10 k Ω to 10 T Ω
- Large backlit LCD screen, with digital display and bargraph
- Fixed test voltages and programmable test voltages from 40 V to 5,100 V
- Quantitative and qualitative insulation analysis
- Automatic calculation of the DAR / PI / DD quality ratios
- Step voltage mode
- Calculation of the result R at a reference temperature



Digital insulation tester

C.A 6505

- > Insulation at 5 kV
- > Wide measurement range from 10 kΩ to 10 TΩ
- > Large backlit LCD screen with digital display and bargraph
- > Fixed test voltages and programmable test voltages from 40 V to 5,100 V
- > Automatic calculation of DAR / PI quality ratios
- > Testing and maintenance of industrial equipment
- > Voltage, capacitance and leakage current
- > Site-proof case with particularly shockproof, leakproof cover (IP 53)



C.A 6505

Specifications

Insulation

Test voltage	500 V	30 kΩ to 2 TΩ
	1,000 V	100 kΩ to 4 TΩ
	2,500 V	100 kΩ to 10 TΩ
	5,000 V	300 kΩ to 10 TΩ
Voltage programming		40 V to 1,000 V: 10 V increments 1,000 V to 5,100 V: 100 V increments
Accuracy	1 kΩ to 40 GΩ	±5 % of value ± 3 counts
	40 GΩ to 10 TΩ	±15 % of value ± 10 counts
Programmable test duration		1 to 59 minutes
DAR (1 min/30 sec)		0.02 to 50.00
PI (10 min/1 min)		0.02 to 50.00
Customizable PI		Time from 30 s to 59 min as required
Voltage test / Safety		0 to 1,000 V AC/DC
Voltage alert indicator		Yes > 25 V
Test inhibition		Yes > 25 V
Capacitance		0.005 to 49.99 μF
Leakage current measurement		0.001 nA to 3 mA
Display		Giant LCD + bargraph
Power supply		NiMH rechargeable battery
Dimensions		270 x 250 x 180 mm
Weight		4.3 kg
Electrical safety		IEC 61010 1,000 V CAT III – IEC 61557

State at delivery

- > **C.A 6505** delivered with a bag containing 2 simplified measurement leads 2 m long, each equipped with an HV plug at each end, 1 guarded safety lead 2 m long with an HV plug at one end and an HV plug with rear connection at the other end, 1 guarded safety lead 0.35 m long with HV plug / HV plug with rear connection, 3 crocodile clips (red, blue and black), 1 mains power cable 1.80 m long, 1 operating manual in 5 languages



Reference to order

- > **C.A 6505 Megohmmeter**

> P01139704

Digital insulation tester

> C.A 6549 The "Pro" for preventive maintenance

- Storage
- Wide graphic screen
- Calculation of the resistance at a reference temperature
- Step voltage testing



Specifications

Insulation	
Test voltages (DC)	500 V 1,000 V 2,500 V 5,000 V
Programmable voltage	
Automatic voltage steps	
Accuracy	1 kΩ to 40 GΩ 40 GΩ to 10 TΩ
Programmable test duration	
DAR (1 min/30 sec)	
PI (10 min/1 min)	
Customizable PI	
DD	
Voltage test / Safety	
Voltage alert indicator	
Test inhibition	
Smooth function	
Capacitance	
Leakage current measurement	
Memory - Communication	
	R(time)
Measurement storage	
Direct report printing	
Communication output	
	PC software
Display	
Memory	
Power supply	
Dimensions	
Weight	
Electrical safety	

C.A 6549

■ C.A 6549

	30 kΩ to 2 TΩ
	100 kΩ to 4 TΩ
	100 kΩ to 10 TΩ
	300 kΩ to 10 TΩ
	40 V to 1,000 V: 10 V increments 1,000 V to 5,100 V: 100 V increments
Value and duration programmable for up to 5 steps, three profiles stored	
	±5 % R ± 3 counts ±15 % R ± 10 counts
	From 1 to 59 min
	0.02 to 50.00
	0.02 to 50.00
	Times programmable from 30 s to 59 min
	0.02 to 50.00
	0 to 1,000 V _{AC/DC}
	Yes > 25 V
	Yes - Adjustable according to test voltage
	Configurable - Digital filtering to stabilize the measurements
	0.005 to 49,99 μF
	0.001 nA to 3 mA
	Viewing on the display + Storage of samples
	Until 1,500 measurements
	on local printer, fixed format
	RS232
	DataView® (optional)
	Graphic
	1,500 measurements
	NiMH battery
	270 x 250 x 180 mm
	4.3 kg
	IEC 61010 1,000 V CAT III - IEC 61557

State at delivery

> **C.A 6547 & C.A 6549** delivered with a carrying bag containing 2 safety leads 3 m long with HV plug and HV crocodile clip (red / blue), 1 guarded safety lead 3 m long with HV plug with rear connector and HV crocodile clip (black), 1 rear-connector lead (blue) 0.35 m long, 1 mains power cable 2 m long, 1 communication cable, 1 simplified operating manual, 1 operating manual in 5 languages

Reference to order

> **C.A 6549**

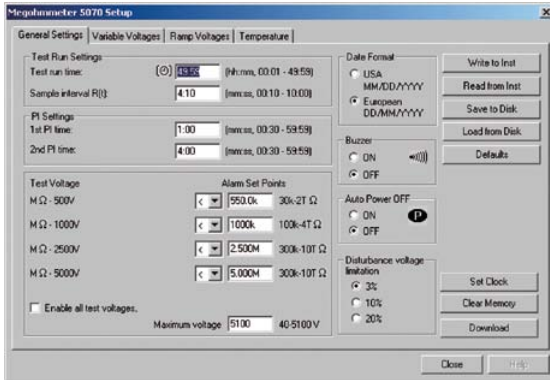
> P011139703

Accessories / Spares

- | | |
|---|--------------|
| Remote-control probe | > P01101935 |
| CA 846 | > P01156301Z |
| CA 861 + K couple | > P01650101Z |
| AN1 artificial neutral box | > P01197201 |
| Set of 2 HV leads for simplified measurement (red/black) | > P01295231 |
| 2 crocodile clips (red + black) | > P01102052Z |
| 2 test probes (red + black) | > P01102051Z |
| 1 simplified protective HV lead + 1 crocodile clip (blue) | > P01295232 |
| 1 HV lead 8 m long+ blue crocodile clip | > P01295214 |
| 1 HV lead 8 m long+ red crocodile clip | > P01295215 |
| 1 HV lead 8 m long + black croc. clip / earth ident. | > P01295216 |
| 1 HV lead 15 m long+ blue crocodile clip | > P01295217 |
| 1 HV lead 15 m long+ red crocodile clip | > P01295218 |
| 1 HV lead 15 m long + black croc. clip / earth ident. | > P01295219 |
| Standard carrying bag for accessories | > P01298066 |
| FF fuse 0.1 A - 380 V - 5 x 20 mm - 10 kA (set of 10) | > P03297514 |
| > For the C.A 6547 & C.A 6549: | |
| No. 5 series printer | > P01102903 |
| Serial-parallel adapter | > P01101941 |
| MEGOHMVIEW software | > P01101938A |
| DATAVIEW report generation software | > P01102006 |
| RS 232 PC cable, DB 9F - DB 25F x 2 | > P01295172 |
| RS 232 printer cable, DB 9F - DB 9M No. 01 | > P01295173 |

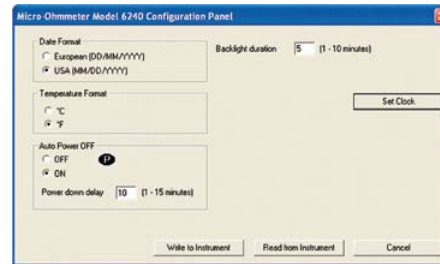
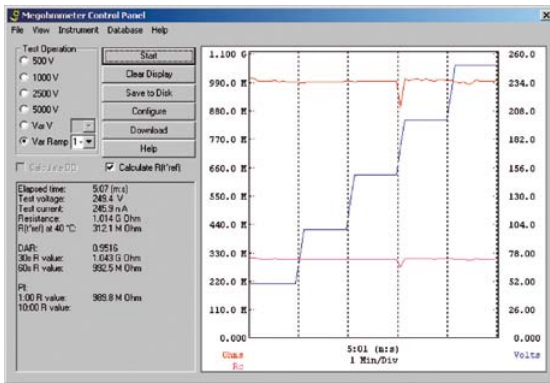
Software for digital insulation testers

DataView® for the C.A 6543, C.A 6547 & C.A 6549



> The essential tool for configuring the instruments, triggering the measurements, viewing the data in real time, recovering the recorded data and creating standard or customized measurement reports

- Configuration of all the functions
- Remote activation of tests by simply pressing a button
- Real-time data capture and display
- Recovery of the data recorded in the instruments
- Display of the DAR, PI and DD ratios
- Graphical plotting of programmed-time tests and step voltage tests in real time
- Possibility of creating a library of configurations suitable for specific applications
- Possibility of inserting user comments directly into the measurement report
- Printing of measurement reports



Index	Name	Value	Units
1	Battery Status	Good	OK
2	Test 1	1.014	G Ohm
3	Test 2	1.014	G Ohm

Index	Name	Value	Units
1	Battery Status	Good	OK
2	Test 1	1.014	G Ohm
3	Test 2	1.014	G Ohm

Channel Name	Battery Status
Measurement Date	10/5/2007
Measurement Time	05:47:00 AM
Instrument Model	6240
Test Number	1
Measurement Type	Resistive
Metal Type	Al
Measurement Range	40 milli-Ohm
Metal Coefficient	3.50
Voltage	2.00 mV
Current	1.015 A
Temp	---
Temp	---
Resistance @ (Temp)	1.99 milli-Ohm
Resistance @ (Temp)	---

Reference to order

> DataView®

> P01102095

Clamp multimeters for leakage current

F62 & F65

- > Quick leakage-current testing
- > Insulation-fault detection on live installations

			F62		F65	
Display			10,000 counts - 2 measurements / s			
Acquisition RMS			-			
Function	Calibre	Resolution	Accuracy			
			with filter 50-60 Hz		with filter 50-60 Hz	
mA AC	60 mA	10 µA	1.2% ± 5 cts	2.5% ± 5 cts	1.2% ± 5 cts	2.5% ± 5 cts (50-500 Hz)
	600 mA	100 µA				3.5% ± 10 cts (500-3 kHz)
A AC	10 A	1 mA	1.2% ± 5 cts	2.5% ± 5 cts	1.2% ± 5 cts	2.5% ± 5 cts (50-500 Hz)
	80 A	10 mA				3.5% ± 10 cts (500-3 kHz)
V AC	600 V	0,1 V	1.5% ± 5 cts (50-60 Hz)		1.5% ± 5 cts (50-60 Hz)	
			1.2% ± 5 cts (50-500 Hz)		1.2% ± 5 cts (50-500 Hz)	
V DC	600 V	0.1 V		1% ± 2 cts		
				1% ± 3 cts		
Resistance (Ω)	1 kΩ	0.1 Ω				
Audible continuity	Buzzer < 35 Ω	Buzzer < 35 Ω	(max measurement voltage 3.3 Vdc)			
Frequency (A)	100 Hz	0.1 Hz	0.5% ± 2 cts (I > 10 mA)			
Frequency (V)	1 kHz	1 Hz				
	1 kHz	1 Hz	0.5% ± 2 cts (V > 5 V)			



Specifications

	F62	F65
MAX. value		100 ms
Backlighting		Yes
Deactivatable automatic shutdown		Yes
Clamping Ø		28 mm
Dimensions / weight		218 x 64 x 30 mm / 280 g (with batteries)
Standards		IEC 61010 / IEC 61010-2-032
Installation category		CAT III 600 V
Enclosure protection rating		IP 30 as per NF EN 60529

States at delivery

- > **F62** delivered in carrying bag with 1 set of Ø 4 mm elbowed leads (red/black) with Ø 4 mm test probes and 2 x 1.5 V AAA or LR3 batteries
- > **F65** delivered in carrying bag with 1 set of Ø 4 mm elbowed leads (red/black) with Ø 4 mm test probes and 2 x 1.5 V AAA or LR3 batteries

References to order

- > **F62** > P01120760
- > **F65** > P01120761



Accessories / Spares

- | | | | |
|--|--------------|---|--------------|
| Set of 2 red + black crocodile in blister pack | > P01101848 | C.A 1871 infrared probe for multimeter | > P01651610Z |
| CA 751 adapter for 2P+E socket | > P01101997Z | C.A 801 single-channel adapter for multimeter | > P01652401Z |
| 4 mm test probe / elbowed leads-Red+Black, 1.2 m, blister pack X 2 | > P01295083Z | C.A 803 two-channel adapter with diff. measurement for multimeter | > P01652411Z |
| Case 200 x 100 x 40 with belt attachment | > P01298065Z | Bag No. 21 (250 x 165 x 60) with strap | > P06239502 |
| CMI214S intensity measurement lead | > P03295509 | | |

Technical overview

EARTH MEASUREMENT

For residential or industrial installations, the presence of an earth connection is one of the basic rules to ensure that the electrical installation is safe.

The absence of an earth connection may endanger people's lives and damage electrical installations and property.

However, the presence of an earth connection does not guarantee safety and, even if the earth is correctly sized, only regular testing can ensure that it functions correctly.

The standards for electrical installations, such as IEC 60364, NF C 15-100, etc., stipulate the general installation conditions to be applied in order to guarantee the safety of people, pets, farm animals and property by protecting them against the hazards and damage which may result from use of the electrical installations.

When there is a large enough area available to set up stakes, earth measurement should be carried out with the traditional 3-pole method, also known as the 62 % method.

There are a large number of different methods for earth measurements, however, and the right choice depends on the type of neutral system, the type of installation (residential, industrial, urban, rural, etc.), the possibility of switching off the power supply, the area available for setting up stakes, etc.

LIST OF THE DIFFERENT EARTH MEASUREMENT METHODS

	Rural building with possibility of setting up stakes	Urban building with no possibility of setting up stakes
Single earth connection		
3-pole method alias 62 % method	■	
Triangle method (2 stakes)	■	
4-pole method	■	
Variant 62 % method (1 stake)	■	
Line-PE loop measurement	■	■
		(only with TT system)
Network of multiple parallel earths		
Selective 4-pole method	■	
Earth clamp	■	■
Earth loop measurement with 2 clamps	■	■

Here is an overview of the most frequently-used measurement methods:

1) The 62% in-line measurement method (two stakes)

This method requires the use of two auxiliary electrodes (or "stakes") to allow current injection and provide the 0V reference potential.

The positioning of the two auxiliary electrodes in relation to the earth connection to be tested $E(X)$, is crucial.

For correct measurements, the "auxiliary connection" providing the reference potential (S) must not be positioned in the areas influenced by earths E & H due to the flow of the current (I).

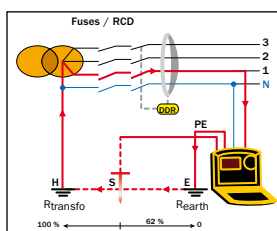
Statistics from the field have shown that the ideal method for guaranteeing the highest possible measurement accuracy involves placing the stake S at a point 62 % of the distance from E on the line EH.

You must then make sure that the measurement does not vary significantly when moving the stake S by $\pm 10\%$ (S' and S'') on either side of its initial position, while remaining on the line EH.

If the measurement varies, it means that (S) is in an influence area, so the procedure should be repeated after increasing the distances.

For a correct measurement, the stake H should be at least 25 metres away from the earth to be tested.

For more accurate measurement, it is possible to use a 4-pole measurement method (adding a connection between the earth to be tested and the ES terminal of the measurement instruments) to minimize the resistance of the measurement leads, thus improving accuracy. This method is strongly recommended for low resistance values as the influence of measurement-lead resistance will then be considerable.



2) Line-PE loop measurement (only on TT system)

In urban environments, it often proves difficult to measure earth resistances using auxiliary stakes because it is not possible to set up the stakes for reasons of space, concreting, etc.

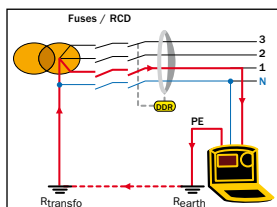
Loop measurement can then be used to test earths in urban environments without using stakes simply by hooking up to the mains power supply (mains socket).

In addition to the earth to be measured, the loop resistance measured in this way includes the earth and internal resistance of the transformer and the resistance of the cables. As all these resistances are very low, the value measured is an overall earth resistance value.

The actual earth resistance is therefore lower: $R_{measured} > R_{earth}$. The (overall) measurement error introduced by this method actually contributes to greater safety.

The standards concerning electrical installations consider that the loop resistance (overall earth resistance) may be taken into account instead of the earth resistance to comply with the rules on protection against the risk of indirect contacts.

Note: On TN or IT (impedant) systems, the loop impedance measurement can be used to calculate the short-circuit current and thus to size the protective devices correctly.



3) Selective earth measurements

For interconnected earths, selective earth measurement can be used for quick, safe testing. In this case, it is not necessary to isolate the installation (no need to open the earth bar) and, for loop measurements with 2 clamps or with an earth clamp, it is not necessary to set up stakes.

For the earth clamp and for the 2-clamp method, all you have to do to find out the earth value and the value of the currents flowing in it is clamp the cable connected to the earth.

An earth clamp comprises two windings: a generator winding and a receiver winding:

- The clamp's "generator" winding develops an AC voltage at the constant level E around the clamped conductor; a current $I = E / R_{loop}$ then flows through the resistive loop.

- The "receiver" winding measures this current.

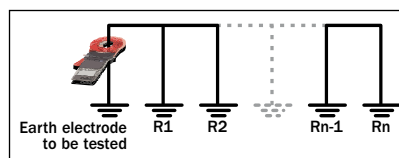
- As E and I are known values, the loop resistance can be deduced from them.

This case involves a network of parallel earths. Knowing that "n" resistances in parallel are equivalent to a resistance R_{aux} with a negligible value, we can measure the local earth value R_x :

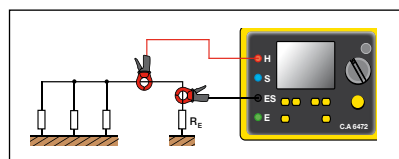
$R_{loop} = R_x + R_{aux}$ (where R_{aux} = resistance equivalent to $R_1 \dots R_n$ in parallel)

As $R_x \gg R_{aux}$, we obtain the result $R_{loop} \approx R_x$

The 2-clamp method is an equivalent method. One clamp acts as the generator, while the second acts as the receiver. This method may be more practical in places where access is difficult or when a larger clamping diameter is required.




Schematic diagram: earth clamp



Schematic diagram: 2-clamp method

It is also possible to use the 4-pole + clamp method, which requires auxiliary stakes but allows precise measurement of the earth resistance.

Earth testers selection guide



	C.A. 6421	C.A. 6423	C.A. 6460	C.A. 6462	C.A. 6470N TERCA 3	C.A. 6471	C.A. 6472	C.A. 6410	C.A. 6472	C.A. 6415
EARTH										
3P method	■	■	■	■	■	■	■			
4P method			■	■	■	■	■			
Automatic coupling					■	■	■			
SELECTIVE EARTH										
4P + clamp method						■	■			
2-clamp method						■	■			
Earth clamp								■	■	■
PYLON EARTH MEASUREMENT										
RESISTIVITY										
manual			■	■						
automatic					■	■	■			
POTENTIAL MEASUREMENT										
CONTINUITY										
MEASUREMENT FREQUENCY										
Single frequency: 128 Hz	■	■	■	■						
Single frequency: 2,400 Hz								■	■	■
41 to 512 Hz					■	■				
41 to 5,078 Hz							■			
Rs and Rh MEASUREMENT										
Udisturbance MEASUREMENT										
DISPLAY										
Analogue	■				■	■	■			
LCD		■	■	■				■	■	■
3-display LCD					■	■	■			
POWER SUPPLY										
Batteries	■	■	■	■	■	■	■	■	■	■
Rechargeable batteries				■	■	■	■			
Page	60	60	61	61	62	63	64	67	67	67

Earth testers



C.A 6421 & C.A 6423

- 2-pole and 3-pole methods
- Easy to use
- Confirmation of the measurement by self-diagnosis
- Designed for use in the field with leakproof on-site casing and clearly-readable display

Specifications

Measurement
Type
Resistivity
Measurement range
Resolution
Accuracy
No-load voltage
Frequency
Alarms
Power supply
Display
Electrical safety
Dimensions / weight

■ C.A 6421

■ C.A 6423

	Earth	
	2P & 3P	
	No	
0.5 to 1,000 Ω		0.01 to 2000 Ω (3 automatic calibres)
-		10 mΩ / 100 mΩ / 1 Ω (depending on calibre)
± (5 % + 0.1% at full scale)		± (2 % + 1 count)
≤ 24 V		≤ 48 V
	128 Hz	
	3 fault-indicator LEDs to validate the measurement	
	8 x 1.5 V batteries	
Analogue		2,000-count digital LCD screen
	IEC 61010 & IEC 61557	
	238 x 136 x 150 mm / 1.3 kg	

States at delivery

- > **C.A 6421 and C.A 6423** delivered with 1 carrying strap, 8 x LR6 1.5 V batteries, 1 operating manual in 5 languages

Accessories / Spares

- > **For the C.A 6421 and C.A 6423**
- Carrying strap > P01298005
- 0.1 A - 250 V HRC fuses (set of 10) > P01297012
- 1.5 V ALK LR6 battery > P01296033
- 1.5 V ALK LR6 batteries (x 12) > P01296033A
- 1.5 V ALK LR6 batteries (x 24) > P01296033B

References to order

- > **C.A 6421** > P01123011
- > **C.A 6423** > P01127013

Earth and resistivity testers

C.A 6460 & C.A 6462

> 3 in 1: earth, coupling and resistivity

- Confirmation of the measurement by self-diagnosis:
3 LEDs indicating the presence of faults liable to invalidate the measurement result
- Highly resistant site-proof casing with cover for use in severe conditions
- Large LCD screen with backlighting



Specifications

	C.A 6460	C.A 6462
Measurement	EARTH / RESISTIVITY / COUPLING	
Type	3P & 4P	
Measurement range	0.01 to 2,000 Ω (3 automatic calibres)	
Resolution	10 mΩ / 100 mΩ / 1 Ω (depending on calibre)	
Accuracy	± (2 % + 1 ct)	
No-load voltage	≤ 24 V	≤ 48 V
Frequency	128 Hz	
Alarms	3 fault-indication LEDs to validate the measurement	
Power supply	8 x 1.5 V batteries	Rechargeable NiMH battery
Display	2,000-count digital LCD	
Electrical safety	IEC 61010 & IEC 61557	
Dimensions	270 x 250 x 110 mm	
Weight	2.8 kg	3.3 kg



Accessories / Spares

> For the C.A 6460 & C.A 6462:

- 0.1 A - 250 V HRC fuses (set of 10)
- Battery pack
- 1.5 V ALK LR6 battery
- 1.5 V ALK LR6 batteries (x 12)
- 1.5 V ALK LR6 batteries (x 24)
- > P01297012
- > P01296021
- > P01296033
- > P01296033A
- > P01296033B

States at delivery

- > **C.A 6460** delivered with 8 x 1.5 V LR6 batteries and 1 operating manual in 5 languages
- > **C.A 6462** delivered with 1 mains lead for recharging and 1 operating manual in 5 languages

References to order

- > **C.A 6460** > P01126501
- > **C.A 6462** > P01126502

Earth and resistivity tester



C.A. 6470N - TERCA 3

- > 4 in 1: Earth, Resistivity, Coupling and Continuity
- > Suitable for industrial and residential environments
- > The best solution for power distributors' needs

C.A. 6470N

C.A. 6470N

Electrical specifications

3P method

Range (automatic selection)	0.01 to 99.99 kΩ
Resolution	0.01 to 100 Ω
Test voltage	16 or 32 V, selectable
Measurement frequency	40 to 512 Hz, automatic or manual
Test current	Up to 250 mA
Accuracy	± 2 % of value ± 1 count

4P method

Range	0.001 to 99.99 kΩ
Resolution	0.001 to 100 Ω
Test voltage	16 V or 32 V
Measurement frequency	40 to 512 Hz, automatic or manual
Test current	Up to 250 mA
Measurement accuracy	± 2 % of value ± 1 count

Soil resistivity measurement

- 4P method

Measurement method	Wenner or Schlumberger method with automatic calculation of results and display in Ω-metres or Ω-feet
Range (automatic selection)	0.01 to 99.99 kΩ
Resolution	0.01 to 100 Ω
Test voltage	16 or 32 V, selectable
Measurement frequency	73 – 91.5 – 101 – 128 Hz, selectable

External voltage measurement

Range (automatic selection)	0.1 to 65.0 V _{ac} /dc - dc to 450 kHz
Accuracy	± 2 % of value + 2 counts
Test voltage	16 V _{dc} (polarity +, - or auto)
Test current	200 mA max. for R < 20 Ω

Data storage

Memory capacity	512 test results
Communication	Optically-isolated USB

Power supply	NiMH 9.6 V rechargeable battery (supplied)
Battery-charger power supply	110/120 V 50/60 Hz external power supply with 18 V _{dc} / 1.9 A output or 12 V _{dc} vehicle power supply
Dimensions	272 x 250 x 128 mm
Weight	3 kg
Electrical safety	50 V CAT IV

State at delivery

- > **C.A. 6470N:** Delivered with 1 mains adapter + 2-pole mains cable for recharging the battery from the mains, data export software + 1 optical / USB communication cable, 5 operating manuals (one per language) on CD-ROM, 5 simplified operating manuals, each in a different language, 5 identification labels, each in a different language.

Reference to order

> C.A. 6470N

> P01126506



Accessories / Spares

DataView® report generation software	> P01102095
Adapter for recharging on vehicle cigarette lighter	> P01102036
Optical / RS communication cable	> P01295252
GB mains power cable	> P01295253
Set of 10 fuses -	
F 0.63 A – 250 V – 5 x 20 mm – 1.5 kA	> AT0094
Adapter for charging battery from the mains	> P01102035
Battery pack	> P01296021
Optical / USB communication cable	> HX0056-Z

Earth and resistivity tester

C.A 6471

C.A 6471

Electrical specifications Measurement with 2 clamps

Range	0.01 to 500 Ω
Resolution	0.01 to 1 Ω
Measurement frequency	Auto: 1367 Hz Manual: 128 Hz - 1367 Hz - 1611 Hz - 1758 Hz

3P measurements

Range (automatic selection)	0.01 Ω to 99.99 kΩ
Resolution	0.01 Ω to 100 Ω
Test voltage	16 V or 32 V _{RMS} rated voltage, selectable by user
Measurement frequency	41 to 512 Hz, automatic or manual
Test current	Up to 250 mA
Accuracy	± 2 % R + 1 count at 128 Hz

4P measurements / 4P measurements with clamps

Range	0.001 Ω to 99.99 kΩ
Resolution	0.001 Ω to 100 Ω
Test voltage	16 V or 32 V selectable
Measurement frequency	41 to 512 Hz, automatic or manual
Test current	Up to 250 mA
Accuracy	± 2 % R + 1 count

Soil resistivity measurement - 4P method

Measurement method	Wenner or Schlumberger method with automatic calculation of results and display in Ω-metres or Ω-feet
Range (automatic selection)	0.01 to 99.99 kΩ; ρ max. 999 kΩm
Resolution	0.01 Ω to 100 Ω
Test voltage	16 or 32 V, selectable
Measurement frequency	41 to 512 Hz, selectable

External voltage measurement

Range (automatic selection)	0.1 to 65.0 V _{AC/DC} - DC to 450 kHz
Accuracy	± 2 % R + 1 count

Resistance measurement (connection test)

Type of measurement	2P (with compensation of cable resistance) or 4P (Kelvin sensor) selectable by user
Range (automatic selection)	2P: 0.01 Ω to 99.99 kΩ 4P: 0.001 Ω to 99.99 kΩ
Accuracy	± 2 % R + 2 counts
Test voltage	16 V _{DC} (polarity +, - or auto)
Test current	Up to 250 mA max

Data storage

Storage capacity	512 test results
Communication	Optically-isolated USB

Power supply

Battery-charger power supply	NiMH 9.6 V rechargeable battery (supplied) 110/120 V 50/60 Hz external power supply with 18 V _{DC} / 1.9 A output or 12 V _{DC} vehicle power supply
------------------------------	---

Dimensions

Weight	272 x 250 x 128 mm
--------	--------------------

Electrical safety

	3 kg
	50 V CAT IV



C.A 6471

> 5-in-1 tester: Earth / Selective Earth / Resistivity / Coupling / Continuity

> Ideal for industry

Accessories / Spares



DataView® report printing software	> P01102095
Adapter for battery charging on vehicle cigarette-lighter	> P01102036
Optical / RS communication cable	> P01295252
GB mains power cable	> P01295253
Set of 10 fuses	
F 0.063 A - 250 V - 5 x 20 mm - 1.5 kA	> AT0094
Battery pack	> P01102035
Optical/USB communication cable	> HX0056-Z
MN62 clamp (diam. 20 mm) delivered with 2 m cable for ES terminal connection	> P01120452
C182 clamp (diam. 20 mm) delivered with 2 m cable for ES terminal connection	> P01120333

State at delivery

> C.A 6471 delivered with 1 mains adapter + 2-pole mains power lead for recharging the battery, data export software + optical/USB communication lead, 2 x C182 clamps with 2 safety leads, 5 operating manuals (1 per language) on CD-ROM, 5 simplified operating manuals each in a different language, 8 specifications labels each in a different language, 1 carrying bag.

Reference to order

> C.A 6471

> P01126505

Earth and resistivity tester

C.A 6472

- All types of earth resistance measurement and pylon earth measurement (option on C.A 6474)
- Resistivity (Wenner + Schlumberger methods)
- Earth coupling
- Soil potential measurement
- Continuity / Resistance



Electrical specifications

3P measurements

Range (automatic selection)	0.01 Ω to 99.9 k Ω
Resolution	0.01 Ω to 100 Ω
Test voltage	16 V or 32 Vrms rated voltage, selectable by user 41 to 5,078 Hz, automatic or manual
Measurement frequency	Up to 250 mA
Test current	$\pm 2\% R + 1$ count at 128 Hz
Accuracy	

Measurements with 2 clamps

Range	0.01 to 500 Ω
Resolution	0.01 to 1 Ω
Measurement frequency	Auto: 1,367 Hz Manual: 128 Hz - 1367 Hz - 1611 Hz - 1758 Hz

4P measurements / 4P measurements with clamps

Range	0.001 Ω to 99.99 k Ω
Resolution	0.001 Ω to 100 Ω
Test voltage	16 V or 32 V selectable
Measurement frequency	41 to 512 Hz, automatic or manual
Test current	Up to 250 mA
Accuracy	$\pm 2\% R + 1$ count

Soil resistivity measurement - 4P method

Measurement method	Wenner or Schlumberger method with automatic calculation of results and display in Ω -metres or Ω -feet
Range (automatic selection)	0.01 to 99.99 k Ω ; ρ max. 999 k Ω m
Resolution	0.01 Ω to 100 Ω
Test voltage	16 or 32 V, selectable
Measurement frequency	41 to 512 Hz, selectable

External voltage measurement

Range (automatic selection)	0.1 to 65.0 Vac/dc - dc to 450 kHz
Accuracy	$\pm 2\% R + 1$ count

Resistance measurement (connection test)

Type of measurement	2P (with compensation of cable resistance) or 4P (Kelvin sensor) selectable by user
Range (automatic selection)	2P: 0.01 Ω to 99.99 k Ω 4P: 0.001 Ω to 99.99 k Ω
Accuracy	$\pm 2\% R + 2$ counts
Test voltage	16 Vdc (polarity +, - or auto)
Test current	Up to 250 mA max

Data storage

Storage capacity	512 test results
------------------	------------------

Power supply

Battery-charger power supply

NiMH 9.6 V rechargeable battery (supplied)
110/120 V 50/60 Hz external power supply with 18 Vdc / 1.9 A output or 12 Vdc vehicle power supply

Dimensions

Weight

Electrical safety

C.A 6472

0.01 Ω to 99.9 k Ω
0.01 Ω to 100 Ω
16 V or 32 Vrms rated voltage, selectable by user 41 to 5,078 Hz, automatic or manual
Up to 250 mA
 $\pm 2\% R + 1$ count at 128 Hz

0.01 to 500 Ω
0.01 to 1 Ω
Auto: 1,367 Hz
Manual: 128 Hz - 1367 Hz - 1611 Hz - 1758 Hz

0.001 Ω to 99.99 k Ω
0.001 Ω to 100 Ω
16 V or 32 V selectable
41 to 512 Hz, automatic or manual
Up to 250 mA
 $\pm 2\% R + 1$ count

Wenner or Schlumberger method with automatic calculation of results and display in Ω -metres or Ω -feet
0.01 to 99.99 k Ω ; ρ max. 999 k Ω m
0.01 Ω to 100 Ω
16 or 32 V, selectable
41 to 512 Hz, selectable

0.1 to 65.0 Vac/dc - dc to 450 kHz
 $\pm 2\% R + 1$ count

2P (with compensation of cable resistance) or 4P (Kelvin sensor) selectable by user
2P: 0.01 Ω to 99.99 k Ω
4P: 0.001 Ω to 99.99 k Ω
 $\pm 2\% R + 2$ counts
16 Vdc (polarity +, - or auto)
Up to 250 mA max

512 test results

NiMH 9.6 V rechargeable battery (supplied)
110/120 V 50/60 Hz external power supply with 18 Vdc / 1.9 A output or 12 Vdc vehicle power supply

272 x 250 x 128 mm

3.2 kg

50 V CAT IV

State at delivery and reference

- C.A 6472 delivered with 1 mains adapter + 2-pole mains power lead for recharging the battery, data export software + optical/USB communication lead, 2 x C182 clamps with 2 safety leads, 5 operating manuals (1 per language) on CD-ROM, 5 simplified operating manuals each in a different language, 8 specifications labels each in a different language, 1 carrying bag. > P01126504

Accessories / Spares

- C.A 6472 - C.A 6474 connection cable > P01295271
- 15 m BNC / BNC cable > P01295272
- 5 m AmpFLEX™ flexible current sensor for C.A 6474 > P01120550
- Set of 12 AmpFLEX™ identification rings > P01102045
- Set of 3 adjustable clamps > P01102046
- Spade lug/banana plug adapters > P01102028
- Calibration loop > P01295294
- AmpFLEX™ flexible current sensors: other lengths are available on request

Earth and resistivity tester

C.A 6474

> **The essential accessory for measurements on pylons:**

- overall line impedance,
- pylon earth resistance,
- resistance of each pylon footing,
- quality of overhead earth wire connection.



Specifications Measurements

		C.A 6474 / PYLON BOX
		Overall pylon earth resistance
		Earth resistance of each pylon footing
		Overall line impedance
		Quality of overhead earth wire connection.
Type of measurement		Active measurement (injection by the C.A 6472)
		Passive measurement (use of disturbance currents)
Measurement range		0.001 Ω to 99.99 kΩ
Accuracy		± (5% + 1 count)
Frequency		41 to 5,078 Hz
Frequency sweep		Yes
Dimensions		260 x 240 x 120 mm
Weight		2.3 kg
Power supply / Storage / Display		Provided by the C.A 6472

DataView®

DataView® for C.A 6470N, C.A 6471, C.A 6472 & C.A 6474

The essential tool for configuring the instruments, triggering the measurements, viewing the data in real time, recovering the recorded data and creating standard or customized measurement reports

- > **Configuration of all the functions**
- > **Remote activation of tests by simply pressing a button**
- > **Real-time data capture and display**
- > **Recovery of the data recorded in the instruments**
- > **Possibility of inserting user comments directly into the measurement report**
- > **Possibility of creating customized report templates**
- > **Display of result curves, such as the measurement of impedance as a function of frequency, for example**
- > **Printing of measurement reports**

Accessories / Spares

DataView®	> P01102095
C.A 6472 – C.A 6474 connection cable	> P01295271
15 m BNC / BNC cable	> P01295272
5 m AmpFLEX™ flexible current sensor for C.A 6474	> P01120550
Set of 12 AmpFLEX™ identification rings	> P01102045
Set of 3 adjustable clamps	> P01102046
5 m green cable for C.A 6474 (E terminal connection)	> P01295291
5 m black cable for C.A 6474 (ES terminal connection)	> P01295292
Spade lug/banana plug adapters	> P01102028
Calibration loop	> P01295294
AmpFLEX™ flexible current sensors: other lengths are available on request	

State at delivery

Delivered with a carrying bag for accessories containing:
 One C.A 6472 – C.A 6474 connection lead, 6 BNC / BNC cables 15 m long, 4 AmpFLEX™ flexible current sensors 5 m long, 1 set of 12 AmpFLEX™ identification rings, 2 cables (5 m green, 5 m black) with safety connectors on winder, 5 spade lug/banana plug converters Ø 4 mm, 3 adjustable clamps, 1 calibration loop, 5 operating manuals and 5 specification labels, each in a different language.

Earth and resistivity kits



Earth kit: for measuring existing earth resistances using the 3P method



Earth and resistivity kit: earth resistance and soil resistivity measurements using any method

High-quality accessories for your earth resistance and soil resistivity measurements

- > **Ergonomic**
 - Simple, error-free connections thanks to colour coding
 - Easy to handle
- > **Universal**
 - Ø 4 mm banana plug / spade lug adapters
- > **Compact, with all the accessories in a single carrying bag divided into compartments**

Composition

1P loop kit	Comprising 1 x 30 m green cable reel, 1 T-rod
50 m 3P earth kit	Comprising 2 T-rods, 2 cable reels (50 m red, 50 m blue), 1 cable winder (10 m green), 1 mallet, 5 spade lug / Ø 4 mm banana plug adapters, 1 carrying bag
100 m 3P earth kit	Comprising 2 T-rods, 2 cable reels (100 m red, 100 m blue), 1 cable winder (10 m green), 1 mallet, 5 spade lug / Ø 4 mm banana plug adapters, 1 carrying bag
150 m 3P earth kit	Comprising 2 T-rods, 2 cable reels (150 m red, 150 m blue), 1 cable winder (10 m green), 1 mallet, 5 spade lug / Ø 4 mm banana plug adapters, 1 carrying bag
100 m earth and resistivity kit	Comprising 4 T-rods, 4 cable reels (100 m red, 100 m blue, 100 m green, 30 m black), 1 cable winder (10 m green), 1 mallet, 5 spade lug / Ø 4 mm banana plug adapters, 1 prestige carrying bag
150 m earth and resistivity kit	Comprising 4 T-rods, 4 cable reels (150 m red, 150 m blue, 150 m green, 30 m black), 1 cable winder (10 m green), 1 mallet, 5 spade lug / Ø 4 mm banana plug adapters, 1 prestige carrying bag
Resistivity add-on kit (100 m)	Comprising 2 cable reels (100 m green and 30 m black), 1 standard carrying case, 2 T-rods
C.A647X continuity kit (µØ position)	Comprising 4 x 1.5 m cables terminated by Ø 4 mm banana plugs, 4 crocodile clips, 2 test probes

References to order

- > 1P loop kit
 - > 50 m 3P earth kit
 - > 100 m 3P earth kit
 - > 150 m 3P earth kit
 - > 100 m earth and resistivity kit
 - > 150 m earth and resistivity kit
 - > Resistivity add-on kit (100 m)
 - > C.A647X continuity kit (µØ position)
- > P01102020
 - > P01102021
 - > P01102022
 - > P01102023
 - > P01102024
 - > P01102025
 - > P01102030
 - > P01102037

Accessories / Spares

- > **For earth and resistivity kits:**
 - 10 m H-shaped green cable winder
 - Set of 5 adapters for terminals
 - Set of 4 reel handles
 - 1 earth T-rod
 - C172 current clamp
 - 166 m red cable reel
 - 100 m red cable reel
 - 50 m red cable reel
 - 166 m blue cable reel
 - 100 m blue cable reel
 - 50 m blue cable reel
 - 100 m green cable reel
 - 33 m black cable reel
 - 33 m green cable reel
 - Standard carrying bag
 - Prestige carrying bag
- > P01102026
 - > P01102028
 - > P01102029
 - > P01102031
 - > P01120310
 - > P01295260
 - > P01295261
 - > P01295262
 - > P01295263
 - > P01295264
 - > P01295265
 - > P01295266
 - > P01295267
 - > P01295268
 - > P01298066
 - > P01298067

Earth clamps

C.A 6410, C.A 6412 & C.A 6415

- > Quick earth-loop testing
- > Testing in total safety because the test is performed without disconnecting the earth bar

> C.A 6410

- Earth loop

> C.A 6412

- Earth loop
- Leakage current

> C.A 6415

- Earth loop
- Leakage current
- Storage of results



Specifications

Earth resistance

Measurement ranges

0 to 1.0 Ω
1.0 to 50.00 Ω
50.00 to 100.0 Ω
100 to 200 Ω
200 to 400 Ω
400 to 600 Ω
600 to 1,200 Ω

Resolution per range

0.01 Ω
0.1 Ω
0.5 Ω
1 Ω
5 Ω
10 Ω
50 Ω

Accuracy per range

± 2 % ± 2 counts
± 1.5 % ± 1 count
± 2 % ± 1 count
± 3 % ± 1 count
± 6 % ± 1 count
± 10 % ± 1 count
± 25 % ± 1 count

Current / leakage current

Measurement ranges

1 to 299 mA
0.300 to 2.999 A
3.00 to 29.99 A

Resolution per range

1 mA
0.001 A
0.01 A

Accuracy per range

± 2.5 % ± 2 counts
± 2.5 % ± 2 counts
± 2.5 % ± 2 counts

Clamping diameter

32 mm

Measurement frequency

2,400 Hz

Indication of disturbance currents and incorrect closure

by symbol

Alarm

configurable

Storage

99 measurements

Power supply

9 V battery

Electrical safety

IEC 61010 - CAT. III 150 V

Display

3,000-count LCD

Dimensions

55 x 100 x 240 mm

Weight

1 kg

Accessories / Spares

> For the C.A 6472 & C.A 6474

- Calibration loop
- MLT 100 carrying case
- 9 V alkaline battery
- 9 V alkaline batteries (x 12)
- 9 V alkaline batteries (x 24)

- > P01122301
- > P01298011
- > P01100620
- > P01100620A
- > P01100620B

State at delivery

- > Each earth clamp is delivered in a carrying case with a 9 V battery & an operating manual in 5 languages



References to order

- > C.A 6410 > P01122011
- > C.A 6412 > P01122012
- > C.A 6415 > P01122013

Micro-ohmmeter



C.A 6240

- > Rugged, leakproof on-site instrument
- > Suitable for use in the field, the workshop or the laboratory
- > Wide measurement range and excellent accuracy due to:
 - the 4-wire measurement method
 - automatic current reversal
 - test current up to 10 A
 - resolution 1 $\mu\Omega$
 - Automatic "on-the-fly" or manual measurement modes



Specifications

Measurement method

Measurement current	10 A	1 A	1 A	100 mA	10 mA	10 mA
Range	400 $\mu\Omega$	40 m Ω	400 m Ω	4000 m Ω	40 Ω	400 Ω
Accuracy	0.25% ± 2 cts					
Resolution	1 $\mu\Omega$	10 $\mu\Omega$	0,1 m Ω	1 m Ω	10 m Ω	100 m Ω
Memory	100 measurements					
Communication output	Optical / USB link					
Power supply	Rechargeable NiMH battery					
Dimensions / weight	273 x 247 x 280 mm / 5 kg					
Electrical safety	IEC 61010 - CAT III 50 V					

State at delivery

> **C.A 6240** delivered with a carrying bag, 1 set of 2 x 10 A Kelvin clamps with 3 m cable, 1 2P EURO mains power supply cable, 1 operating manual + 1 simplified operating manual in 5 languages, data export software + one optical / USB communication lead

Accessories / Spares

- | | |
|--|--------------|
| Double test probes x 2 | > P01102056 |
| Mini Kelvin clamps (set of 2) | > P01101783 |
| GB mains power lead | > P01295253 |
| C.A 846 thermohygrometer | > P01156301Z |
| 2P EUR. mains power lead | > P01295174 |
| Set of 10 fuses: 6.3 x 32 / 12.5 A / 500 V | > P01297091 |
| Standard carrying bag | > P01298066 |
| Optical/USB communication cable | > HX0056-Z |
| 10 A-P clamps (set of 2) | > P01101794 |
| DataView® | > P01102095 |

Reference to order

> **C.A 6240**

> P01143200

Micro-ohmmeter

C.A 6250

- > Rugged, leakproof on-site instrument
- > Suitable for use in the field, the workshop or the laboratory
- > Wide measurement range and excellent accuracy due to:
 - The 4-wire measurement method
 - Automatic current reversal
 - Test current up to 10 A
 - Resolution 0.1 $\mu\Omega$
 - "Temperature compensation" function for comparative results
 - Extended memory



C.A 6250

Specifications

Measurement method

Measurement current	4-wire method						
Range	10 A	10 A	10 A	1 A	100 mA	10 mA	1 mA
Accuracy	5.0000 m Ω	25.000 m Ω	250.00 m Ω	2,500.0 m Ω	25.000 Ω	250.00 Ω	2,500.0 Ω
Resolution	1 $\mu\Omega$	10 $\mu\Omega$	0.1 m Ω	1 m Ω	10 m Ω	100 m Ω	
Memory	100 measurements						
Communication output	Optical / USB link						
Power supply	Rechargeable NiMH battery						
Dimensions / weight	273 x 247 x 280 mm / 5 kg						
Electrical safety	IEC 61010 - CAT III 50 V						

State at delivery

- > **C.A 6250** delivered in carrying bag with 1 power supply cable 2 m long and 2 x 2 m cables terminated by 10 A Kelvin clamps

Reference to order

- > **C.A 6250** > P01143201

Accessories / Spares

- Double test probes x 2 > P01102056
- Mini Kelvin clamps (set of 2) > P01101783
- GB mains power lead > P01295253
- C.A 846 thermohygrometer > P01156301Z
- 2P EUR. mains power lead > P01295174
- Set of 10 fuses: 6.3 x 32 / 12.5 A / 500 V > P01297091
- Standard carrying bag > P01298066
- Optical/USB communication cable > HX0056-Z
- 10A-P clamps (set of 2) > P01101794
- DataView® > P01102095
- Pt 100 temperature probe > P01102013
- 2 m cable for remote Pt 100 > P01102014
- Series printer no. 5 > P01102903

Electrical equipment tester

DTR 8500

> Single-phase ratiometer

■ Testing of power, voltage or current transformers



Specifications

Transformation ratio

Accuracy

Test signal

Test current display

Range

Accuracy

Test signal

Display

Power supply

Battery

Battery life

Charging time

Dimensions

Weight

Electrical safety

■ DTR 8500

0.8000:1 to 1,500.0:1

Ratio < 10:1: $\pm 0.2\%$ of reading
Ratio of 10:1 to 1,000:1: $\pm 0.1\%$ of reading
Ratio > 1,000:1: $\pm 0.2\%$ of reading

PT/VT mode: 44 Vrms maximum
CT mode: 0 to 1 A automatic level, 0.1 to 5 Vrms

0 to 1,000 mA

$\pm 0.2\%$ of reading ± 2 mA

70 Hz

LCD, 2 x 20 characters, adjustable contrast,
visible night and day.

Rechargeable NiCd battery and 230/115 V (50/60 Hz)
mains supply.

Switch from 230 V to 115 V with internal selector. Instrument
configured for 230 V when delivered.

2 NiCd 12.5 V batteries, 1,300 mA/h

Up to 10 hours in continuous operation

The instrument can be used while the battery is charging.

Approx. 14 hours

330 x 305 x 152 mm

6.4 kg

IEC 61010-1 CAT III 300 V

State at delivery

> **DTR 8500** - accessories bag containing: 2 measurement leads (H and X) terminated by crocodile clips, 1 power supply cable

Reference to order

> **DTR 8500**

> P01157701

Electrical equipment tester

C.A 6121



> "Industrial machine" tester as per IEC 60204:
Insulation / dielectric test / continuity / voltage drop / discharge time

C.A 6121

Specifications

Insulation

Test voltage	500 / 1,000 V _{DC}
Measurement range	1 k Ω to 500 M Ω
Accuracy 0 to 200 M Ω	$\pm(2\%$ of reading + 2 counts)

Dielectric testing

Test voltage	1,000 / 1,250 / 1,500 V _{AC} (50 Hz) for U _{mains} = 230 V at 500 VA
Measurement range	0 to 500 mA
Accuracy	$\pm(2\%$ of reading + 0.3 mA) For trigger current set to 1, 3, 5, 10 or 20 mA $\pm(2\%$ of reading + 0.5 mA) For trigger current set to 30, 40, 50, 60, 70, 80, 90 or 100 mA $\pm(2\%$ of reading + 2 mA) For trigger current set to 150, 200, 250, 300, 330, 350, 400, 450 or 500 mA

Continuity

Range	0 to 2 Ω
Measurement current	I > 10 A
Accuracy 0 to 1 Ω	$\pm(2\%$ of reading + 2 m Ω)

Voltage drop

Test current	10 A
Measurement range	0 to 10 V
Accuracy	$\pm(2\%$ of reading + 0.02 V)

Discharge time

External (2 counts) or internal (4 counts)

Storage

999 measurements

Communication output

RS232

Power supply

230 V / 50 Hz mains supply

Dimensions

400 x 260 x 250 mm

Weight

11 kg

Electrical safety

IEC 61010-1 - CAT III 600 V



Accessories / Spares

"C.A 6121 TRANSFER" Windows processing software (supplied with communication cable)	> P01101915
Serial printer No. 5	> P01102903
DB9F-DB25M adapter	> P01101841
Remote-control pedal	> P01101916
Indicator lamps (green/red)	> P01101917
Roll of paper for serial printer (set of 5)	> P01101842
2 crocodile clips (red + black)	> P01102052Z
2 test probes (red + black)	> P01102051Z
2 HV test guns with 6 m cable	> P01101918
2 HV test guns with 2 m cable	> P01101919
Set of 2 keys	> P01101932
2 safety leads, 3 m (1 red, 1 black)	> P01295097
1 continuity test lead, 2.5 m (black)	> P01295137
1 continuity test lead, 2.5 m (red)	> P01295140
1 discharge time cable (EURO)	> P01295141
DB9F-25F cable x 2	> P01295172
DB9F-DB9M cable No. 01	> P01295173
Set of 10 fuses: 20 A-600 V 10.3 x 38F x 10	> P01297030
Rigid bag no. 3	> P01298031

State at delivery

> **C.A 6121** is delivered with an accessories bag, 2 HV test guns with 2 m cable, 2 continuity test leads 2.5 m long (1 red, 1 black), 2 insulation test leads 3 m long (1 red, 1 black), 2 crocodile clips (1 red, 1 black), 1 red test probe, 1 discharge-time cable, 1 power cable, 1 operating guide in 5 languages

Reference to order

> **C.A 6121** > P01145601

Electrical equipment tester



C.A 6150

- > Multi-function
- > AUTOTEST function for automatic execution of a measurement sequence
- > Large memory capacity: 600 measurements
- > Testing and certification according to the European standards
- > Dielectric testing and insulation resistance measurement

Specifications

Insulation

Test voltage	250 / 500 / 1,000 V _{DC}
Measurement range	0.000 MΩ to 999 MΩ
Accuracy 0.000 – 1.999 MΩ	± (5 % of reading + 10 counts)
2.000 – 199.9 MΩ	± (3 % of reading + 3 counts)
200 – 999 MΩ	± (10 % of reading + 10 counts)

Dielectric testing

Test voltage	100 to 5,000 V _{AC} / (50 – 60 Hz) for U _{Mains} = 230 V at 500 VA
Measurement range	0.100 to 5.000 kV
Accuracy 0.100 to 0.999 kV	±(2 % of reading + 5 counts)
0.999 to 5.000 kV	±(3 % of reading + 5 counts)

Storage

Communication output

Power supply

Dimensions

Weight

Electrical safety

C.A 6150

Test voltage	250 / 500 / 1,000 V _{DC}
Measurement range	0.000 MΩ to 999 MΩ
Accuracy 0.000 – 1.999 MΩ	± (5 % of reading + 10 counts)
2.000 – 199.9 MΩ	± (3 % of reading + 3 counts)
200 – 999 MΩ	± (10 % of reading + 10 counts)
Test voltage	100 to 5,000 V _{AC} / (50 – 60 Hz) for U _{Mains} = 230 V at 500 VA
Measurement range	0.100 to 5.000 kV
Accuracy 0.100 to 0.999 kV	±(2 % of reading + 5 counts)
0.999 to 5.000 kV	±(3 % of reading + 5 counts)
Storage	1,600 measurements
Communication output	RS232
Power supply	230 V / 50-60 Hz mains supply
Dimensions	410 x 175 x 370 mm
Weight	12.5 kg
Electrical safety	IEC 61010-1 - CAT II 600 V

State at delivery

- > The **C.A 6150** is delivered with a bag, 2 HV test guns with 2 m cable, 2 insulation test leads 3 m long (1 red, 1 black), 2 crocodile clips (1 red, 1 black), 2 test probes (1 red, 1 black), 5 operating manuals (5 languages), 1 power cable

Reference to order

> **C.A 6150**

> P01145701 (Euro)

Accessories / Spares

- | | |
|--|-------------|
| Operating software (supplied with communication cable) | > P01101996 |
| DB9F-DB25M adapter | > P01101841 |
| Remote control pedal | > P01101916 |
| Indicator lamps (green / red) | > P01101917 |
| 2 HV test guns with 6 m cable | > P01101918 |
| 2 HV test guns with 2 m cable | > P01101919 |
| 2 safety leads, 3 m (1 red, 1 black) | > P01295097 |
| 1 power cable (Euro) | > P01295234 |
| RS232 DB9F-DB9F communication cable | > P01295172 |
| Set of 10 fuses, 2.5 A-250 V 5 x 20T | > P01297085 |
| Set of 10 fuses, 16 A-250 V 6 x 32T | > P01297086 |
| Standard carrying bag | > P01298066 |

Electrical equipment testers

C.A 6160

Specifications

Insulation

Test voltage	250 / 500 / 1,000 V _{DC}
Measurement range	0.000 MΩ to 999 MΩ
Accuracy	0.000 – 1.999 MΩ ± (5% of reading + 10 counts)
	2.000 – 199.9 MΩ ± (3% of reading + 3 counts)
	200 – 999 MΩ ± (10% of reading + 10 counts)

Dielectric testing

Test voltage	100 to 5,000 V _{AC} / (50,60) Hz for U _{Mains} = 230 V at 500 VA
Measurement range	0.5 to 500 mA until 500 VA
Accuracy	0.100 to 0.999 kV ± (2% of reading + 5 counts)
	0.999 to 5.000 kV ± (3% of reading + 5 counts)

Continuity

Test current	0.1 / 0.2 / 10 / 25 A
Measurement range	0.000 to 9.999 Ω for I = 10 A or 25 A
	0.00 to 100.0 Ω for I = 0.1 A or 0.2 A
Accuracy	± (3% of reading + 3 counts)

0.000 to 0.999 Ω at 10 / 25 A

Voltage drop

0.00 to 99.99 V at 10 A

Discharge time

External (mains socket)

Internal (components)

Leakage current

Measurement range	0.00 to 20.0 mA
Accuracy	± (5% of reading + 3 counts)

Residual leakage current

Measurement range	0.00 to 20.0 mA
Accuracy	± (5% of reading + 3 counts)

Contact leakage current

Measurement range	0.00 to 2.00 mA
Accuracy	± (5% of reading + 3 counts)

Functional testing

Measurements	Active and apparent power / voltage / current / frequency / Cos φ
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Storage

1,600 measurements

Communication output

RS232

Power supply

230 V / 50-60 Hz mains supply

Dimensions

410 x 175 x 370 mm

Weight

13.5 kg

Electrical safety

IEC 61010-1 - CAT II 600 V

C.A 6160

- > Multi-function
- > An AUTOTEST function for automatic execution of a sequence of measurements
- > Large memory: 1,600 measurements can be stored
- > Testing and certification in accordance with the European standard
- > A single instrument for all the tests required: dielectric testing, continuity and voltage drop testing, insulation resistance measurement, leakage current measurement, discharge time measurement and functional testing



State at delivery

- > **C.A 6160** is delivered with 2 HV test guns with 2 m cable, 2 insulation test leads 3 m long (1 red, 1 black), 4 crocodile clips (2 red, 2 black), 2 test probes (1 red, 1 black), 4 continuity test leads, 2.5 m (2 red, 2 black), 1 discharge-time cable, 5 operating manuals (5 languages), 1 power cable

Reference to order

- > **C.A 6160** > P01145801 (Euro)

CE Link software (option) for C.A 6150 & C.A 6160

Used for:

- downloading the recorded data
- creating measurement sequences and loading them into the instrument
- launching remote tests and retrieving the data directly in the software
- creating and printing measurements

Accessories / Spares

- | | |
|---|-------------|
| Processing software (supplied with communication cable) | > P01101996 |
| DB9F-DB25M adapter | > P01101841 |
| Remote-control pedal | > P01101916 |
| Indicator lamps (green/red) | > P01101917 |
| 2 HV test guns with 6 m cable | > P01101918 |
| 2 HV test guns with 2 m cable | > P01101919 |
| 2 safety leads 3 m long (1 red, 1 black) | > P01295097 |
| 1 power cable (Euro) | > P01295234 |
| 1 RS232 DB9F-DB9F communication cable | > P01295172 |
| Set of 10 fuses: 2.5 A-250 V 5 x 20T | > P01297085 |
| Set of 10 fuses: 16 A-250 V 6 x 32 T | > P01297086 |
| Standard carrying bag | > P01298066 |
| 1 discharge time cable (EURO) | > P01295141 |

Phase rotation and/or motor testers



Specifications

Operating voltage for phase rotation function

Frequency range

Power supply

Dimensions

Weight

Electrical safety

C.A. 6608 & C.A. 6609

- > Indication of phase presence or absence
- > Determination of a motor's rotation direction with or without contact (C.A. 6609 only)
- > Automatic tests as soon as the instrument is connected
- > Terminals and cables identified by colour coding to simplify connection

C.A. 6608

C.A. 6609

40 to 850 Vac between phases	With connections: 40 to 600 Vac between phases Without connections: 120 to 400 Vac between phases
15 to 400 Hz	
Self-powered via the measurement inputs	9 V battery
130 x 69 x 32 mm	
130 g	170 g
IEC 61010-1 600 V CAT III IEC 61557-7	



States at delivery

- > **C.A. 6608 Phase Rotation Tester**
Delivered in a carrying bag containing 3 test leads, 3 crocodile clips and 1 operating manual in 5 languages
- > **C.A. 6609 Phase Rotation and Motor Tester**
Delivered in a carrying bag containing 3 test leads, 3 crocodile clips and 1 operating manual in 5 languages

References to order

- > C.A. 6608 > P01191304
- > C.A. 6609 > P01191305



Battery capacity tester



C.A 6630

- > **Test batteries simply, quickly and safely**
- Zero adjustment function for compensation of the voltage circuit displayed
- 2-display LCD screen with numerous symbols
- power supply by 6 x 1.5 V batteries battery life in continuous use: 7 hours
- max. power consumption: 1 VA
- dimensions: 250 x 100 x 45 mm
- weight: 500 g including batteries
- resistance measurement:
 - temperature coeff.: $\pm (0.1 \% R + 0.5 \text{ digit})$
 - 0 °C measurement voltage: 1.5 mV_{ac}
 - measurement frequency: 1 kHz $\pm 10 \%$

Specifications

Range	40 mΩ	400 mΩ	4 Ω	40 Ω
Resolution	10 μΩ	100 μΩ	1 mΩ	10 mΩ
Measurement current	37.5 mA	3.75 mA	375 μA	37.5 μA
Accuracy	$\pm (1 \% R + 8 \text{ digits})$			
Voltage measurement	temp. coeff.: $\pm (0.1 \% R + 0.5 \text{ digit}) / ^\circ\text{C}$			
Range	4 V		40 V	
Resolution	1 mV		10 mV	
Accuracy	$\pm (1 \% R + 6 \text{ digits})$			

C.A 6630

Range	40 mΩ	400 mΩ	4 Ω	40 Ω
Resolution	10 μΩ	100 μΩ	1 mΩ	10 mΩ
Measurement current	37.5 mA	3.75 mA	375 μA	37.5 μA
Accuracy	$\pm (1 \% R + 8 \text{ digits})$			
Voltage measurement	temp. coeff.: $\pm (0.1 \% R + 0.5 \text{ digit}) / ^\circ\text{C}$			
Range	4 V		40 V	
Resolution	1 mV		10 mV	
Accuracy	$\pm (1 \% R + 6 \text{ digits})$			

State at delivery

> **C.A 6630** Delivered in a rigid carrying case with a set of 2 measurement leads 1 m long terminated by retractable test probes, PC transfer software for exporting and processing the stored data, one C.A 6630 / PC connection cable and an operating manual in 5 languages

Reference to order

> **C.A 6630**

> P01191303

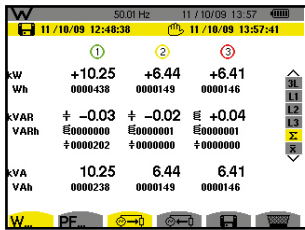


A phase of analysis is essential to precisely identify the behaviour of the installations and determine which solutions to implement.

The measurements made help to ensure that the solutions are pertinent and that the gains achieved are maintained over the long term in the context of an energy optimization programme.

So measurement provides the foundation for optimizing your installations' energy efficiency, supervising your electrical networks and fairly allocating the costs.

POWER MEASUREMENTS



Power measurement is a key element for the definition, success and long-term effects of an energy optimization programme. Reducing electricity consumption is also a simple, painless way of saving money. Electricity is a clean energy source and is less harmful for the environment, but it does affect it nevertheless.

The various parameters of the installation are measured regularly, including the different power values used to size the electrical network and the phase shift data, as well as the voltage, current and frequency measurements.

For private customers, reactive power is neither measured nor billed separately. Instead it is included at a flat rate in the active power price. Things are very different for industrial customers, however. Electricity suppliers penalize consumers whose displacement power factor (cos phi or DPF) is lower than 0.93 (in France) or whose tan phi is higher than 0.4 (in France).

This set of measurements will help the installation manager to size the capacitor banks correctly.

DETECTION OF DISTURBANCES



With the spread of systems incorporating electronics using switching power supplies, the electrical network is becoming increasingly polluted. A further "complication" is that fact that electricity market deregulation could lead to an increase in the frequency of general network blackouts.

The quality requirements have become much more demanding and stringent than in the past. All the equipment in factories and buildings now includes digital electronics which are known to be sensitive to micro-outages, peaks and dips, harmonics and disturbances in general.

The complexity of industrial equipment makes it vulnerable to the voltage disturbances that occur on the electrical network. The arrival of new quick-switching components is leading to a large number of low-order harmonic currents (3, 5, 7, 9, 11, ...).

Electrical network analysers capable of recording disturbances for industrial companies and professionals in the electricity sector (producers, transmission companies, electricity users) are essential tools for satisfactory supervision and timely maintenance of installations.

They have to provide direct measurements, allow as much parameterization as possible for recording and facilitate subsequent analysis.

Some faults are encountered very frequently. In general, most disturbances are caused by:

1/ Slow and transient voltage variations.

The voltage amplitude is a crucial parameter for electricity quality.

The voltage amplitude varies abnormally and may even drop to a level close to zero.

The causes mainly lie in the installation itself. The connection of heavy loads may lead to voltage variations if the short-circuit power at a point of supply is undersized.

Several types of faults* are then defined: overvoltage, voltage dip, outage, etc. The rated network voltage variation range is set by the power distributor.

2/ Flicker: rapid voltage fluctuations.

When variable loads such as arc furnaces, laser printers, microwave ovens or air-conditioning systems are started up, they cause rapid voltage variations. This phenomenon is called flicker. In reality, the flicker value is the result of a statistical calculation based on measurements of the rapid voltage variations.

A 10-minute interval is considered an acceptable compromise for evaluation of the short-term flicker (Pst).

If the combined effect of several disturbance-generating loads operating in a random way (e.g. welding units or motors) has to be taken into account or when flicker sources with long or variable operating cycles are involved (electric arc furnace), the resulting disturbance must be assessed over a longer time. The measurement duration defined is then 2 hours, a time considered appropriate for the load operating cycle or the time during which an observer may be sensitive to long-term flicker (Plt).

3/ Harmonics and interharmonics.

The waveform of the current consumed by loads connected to the electrical network is often no longer purely sinusoidal. This current distortion implies distortion of the voltage also depending on the impedance of the source. The disturbances called harmonics are caused by connecting non-linear loads, such as equipment incorporating power electronics, to the network. This may have instant consequences on certain electronic equipment: operating problems (synchronization, switching), untimely tripping, measurement errors on energy meters, etc. In the medium term, the extra heating caused by this may reduce the life span of rotating machines, capacitors, power transformers and neutral conductors.

Today's measurement instruments have to be capable of performing this harmonic analysis order by order, as well as measuring the Total Harmonic Distortion (THD) for more detailed diagnosis of the installation.

Selection guide for power and/or energy analysers



	C.A. 404	C.A. 405	F21	C.A. 8220	C.A. 8230	C.A. 8332B	C.A. 8334B	C.A. 8335	C.A. 8340	C.A. 8342	C.A. 8352
Number of U/I input channels	1	1	1	1	1	3	3	4	4	4	4
Display											
Analogue	■	■									
Digital			■	■	■	■	■	■	■	■	■
Scope mode				■	■	■	■	■	■	■	■
Electrical network											
Single-phase	■	■	■	■	■	■	■	■	■	■	■
Balanced 3-phase		■	■	■	■	■	■	■	■	■	■
3-phase				■	■	■	■	■	■	■	■
Measurements											
DC voltage			■	■	■	■	■	■	■	■	■
AC voltage			■	■	■	■	■	■	■	■	■
DC current			■	■	■	■	■	■	■	■	■
AC current			■	■	■	■	■	■	■	■	■
Frequency	■	■	■	■	■	■	■	■	■	■	■
Power											
VA			■	■	■	■	■	■	■	■	■
W	■	■	■	■	■	■	■	■	■	■	■
var			■	■	■	■	■	■	■	■	■
Cos φ / DPF				■	■	■	■	■	■	■	■
PF				■	■	■	■	■	■	■	■
Tan φ				■	■	■	■	■	■	■	■
Energy											
VAh, Wh, varh				■	■	■	■	■	■	■	■
Harmonics											
THD				■	■	■	■	■	■	■	■
FD				■	■	■	■	■	■	■	■
Decomposition				■	■	■	■	■	■	■	■
Interharmonics									■	■	■
Other											
PST flicker					■	■	■	■	■	■	■
PLT flicker									■	■	■
Sliding PLT flicker									■	■	■
Unbalance							■	■	■	■	■
Temperature				■							■
Resistance				■							
Rotation speed				■							
μs acquisition										■	
Monitoring											
Recording					■	■	■	■	■	■	■
Transients							■	■	■	■	■
μs transients										■	
Alarms					■	■	■	■	■	■	■
PC software				■	■	■	■	■	■	■	■
Page	121	121	33	78	79	80	81	82	84	84	85

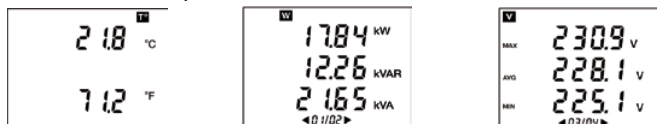
Power analyser



C.A 8220

> Ideal for motor maintenance

- Access to all measurements simultaneously
- Measurement of low resistances and high currents
- Voltage calculation per half-period in accordance with EN 50160
- Motor rotation speed



■ C.A 8220

Specifications

Electrical

Voltage (TRMS)

Current (TRMS)

MN clamp

C clamp
AmpFLEX™ or MiniFLEX clamps
PAC clamp
E3N clamp

Frequency

Other measurements

Harmonics

Sampling frequency

Data storage

Power supply

Battery life

Mechanical

Communication port

Display

Dimensions

Weight

Safety

Phase-to-phase: 660 V_{AC}+DC

Phase-to-neutral: 600 V_{AC}+DC

MN93: 2 to 240 A_{AC};

MN93A: 0.005 A_{AC} to 5 A_{AC} / 0.1 A_{AC} to 120 A_{AC}

3 A to 1,200 A_{AC}

30 A to 6,500 A_{AC}

10 A to 1,000 A_{AC} / 10 A to 1,400 A_{DC}

50 mA to 10 A_{AC}+DC, 100 mA to 100 A_{AC}+DC

40 Hz to 70 Hz

kW, kVAR, PF, DPF, VA, temperature, phase rotation, RPM, resistance, continuity, diode test

1st to 50th

256 samples/cycle

≥ 99 complete sets of voltage, current, power and harmonics measurement data

6 x 1.5 V AA or optional mains adapter

≥ 8 hours with display on

Optically isolated USB

3 lines backlight digital display with custom icons

211 x 108 x 60 mm

0.88 kg

IEC 61010 600 V CAT III, IP 54, Pollution degree 2

State at delivery

- > The **C.A 8220** analyser is always delivered complete with 2 banana leads, 2 x 4 mm test probes, 2 crocodile clips, 6 x 1.2 V AA batteries, 1 USB optical cable, Power Analyser Transfer processing software, 1 operating manual on CD



Accessories / Spares

> C.A 8220

- C.A 8220 analyser (without clamp) > P01160620
- C.A 8220 MN93A analyser (with MN93A clamp) > P01160621
- C.A 8220 AmpFLEX™ analyser (with AmpFLEX™ clamp) > P01160622

C.A 1711 tachometer sensor

E3N clamp

E3N clamp adapter

E3N mains power unit

Pt100 adaptor, 2 wires

> P01102082

> P01120043A

> P01102081

> P01120047

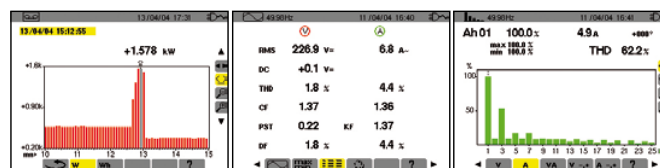
> HX0091

Power analyser

C.A 8230

> Ideal for electrical network maintenance

- All measurements accessible simultaneously
- INRUSH function
- Excellent quality/price ratio



Specifications

Electrical

Voltage (TRMS)	Phase-to-phase: 660 V _{AC} +DC Phase-to-neutral: 600 V _{AC} +DC
Current (TRMS)	MN93: 2 to 240 A _{AC} ; MN93A: 0.005 A _{AC} to 5 A _{AC} / 0.1 A _{AC} to 120 A _{AC}
MN clamp	3 A to 1,200 A _{AC}
C clamp	30 A to 6,500 A _{AC}
AmpFLEX™ or MiniFLEX clamps	10 A to 1,000 A _{AC} / 10 A to 1,400 A _{DC}
PAC clamp	50 mA to 10 A _{AC} +DC, 100 mA to 100 A _{AC} +DC
E3N clamp	40 Hz to 70 Hz
Frequency	40 Hz to 70 Hz
Other measurements	kW, kVAR, PF, DPF, kVARh, kVAh, K factor, flicker, harmonics phase shift, phase rotation
Harmonics	THD-R, THD-F, V, A, VA, 1st to 50th, direction, sequence
Sampling frequency	256 samples/cycle
Data storage	1.5 MB partitioned for waveforms, alarms and trend recording
Power supply	6 x 1.5 V AA rechargeable batteries (included) AC supply: 120/230 V _{AC} (50/60 Hz)
Battery life	≥ 8 hours with display on ≥ 40 hours with display on (recording mode)
Mechanical	
Communication port	Optically isolated USB
Display	¼ VGA (320 x 240) color LCD
Dimensions	211 x 108 x 60 mm
Weight	0.88 kg
Safety	IEC 61010 600 V CAT III, IP 54, Pollution degree 2

C.A 8230



**IEC 61010
600 V
CAT III**

Accessories / Spares

> For the C.A 8220 & C.A 8230

- MN93A clamp
- MN93 clamp
- Mini-AmpFLEX™ A193 450 mm
- Mini-AmpFLEX™ A193 800 mm
- PAC93 BK clamp
- C193 BK clamp
- 5 A adapter box
- Optical cable
- Carrying bag no. 5
- Crocodile clips (1 red/ 1 black)
- Banana/banana lead (1 red/ 1 black)
- Test probe (1 red/ 1 black)
- Pack 6 NiMH rechargeable batteries
- C.A 82X0 EUR mains power supply
- Mini-Mini-AmpFLEX™ MA193
- RS232/USB lead
- DataView®

- > P01120434B
- > P01120425B
- > P01120526B
- > P01120531B
- > P01120079B
- > P01120323B
- > P01101959
- > P01295252
- > P01298049
- > P01102052Z
- > P01295288Z
- > P01102051Z
- > P01120434
- > P01160640
- > P01120580
- > HX0056Z
- > P01102095

State at delivery

- > The **C.A 8230** analyser is always delivered complete with 2 banana leads, 2 x 4 mm test probes, 2 crocodile clips, 6 x 1.2 V rechargeable batteries, 1 x 230 V mains adapter, 1 USB optical cable, Power Analyser Transfer processing software, 1 operating manual on CD, 1 bag no. 5



References to order

- > **C.A 8230**
- C.A 8230 analyser (without clamp) > P01160630
- C.A 8230 MN93A analyser (with MN93A clamp) > P01160631
- C.A 8230 AmpFLEX™ analyser (with AmpFLEX™ sensor) > P01160632

Three-phase network and energy analyser



C.A 8332B

- > Measures all the voltage, current and power parameters necessary for full diagnosis of an electrical installation
- > All the specifications required at a very attractive price
- > Proven simplicity of use
- > 3-year warranty

■ C.A 8332B

Specifications

Sampling	256 samples/period
Voltage (RMS AC+DC)	V to 960 V (phase-Phase); 6 V to 480 V (Phase-Neutral)
Current (RMS AC+DC)	MN clamp C clamp AmpFLEX™ or MiniFLEX clamps PAC clamp
Frequency	40 Hz to 69 Hz
Other measurements	kW, kVAR, kVA, PF, DPF, kWh, kVARh, kVAh, Flicker, unbalance, K-Factor
Harmonics	THD up to the 50th order, phase
Transients	Recording up to several days Rechargeable 9.6 V NiMH battery or 90 to 260 V mains power pack
Power supply	≥ 8 hours; ≥ 35 in standby mode
Battery life	
Storage	
Screens and curves	8
Recordings	From 42 minutes to several weeks
Alarms	4,000 of 40 different type
Transients	50
Mechanical	
Communication port	Optical RS232
Display	1/4 VGA colour screen, Diagonal 148 mm
Dimensions	24 x 18 x 5.5 cm
Weight	2.1 kg
Safety	IEC 61010, 600 V CAT IV, 1,000 V CAT III

References to order

- > C.A 8332B-F with MN93 clamp
- > C.A 8332B-INT with MN93 clamp
- > C.A 8332B-F with MN93A clamp
- > C.A 8332B-INT with MN93A clamp
- > C.A 8332B-F with AmpFLEX™ 450 clamp
- > C.A 8332B-INT with AmpFLEX™ 450 clamp
- > P01160521
- > P01160524
- > P01160522
- > P01160525
- > P01160523
- > P01160526

Other references are available depending on the sensors chosen.
Please contact us for details.

State at delivery

- > With the Qualistar C.A 8332B: bag No. 22, RS232 optical lead, mains lead, 4 x Ø 4 banana voltage leads 3 m long, 4 crocodile clips, safety plug, operating manual, PC data recovery software and the set of current sensors selected

Accessories / Spares

- > For the C.A 8332B and C.A 8334B
- CA833X-F 5 A adapter box
- PAC93 BK clamp
- C193 BK clamp
- MN93 BK clamp
- MN93A BK clamp
- Other clamps references
- > P01101959
- > P01120079B
- > P01120323B
- > P01120425B
- > P01120434B
- > contact us

Three-phase network and energy analyser

QualiSTAR C.A 8334B

- > Intuitive operation making it very easy to use
- > Simultaneous operation of all the instrument's modes (recording, alarm, measurement, power, harmonics)
- > Wide graphic screen, very easy to read
- > Suitable for single and three-phase networks
- > 3-year warranty
- Direct access to all the measurement modes for full diagnosis: Energy, W, VA, Var, PF, $\cos \phi$, $\tan \phi$, THD up to 50th harmonic order, etc.



Specifications

		C.A 8334B
Sampling		256 samples/period
Voltage (RMS AC+DC)		V to 960 V (phase-Phase); 6 V to 480 V (Phase-Neutral)
Current (RMS AC+DC)	MN clamp	MN93: 2 to 240 AAC; MN93A: 0.005 AAC to 5 AAC / 0.1 AAC to 120 AAC
	C clamp	3 A to 1,200 AAC
	AmpFLEX™ or MiniFLEX clamps	30 A to 6,500 AAC
	PAC clamp	10 A to 1,000 AAC / 10 A to 1,400 ADC
Frequency		40 Hz to 69 Hz
Other measurements		kW, kvar, kVA, PF, DPF, kWh, kvarh, kVAh, Flicker, unbalance, K-Factor
Harmonics		THD up to the 50th order, phase
Transients		Recording up to several days Rechargeable 9.6 V NiMH battery or 90 to 260 V mains power pack ≥ 8 hours; ≥ 35 in standby mode
Power supply		
Battery life		
Storage		
Screens and curves		12
Recordings		From 42 minutes to several weeks
Alarms		4,000 of 40 different type
Transients		50
Mechanical		
Communication port		Optical RS232
Display		1/4 VGA colour screen, Diagonal 148 mm
Dimensions		24 x 18 x 5.5 cm
Weight		2.1 kg
Safety		IEC 61010, 600 V CAT IV, 1,000 V CAT III



Accessories / Spares

- | | |
|--------------------------------|--------------|
| MN93A BK clamp | > P01120434B |
| AmpFLEX™ A193 450 mm BK | > P01120526B |
| AmpFLEX™ A193 800 mm BK | > P01120531B |
| Mini- AmpFLEX™ MA193 200 MM BK | > P01120580 |
| Waist bag no. 21 | > P01298055 |
| Qualistar bag no. 22 | > P01298056 |
| Qualistar screen film | > P01102059 |
| Site-proof case | > P01298062 |
| Qualistar bag no. 06 | > P01298051 |
| DataVIEW software | > P01102058 |
| Optical RS232 lead | > P01295190A |
| USB adapter | > HX0055 |
| In-vehicle charger | > HX0061 |

State at delivery

- > With the Qualistar **C.A 8334B**: bag No. 22, RS232 optical lead, mains power lead, 4 x Ø 4 mm banana voltage leads 3 m long, 4 crocodile clips, safety plug, operating manual, PC data recovery software and the set of current sensors chosen.

References to order

- | | |
|-------------------------|-------------|
| > CA 8334B-F MN93 | > P01160551 |
| > CA 8334B-F MN93A | > P01160552 |
| > CA 8334B-F AmpFLEX™ | > P01160553 |
| > CA 8334B-INT MN | > P01160554 |
| > CA 8334B-INT MN93A | > P01160555 |
| > CA 8334B-INT AmpFLEX™ | > P01160556 |
- Other configurations are available: please contact us for details

Three-phase network and energy analyser



QualiSTAR+ C.A 8335

- > Measures all the voltage, current and power parameters necessary for full diagnosis of an electrical installation.
- > Captures and records all the parameters, transients, alarms and waveforms simultaneously.
- > Proven simplicity of use
- > 3-year warranty

I C.A 8335

Specifications

Sampling	256 samples/period
Voltage (RMS AC+DC)	10 V to 1,000 V
Current (RMS AC+DC)	MN clamp MN93: 2 to 240 AAC; MN93A: 0.005 AAC to 5 AAC / 0.1 AAC to 120 AAC 3 A to 1,200 AAC 30 A to 6,500 AAC 10 A to 1,000 AAC / 10 A to 1,400 ADC 50 mA to 10 AAC+DC, 100 mA to 100 AAC+DC
Frequency	40 Hz to 69 Hz
Other measurements	kW, kvar, kVA, PF, DPF, kWh, kvarh, kVAh, Flicker, Unbalance, K Factor
Harmonics	THD up to the 50th order, phase
Power supply	Rechargeable 9.6 V NiMH battery or 90 to 260 V mains power supply
Battery life	≥ 10 hours; ≥ 30 in standby mode
Storage	≥ 2 GB
Memory depth	50
Screens and curves	100 (several weeks)
Recordings	10,000, 40 different types
Alarms	210
Transients	≥ 1 min on all 3 phases
Inrush	
Mechanical	
Communication port	USB
Display	1/4 VGA colour screen, Diagonal 148 mm
Battery life	≥ 8 hours with display on ≥ 40 hours with display on (recording mode)
Dimensions	24 x 18 x 5.5 cm
Weight	2 kg
Safety	IEC 61010, 600 V CAT IV, 1,000 V CAT III

Current (RMS AC+DC)	MN clamp MN93: 2 to 240 AAC; MN93A: 0.005 AAC to 5 AAC / 0.1 AAC to 120 AAC 3 A to 1,200 AAC 30 A to 6,500 AAC 10 A to 1,000 AAC / 10 A to 1,400 ADC 50 mA to 10 AAC+DC, 100 mA to 100 AAC+DC
Frequency	40 Hz to 69 Hz
Other measurements	kW, kvar, kVA, PF, DPF, kWh, kvarh, kVAh, Flicker, Unbalance, K Factor
Harmonics	THD up to the 50th order, phase
Power supply	Rechargeable 9.6 V NiMH battery or 90 to 260 V mains power supply
Battery life	≥ 10 hours; ≥ 30 in standby mode
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Recordings	10,000, 40 different types
Alarms	210
Transients	≥ 1 min on all 3 phases
Inrush	
Mechanical	
Communication port	USB
Display	1/4 VGA colour screen, Diagonal 148 mm
Battery life	≥ 8 hours with display on ≥ 40 hours with display on (recording mode)
Dimensions	24 x 18 x 5.5 cm
Weight	2 kg
Safety	IEC 61010, 600 V CAT IV, 1,000 V CAT III

State at delivery

- > Delivered with 1 carrying bag No. 22, 1 USB cable, 1 charger/power supply, 1 mains lead, 5 voltage leads 3 m long with banana connectors Ø 4 mm, 5 crocodile clamps, 12-colour identification kit for leads and inputs, 1 screen protection film, 1 safety plug, 1 multilingual operating manual, PC software for data retrieval



Reference to order

- > **C.A 8335**
power analyser:

> P01160577

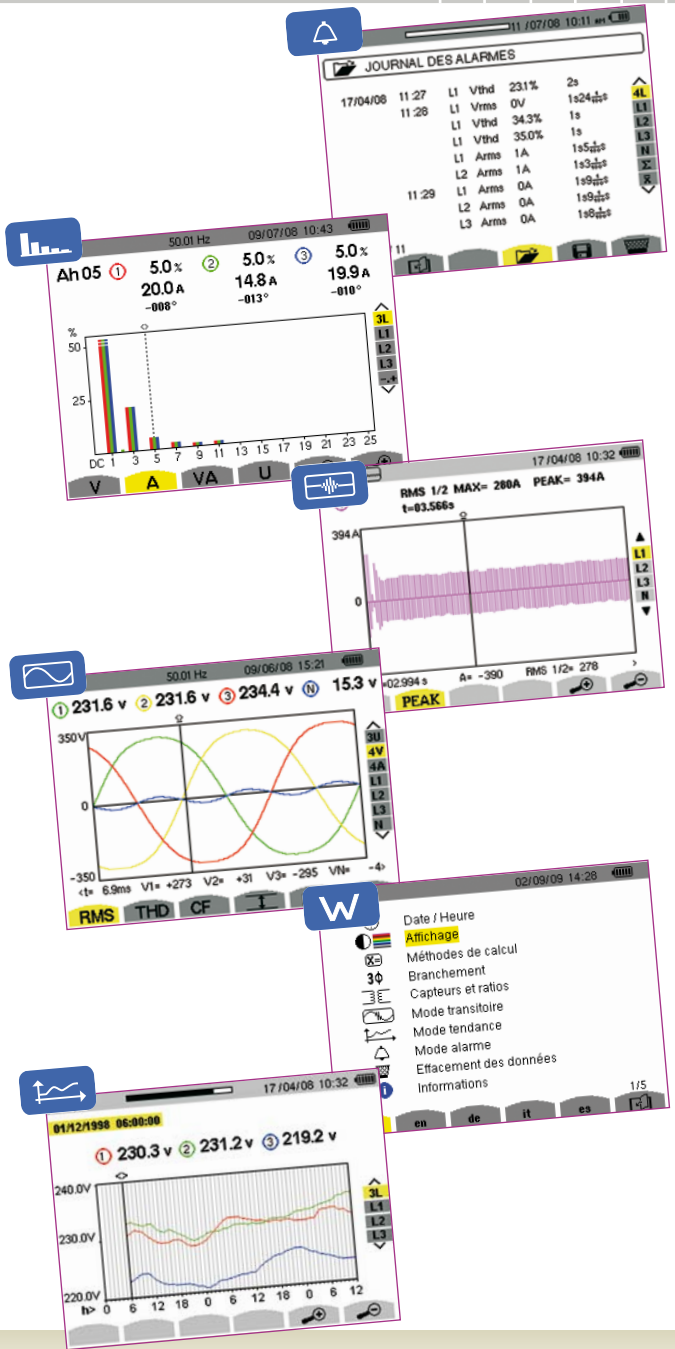
Accessories / Spares

- CA833X-F 5 A adapter box > P01101959
- PAC93 clamp > P01120079B
- C193 clamp > P01120323B
- MN93 clamp > P01120425B
- MN93A clamp > P01120434B
- AmpFLEX™ A193 450 mm > P01120526B
- AmpFLEX™ A193 800 mm > P01120531B
- Mini- AmpFLEX™ MA193 200 mm > P01120580
- Soft case with neck strap no. 21 > P01298055
- Qualistar soft case no. 22 > P01298056
- Screen protection film > P01102059
- Set of rings and inserts > P01102080
- DataView software > P01102058
- Mains power supply AP 30 W > P01102057
- Lead USB-A USB-B > P01129593
- E3N clamp > P01120043A
- E3N adapter > P01120081
- E3N mains power > P01120047

NEW !!!
4 voltage inputs
4 current inputs

Functions

- Real-time display of waveforms (4 voltages and 4 currents)
- RMS voltage and current measurements per half-period
- Intuitive use
- Automatic recognition of the different types of current sensors
- Includes measurement of all the DC components
- Voltage and current ratios
- Mixing current sensors
- Measurement, calculation and display of harmonics up to the 50th order with their phase details
- Calculation of total harmonic distortion (THD)
- Capture of transients per sample (1/256th of a period)
- Display of phasor diagram
- Measurement of VA, W, total var and var per phase power values
- Measurement of VAh, Wh, total varh and varh per phase energy values
- Calculation of K factor
- Calculation of $\cos \phi$ displacement power factor (DPF) and power factor (PF)
- Capture of up to 210 transients
- Flicker calculation
- Unbalance calculation (current and voltage)
- Monitoring of the electrical network with alarm parameterization
- Creation and recording of screenshots (image and data)
- Back-up and export on PC.
- Software for data retrieval and real-time communication with a PC.



Voltage leads



Crocodile clips

Set of inserts/rings



5 A adapter



Mains power supply



Mini AmpFLEX™ MA 193
30 to 6,500 Aac



Qualistar
carrying bag



Software



USB lead



A 193/450 mm
30 to 6,500 Aac



MN 93
1 A to 240 Aac

MN 93A
0.1 A to 120 Aac
0.05 A to 5 Aac



C193
3 to 1,200 Aac



A 193/800 mm
30 to 6,500 Aac



PAC93
1 to 1,400 Aac
1 to 1,700 Adc



E3N clamp
50 mA to 10 Aac+DC
100 mA to 100 Aac+DC

Portables wattmeters with colour touch screen



IEC 61010
600 V
CAT III

IEC 61000-4-30
class A
All values

State at delivery

> **C.A 8340** or **C.A 8342** analyser delivered with 1 special CA834x carrying bag, 1 x 128 MB memory card, 1 simplified operating manual, DRAN-VIEW® software, 8 colour coded banana/banana leads 3 m long, 4 black leads with hermaphrodite connectors, 230 V mains adapter, and/or set of 4 clamps as required (4 MN93B clamps or 4 C193B clamps or 4 AmpFLEX™ 450 mm clamps or 4 AmpFLEX™ 800 mm clamps or 4 PAC93B clamps).

References to order

- | | |
|---|-------------|
| > C.A 8340 analyser without clamps | > P01160660 |
| CA8340MN kit | > P01160661 |
| CA8340C kit | > P01160662 |
| CA8340 AmpFLEX™ 450 kit | > P01160663 |
| CA8340 AmpFLEX™ 800 kit | > P01160664 |
| > C.A 8342 analyser without clamps | > P01160670 |
| CA8342 MN kit | > P01160671 |
| CA8342 C kit | > P01160672 |
| CA8342 AmpFLEX™ 450 kit | > P01160673 |
| CA8342 AmpFLEX™ 800 kit | > P01160674 |

C.A 8340 & C.A 8342

- > These portable wattmeters with colour touch screens are compact instruments which simplify instant network-type detection, data recording and monitoring of energy quality.
- 4 insulated voltage channels and 4 insulated current channels
- Sampling interval of 1 µs to 1 hour per channel
- Analysis of harmonics/interharmonics up to the 63rd order
- Recording of EN50160 parameters for non-sinusoidal and unbalanced networks
- Transient capture in compliance with IEC 61000-4-30

■ C.A 8340

■ C.A 8342

Specifications

4 voltage channels and 4 current channels, all completely insulated

Number of points per period

Harmonics and Interharmonics

Power values

Energy values

Disturbances

Flicker

Unbalance

Communication / memory

Power supply

Software

Electrical safety

Dimensions / Weight

	■ C.A 8340	■ C.A 8342
Number of points per period	256	1,000
Harmonics and Interharmonics	■	■
Power values	V, A, MIN, MAX, W, VAR, VA, FP, cos φ, frequency, global and phase/phase, FC	
Energy values	Generated and consumed active, reactive, capacitive and inductive energies	
Disturbances	Monitoring in accordance with EN50160	
Flicker	■	■
Unbalance	Phase shift, global unbalance – positive-sequence, negative-sequence and zero-sequence current	
Communication / memory	Ethernet, USB, serial port via adapter / 128 MB	
Power supply	Mains and/or batteries	
Software	DRAN-VIEW®	
Electrical safety	IEC 61000-4-30 class A 600 V CAT III	
Dimensions / Weight	300 x 64 x 203 mm / 1.9 kg	

Accessories / Spares

- | | |
|---------------------------------|-------------|
| DranView® software | > P01160680 |
| CA834X carrying bag | > P01298070 |
| 128MB memory card | > P01102039 |
| Battery pack | > P01296038 |
| White/black voltage cable (x 8) | > P01295183 |
| Mains adapter | > P01296039 |
| Ethernet adapter | > P01102041 |
| RS232 adapter | > P01102042 |
| USB adapter | > P01102043 |
| MN93B clamp | > P01120450 |
| C193B clamp | > P01120331 |
| Ampflex 450 mm clamp | > P01120540 |
| Ampflex 800 mm clamp | > P01120543 |
| PAC93B clamp | > P01120090 |
| Set of 4 MN93B clamps | > P01120451 |
| Set of 4 C193B clamps | > P01120332 |
| Set of 4 AmpFLEX™ 450 mm clamps | > P01120541 |
| Set of 4 AmpFLEX™ 800 mm clamps | > P01120544 |
| Set of 4 PAC93B clamps | > P01120091 |

Power and energy analyser

C.A 8352

> The C.A 8352 is an electrical-network quality analyser operating on AC networks and presented in a rugged site-proof case with a lid.

- Analysis parameters in line with the applicable EN 50160 standard
- Recording of all the parameters every 200 ms, as well as event capture.
- Capture of remote-control signals
- Harmonic analysis up to the 50th order, with THD
- Spectral analysis of the interharmonic frequencies
- Analysis of the system's unbalance and symmetry



■ C.A 8352

Specifications

Sampling frequency	From 9.6 kHz to 38.4 kHz for waveforms and trend recordings
Voltage (AC RMS)	From 10 V to 700 V
Current (AC RMS)	Direct inputs for currents from 0.05 to 5 Aac
Frequency (Hz)	MN95 clamp: from 200 mA to 6 Aac C145 clamp: de 2 to 1,200 Aac AmpFLEX™ clamp: from 25 to 3,000 Aac 40 to 69 Hz
Other measurements	kW, kVAR, PF, DPF, kWh, kVARh, kWhA, K-factor, Flicker
Harmonics	1st to 50th, direction, sequence
Power supply	AC mains supply: 110/230 VAC ±20 % (50/60 Hz)
Memory depth	10 GB
Channels	8 analogue channels (optional)
Communication port	USB / RS232 x 2 / Ethernet
Display	10" color LCD touch screen
Dimensions	300 x 64 x 203 mm
Weight	1.9 kg
Electrical safety	IEC 61000-4-30 class A 600 V CAT III

Accessories / Spares

- | | |
|--------------------------------------|--------------|
| Blue/black voltage cable (x 8) | > P01295183 |
| C145 clamps for C.A 8352 (x 4) | > P01120319A |
| C145 clamp for C.A 8352 | > P01120320A |
| MN95 clamps for C.A 8352 (x 4) | > P01120429 |
| MN95 clamp for C.A 8352 | > P01120430 |
| AmpFLEX™ A195 450MM (x 4) | > P01120519 |
| AmpFLEX™ A195 800MM (x 4) | > P01120520 |
| AmpFLEX™ A195 450MM | > P01120521 |
| AmpFLEX™ A195 800MM | > P01120522 |
| 5 A current cable for C.A 8352 (x 4) | > P01295184A |

State at delivery

- > Each option is delivered complete 1 C.A 8352, 8 x 3 m leads, 1 x 5 A current cable and 1 stylus

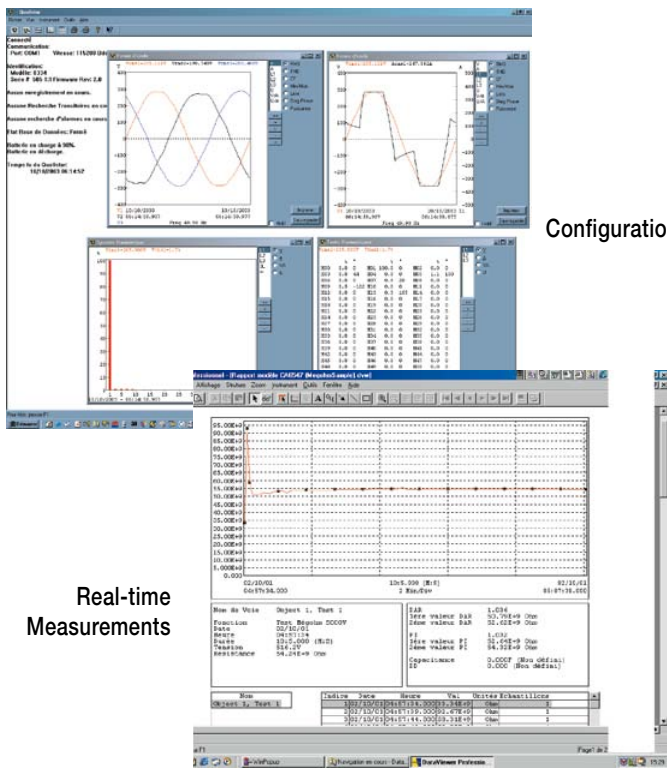


References to order

- OPTION 1 Power analyser & vectorscope
- OPTION 2 Flickermeter, EN50160 analyser
- OPTION 3 Transient recorder
- OPTION 4 Data recorder on external analogue inputs
- OPTION 5 Remote-control signals
- OPTION 6 Power 2: symmetry, impedance
- OPTION 7 Remote control: modem

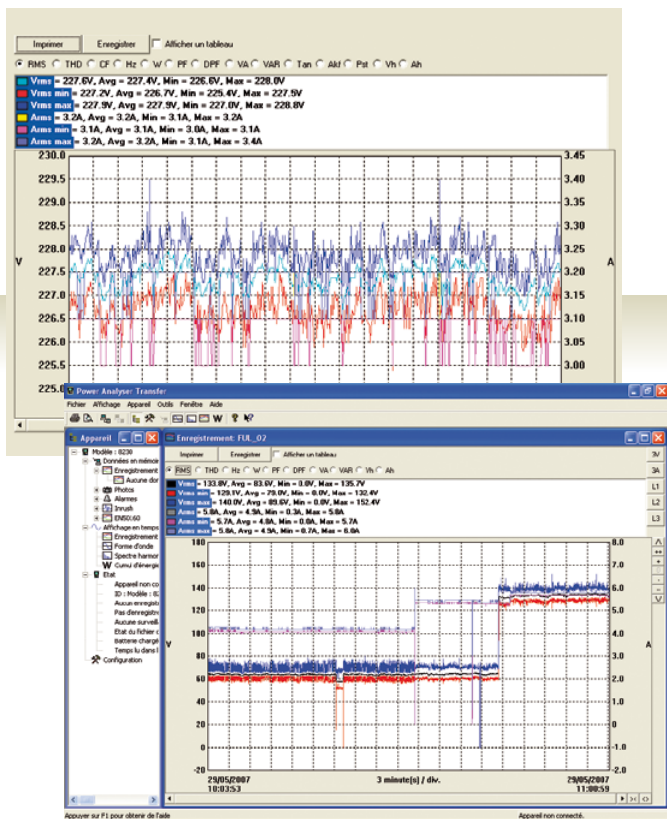
Contact us

Multi-product processing software for PC



Configuration

Real-time Measurements



Recordings

DataView®

> The easy-to-use DataView® software automatically recognizes the instrument connected to the PC. Users have direct access to:

- the data recorded in the instrument
- the instrument's configuration
- the various measurements in real time

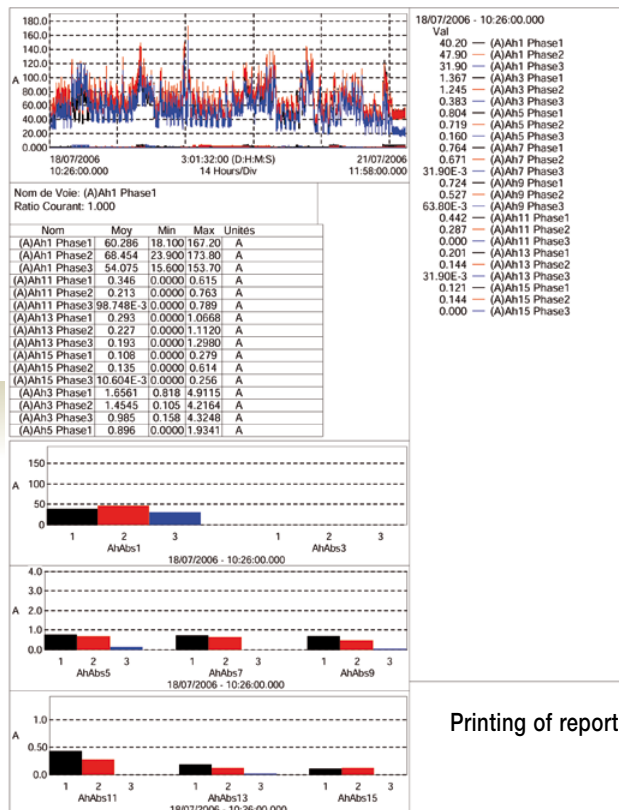
> DataView® is compatible with multiple products, including:

- Qualistar® energy analysers
- C.A 8220 & C.A 8230 power analysers
- C.A 6470N earth tester
- C.A 6543, C.A 6547 & C.A 6549 megohmmeters
- As well as other measurement instruments

> These instruments are connected to the PC via a USB link, an RS232 interface or Bluetooth.

Minimum operating system required:

- Windows® 2000
- Windows® XP
- Windows® Vista
- Windows® 7



Printing of reports

Reference to order

> DataView® software

> P01102095

