CHAUVIN® ARNOUX
CHAUVIN ARNOUX GROUP

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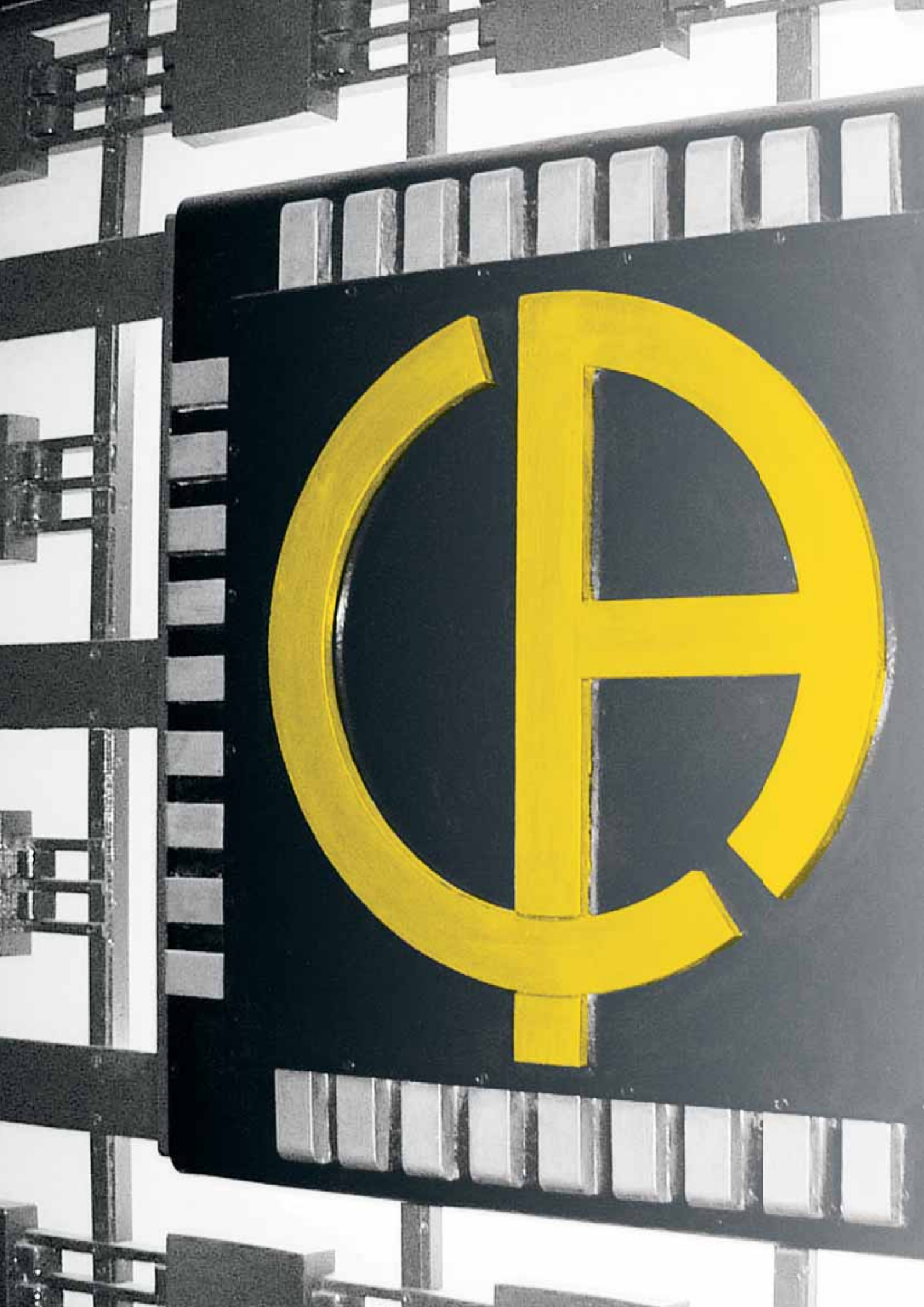
TEST & MEASUREMENT

2017 2018

Measure up



UNIVERSAL TEST & MEASUREMENT

ELECTRICAL SAFETY

ENERGY QUALITY & INSTALLATION MONITORING

PHYSICAL & ENVIRONMENTAL MEASUREMENTS

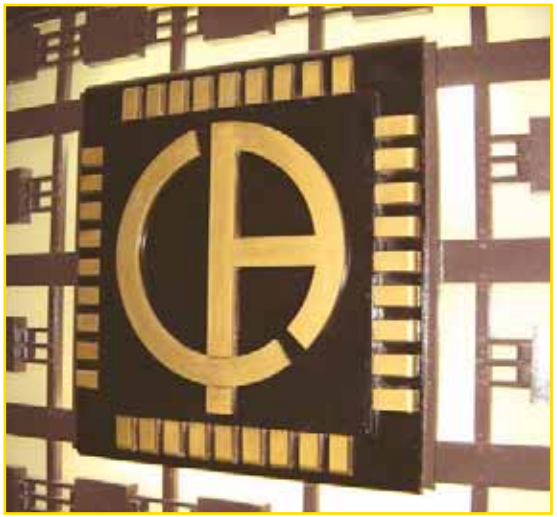
RADIOFREQUENCY & MICROWAVE MEASUREMENTS

LABORATORY & EDUCATIONAL EQUIPMENT

CURRENT MEASUREMENT

ACCESSORIES

ABOUT THE CHAUVIN ARNOUX GROUP



Logo on the company's former main gate

AN AMAZING **STORY!**

Every story starts somewhere. The story of the Chauvin Arnoux company as an inventor and manufacturer of measurement instruments since 1893 is rich in developments and innovations. Today, its products bear witness to and reflect the sociological and technological changes and the industrial innovations which marked the previous century. A fascinating story that explains why and how Chauvin Arnoux's image and personality evolved... in two colours.

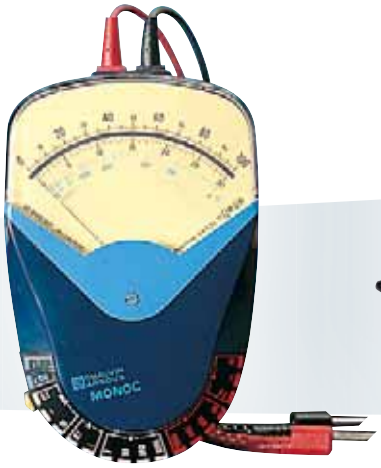
It is often said that at the root of knowledge is language, or that the origin of an innovation was an idea,... yet it is the individual, the person, who is really the source of knowledge and discoveries. This also applies to electricity, which was not invented in the 19th century, but discovered in the 6th century BCE by a Greek philosopher and scientist named Thales, the first person to note the electrostatic properties of amber.

From the beginning of the 19th century, there was the yellow of amber. Then manufactured goods began to include the yellow of brass and copper, materials used in measurement instruments, either for the casings of galvanometers or for the connections of electrical measurement instruments. Beige was also introduced with the use of varnished wood in the casings, while black was reserved for the instruments' dials. Right from the start in 1893, the contrast between black and the yellow of varnished wood soon became the norm for the measurement instruments produced by Chauvin Arnoux.

In a relatively short time, between 1900 and 1936, with the development of new technologies and new techniques for working materials, yellow brass began to be used with black Bakelite, eventually spreading to nearly all our instruments.
Already known for its sense of design and the combination of its original colours yellow brass and

1895 reflection galvanometer

This calibration potentiometer dating from 1900 was used with a standard battery and a galvanometer like the one shown above. Its price was 195 francs!



The Monoc L

CdA 600 Polyclamp (1982)

ABOUT THE CHAUVIN ARNOUX GROUP

black, in its measurement instruments, Chauvin Arnoux reproduced these colours in its first corporate logo in 1927.
In the 1940s, many measurement instruments only used black or black and the silver-grey of ferrous metals, sometimes painted. Chauvin Arnoux adapted its original visual identity to suit the fashions of the time, which also corresponded to technical criteria for safety, life-span extension or weight considerations linked to the metal and the manufacturing process used.

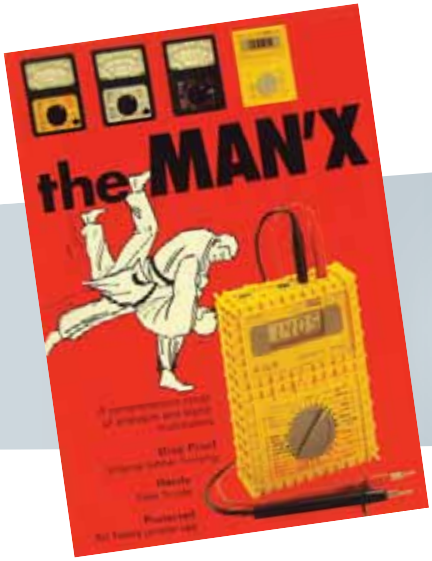
The 1950s saw the arrival of rubber-like materials, used for the bases of portable instruments, and subsequently for the shockproof sheaths made of black neoprene, first designed and patented by Metrix® and Chauvin Arnoux in 1958. These shockproof sheaths later became widely used on the handheld instrument market.

With the 1970s came plastics technology. This was when Chauvin Arnoux launched worldwide its first innovative products made of black and yellow plastic: the CdA 8 tester in 1979, the CdA 600 multimeter clamp in 1982, followed by the whole range. Some earth testers, such as the Terca in 1985 and the Prowatt wattmeters in 1989, also had a yellow casing. **The combination of yellow and black** for on-site equipment began to spread with its use for safety signage and for identifying hazardous areas on site…
This encouraged Chauvin Arnoux to launch the well-known IMEG 500 or ISOL1000 series in Europe and then in the United States with the company's two colours.

The MAN'X 500 series launched by Chauvin Arnoux, the very first multimeters made of a flexible material, further strengthened the company's visual identity.
At about the same time, Metrix launched several products with yellow casings and black platens, including the instruments in its MX 44 series (1988) followed by the MX 51 series.
Over the years, Chauvin Arnoux has developed its visual identity across all its product ranges: its multimeters, wattmeters, megohmmeters and installation testers all bear the company's colours

One last remark about colours: while yellow is always seen as the colour of the sun and of certain kings or emperors in Asia, it is not so widely known that in physics, black is the symbol of a "black body", meaning a system which absorbs all the light it receives. Black and yellow? A historic tandem for Chauvin Arnoux which was the first company to use this pairing for its corporate visual identity in the early 20th century when it first designed its logo in 1927.

Axel Arnoux



On both the French MICA multimeter in 1985 and the ANAGRAF American version available the same year, the yellow of Chauvin Arnoux is clearly in evidence.

MX 51

MEASUREMENT EXPERTS

Founded in 1893 by **Raphaël Chauvin** and **René Arnoux**, **CHAUVIN ARNOUX** is an expert in the measurement of electrical and physical quantities in the industrial and tertiary sectors.
Total control of product design and manufacturing in-house enables the Group to innovate constantly and to propose a very broad product and service offering meeting all its customers' needs.
The Group's **quality policy** enables it to deliver products which comply with the specifications, as well as the international and national standards, in the metrological, environmental and user-safety sectors.

A FEW FIGURES

100 million euros
of sales revenues

10 subsidiaries across the world

900 employees

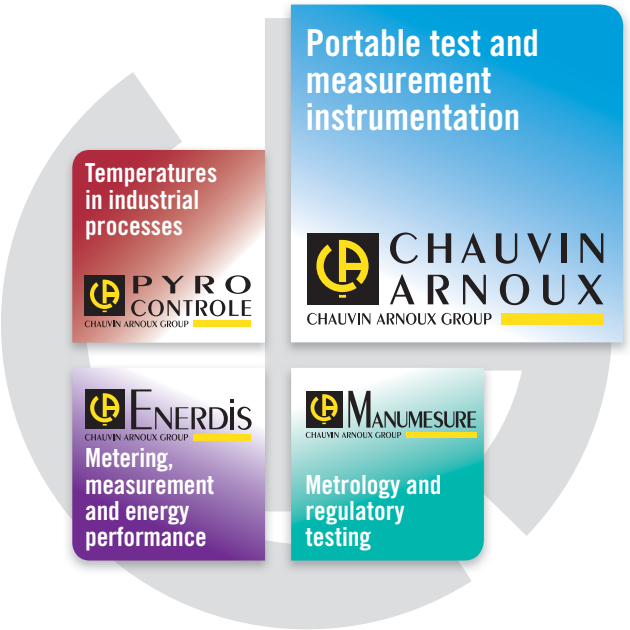
7 production sites

6 R&D departments
worldwide

11% of revenues
invested in R&D

4 FRENCH COMPANIES

selling the product and service offering



CHAUVIN ARNOUX IS A MAJOR PLAYER ON THE MEASUREMENT MARKET IN FRANCE AND INTERNATIONALLY.

7 PRODUCTION SITES

- 3 in Normandy (France)
- 1 in Lyon (France)
- 1 in Milan (Italy)
- 1 in Dover (USA)
- 1 in Shanghai (China)

10 SUBSIDIARIES

- Germany
- Austria
- China
- Spain
- Italy
- Lebanon
- Sweden
- Switzerland
- United Kingdom
- United States

CHAUVIN ARNOUX TEST & MEASUREMENT

CHAUVIN ARNOUX, the French international Group specialized in electrical measurement, relies on its **Chauvin Arnoux®** brand to propose a wide range of **portable measuring instruments**.

Its offering covers:
- **electrical measurement** (testers, multimeters and current clamps)
- **electrical safety testing** (insulation testers, ohmmeters, earth/ground testers)
- **power recording and analysis** (wattmeters and network quality analysers)
- **measurement of physical** quantities (thermal cameras, luxmeters, sound level meters)

Laboratory and educational instruments (training benches and cases) complete the scope of its expertise.

KNOW-HOW ACKNOWLEDGED IN ALL SECTORS OF ACTIVITY

Electrical production, transmission, distribution, installation & maintenance

Tertiary and industrial maintenance, diagnostics & testing

Improvement of energy efficiency

R&D and laboratory work

Education

QUALITY, STANDARDS AND ECO-RESPONSIBLE APPROACH

"Eco Conception" eco-design label for product development based on an eco-friendly approach

The Group's ISO 9001 certification for the design processes and ISO 14001 certification for the manufacturing and sales processes demonstrate its determination to reconcile business and protection of the environment.

- Portable testers and multimeters
- Current clamps & multimeter clamps
- Insulation, earth and continuity testers
- Installation and electrical equipment testers
- Wattmeter-energy meters & electrical disturbance analysers
- Thermal cameras, thermometers, tachometers, field meters, luxmeters, etc.
- Recorders
- Training benches

In our laboratories, we carry out **strict quality inspections and tests at each stage in the design and manufacturing processes**: functional and metrological testing, mechanical and climatic testing, electromagnetic compatibility testing, electrical safety testing, ageing tests, etc.

A LINK BETWEEN YOU AND US

The Chauvin Arnoux Group has always attached great importance to its communication with the outside world. **Convinced that it is essential to dialogue with all its partner distributors and customers**, the Group uses **diverse communication media** to **maintain this link** via magazines, technical journals, its website, its presence in the specialist press and the main industrial platforms.

CONTACT MEASUREMENT NEWS

A magazine for customers focusing on the Group's news and innovations, **Contact Measurement News** remains the best place for **technical information from the companies in the Group**. Sent out to 48,000 readers and available in the distribution networks all over the world, this thirty-page magazine is printed in colour on glossy paper and is available in three languages.

LES CAHIERS DE L'INSTRUMENTATION

"Les Cahiers de l'Instrumentation" is a magazine providing information for the education sector. It is published traditionally to coincide with the annual Educatec trade fair. Its twenty colour pages include practical exercises highlighting solutions, information on the standards and practical case studies involving measuring instruments, testers or energy-control equipment.
A firm favourite among teachers in technical education, this magazine serves as a bridge between students and the world of business.

40 years of communication to stay close to you and maintain your trust

- Contact Measurement News
- "Les Cahiers de l'instrumentation"
- Website 3.0

WEBSITE 3.0

Everyone agrees that the **Web 3.0** is a question of mobility, connected things and data. Internet access is increasingly nomadic. Information may be accessed anywhere, at any time. The Chauvin Arnoux Group has understood this and taken it fully on board, proposing a **new, totally redesigned website** which accompanies Internet users as they browse. **Finding, sharing and combining information** are now much easier. A new conception of the web with a single purpose: **to offer users relevant, customized information** on each of the Group's brands: Chauvin Arnoux®, Enerdis®, Pyrocontrole® and Manumesure.

FOCUS ON IMAGES

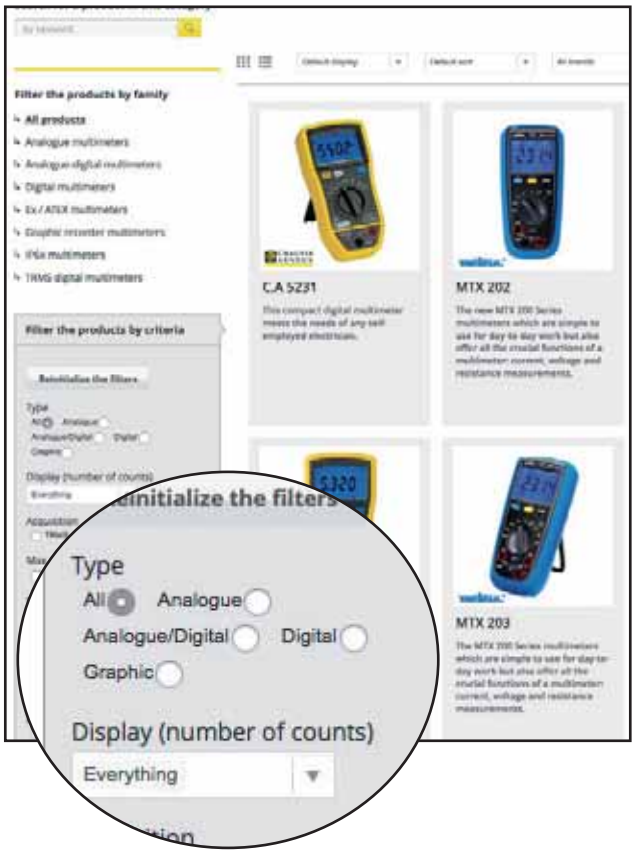
Because a website without pictures is a website which isn't working, **chauvin-arnoux.com** gives pride of place to all the images on the site. Whether they involve corporate matters, applications, expertise or products, they place the company at the heart of a system which values complementarity between the different brands. They give the image of a **structured Group** by using **an identical presentation layout for each of the Group's companies.**

TRANSVERSE EXPERTISE

Multiplying the number of ways in to give internet users direct access to the information while limiting the number of clicks necessary: that's the challenge taken up by the Group. The **transverse nature of the four companies' skills** thus becomes obvious. Moving from one site to another, from one skill to another, via the history of the Group, the training schedule, the press and career opportunities, everything combines to make browsing **simple, effective and quick.**

A CLARIFIED PRODUCT OFFERING

Each company in the Group presents the scope of its offering by means of its products, expertise, applications or publications. Internet users have direct access to all the information linked to a product or complete range of products. The **search engine** quickly allows you find a product datasheet simply by entering a few keywords. You can also refine the search by using "**faceted**" **navigation** based on technical parameters which you check or uncheck, as required. In this way, internet users can **very quickly target the product** which meets their needs. This helps save precious time for visitors in a hurry.



The whole site is multilingual, available in French, English, Spanish, Italian and German. And each subsidiary has its own website which is consistent with the Group site.

CHAUVIN ARNOUX, A CERTIFIED TRAINING ORGANIZATION SINCE 1993

The Chauvin Arnoux Group proposes six one-day training modules. Whether you need theoretical training or practical experience based around a product, choose the market leader to train you and your staff.

New in 2016: a training course dedicated to energy auditing so that you perform the right measurements.

ENERGY AUDITS: OPT FOR THE RIGHT MEASUREMENTS

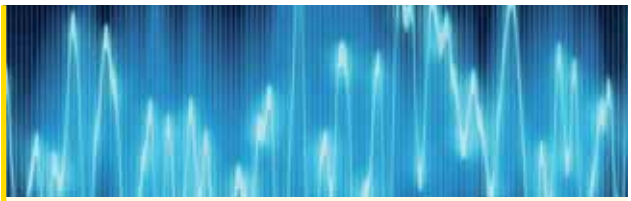
- The advantages of energy auditing
- Economical, environmental and regulatory constraints
- People authorized to perform an energy audit
- Towards a continuous improvement process: the ISO 50001 standard
- Choosing the right measuring tool
- Defining the potential sources of energy savings and the related measurements
- Implementing appropriate solutions

UNDERSTANDING AND OVERCOMING HARMONICS

- The basics of harmonic phenomena.
- Identifying and characterizing the sources of disturbances.
- Measuring and detecting the phenomena in experimental conditions using a harmonic analyser.
- The applicable standards and labels.
- Understanding the effect of harmonics on the electrical components using real cases.
- How to deal with harmonic disturbances.

ELECTRICAL INSTALLATIONS AND ENERGY QUALITY

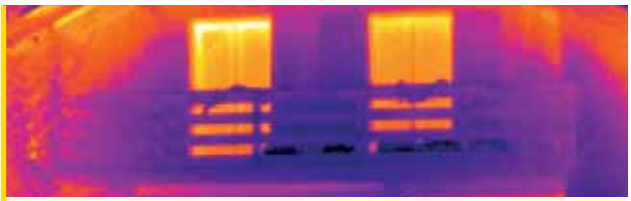
- Excessive consumption of reactive energy leading to penalty payments.
- Loss of service continuity at the first fault on an IT system.
- Untimely tripping of the circuit-breakers protecting industrial electrical equipment.
- Untimely tripping of RCDs.
- Random fault on an electricity distribution system.



ELECTRICAL INSTALLATIONS AND NF C 15-100

- Properties and objectives of the earth/ground connection systems
- Behaviour of the earth/ground connection systems with regard to harmonics
- Insulation resistance measurement
- Electrical continuity measurements on protective conductors
- Resistance measurements on earth/ground electrodes
- Residual Current Device (RCD) testing

CERTIFICATION NUMBER 11.92.06217.92



THERMOGRAPHY

- Understanding heat exchange phenomena.
- Measuring with an infrared thermographic camera.
- Interpreting the measurements.
- Overview of all the applications of thermography and the current obligations.

C.A 8336 NETWORK ANALYSER

- Setup and connections
- Presentation of the various measurements and functions: waveforms, harmonics, transients, alarms, etc.
- Recording and measurement campaigns
- Analysis of the measurement results
- Simulation exercise with the instrument on an electrical model

Training provided on the Chauvin Arnoux Group's historic site in the 18th Arrondissement of Paris

- Expert training instructors acknowledged in their fields
- Innovative demonstration equipment to understand and operate
- Limited number of participants for high-quality discussions

Detailed training schedule and registration form available from **www.chauvin-arnoux.com** or by sending a simple request to **formation@chauvin-arnoux.com**

TRAINING IS AN ESSENTIAL ADVANTAGE IN ANYONE'S CAREER.

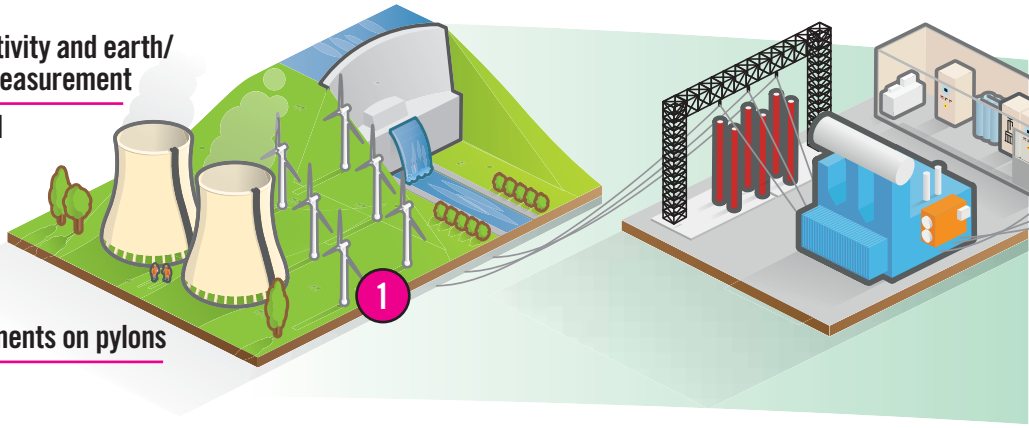
- Favouring skills development
- Gaining access to the different levels of qualification
- Obtaining authorizations

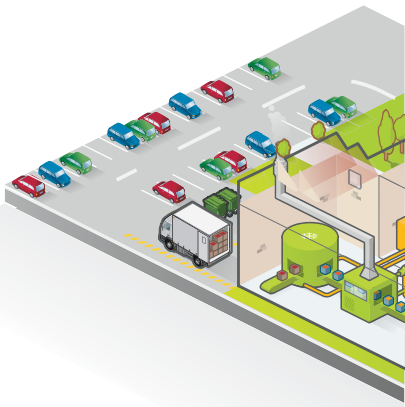
EARTH/GROUND CONNECTION TESTING

1 **Soil resistivity and earth/ ground measurement**
C.A 6470N

2 **Measurements on pylons**
C.A 6474

3 **On MV/HV lines**
C.A 6472



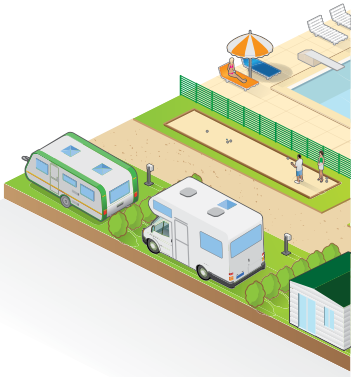


INSTALLATION MAINTENANCE AND TESTING

4 **Separation of installations, voltage absence testing, phase sequence testing**
C.A 773

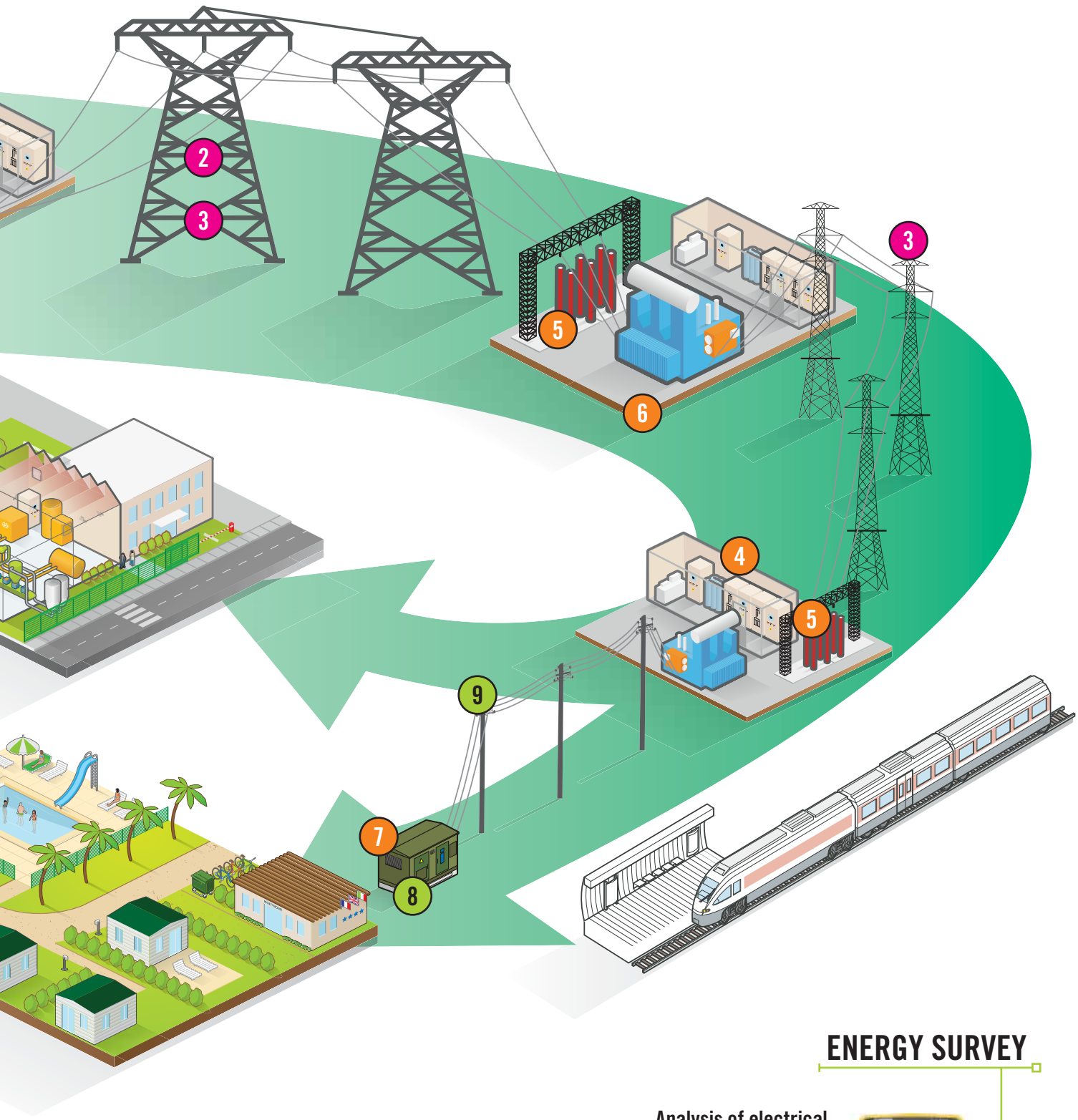
5 **Testing of circuit-breakers and equipotential bonds**
C.A 6240 - C.A 6292

6 **15 kV insulation testing**
C.A 6555



7 **Current measurements**
MA4000D

EARTH/GROUND CONNECTION TESTING



ENERGY SURVEY

Electrical consumption monitoring

PEL105

8

Analysis of electrical network quality (flicker, over- and undercurrent/ voltages/harmonics)

C.A 8336

9

APPLICATIONS

DETECTION OF ELECTRICAL DISTURBANCES

1 **Energy quality analysis**
C.A 8336

2 **Recording of voltage drops and voltage surges**
L261

INDUSTRIAL MAINTENANCE

3 **Testing for electrical or mechanical overheating**
C.A 1886

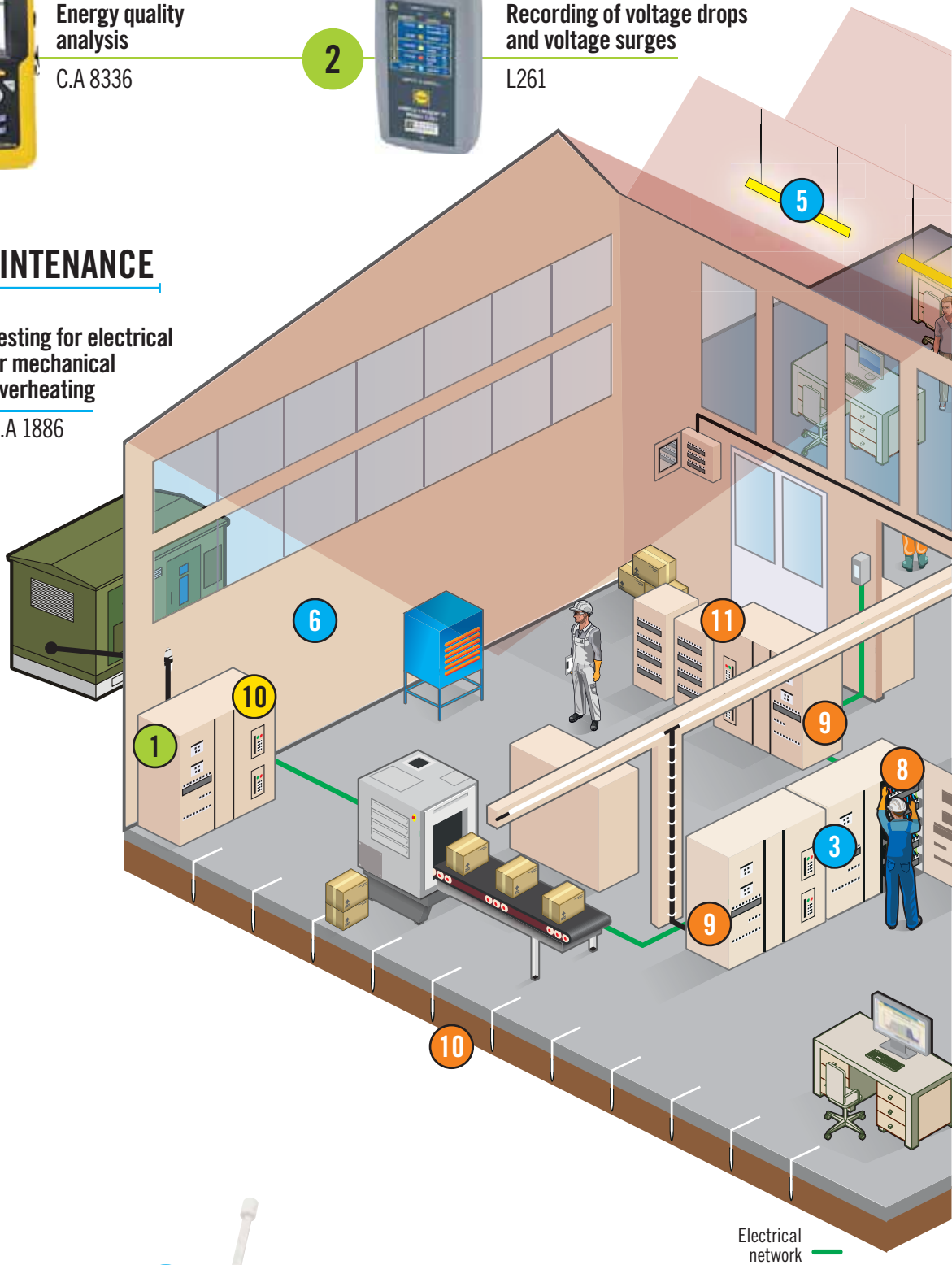
REGULATORY TESTING OF THE WORKING ENVIRONMENT

4 **Noise**
C.A 834

5 **Lighting**
C.A 1110

6 **Humidity**
C.A 1246

7 **Electric fields**
C.A 43



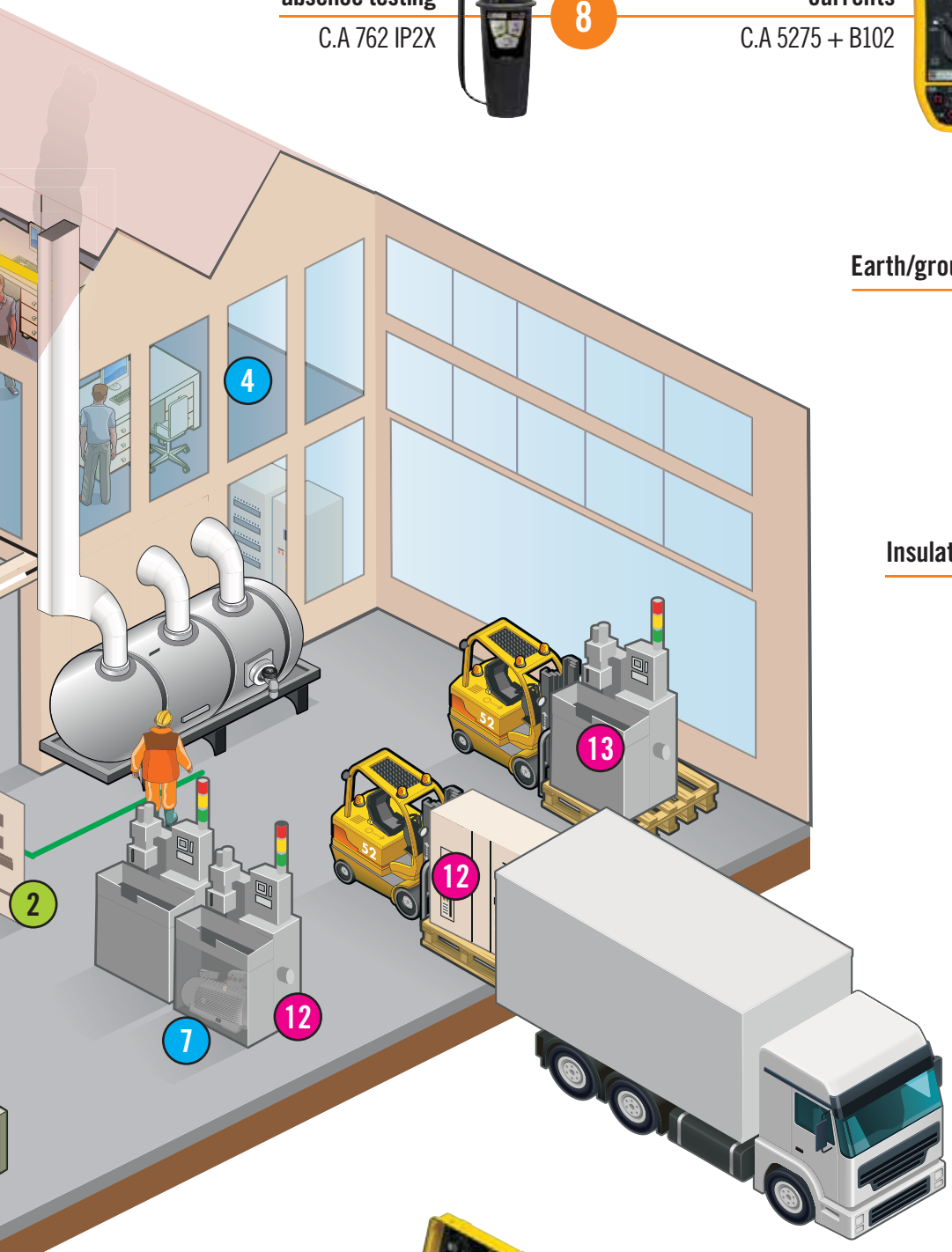
SAFETY OF PEOPLE

Voltage absence testing
C.A 762 IP2X
8

Detection of leakage currents
C.A 5275 + B102
9

Earth/ground testing
C.A 6417
10

Insulation testing
C.A 6524
11



MANUFACTURING QUALITY CONTROL

Industrial machine testing
C.A 6121
13

Electrical cabinet testing
C.A 6155
12

REGULATORY TESTING AS PER IEC 60364-6

1 **Earth/continuity measurement**
C.A 6462

2 **Comprehensive electrical safety testing on installations**
C.A 6116N

ENERGY EFFICIENCY

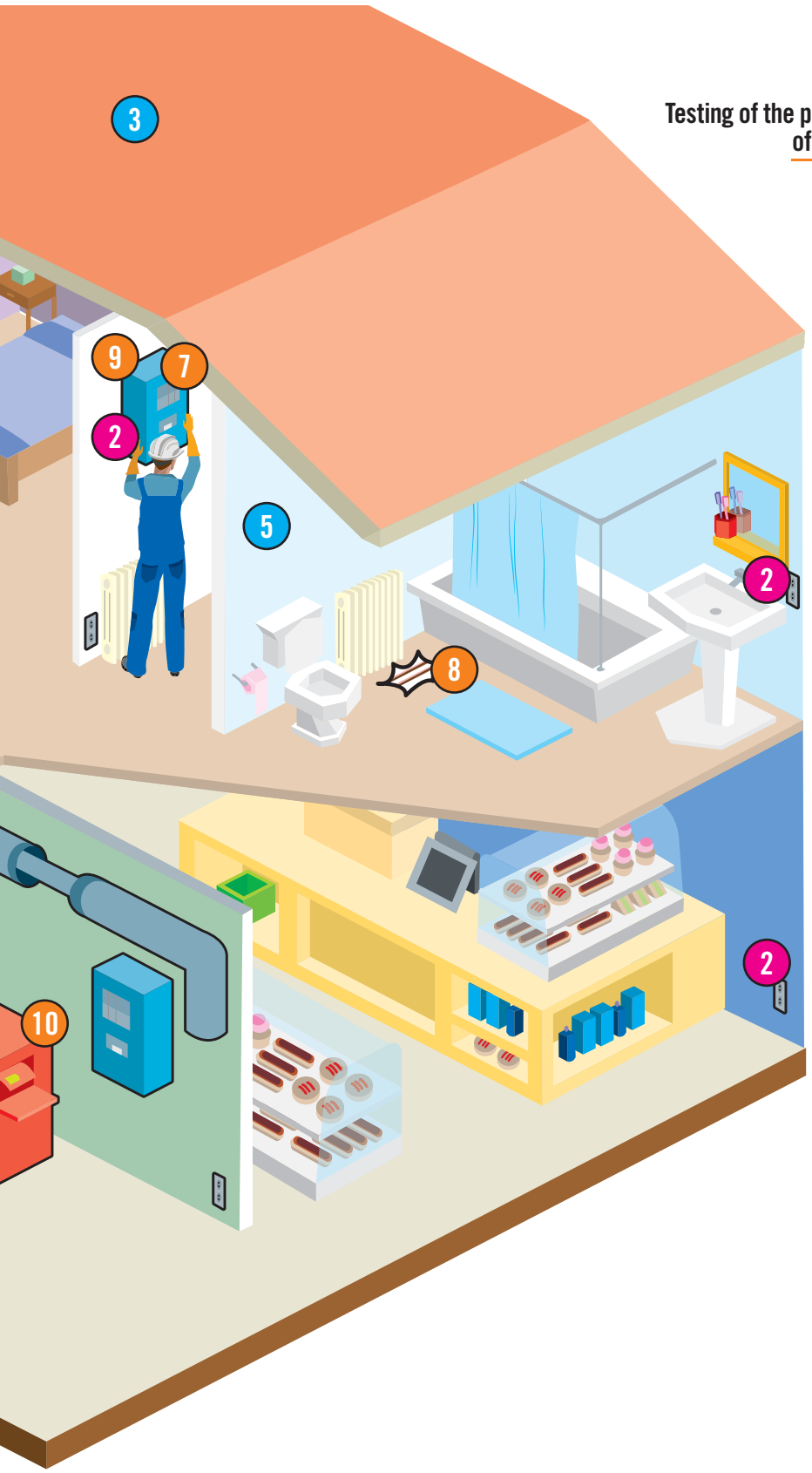
3 **Measurement of insulation, leakproofing and thermal bridges**
C.A 1950

4 **Energy performance of heating, ventilation and air-conditioning**
C.A 1052

5 **CO_2 temperature and humidity testing**
C.A 1510

6 **Recording and analysis of electrical consumption**
PEL103

GENERAL ELECTRICAL RENOVATION WORK



Testing of the power supply and continuity of the electrical connections

C.A 755

7

Detection and location of cables and metal conductors

C.A 6681

8

Verification of voltages, currents and electrical continuity

F201

9

Ionization current measurement on gas boiler

C.A 5277

10


8008
105

UNIVERSAL TEST & MEASUREMENT

THE STANDARDS

EN 60529

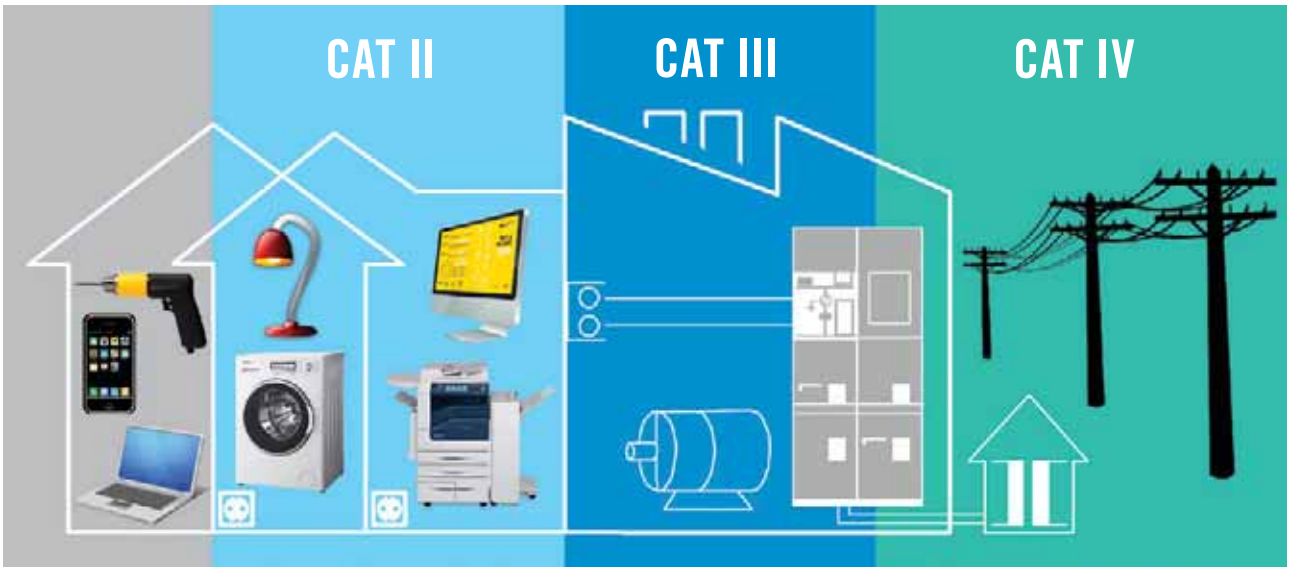
The EN 60529 standard defines the level of tightness(leakproofing) of an instrument against penetration by solids or water. The IP rating corresponds to the instrument's level of protection against penetration by solids (1st digit) and by water (2nd digit). The higher the rating, the more effective the protection. A product without protection corresponds to a rating of IP00 (minimum rating), whereas a product totally protected against penetration by solids and liquids would have a rating of IP68 (maximum rating).

IEC 61010

This international standard defines the safety rules for electrical measuring, control and laboratory instruments. It helps to **ensure** that the design and construction of the instruments **protect users and their environment** against: electric shocks, burns, mechanical hazards, the spread of fire from these instruments, excessive temperatures, etc.

For some types of instrument, this standard is completed by specific instructions.

The development of industrial and domestic equipment is increasing the hazards which may be encountered on an electrical installation, notably in terms of ever-higher voltage surges. On LV installations, where the voltages are limited to 1,000 VAC and 1,500 VDC, **the hazard levels depend the type of installation and the voltage level.**



CAT II : **Measurements on circuits connected directly to the low-voltage installation.**

Examples: domestic distribution system, portable or domestic appliances and equipment, mains power sockets.

CAT III : **Measurements on the building's installation.**

Examples: fixed installations involved in industrial distribution and the input circuits for electrical maintenance of a building (lighting, lift, etc.).

CAT IV : **Measurements at the source of the low-voltage installation.**

Examples: direct distribution circuit, primary sources, overhead-line and cable systems, including distribution busbars and the associated protective equipment against voltage surges.

The international standards in the IEC 61010 family concern the safety rules for electrical measuring, control and laboratory instruments and their uses. More specifically, **the IEC 61010-031 standard** and its amendment A1 which define the safety rules **for measuring instruments** and accessories used with them. In the new edition which came into force on 1st March 2011, this standard has been completed with Chapter 13 covering "prevention of hazards linked to short-circuits and electric arcs":

This addition stipulates the following rules for work on CAT III and CAT IV installations:

- The conductive part of test probes must not exceed 4 mm in length
- The external surfaces of the jaws of crocodile clips must be non-conductive and the conductive parts must not be accessible when the clip is closed.

The IEC 61010-2-033 standard, first published on 09/02/2013, has brought changes concerning multimeters, multimeter clamps, etc.

Since 9th March 2015, these instruments have had to guarantee a minimum safety level corresponding at least to CAT III 300 V.

IEC 61557

This international standard specifies the electrical safety characteristics in 1,000 VAC and 1,500 VDC low-voltage distribution networks. It defines all the requirements for combined performance measurement and monitoring devices which measure and supervise the electrical parameters in electrical distribution networks. These requirements also define the performance levels in single and three-phase AC or DC networks with rated voltages less than or equal to 1,000 V AC or 1,500 V DC.

The parts of the IEC 61557 standard applicable to our areas of test and measurement include:

Part 1 : IEC 61557-1 : General

Part 2 : IEC 61557-2 : Insulation resistance

Part 3 : IEC 61557-3 : Loop impedance

Part 4 : IEC 61557-4 : Resistance of earth conductors and equipotential bonding

Part 5 : IEC 61557-5 : Resistance to earth

Part 6 : IEC 61557-6 : Effectiveness of residual current devices (RCDs) in TT, TN and IT networks

Part 7 : IEC 61557-7 : Phase sequence

NF C 15-100

This is the **official French safety standard concerning the protection of low voltage electrical installations**, the protection of people and the ease of managing, operating and upgrading the installation. **Installations in housing** (house or apartment) **must comply with this standard**.

In particular, NF C 15-100 defines the protective systems, RCD circuit-breakers, wiring, number and type of lighting points and number of power outlets in each type of room (bathroom, kitchen...), etc.

TECHNICAL REMINDERS

NUMBER OF COUNTS (FOR MEASUREMENT)

This is one of the fundamental specifications of instruments using analogue-digital conversion. It is usually used to define **the measurement range and the resolution**, on the basis of the value chosen as the rated calibre.

MEASUREMENT RANGE

This indicates the limits within which a digital instrument maintains its specified characteristics. The measurements obtained are not subject to an error greater than the maximum tolerated error.
It is defined by a minimum measurable value and a maximum measurable value.

RATED CALIBRE

The calibre of an instrument is the **value of the quantity to be measured** which corresponds to the upper limit of the measurement range. For example, for an ammeter, if this upper limit is 5 A, its calibre is said to be 5 A.

RESOLUTION

This is the smallest measurable value difference. It is also the **value of one measurement count** or unit of quantification which is usually termed the "unit".

MINIMUM MEASURABLE VALUE (OR THRESHOLD)

This is the **smallest measurable value**. For an instrument with excellent conversion linearity, it may be the same as the resolution.
This is not always the case and the manufacturer should indicate it clearly, because **this minimum value also depends on the accuracy**, and particularly on the constant error.
When the constant error is too high, it becomes impossible to obtain valid measurements of very low values.

RMS: ROOT MEAN SQUARE

The term RMS (Root Mean Square) refers to the effective value. By definition, the effective value of any current is **the value of the DC current which would produce the same heating when flowing through a resistor.**

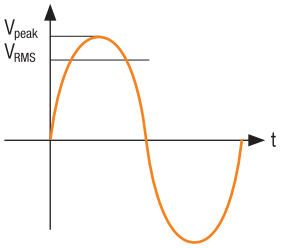
$$V_{RMS}=\sqrt{\frac{1}{T}\int_{o}^{T}v(t)^2}$$

In the specific case of a sinusoidal quantity, application of the relation above gives:

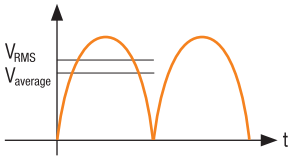
$$V = V_{peak}\cos\omega t$$

$$V_{RMS}=\sqrt{\frac{1}{T}\int V_{peak}^2\ \cos(\omega t)^2.dt} = \frac{V_{peak}}{\sqrt{2}}$$

The amplitude (Vc) of a voltage or of a sinusoidal current is equal to $\sqrt{2}$ times its RMS value ($Vc = \sqrt{2}\ V_{RMS}$).
It is crucial to know this RMS value in industrial environments; it is this value which is used to define a current.



Thus, for a 230 V/50 Hz network:
$V_{RMS} = 230$ V
$V_{peak} = 325$ V
$V_{average} = 207$ V



For a sinusoidal AC voltage
$V_{peak} = V_{RMS} \times \sqrt{2}$
$V_{average} = 0.9\ V_{RMS}$

An "average value" measuring instrument measures the average value of a sinusoidal current, after rectification and filtering, and displays the RMS value after applying a coefficient of 1/0.9 = 1.111
This indirect measurement method is simple and accurate but only valid for an undistorted sinusoidal current. It only tolerates distortion of a few percent.
This is why **"RMS" measuring instruments are increasingly widely used**. They rely on direct measurement principles: the thermal method (used mainly in metrology) and analogue or digital calculation methods requiring sophisticated electronic components.

PEAK VALUE – CREST FACTOR

The crest factor is expressed as follows $CF = V_{peak} / V_{RMS}$
This information complements the RMS value, allowing you to assess the distortion of a signal in qualitative terms.
For a sinusoidal signal, $CF = \sqrt{2} = 1.414$

ADVICE

When we speak of a 230 V network voltage, we are referring to an RMS value. For many years, the level of distortion caused by linear loads (incandescent lamps, heating) connected to the network was very low. The spread of non-linear loads (switching power supplies, light dimmers, variable speed-drives or compact fluorescent lamps) is calling this approach into question, as "pure" sinusoidal currents are becoming increasingly rare on the network.

Conventional measuring instruments (calculating the RMS value from the average value) are only accurate with sinusoidal currents, as a matter of principle. Otherwise, the measurement error may be as high as 50 %!

You are advised to opt for "RMS" measuring instruments which are capable of providing correct measurements, whatever the waveform of the current or voltage.

SAFETY RULES AND GOOD PRACTICES

- Use measuring instruments and accessories which are suitable for the application and the measuring conditions.

Prefer CAT IV instruments:

- They can withstand voltage surges which are up to 50 % greater than a CAT III product
- CAT IV 1000 V provides protection against electric shocks up to 12,000 V, while CAT IV 600 V instruments protect up to 8,000 V.
- Using a lower-category instrument means checking that the installation is equipped with protective systems (disconnecting switch, circuit-breaker, etc.) which are functional and in good condition. This is often the case… but not always!
- **For outdoor or temporary installations or for installations upstream of the protective systems, CAT IV instruments must be used.**

- It is the weakest element which defines your level of protection. If you use accessories of a lower category or with a lower voltage than your measuring instrument, the global level of safety offered by your measuring system will be reduced.
- Use accessories in perfect condition. Any accessory which is faulty, however slightly, must be replaced immediately as it can no longer guarantee your safety.
- The fuses are protective elements. If you replace them with cheaper models or, even worse, with a metal element (copper wire, aluminium foil, etc.), you will no longer be protected against possible voltage surges on your installation.

CHOOSE YOUR TESTER

	C.A 732 page 25	C.A 745 N page 26	C.A 755 page 27	C.A 757 page 27
Strengths	Built-in torch Moulded body for exceptional handling	Phase test with a single test probe Continuity and resistance test	Casing with built-in compartment for stowing the test probes Measurements up to 1,000 V	MiniFlex® measurement accessory supplied Measurements up to 1,000 V
Display	Leds	LCD bargraph	Backlit digital display	Backlit digital display
Single-pole phase detection		■		
No-contact phase detection	■		■	■
AC or DC voltage		■	■	■
Audible continuity		■	■	■
Resistance		■	■	■
Diode			■	■
Capacitance			■	■
Current				■
Removable test probes		■	■	■
600V CAT III		■	■	■
1000V CAT III	■			

C.A 732

Réf. : P01191745Z

1000 V
CAT III

STRENGTHS

- No-contact phase detection
- Built-in torch
- Moulded body for exceptional handling

SPECIFICATIONS

	C.A 732
Detection threshold	195 V_{AC} ≤ U ≤ 265 V_{AC}
Audible beep	U > 230 V
Operating frequency	50/60 Hz
Standards	IEC 61010 1000 V CAT III
Power supply	2 x 1.5 V LR03 batteries
Dimensions / weight	176 x 26 mm / 48 g

CONTENTS

- C.A 732 delivered in blister pack with 2 x 1.5 V LR03 batteries

ACCESSORIES / REPLACEMENT PARTS

- 1,5 V LR03 battery — P01296032
- See all the accessories on page 46

C.A 745 N

Ref. : P01191743Z

600 V CAT III

IP 54

STRENGTHS

- No risk of tripping high-sensitivity RCDs during phase/earth testing

SPECIFICATIONS

	C.A 745 N
Voltage test	12 V to 690 V ~ (7 segments)
Beep	U > 50 V~
Impedance	400 kΩ
Phase/neutral identification	Flashing “Ph” diode and intermittent beep for U > 100 V~
Operating frequency	DC and 50/60 Hz
Polarity test	“+” and “-”
Voltage protection	up to 1,100 V
Audible continuity test	R < 2 kΩ
Resistance test	2 kΩ to 300 kΩ (3 segments)
Standards	IEC 61010 600 V CAT III
Power supply	2 x 1.5 V LR03 batteries
Dimensions / weight	180 x 52 x 45 mm / 200 g

CONTENTS

- C.A 745 N delivered in blister pack with 2 x 1.5 V LR03 batteries and 2 removable test probes (red/black)

ACCESSORIES / REPLACEMENT PARTS

- 1.5 V LR03 battery — P01296032
- Set of red/black CAT III/IV test probes — P01102152Z
- See all the accessories on page 46

C.A 755 - C.A 757

Ref. : P01191755 P01191757

600 V CAT III

IP 54

STRENGTHS

- Measurements up to 1,000 V
- Backlit digital display
- Built-in compartment for stowing test probes in casing
- C.A 757: MiniFlex® measurement accessory supplied

SPECIFICATIONS

	C.A 755	C.A 757
Current		
Measurement range via current sensor		500 mA to 300 A (2 calibres)
Resolution		0.01 A to 0.1 A
DC voltage		
Measurement range	3 mV to 1,000 V – 4 calibres	
Resolution	1 mV to 1 V	
AC voltage		
Measurement range	100 mV to 1,000 V – 4 calibres	
Resolution	1 mV to 1 V	
Operating frequency	DC and 50/60 Hz	
Impedance	10 MΩ	
No-contact voltage detection	230 V 50/60 Hz conductor at a distance of approx. 5 cm	
Audible continuity test	R ≤ 30 Ω	
Resistance		
Measurement range	0.3 Ω to 30 MΩ – 6 calibres	
Resolution	0.1 Ω to 0.01 MΩ	
Capacitance		
Measurement range	400 pF to 30 mF	
Resolution	0.001 nF to 0.01 mF	
Standards	600 V CAT III, IEC 61010-1, IEC 61010-031, IEC 61010-032, IEC 61010-033	
Power supply	2 x 1.5 V batteries (LR03)	
Battery life	100 hours with alkaline batteries – Automatic standby after 10 minutes	
Dimensions / weight	180 x 52 x 45 mm / 200 g	

CONTENTS

- C.A 755 delivered with 1 set of extra-fine test probes CAT III/CAT IV (red/black), 2 x 1.5 V LR3 alkaline batteries
- C.A 757 delivered with 1 set of extra-fine test probes CAT III/CAT IV (red/black), 2 x 1.5 V LR3 alkaline batteries, 1 MiniFlex® sensor with a loop length of 250 mm, a connection cable 1 m long and a specific connector for C.A 757, 1 Velcro strap

ACCESSORIES / REPLACEMENT PARTS

- 1 set of black/red CAT III/IV test probes — P01102152Z
- 1.5 V LR03 alkaline battery (x 1) — P01296032
- See all the accessories on page 46

CHOOSE YOUR VOLTAGE DETECTOR/VOLTAGE ABSENCE TESTER (VAT)

	C.A 742 / IP2X page 29		C.A 762 / IP2X page 29		C.A 771 / IP2X page 30		C.A 773 / IP2X page 30	
600V CAT IV	■		■					
1000V CAT IV					■		■	
IP2X Version		■		■		■		■
Single-pole phase detection	■		■		■		■	
AC or DC voltage test	■		■		■		■	
Stray voltage detection					■		■	
RCD tripping					■		■	
Audible continuity	■		■		■		■	
Extended continuity / Resistance			■		■		■	
2-wire phase rotation			■		■		■	
Removable test probe	■		■		■		■	
Compliant with IEC 61243-3	■		■		■		■	
Integrated Autotest	■		■		■		■	
LED display	■		■		■		■	
Digital display							■	
Extended climatic class					■			
IP65	■		■		■		■	

C.A 742 - C.A 742 IP2X

Ref. : P01191742Z P01191742D

C.A 762 - C.A 762 IP2X

Ref. : P01191762Z P01191762D

600 V CAT IV | IP 65 | IEC 61243-3 | NF C 18-510

STRENGTHS

- Full integrated Autotest
- Voltage test up to 690 Vac (16 2/3 – 800 Hz) / 750 Vdc
- IP2X versions available, compliant with NF C 18-510
- Removable test probe and lead
- Phase-sequence testing up to 400 Hz

SPECIFICATIONS

	C.A 742	C.A 762
Voltage detector		
Voltage	12 V_{AC} ≤ U ≤ 690 V_{AC} 12 V_{DC} ≤ U ≤ 750 V_{DC}	
Frequency	DC, 16 2/3 to 800 Hz	
Impedance	> 300 kΩ	> 400 kΩ
Max. current	3.5 mA_{RMS}	
Indication of polarity	Yes	
Hazardous voltage indication	The red ELV (Extra Low Voltage) LED indicates when the voltage is higher than the SELV (Safety Extra Low Voltage); the higher the voltage, the faster it flashes.	
Phase / Neutral identification	Above 120 V (45 - 65 Hz) Above 400 V (16 2/3 - 45 Hz)	
Continuity with buzzer		
Trigger threshold	100 Ω typical (150 Ω max.)	
Extended continuity test	-	2 kΩ, 60 kΩ, 300 kΩ
Test current	≤ 1 mA	
Open-circuit voltage	≤ 3.3 V	
Protection	Up to 1000 V	
Phase rotation	No	2-wire method
Ph/Ph voltage	-	50 V ≤ U ≤ 690 V_{AC}
Frequency	-	Between 45 and 400 Hz
Buzzer	Intermittent beep for voltage detection and continuous beep for continuity	
Standards and electrical safety	IEC 61010 600 V CAT IV IEC 61243-3 Ed.2 concerning Voltage Detectors/Voltage Absence Testers (VATs) IEC 61326-1, emission and immunity in industrial environments	
Protection of enclosure	Casing: IP65 Test probes (option): IP2X	
Climatic conditions	Use from -15 °C to +45 °C / 20 to 95 % RH	
Power supply	2 x 1.5 V batteries (AAA and LR03)	
Battery life	7,500 x 10 s measurements	7,000 x 10 s measurements
Dimensions / weight	163 x 64 x 40 mm / 210 g	

* Typical value with standard protective equipment (PPE)

ADDITIONAL INFO

- Don't forget the adapter for 2P+E sockets
  C.A 751 ____ P01101997Z

CONTENTS

- 1 voltage detector delivered with:
- 1 black Ø 2 mm test-probe lead with crystal safety cap
- 1 red Ø 2 mm test-probe lead with crystal safety cap
- 1 wrist-strap
- 2 x 1.5 V LR03 batteries

- The IP2X version is delivered with:
- 2 x IP2X Ø 4 mm test probes (red/black)
- 1 black cable 1.10 m long equipped with a probe-holder system
- 1 wrist strap
- 2 x 1.5 V LR03 batteries

ACCESSORIES / REPLACEMENT PARTS

- Red Ø 2 mm test probe ____ P01102008Z
- Crystal safety cap for Ø 2 mm test probe (x10) ____ P01102033
- See all the accessories on page 46

VOLTAGE DETECTORS / VOLTAGE ABSENCE TESTERS (VATS)

C.A 771 - C.A 771 IP2X

Ref. : P01191771 P01191771A

C.A 773 - C.A 773 IP2X

Ref. : P01191773 P01191773A

1000 V CAT IV | IP 65 | IEC 61243-3 | NF C 18-510

STRENGTHS

- Full Autotest with indication of the type of fault
- Lighting of the point of measurement
- Automatic standby
- Extended climatic class
- IP2X version available, compliant with NF C 18-510

SPECIFICATIONS

	C.A 771	C.A 773
Display	LEDs	LEDs + Backlit digital display
Voltage detection		
Voltage	12 V_{AC} ≤ U ≤ 1000 V_{AC} 12 V_{DC} ≤ U ≤ 1400 V_{DC}	
Frequency	DC, 16 2/3 to 800 Hz	
Impedance	> 500 kΩ	
Max. current	3.5 mA RMS	
Polarity indication	Yes	
Stray voltage detection	Yes (by low-impedance load switching)	
RCD tripping	Yes (by low-impedance load switching) Approx. 30 mA to 230 V	
Redundant hazardous voltage indication	The ELV (Extra Low Voltage) LED indicates a voltage higher than the SELV (Safety Extra Low Voltage) with the flashing rate proportional to the voltage	
Phase / Neutral identification	Above 50 V (45 - 65 Hz) Above 150 V (16 2/3 - 45 Hz)	
Continuity & Resistance		
Buzzer trigger threshold	100 Ω typical (150 Ω max.)	100 Ω typical (150 Ω max.)
Extended continuity test (Resistance)	2kΩ, 60 kΩ, 300 kΩ	0,5 Ω to 2,999 kΩ
Test current / Open-circuit voltage	≤ 1 mA / ≤ 3.3 V	
Phase rotation	2-wire method	
Ph/Ph voltage	50 V ≤ U ≤ 1000 V_{AC} (45 - 400 Hz)	
Buzzer	Intermittent beep for voltage detection / Continuous beep for continuity	
Standards and electrical safety	IEC 61243-3:2009, EN 61243-3:2010 IEC 61010 1000 V CAT IV	
Enclosure protection	IP65	
Climatic conditions	-30 °C to +60 °C (Extended "class S")	-15 °C to +45 °C ("class N")
Battery life	> 5,000 x 10 s measurements	> 2,500 x 10 s measurements
Dimensions / weight	228 x 60 x 39 mm (without test probe) / 350 g approx.	

ADDITIONAL INFO

- Don't forget the universal measurement adapter for testing your 2P+E power sockets
  C.A 753 ____ P01191748Z

CONTENTS

- 1 voltage detector delivered with:
- 1 set of red/black Ø 2 mm removable test probes with crystal safety cap
- 1 test-probe protector
- 1 Velcro strap
- 2 x 1.5 V LR03 batteries

- The IP2X version is delivered with:
- 1 set of red/black IP2X Ø 4 mm removable test probes with crystal safety cap
- 1 Velcro strap
- 2 x 1.5 V LR03 batteries

ACCESSORIES / REPLACEMENT PARTS

- C.A 753 measurement adapter for 2P+E sockets ____ P01191748Z
- Shoulder bag ____ P01298076
- See all the accessories on page 46

CHOOSE YOUR ANALOGUE MULTIMETER

	C.A 5001 page 32	C.A 5003 page 32	C.A 5005 page 32	C.A 5011 page 33
Analogue	■	■	■	■
Digital				■
Anti-parallax mirror	■	■	■	
4,000-count display				■
Backlighting				■
TRMS AC + DC measurement method				■
Max				■
Low-impedance calibre (LowZ)	■	■	■	
AC and DC current	■	■	■	■
Current via clamp			■	
µA calibre	■	■	■	
5 A calibre	■			
10 A calibre			■	■
15 A calibre		■		
Resistance	■	■	■	■
Audible beep	■	■	■	■
Frequency				■
dB	■	■	■	■
Fuse check LED	■	■	■	■
Voltage presence LED in ohmmeter mode				■

C.A 5001 - C.A 5003 - C.A 5005

Ref. : P01196521E P01196522E P01196523E

600 V CAT III

IP 53

STRENGTHS

- "Fus" LED: HRC fuse check
- "Voltest™" LED: voltage presence in ohmmeter* mode
- Automatic tare in ohmmeter mode*
- µA calibres
- Compact, shockproof casing with multi-purpose "Multistand™" articulated stand

* for C.A 5003 and C.A 5005

SPECIFICATIONS

	C.A 5001	C.A 5003(1)	C.A 5005(1)
DC voltage	8 calibres : 100 mV / … / 1000 V(2)		
AC voltage	5 calibres : 10 V / … / 1000 V(2)		
Internal resistance	20 kΩ/V		
Operating frequency	10 Hz … 100 kHz depending on calibre		
DC current	5 cal. : 50 µA / … / 5 A	7 cal. : 50 µA / … / 15 A	6 cal. : 50 µA / … / 10 A
AC current	4 cal. : 5 mA / … / 5 A	5 cal. : 1.5 mA / … / 15 A	5 cal. : 3 A / … / 300 A(3)
Resistance	2 cal. : 10 kΩ and 1 MΩ		
Audible continuity test	R < 50 Ω		
Scale in dB for VAC	0 … +22 dB		
Typical accuracy(4)	1.5 % for VDC • 2.5 % for VAC and AAC & • 10 % for Ω		
Power supply	1 x 1.5 V LR06 battery	1 x 9 V 6LR61 battery	
Battery life	10,000 x 15 s measurements	10,000 x 10 s measurements	
Electrical safety(5)	IEC 61010-1 Edition 2 600 V CAT III		
Protection(6)	HRC fuses 0.5 A and 5 A	HRC fuses 1.6 A and 16 A	HRC fuses 1 A and 10 A
Ingress protection	IP 40	IP 53	
Climatic conditions	–10 °C … +55 °C and HR < 90 %		
Dimensions / weight	160 x 105 x 56 mm / 500 g		

(1) Additional "Voltest™" function to check for the possible presence of a voltage during resistance measurement and audible continuity test - (2) Use limited to 600 V max. (3) Limited to 240 A max. by the MN 89 miniclamp - (4) In % of end-of-scale - (5) Degree of pollution 2 - (6) Electronic protection and HRC fuses for the current calibres with fuse test LED.

ADDITIONAL INFO

- Also delivered complete in a hard case:

C.A 5001 case ____ P01196521F
C.A 5003 case ____ P01196522F
C.A 5005 case ____ P01196523F

- The C.A 5005 is delivered with a current clamp for measurements up to 200 AAC

CONTENTS

- C.A 5001 delivered with 1 set of silicone straight banana plug/elbowed banana plug leads, 1 set of safety test probes, 1 x 1.5 V LR6 battery
- C.A 5003 delivered with 1 set of silicone straight banana plug/elbowed banana plug leads, 1 set of safety test probes, 1 x 9 V 6LR61 battery
- C.A 5005 delivered with 1 MN89 AC clamp, 1 set of silicone straight banana plug/elbowed banana plug leads, 1 set of safety test probes, 1 x 9 V 6LR61 battery

ACCESSORIES / REPLACEMENT PARTS

- Accessories kit for electricians ____ P01295459Z
- CMI214S current measurement lead ____ P03295509
- See all the accessories on page 46

C.A 5011

Ref. : P01196311E

600 V CAT IV | IP 53 | TRMS

STRENGTHS

- Extra safety with 2 LEDs: “Fus”: HRC fuse test, “Voltest™”: voltage presence in ohmmeter mode
- Two complementary readings: digital for accuracy, with backlighting, and analogue for quick reading
- Automatic AC/DC recognition
- Compact, shockproof casing with multi-purpose Multistand™ articulated stand

SPECIFICATIONS

	C.A 5011
DC and AC voltage	2 x 5 calibres 400 mV / … / 1000 V(1)
Impedance	10 MΩ
Operating frequency (2)	20 Hz / … / 10 kHz
DC and AC current	2 x 6 calibres : 400 µA / … / 10 A
Resistance (3)	6 calibres : 400 Ω / … / 40 MΩ
Audible continuity test (3)	R < 400 Ω
Frequency	3 calibres : 4 kHz / … / 400 kHz
Scale in dB for VAC	-20 dB … +16 dB
Max. value	Sur 500 ms
Typical accuracy (4)	1% for VDC and Ω, 1.5 % for ADC
Power supply	1 x 9 V 6LR61 battery
Battery life	300 hours
Electrical safety (5)	IEC 61010-1 Edition 2 600 V Cat IV
Protection (6)	1 A and 10 A HRC fuses
Ingress protection	IP 53
Climatic conditions	-10 °C … +55 °C and RH < 90 %
Dimensions / weight	160 x 105 x 56 mm / 500 g

(1) Use limited to 600 V max. (2) Crest factor ≤ 5 – (3) Additional Voltest™ function to check for the possible presence of a voltage - (4) In digital mode. In analogue mode: 2.5 % – (5) Degree of pollution 2 – (6) Electronic protection and HRC fuses for the current calibres with fuse test LED.

ADDITIONAL INFO

- Also available delivered complete in hard case:
  C.A 5011 case ____ P01196311F

CONTENTS

- 1 C.A 5011 multimeter
- 1 set of silicone straight banana plug/elbowed banana plug leads
- 1 set of safety test probes
- 1 x 9 V 6LR61 battery

ACCESSORIES / REPLACEMENT PARTS

- Accessories kit for electricians ____ P01295459Z
- PVC test-probe lead with insulated elbowed male plug Ø 4 mm (x 2) ____ P01295456Z
- See all the accessories on page 46

CHOOSE YOUR DIGITAL MULTIMETER

	C.A 702 page 36	C.A 703 page 36	C.A 5231 page 37	C.A 5233 page 37
2,000-count display	■	■		
6,000-count display			■	■
Bargraph			■	■
Bi-mode bargraph (full scale - central zero)				
Backlighting			■	■
AVG measurement method	■	■		
TRMS AC/DC measurement method			■	■
TRMS AC+DC measurement method				
Autoranging	■	■	■	■
Max.				■
Peak				
AC and DC voltage up to 600 V	■	■		
AC and DC voltage up to 1,000 V			■	■
No-contact voltage detection	■	■	■	■
Low-impedance calibre (LowZ)			■	■
LowZ voltage with low-pass filter				
AC and DC current		■		■
Current via clamp			■	
µA calibre		■		
10 A calibre				■
Resistance	■	■	■	■
Audible continuity	■	■	■	■
Semi-conductor test	■	■	■	■
Frequency				■
Capacitance				■
Temperature				■
CAT III 1000 V	■	■	■	
CAT IV 600 V	■	■	■	■

CHOOSE YOUR DIGITAL MULTIMETER




C.A 5271 page 38	C.A 5273 page 38	C.A 5275 page 39	C.A 5277 page 39	
				2,000-count display
■	■	■	■	6,000-count display
■	■	■	■	Bargraph
	■	■	■	Bi-mode bargraph (full scale - central zero)
	■	■	■	Backlighting
				AVG measurement method
■	■	■	■	TRMS AC/DC measurement method
		■	■	TRMS AC+DC measurement method
■	■	■	■	Autoranging
	■	■	■	Max.
			■	Peak
				AC and DC voltage up to 600 V
■	■	■	■	AC and DC voltage up to 1,000 V
				No-contact voltage detection
■	■	■	■	Low-impedance calibre (LowZ)
■	■	■	■	LowZ voltage with low-pass filter
■	■	■	■	AC and DC current
				Current via clamp
		■	■	µA calibre
■	■	■	■	10 A calibre
■	■	■	■	Resistance
■	■	■	■	Audible continuity
■	■	■	■	Semi-conductor test
	■	■	■	Frequency
	■	■	■	Capacitance
	■		■	Temperature
■	■	■	■	CAT III 1000 V
■	■	■	■	CAT IV 600 V

C.A 702 - C.A 703

Ref. : P01191739Z P01191740Z

600 V CAT IV

IEC 61010-2-033

STRENGTHS

- Pocket format
- Built-in test probes
- Easy to handle and safe
- Built-in torch

SPECIFICATIONS

	C.A 702	C.A 703
Display	2,000 counts	
Calibre selection	Automatic (AUTORANGE)	
V_{DC} / accuracy	200 mV / ± 0.5 % R + 3 D 2.000 V; 20.00 V; 200.0 V; 600 V / ± 1.2 % R + 3 D > 600 V / outside specifications	
V_{AC} / accuracy (40-400 Hz)	2.000 V; 20.00 V / ± 1.0 % R + 8 D 200.0 V; 600 V / ± 2.3 % R + 10 D > 600 V / outside specifications	
No-contact voltage detection	Yes	Yes
I_{DC} / accuracy Protection		200.0 µA; 2,000 µA ± 2.0 % R + 8 D 20.00 mA; 200.0 mA ± 2.0 % R + 8 D 200 mA / 500 V electronic fuse
I_{AC} / accuracy Protection		200.0 µA; 2,000 µA ± 2.5 % R + 10 D 20.00 mA; 200.0 mA ± 2.5 % R + 10 D Protection 200 mA / 500 V Electronic fuse
Resistance • Accuracy • Protection	200.0 Ω / ± 0.8 % R + 5 D • 2.000 kΩ. 20.00 KΩ. 200.0 KΩ / ± 1.2 % R + 5 D 2.000 MΩ / ± 5.0 % R + 5 D 20.00 MΩ / ±10.0 % R + 5 D • 600 V_{RMS}	
Diode test • Test signal • Protection	1.999 V • $V_{Test} \leq 1.5$ V • $I_{Test} \leq 1$ mA • 600 V_{RMS}	
Audible continuity • Buzzer • Protection	199.9 Ω • R < approx. 60 Ω • 600 V_{RMS}	
Torch	Yes	Yes
Standards	IEC 61010 1000 V CAT III / 600 V CAT IV	
Power supply	2 x 1.5 V LR03 batteries	
Miscellaneous	Built-in test-probe leads	
Dimensions / weight	104 x 55 x 32.5 mm / 145 g	

ACCESSORIES / REPLACEMENT PARTS

- 1.5 V LR03 battery — P01296032
- 200 x 100 x 40 mm soft case — P01298065Z
- See all the accessories on page 46

CONTENTS

- C.A 702 and C.A 703 delivered with:
- 2 x 1.5 V LR03 batteries

C.A 5231 - C.A 5233

Ref. : P01196731 P01196733

1000 V CAT III | 600 V CAT IV | IEC 61010-2-033 | IP 54 | TRMS

STRENGTHS

- Compact and ergonomic
- AC/DC voltage up to 1,000 V
- AC/DC current up to 600 A with 1,000/1 current clamp (option)

SPECIFICATIONS

	C.A 5231	C.A 5233
Display	6,000-count display + 61-segment bargraph	
Backlighting	Yes	
Acquisition	True RMS AC	
Autorange / Manual range	Yes / Yes	
Best accuracy	0.02 %	
AC voltage	6 calibres / 1,000 V / resolution: 0.01 mV	
LowZ AC voltage	Yes	
DC voltage	6 calibres / 1,000 V / resolution: 0.01 mV	
AC/DC current	With 1 AC or DC clamp (1 mV/A) as an option 1 calibre: 600 A Resolution: 0.1 A	2 calibres: 10 A / 6 A Resolution: 0.001 A
Resistance measurement	6 calibres / 60 MΩ / resolution: 0.1 Ω	
Audible continuity / Diode test	Yes / Yes	
Frequency Duty cycle		3 calibres: up to 3 kHz Yes
Capacitance		6 calibres / 1,000 µF Resolution: 0.01 nF
Temperature		2 calibres -20 °C to 760 °C -4 °F to 1,400 °F Resolution: 0.1°
No-contact voltage detection (NCV)	Yes	Yes
Display Hold	Yes	Yes
Relative mode		Yes
Min-Max		Yes
Power supply	1 x 9 V 6LR61 battery	
Ingress protection	IP54	
Standards	IEC 61010-1, IEC 61010-2-033 CAT IV 600 V / CAT III 1000 V	IEC 61010-1, IEC 61010-2-033 CAT IV 600 V / CAT III 600 V
Dimensions / weight	155 x 75 x 55 mm / 320 g	

ADDITIONAL INFO

- The C.A 5231 can also be delivered complete with its MINI03 100 Aac current clamp:
  C.A 5231 complete kit ____ P01196734

CONTENTS

- C.A 5231 delivered with:
- 1 set of red/black test-probe leads
- 1 x 9 V 6LR61 battery

- C.A 5233 delivered with:
- 1 set of red/black test-probe leads
- 1 TC-K adapter for DMM
- 1 wire K thermocouple
- 1 x 9 V 6LR61 battery

ACCESSORIES / REPLACEMENT PARTS

- Accessories kit for electricians ____ P01295459Z
- PVC test-probe lead, insulated elbowed male plug Ø 4 mm (x 2) ____ P01295456Z
- See all the accessories on page 46

C.A 5271 - C.A 5273

Ref. : P01196771 P01196773

TRMS | 1000 V CAT III | 600 V CAT IV | IEC 61010-2-033 | IP 54

STRENGTHS

- Large 6,000-count display
- Double backlit display
- Temperature and capacitance measurements
- Bargraph central zero mode
- Min/Max memorization

SPECIFICATIONS

	C.A 5271	C.A 5273
Display	6,000 counts	2 x 6,000 counts, backlit
Bargraph (63 elements)	Yes	Bi-mode (full scale / central zero)
Acquisition	TRMS AC / DC	
Measurement rate	5 measurements / second	
Automatic / manual ranges	Yes / No	Yes / Yes
AC/DC voltage	600.0 mV / 6.000 V / 60.00 V / 600.0 V / 1,000 V	
Typical accuracy (V_{DC})	0.2% + 2 cts	
Bandwidth (V_{AC})	40 Hz to 3 kHz	
LowZ AC voltage	Low-impedance setting with Low-pass Filter	
AC/DC current	6.000 A / 10.00 A (20 A/30 s)	
Resistance measurement	600.0 Ω / 6,000 Ω / 60.00 kΩ / 600.0 kΩ 6.000 MΩ / 60.00 MΩ	
Audible continuity / Diode test	Yes / Yes	
Frequency	No	600.0 Hz / 6.000 kHz / 50.00 kHz
Capacitance	No	8 cal.: 6.000 nF to 60.00 mF
Temperature	No	-59.6 °C to +1,200°C -4°F to +2,192 °F
Hold	Yes	
Min / MAX (100 ms)	No	Yes
Automatic power-off	Yes (deactivatable)	
Safety	IEC 61010-1, IEC 61010-2-033 CAT IV 600 V / CAT III 1000V	
Ingress protection	IP54	
Power supply	1 x 9V 6LR61 battery	
Dimensions / weight	90 x 190 x 45 / 400 g	

ADDITIONAL INFO

- 5 measurements / s
- 12-bit converter
- 3-year warranty

CONTENTS

- C.A 5271 delivered with a set of banana leads, a set of test probes, a 9 V battery, a startup guide and a CD containing the User Manual
- C.A 5273 same as C.A 5271 plus a K-thermocouple temperature sensor

ACCESSORIES / REPLACEMENT PARTS

- Accessories kit for electricians — P01295459Z
- PVC test-probe lead, insulated elbowed male plug Ø 4 mm (x 2) — P01295456Z
- See all the accessories on page 46

C.A 5275 - C.A 5277

Ref. : P01196775 P01196777

TRMS AC+DC | 1000 V CAT III | 600 V CAT IV | IEC 61010 | IP 54

STRENGTHS

- 10 µV resolution
- Current measurement from 1 µA
- Measurement of ionization currents
- Min / Max / Peak+ / Peak- acquisition
- Differential (ΔX) and relative (ΔX / X%) measurements

SPECIFICATIONS

	C.A 5275	C.A 5277
Display	2 x 6,000 counts, backlit	
Bargraph	63 elements, bi-mode (full scale / central zero)	
Acquisition	TRMS AC / DC / AC+DC	
Measurement rate	5 measurements / second	
Automatic / Manual ranges	Yes / Yes	
AC/DC/AC+DC voltage	60.00 mV / 600.0 mV / 6 V / 60.00 V / 600.0 V / 1,000 V	
Typical accuracy (V_{DC})	0.09% + 2 cts	
Bandwidth (V_{AC})	40 Hz to 10 kHz	
LowZ AC voltage	Low-impedance setting with Low-pass Filter	
AC/DC/AC+DC current	6,000 µA / 60.00 mA / 600.0 mA / 6.000 A / 10.00 A (20 A / 30 s)	
Ionization current	0.2 µA to 20.0 μA_{DC}	
Resistance measurement	600.0 Ω / 6,000 Ω / 60.00 kΩ / 600.0 kΩ 6.000 MΩ / 60.00 MΩ	
Audible continuity / Diode test	Yes / Yes	
Frequency	600.0 Hz / 6.000 kHz / 20.00 kHz	
Capacitance	6.000 nF / 60 nF / 600 nF / 6 µF / 60 µF / 600 µF / 6 mF / 60 mF	
Temperature	No	-59.6 °C to +1,200 °C -4°F to 2,192 °F
Hold	Yes	
Min / MAX (100 ms)	Yes	
Peak+ / Peak- (1 ms)	No	Yes
Differential (ΔX) / RELative (ΔX/X%) measurement	No	Yes
Automatic power-off	Yes (deactivatable)	
Safety	IEC 61010-1, IEC 61010-2-033 CAT IV 600 V / CAT III 1000 V	
Ingress protection	IP54	
Power supply	1 x 9 V 6LR61 battery	
Dimensions / weight	90 x 190 x 45 / 400 g	

ADDITIONAL INFO

- 5 measurements / s
- 12-bit converter
- 3-year warranty

CONTENTS

- C.A 5275 delivered with a set of banana plugs, a set of test probes, a 9 V battery, a shoulder bag, a MultiFix mounting accessory and a startup guide
- C.A 5277 same as C.A 5275 plus a K-thermocouple temperature sensor

ACCESSORIES / REPLACEMENT PARTS

- Accessories kit for electricians — P01295459Z
- PVC test-probe lead, insulated elbowed male plug Ø 4 mm (x 2) — P01295456Z
- See all the accessories on page 46

CHOOSE YOUR AMMETER WITH FLEXIBLE CURRENT SENSOR

	MA400D-170 page 41	MA400D-250 page 41	MA4000D-350 page 41
Clamping Ø 45 mm	■		
Clamping Ø 70 mm		■	
Clamping Ø 100 mm			■
AC current	■	■	■
TRMS	■	■	■
4,000-count display	■	■	■
Max. Hold	■	■	■
CAT IV 600 V	■	■	■

AMMETERS WITH FLEXIBLE CURRENT SENSORS

MA400D-170 - MAD400D-250

Ref. : P01120575Z P01120576Z

MA4000D-350

Ref. : P01120577Z

600 V CAT IV **TRMS**

STRENGTHS

- Compact, stand-alone and easy to use
- Direct current readings
- Measurement from just a few tens of mA
- Memorization of maximum value

SPECIFICATIONS

	MA400D-170 / 250		
Display range	4 AAC	40 AAC	400 AAC
Measurement range	0.020 A … 3.999 A	4.00 A … 39.99 A	40.0 A … 399.9 A
Resolution	1 mA	10 mA	100 mA
Accuracy	± (2% + 10 cts)	± (1.5% + 2 cts)	± (1.5% + 2 cts)
Clamping Ø / Sensor length	MA400D-170 : Ø 45 mm / 170 mm MA400D-250 : Ø 70 mm / 250 mm		
Bandwidth	10 Hz … 3 kHz		
Power supply	2 x 1.5 V LR03 batteries		
Safety	IEC 61010 CAT IV 600 V		
Operating temperature	0°C to +50°C		
Instrument weight	130 g approx.		
Casing dimensions	100 x 60 x 20 mm		
Length of built-in connection cable	0.8 m		

	MA4000D-350		
Display range	40 AAC	400 AAC	4,000 AAC
Measurement range	0.01 A … 39.99 A	40.0 A … 399.9 A	400 A … 3,999 A
Resolution	10 mA	100 mA	1 A
Accuracy	± (2% + 10 cts)	± (1.5% + 2 cts)	± (1.5% + 2 cts)
Clamping Ø / Sensor length	MA4000D-350 : Ø 100 mm / 350 mm		
Bandwidth	10 Hz … 3 kHz		
Power supply	2 x 1.5 V LR06 batteries		
Safety	IEC 61010 CAT IV 600 V		
Operating temperature	0°C to +50°C		
Instrument weight	130 g approx.		
Casing dimensions	100 x 60 x 20 mm		
Length of built-in connection cable	0.8 m		

CONTENTS

- 1 ammeter delivered with:
- 2 x 1.5 V LR06 batteries
- 1 Velcro mounting strap

ACCESSORIES / REPLACEMENT PARTS

- Shoulder bag 120 x 200 x 60 — P01298074
- MULTIFIX accessories — P01102100Z
- See all the accessories on page 46

CHOOSE YOUR MULTIMETER CLAMP

	F201 page 43	F203 page 43	F205 page 43	F401 page 44	F403 page 44	F405 page 44	F407 page 44	F601 page 45	F603 page 45	F605 page 45	F607 page 45
Clamping Ø 34 mm	■	■	■								
Clamping Ø 48 mm				■	■	■	■				
Clamping Ø 60 mm								■	■	■	■
AC current	■	■	■	■	■	■	■	■	■	■	■
DC current		■	■		■	■	■		■	■	■
Automatic zero DC		■	■		■	■	■		■	■	■
TRMS measurement	■	■	■	■	■	■	■	■	■	■	■
Measurement with DC component (AC+DC)			■			■	■			■	■
Measurement on non-linear loads	■	■	■	■	■	■	■	■	■	■	■
6,000-count display	■	■	■								
10,000-count display				■	■	■	■ x 3	■	■	■	■ x 3
Backlighting		■	■	■	■	■	■	■	■	■	■
AC and DC voltage measurement	■	■	■	■	■	■	■	■	■	■	■
Resistance	■	■	■	■	■	■	■	■	■	■	■
Audible continuity	■	■	■	■	■	■		■	■	■	
Semi-conductor test	■	■	■	■	■	■		■	■	■	
Frequency	■	■	■	■	■	■	■	■	■	■	■
Temperature	■	■		■	■			■	■		
Active power (W)			■			■	■			■	■
Apparent and reactive power (VA, var)			■			■	■			■	■
Power factor (PF/DPF)			■ |			■ |	■ | ■			■ |	■ | ■
AC / DC / AC+DC power measurement			■			■	■			■	■
Phase rotation (2 wires)			■			■				■	
Total Harmonic Distortion (THDf% / THDr%)			■			■	■			■	■
Harmonic decomposition (Harm0…Harm25)							■				■
Crest factor (CF)							■				■
Automatic deactivatable AC/DC	■	■	■	■	■	■	■	■	■	■	■
Motor InRush	■	■	■	■	■	■	■	■	■	■	■
Current surge with load (TrueInrush)	■	■	■	■	■	■	■	■	■	■	■
Min.	■	■	■	■	■	■	■	■	■	■	■
Max.	■	■	■	■	■	■	■	■	■	■	■
Peak			■			■	■			■	■
Differential measurement ΔX		■	■		■	■			■	■	
Relative measurement ΔX/X		■	■		■	■			■	■	
Adapter input (external probe)		■			■				■		
Data logging							■				■
PC interface / Bluetooth interface							■				■
CAT IV 600 V	■	■	■								
CAT IV 1000 V				■	■	■	■	■	■	■	■

F201 - F203 - F205

Ref. :P01120921 P01120923 P01120925

600 AAC
900 ADC
TRMS
1000 V CAT III
600 V CAT IV
True InRush
IEC 61010-2-032
IEC 61010-2-033

SPECIFICATIONS

	F201	F203	F205
Clamping	Ø 34 mm		
Display	LCD	Backlit LCD	
Resolution	6,000 counts		
Number of values displayed	1		
Type of acquisition	TRMS AC	TRMS AC/DC	TRMS AC, DC, AC+DC
Autorange	Yes		
Automatic AC/DC detection	Yes		
AAC	600 A		
ADC		900 A	
AAC+DC			600 A (900 A peak)
Best accuracy	1 % R + 3 counts		
VAC	1,000 V		
VDC	1,000 V		
VAC+DC			1,000 V (1,400 V peak)
Best accuracy	1 % R + 3 counts		
Frequency for V / I	Yes / Yes		
Resistance	60 kΩ		
Audible continuity	Adjustable from 1 Ω to 599 Ω		
Diode test (semi-conductor junction)	Yes		
Temperature (type K)	°C: -60.0 to +1,000 °C °F: -76 to +1,832 °F		
Adapter		Yes	
Single-phase and total three-phase power values			AC, DC, AC+DC
Active (W)			Yes
Reactive (var)			Yes
Apparent (VA)			Yes
FP			Yes
Harmonic analysis THDf / THDr			Yes / Yes
Phase rotation *(2-wire method)*			Yes
Functions			
Overcurrent measurement	Yes		
Motor InRush	Yes		
Load evolution (TrueInrush)	Yes		
Hold	Yes		
Min / MAX	Yes		
Peak+ / Peak-			Yes
RELative ΔX		Yes	Yes
Differential ΔX/X(%)		Yes	Yes
Auto Power Off	Yes		
Electrical safety as per IEC 61010-1, IEC 61010-2-032, IEC 61010-2-033	600 V CAT IV - 1000 V CAT III		
Power supply	1 x 9 V 6LR61 battery		
Dimensions / weight	78 x 222 x 42 mm / 340 g		

STRENGTHS

- Clamping Ø 34 mm
- Compact format
- Light weight
- TRMS AC+DC with the F205 clamp

CONTENTS

F201 delivered with:

- 1 set of built-in PVC test-probe leads (black/red) / insulated elbowed male banana plug Ø 4 mm
- 1 x 9 V 6LR61 battery
- 1 Multifix shoulder bag
- 1 mini-CD containing the User Manual

F203 same as F201 plus 1 wire thermocouple with built-in insulated Ø 4 mm banana connections with 19 mm spacing

F205 delivered with:

- 1 set of PVC leads (black/red) with insulated elbowed male banana plug Ø 4 mm / insulated straight male banana plug Ø 4 mm
- 2 test probes / insulated female plug Ø 4 mm (black/red)
- 1 safety crocodile clip (black)
- 1 x 9 V 6LR61 battery
- 1 Multifix shoulder bag
- 1 mini-CD containing the User Manual

F401 - F403 - F405 - F407

Ref. : P01120941 P01120943 P01120945 P01120947

1000 AAC 1500 ADC | TRMS | 1000 V CAT IV | IP 54 | True InRush | IEC 61010-2-032 | IEC 61010-2-033

SPECIFICATIONS

	F401	F403	F405	F407
Clamping	Ø 48 mm			
Display	Backlit LCD			
Resolution	10,000 counts			
Number of values displayed	1			3
Type of acquisition	TRMS AC	TRMS AC/DC	TRMS AC, DC, AC+DC	
Autorange	Yes			
Automatic AC/DC detection	Yes			
AAC	1,000 A			
ADC		1,500 A		
AAC+DC			1,000 A (1,500 A peak)	
Best accuracy	1 % R + 3 counts			
VAC	1,000 V			
VDC	1,000 V			
VAC+DC			1,000 V (1,400 V peak)	
Best accuracy	1 % R + 3 counts			
Frequency for V / I	Yes / Yes			
Resistance	100 kΩ			
Audible continuity	Adjustable from 1 Ω to 999 Ω			
Diode test (semi-conductor junction)	Yes			
Temperature (type K)	°C: -60.0 to +1,000 °C °F: -76 to +1,832 °F			
Adapter		Yes		
Single-phase and total three-phase power values			Yes	
Active (W)			Yes	
Reactive (VAR)			Yes	
Apparent (VA)			Yes	
FP / DPF			Yes / –	Yes / Yes
Harmonic analysis THDf /THDr			Yes / Yes	
Frequency analysis			No	25th order
Phase rotation *(2-wire method)*			Yes	
Functions				
Overcurrent measurement	Yes			
Motor Inrush	Yes			
Load evolution (TrueInrush)	Yes			
Hold	Yes			
Min / MAX	Yes			
Peak+ / Peak-			Yes	
RELative ΔX		Yes	Yes	
Differential ΔX/X(%)		Yes	Yes	
Auto Power Off	Yes			
Data logging				Yes
Communication interface				Bluetooth
Electrical safety as per IEC 61010-1, IEC 61010-2-032, IEC 61010-2-033	1000 V CAT IV - 1000 V CAT III			
Power supply	4 x 1.5 V LR06 batteries			
Dimensions / weight	92 x 272 x 41 mm / 600 g			

STRENGTHS

- Small and medium-power LV applications
- Clamping Ø 48 mm
- TRMS AC+DC with the F405 / F407 clamps
- Delivered in pre-equipped MultiFix shoulder bag

CONTENTS

F401 / F403 delivered with:

- 1 set of PVC leads (black/red) with insulated elbowed male banana plug Ø 4 mm / insulated straight male banana plug Ø 4 mm
- 2 test probes / insulated female plug Ø 4 mm (black/red)
- 1 wire thermocouple with built-in insulated Ø 4 mm banana connections with 19 mm spacing
- 4 x 1.5 V LR03 batteries
- 1 Multifix shoulder bag
- 1 mini-CD containing the User Manual

F405 same as F401 / F403 without the wire thermocouple and with 1 safety crocodile clip (black)

F407 same as F405 with:

- 2 safety crocodile clips (red/black)
- 1 mini-CD containing the Power Analyser Transfer PC software and the User Manual

F601 - F603 - F605 - F607

Ref. : P01120961 P01120963 P01120965 P01120967

2000 AAC 3000 ADC | TRMS | 1000 V CAT IV | IP 54 | True InRush | IEC 61010-2-032 | IEC 61010-2-033

SPECIFICATIONS

	F601	F603	F605	F607
Clamping	Ø 60 mm			
Display	Backlit LCD			
Resolution	10,000 counts			
Number of values displayed	1			3
Type of acquisition	TRMS AC	TRMS AC/DC	TRMS AC, DC, AC+DC	
Autorange	Yes			
Automatic AC/DC detection	Yes			
AAC	2,000 A			
ADC		3,000 A		
AAC+DC			2,000 A (3,000 A peak)	
Best accuracy	1 % R + 3 counts			
VAC	1,000 V			
VDC	1,000 V			
VAC+DC			1,000 V (1,400 V peak)	
Best accuracy	1 % R + 3 counts			
Frequency for V / I	Yes / Yes			
Resistance	100 kΩ			
Audible continuity	Adjustable from 1 Ω to 999 Ω			
Diode test (semi-conductor junction)	Yes			
Temperature (type K)	°C: -60.0 to +1,000 °C °F: -76 to +1,832 °F			
Adapter		Yes		
Single-phase and total three-phase power values			Yes	
Active (W)			Yes	
Reactive (VAR)			Yes	
Apparent (VA)			Yes	
FP / DPF			Yes / –	Yes / Yes
Harmonic analysis THDf /THDr			Yes / Yes	
Frequency analysis				25th order
Phase rotation *(2-wire method)*			Yes	
Functions				
Overcurrent measurement	Yes			
Motor Inrush	Yes			
Load evolution (TrueInrush)	Yes			
Hold	Yes			
Min / MAX	Yes			
Peak+ / Peak-			Yes	
RELative ΔX		Yes	Yes	
Differential ΔX/X(%)		Yes	Yes	
Auto Power Off	Yes			
Data logging				Yes
Communication interface				Bluetooth
Electrical safety as per IEC 61010-1, IEC 61010-2-032, IEC 61010-2-033	1000 V CAT IV - 1000 V CAT III			
Power supply	4 x 1.5 V LR06 batteries			
Dimensions / weight	111 x 296 x 41 mm / 640 g			

STRENGTHS

- High-power LV applications
- Clamping Ø 60 mm
- TRMS AC+DC with the F605 / F607
- Delivered in pre-equipped MultiFix shoulder bag

CONTENTS

F601 / F603 delivered with:

- 1 set of PVC leads (black/red) with insulated elbowed male banana plug Ø 4 mm / insulated straight male banana plug Ø 4 mm
- 2 test probes / insulated female plug Ø 4 mm (black/red)
- 1 wire thermocouple with built-in insulated Ø 4 mm banana connections with 19 mm spacing
- 4 x 1.5 V LR03 batteries
- 1 Multifix shoulder bag
- 1 mini-CD containing the USER Manual

F605 same as F601/F603 without the wire thermocouple and with 1 safety crocodile clip (black)

F607 same as F605 with:

- 2 safety crocodile clips (black/red)
- 1 mini-CD containing the Power Analyser Transfer PC software and the User Manual

ACCESSORIES / REPLACEMENT PARTS

TESTERS

C.A 732

▪ 1.5 V LR03 battery	P01296032

C.A 745N

▪ Set of red/black CAT III/IV test probes	P01102152Z
▪ Set of red/black test probes - Ø 2 mm, CAT II	P01102153Z
▪ Set of red/black test probes - Ø 4 mm, CAT II	P01102154Z
▪ C.A 753 universal measurement adapter for 2P+E sockets	P01191748Z
▪ Velcro strap x 5	P01102113
▪ 1.5 V LR03 alkaline battery	P01296033
▪ Bag compatible with MultiFix accessory, 120 x 200 x 60 mm	P01298074
▪ MultiFix mounting accessory	P01102100Z

C.A 755, C.A 757

▪ Set of black/red CAT III/IV test probes	P01102152Z
▪ Set of black/red Ø 2 mm test probes, CAT II	P01102153Z
▪ Set of black/red Ø 4 mm test probes, CAT II	P01102154Z
▪ MA101-250 current sensor for C.A 757	P01120591
▪ C.A 753 universal measurement adapter for 2P+E sockets	P01191748Z
▪ Velcro strap x 5	P01102113
▪ 1.5 V LR03 alkaline battery	P01296033
▪ Bag compatible with MultiFix accessory, 120 x 200 x 60 mm	P01298074
▪ MultiFix mounting accessory	P01102100Z

VOLTAGE DETECTORS

C.A 742, C.A 742 IP2X, C.A 762 and C.A 762 IP2X

▪ Measurement adapter for 2P+E socket, model C.A 751	P01101997Z
▪ Universal measurement adapter for 2P+E socket, model C.A 753	P01191748Z
▪ Red test probe Ø2 mm	P01102008Z
▪ Black test-probe lead Ø2 mm	P01102009Z
▪ Adapter for safety rod (set of 2)	P01102034
▪ Crystal safety cap for test probe Ø2 mm (x10)	P01102033
▪ Set of 2 leads 0.25 m and 0.85 m long with Ø4 mm IP2X test probes	P01295285Z
▪ Set of 2 leads 1.5 m long with Ø4 mm IP2X test probes	P01295462Z
▪ MultiFix shoulder bag, 120 x 200 x 60 mm	P01298074
▪ IP2X CAT IV test probes	P01102127Z
▪ IP2X Ø4 mm test probes	P01102128Z
▪ Soft case, 200 x 100 x 40 mm with belt clip	P01298065Z
▪ Shoulder bag no. 10	P01298012Z
▪ Wrist-strap	P03100824
▪ 1 probe-holder cable 1.10 m long + 2 red/black ø 4 mm IP2X test probes	P01102121Z

C.A 771, C.A 771 IP2X, C.A 773 and C.A 773 IP2X

▪ CAT IV test probes	P01102123Z
▪ Ø2 mm test probes	P01102124Z
▪ Ø4 mm test probes	P01102125Z
▪ Test-probe protector	P01102126Z
▪ IP2X CAT IV test probes	P01102127Z
▪ IP2X Ø4 mm test probes	P01102128Z
▪ MultiFix shoulder bag, 120x320x60 mm	P01298076
▪ Crystal safety cap for test probe Ø2 mm (x10)	P01102033

ANALOGUE MULTIMETERS

C.A 5001, C.A 5003 and C.A 5005

▪ Accessories kit for electricians	P01295459Z
▪ I/R probe	P01651610Z
▪ C.A 801 single-channel temperature adapter	P01652401Z
▪ C.A 803 two-channel temperature adapter with differential measurement	P01652411Z
▪ CMI214S current measurement lead	P03295509
▪ Shoulder bag	P01298033
▪ Soft case no. 5	P01298036
▪ Hard case	P01298037
▪ Shoulder bag no. 21 with strap (250x165x60 mm)	P06239502
▪ 1 probe-holder cable 1.10 m long + 2 red/black ø 4 mm IP2X test probes	P01102121Z

C.A 5001

▪ 1.5 V LR06 battery	P01296033
▪ 0.5 A HRC fuse (x 10)	P01297028
▪ 5 A HRC fuse (x 10)	P01297035

C.A 5003

▪ 9 V 6LR61 battery	P01100620
▪ MN11 LCA 200/0.2 clamp	P01120404
▪ 1.6 A HRC fuse (x 10)	P01297036
▪ 16 A HRC fuse (x 10)	P01297037

C.A 5005

▪ 9 V 6LR61 battery	P01100620
▪ MINI 09 clamp - 1 A / 100 MVDC	P01105109Z
▪ MN11 LCA 200/0.2 clamp	P01120404
▪ 10 A HRC fuse (x 10)	P01297038
▪ 1 A HRC fuse (x 10)	P01297039

DIGITAL MULTIMETERS

C.A 5011

- 9 V 6LR61 battery — P01100620
- Crocodile wire grip (x 2) — P01102053Z
- Insulation-piercing clip (x 2) — P01102055Z
- Moulded PVC lead with straight male plug/insulated elbowed male plug Ø4 mm (x 2) — P01295451Z
- Moulded red/black silicone lead with straight male plug/insulated elbowed male plug Ø4 mm (x 2) — P01295453Z
- Safety test probe (x 2) — P01295454Z
- PVC test-probe lead, insulated elbowed male plug Ø 4 mm (x 2) — P01295456Z
- Crocodile clip (x 2) — P01295457Z
- Ø 4 mm CAT II 300 V test probe (x 2) — P01295458Z
- Ø 2 mm CAT II 300 V test probe (x 2) — P01295460Z
- IP2X test-probe lead (x 2) — P01295461Z
- Accessories kit for electricians — P01295459Z
- I/R probe — P01651610Z
- C.A 801 single-channel temperature adapter — P01652401Z
- C.A 803 two-channel temperature adapter with differential measurement — P01652411Z
- CMI214S current measurement lead — P03295509

C.A 5231, C.A 5233, C.A 5271, C.A 5273, C.A 5275 et C.A 5277

- 9 V 6LR61 battery — P01100620
- Crocodile wire grips (x 2) — P01102053Z
- Insulation-piercing clip (x 2) — P01102055Z
- 40 kVdc / 28 kVac high-voltage probe — P01102097
- MultiFix multi-position mounting accessory — P01102100Z
- Moulded PVC lead with straight male plug/insulated elbowed male plug Ø4 mm (x 2) — P01295451Z
- Moulded red/black silicone lead with straight male plug/insulated elbowed male plug Ø4 mm (x 2) — P01295453Z
- Safety test probe (x 2) — P01295454Z
- PVC test-probe lead, insulated elbowed male plug (x 2) — P01295456Z
- Crocodile clip (x 2) — P01295457Z
- Ø 4 mm CAT II 300 V test probe (x 2) — P01295458Z
- Ø 2 mm CAT II 300 V test probe (x 2) — P01295460Z
- IP2X test-probe lead (x 2) — P01295461Z
- Accessories kit for electricians — P01295459Z
- I/R probe — P01651610Z
- C.A 801 single-channel temperature adapter — P01652401Z
- C.A 803 two-channel temperature adapter with differential measurement — P01652411Z

C.A 5231

- 100 AAC MINI 03 current clamp — P01105103Z
- 400 AAC / 600 ADC PAC10 current clamp — P01120070

C.A 5233, C.A 5273 and C.A 5277

- Safety thermocouple adapter (x 2) — P01102106Z
- Safety adapter and temperature probe, wire K sensor, -50°C to +450°C — P01102107Z
- CMI214S current measurement lead — P03295509

ACCESSORIES / REPLACEMENT PARTS

MULTIMETER CLAMPS

F200, F400 and F600 SERIES

- MultiFix multi-position mounting accessory — P01102100Z
- Moulded PVC lead with straight male plug/insulated elbowed male plug Ø4 mm (x 2) — P01295451Z
- Moulded red/black silicone lead with straight male plug/insulated elbowed male plug Ø4 mm (x 2) — P01295453Z
- Safety test probe (x 2) — P01295454Z
- PVC test-probe lead, insulated straight male plug Ø 4 mm (x 2) — P01295455Z
- PVC test-probe lead, insulated elbowed male plug Ø 4 mm (x 2) — P01295456Z
- Crocodile clip (x 2) — P01295457Z
- Ø 4 mm CAT II 300 V test probe (x 2) — P01295458Z
- IP2X test-probe lead (x 2) — P01295461Z
- Accessories kit for electricians — P01295459Z
- CMI214S current measurement lead — P03295509

F400 and F600 SERIES

- 1.5 V LR06 battery — P01296033
- MultiFix shoulder bag 120x320x60 mm — P01298076

F201 and F205

- 9 V 6LR61 battery — P01100620
- MultiFix shoulder bag 120x245x60 mm — P01298075

F203

- 9 V 6LR61 battery — P01100620
- Safety thermocouple adapter (x 2) — P01102106Z
- Safety adapter and temperature probe, wire K sensor, -50°C to +450°C — P01102107Z
- MultiFix shoulder bag 120x245x60 mm — P01298075
- C.A 801 single-channel temperature adapter — P01652401Z
- C.A 803 two-channel temperature adapter with differential measurement — P01652411Z

F403 and F603

- Safety thermocouple adapter (x 2) — P01102106Z
- Safety adapter and temperature probe, wire K sensor, -50°C to +450°C — P01102107Z
- C.A 801 single-channel temperature adapter — P01652401Z
- C.A 803 two-channel temperature adapter with differential measurement — P01652411Z

F407 and F607

- DataView® software — P01102095
- Bluetooth/USB modem — P01102112

MA400D & MA4000D

- Shoulder bag 120x200x60 mm — P01298074
- MultiFix accessories — P01102100Z
- Velcro strap (set of 5) — P01102113

FIND ALL OUR ACCESSORIES ON PAGE 230

NOTES


1101
V
9.95
MΩ
HOLD
HOLD
MEM
SET-UP
TEST
ΔREL
CLR
MΩ
OFF
50V
100V
250V
500V
1000V
C.A 6526
MEGOHMMETER
REMOTE
TEST PROBE
TYPE 3
COUPURE

ELECTRICAL SAFETY

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. Continuity
3. Insulation
4. Tests of protective devices

1. EARTH

To guarantee safety on residential or industrial electrical installations, one of the basic rules is that there must be an earth electrode.

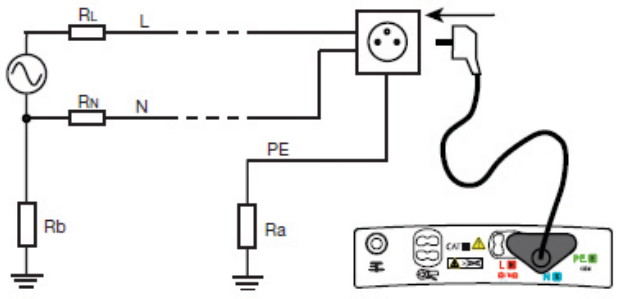
If there is no earth electrode, it may endanger people's lives and damage electrical installations and property.

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 (1P live earth, PH-PE loop impedance, selective earth with 1-clamp method, etc.), some more suitable than others, depending on the type of earth connection 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 measuring 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 2 Ω. As the resistance value is low, the resistance of the measurement leads must be compensated, particularly if very long leads are used.



Example : Approximate measurement of earth resistance by the Zs (Ph-PE) loop measurement method in a TT-type earthing system

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 MΩ
SELV or PELV	250	≥ 0.5
≤ 500 V including PELV	500	≥ 1.0
> 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.
A fuse table directly integrated in certain installation testers can be used to check automatically that the fuses are correctly sized.

Residual Current Devices (RCDs): types AC, A and B

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.

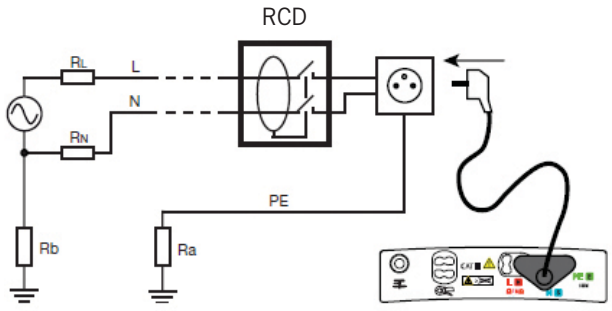
Type-B RCDs are designed to provide a specified response for DC-only leakage currents. A specific test is then required to check RCDs of this type.

5. OTHER RECOMMENDED MEASUREMENTS

When testing low-voltage installations, other measurements are recommended (mandatory in some countries) such as:

- **The voltage drop ΔV% in the cables**, obtained by means of two line-impedance measurements to check that their cross-sections are appropriate
- The **correct phase order** in three-phase systems, thus ensuring that rotating machines turn in the right direction
- **The installation's voltage and frequency**, allowing identification of any poor connections

Detection of phase current unbalance by measuring with a clamp and first-level assessment of the harmonic content are useful additions to any installation analysis.



Example: RCD test via connection in a wall socket in TT-type earthing systems.

INSULATION MEASUREMENT

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 earthing 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.

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 kΩ, MΩ or GΩ**. 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 means it can be used as a **basis for preventive maintenance**. This measurement is performed using an insulation tester, also called a megohmmeter.

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.

INSULATION MEASUREMENT APPLICATIONS

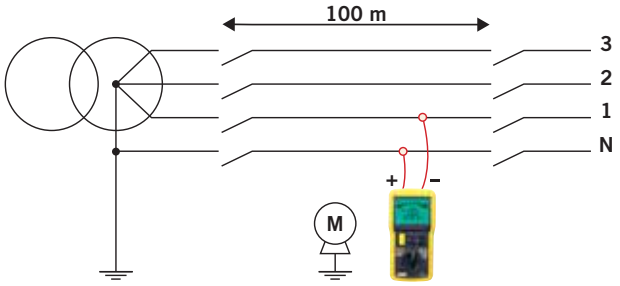
Insulation measurement on electrical installations

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.



Insulation test 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, IEEE 43-2000, etc.)

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 its 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, C.A 6550, C.A 6555)
- 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 – 10,000 – 15,000 VDC

Measurement range: kΩ, MΩ, GΩ, TΩ

■ 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

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 earthing 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.

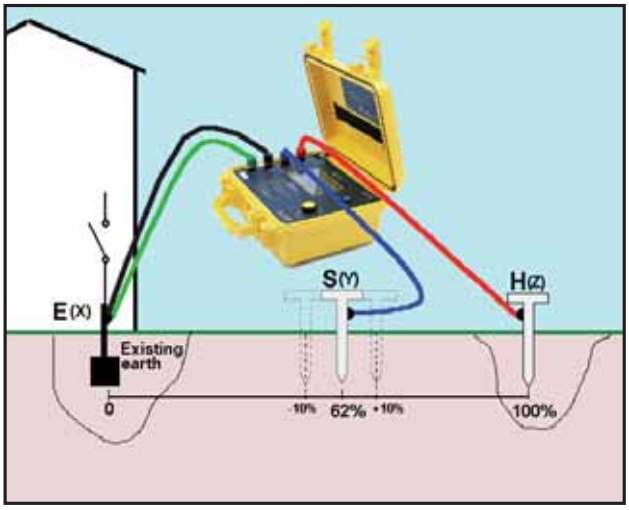
LIST OF THE DIFFERENT EARTH MEASUREMENT METHODS

	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:

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 0 V 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 ± 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.

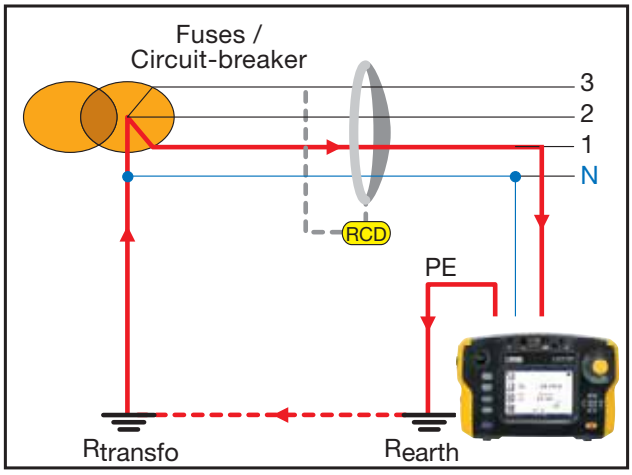
Line-PE loop measurement (only on TT system)

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: Rmeasured > Rearth. 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.

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 / Rloop 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.

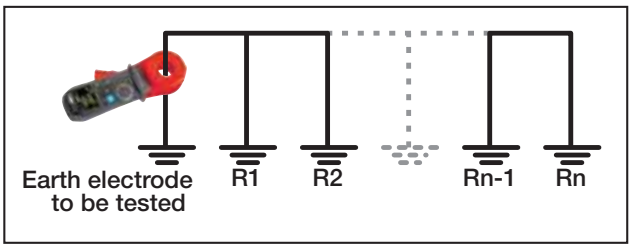
This case involves a network of parallel earths. Knowing that "n" resistances in parallel are equivalent to a resistance Raux with a negligible value, we can measure the local earth value Rx:

Rloop = Rx + Raux (where Raux = resistance equivalent to R1…Rn in parallel)

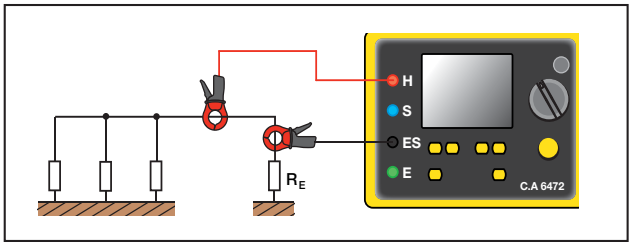
As Rx >> Raux', we obtain the result Rloop # Rx

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.

SAFETY OF MACHINES, SWITCHBOARDS AND PORTABLE ELECTRICAL APPLIANCES

MACHINE SAFETY

The **IEC 60204 / EN 60204** standard defines a **machine** as a **set of parts** or systems linked together, **at least one of which is mobile**. The fields of application are particularly diverse: machines for working metal, wood, textiles, printing, compressors, leather, tanneries, agricultural machinery, building sites and quarries, etc.

Part 1 of this reference standard defines the general requirements regarding electrical machine safety to ensure the protection of people who may be exposed to hazardous phenomena due to failure of the electrical equipment or the command circuits, disturbances in the power sources or power circuits, loss of continuity in the circuits, electromagnetic disturbances, release of accumulated energy, excessive audible noise or excessive surface temperatures.

To ensure electrical safety on the machines, you have to carry out a number of checks and tests after initial implementation, installation, renovation or modification and during periodic testing

- Checking of the **protective automatic cut-off systems** on the power supply in particular (the types of tests and checks depend on the earthing system):
  - Checking of PE continuity on each circuit in the machine with a measurement current ≥ 200 mA which may be as high as 10 A,
  - Verification of the loop impedance as per IEC 61557-3 and correct coordination of the protection against overcurrents
  - Visual check of the protection against overcurrents
  - RCD testing as per IEC 61557-6, tripping-time test (recommended)
  - Verification of the current at the first insulation fault by measurement or calculation

  Note: this test may be simplified depending on the condition of the machine as established by a questionnaire included in the standard.
- Insulation resistance measurement at 500 VDC, R > 1 MΩ
- Test of dielectric strength with 50 or 60 Hz AC voltage, at 2 x UN or 1,000 V, duration 1 sec (without disruptive discharge)
- Residual overvoltage test by measuring the discharge time < 1 sec or 5 sec.
- Operating test of the machine and the circuits involved in electrical safety
- The tests are usually performed in the order of decreasing failure in order to intercept electrical safety problems on the machine tested as quickly as possible.

Other aspects of the machine may be checked, such as the conformity of the documentation, the temperature reached, the correct order of the phase sequence and the phase drop between the power supply and the load.

SWITCHBOARD SAFETY

The IEC 61439 / EN 61439 standard defines a set of low-voltage equipment as a combination of one or more low-voltage connection devices.
A recent upgrade of this standard precisely defines the limits of liability between the original manufacturer, who should perform the design checks, and the assembler (switchboard operator) who should perform individual series testing. These checks include construction and performance tests. The switchboard operator is considered to become the original manufacturer if modifications are made to the low-voltage switchboard. A declaration of conformity based on simple comparison with a similar switchboard will not be accepted, so a new check is necessary. This new context means that additional test equipment is needed to ensure compliance with the requirements of this reference standard.
The tests required for low-voltage switchboards are:

- **Physical measurement of the insulation gap or leakage distance**
- **PE continuity check** with a measurement current ≥ 200 mA which may be up to 10 A (R ≤ 0.1 Ω)
- **Short-circuit withstand** by creating a bolted short-circuit
- Checking of the **dielectric properties** by a test at 50 / 60 Hz with the application of a voltage between the different groups of terminals rising slowly and then held for 5 sec or 1 sec

■ **Insulation test** (variant)
Other aspects can also be checked, such as the discharge time, the IP protection rating, the electrical circuits and connections (by random testing), identification of the external terminals, mechanical operation, shock voltage withstand, heating, etc.

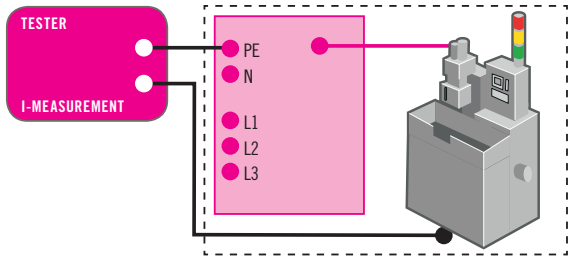
SAFETY OF PORTABLE ELECTRICAL APPLIANCES

The VDE 701 and VDE 702 standards define the inspections to be performed after repair or modification of the electrical appliances and the periodic inspections necessary, as well as general guidelines for electrical safety. This reference standard describes the automatic sequencing of the tests to be performed.
Many of the tests and checks to be performed are identical to those described in the Machines and Switchboards section, plus certain tests "with probes" when the equipment does not have double insulation or reinforced insulation (Class I).
Furthermore, the leakage current measurements must include leakage measurements by different methods (substitution method, differential leakage method, contact leakage method, etc.). The polarity of the mains leads must also be checked to ensure that it complies.

MAIN TESTS & CHECKS

PE CONTINUITY TEST

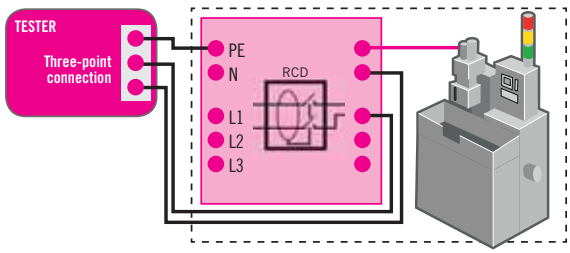
(IEC 61557-4)



Used to check whether the resistance measured corresponds to the cross-section and length of the PE conductor.

RCD AND PRCD TEST

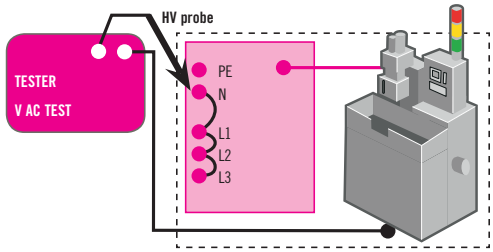
RCD test (Uc, T, I) (IEC 61557-6)



The RCD test can be used to check operation of the RCDs.

HV DIELECTRIC TEST

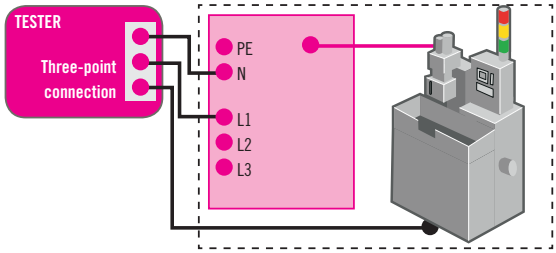
AC dielectric strength



The AC dielectric test can be used to confirm the device's ability to function at its operating voltage. These tests are performed at a higher voltage than the normal operating voltage.

LOOP IMPEDANCE MEASUREMENT

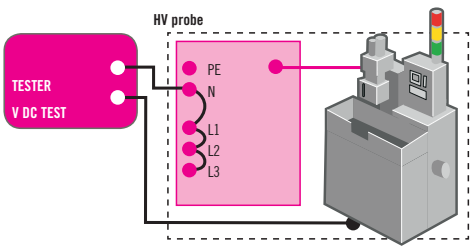
Loop & PFC measurement (IEC 61557-3)



By measuring the loop impedance and calculating the prospective fault current (PFC), you can check that the automatic cut-off systems or fuses are appropriately sized.

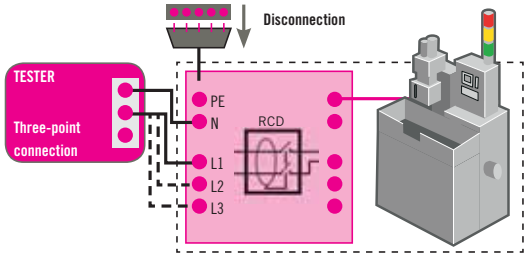
INSULATION RESISTANCE MEASUREMENT

Measurement of Rinsulation in MΩ (IEC 61557-2)



By measuring the insulation resistance, it is possible to detect faults due to deterioration or pollution and mould.

DISCHARGE TIME



When the machines are disconnected, high-value capacitors may supply a hazardous voltage. This test measures whether the time taken by the discharge voltage to reach a non-hazardous value complies with the requirements (< 5s/< 1s).

TECHNICAL OVERVIEW / OTHER TESTERS

MEASUREMENT OF LOW RESISTANCES

The measurement of low resistances is **widely used in preventive maintenance** to check the continuity of the chassis-earths, surface condition and metallization, the quality of the contacts in the switches and relays, the resistance of the cables and windings, to assess motor and transformer heating and, in general, to check the mechanical joints. A wide variety of fields are involved, including the automotive sector, telecommunications, transport, motor and transformer manufacturers, etc . as well as the repair and maintenance companies working in these different sectors.

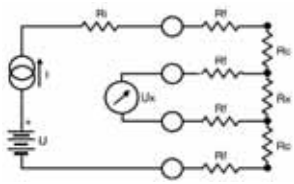
Measurement principle

The basic principle for measuring resistance involves applying Ohm's Law: U = R x I. When measuring very low resistances, a measurement current is injected and the resulting voltage is measured on the terminals of the resistance to be checked. The connections are the same as for 4-wire measurements, often called a Kelvin assembly, which limits the influence of the measurement leads when measuring low resistances.

The connection diagram is shown opposite:

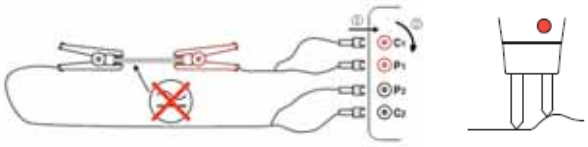
From a DC voltage source U, a generator supplies a current with the value I.

A voltmeter measures the voltage drop Ux at the terminals of the resistor Rx to be measured and displays Rx = Ux / I. The result is independent of the other resistances encountered in the current loop (Ri, Rf, Rc), as long as the total voltage drop which they cause with Rx remains lower than the voltage which the current source can supply.



Where: Ri = internal resistance of the instrument, Rf = resistance of the measurement wires, Rc = contact resistance, Rx = resistance to be measured

In practice, double retractable test probes, pivoting or otherwise, or Kelvin clamps are used for better contact with the object to be tested. Lastly, when measuring on a rivet, the two contacts of a given test probe must be capable of retracting by different amounts.

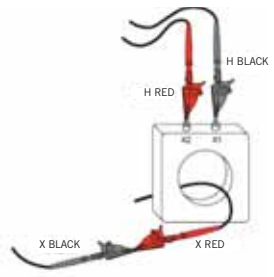


The micro-ohmmeters must offer a resolution of 1 µΩ or even 0.1 µΩ, a wide measurement range and compensation of the thermocouple effects by inversion of the measurement current. To ensure operator safety, the equipment must be protected against accidental overvoltages, prevent measurement in the presence of a disturbance voltage and trigger automatic discharging after measurements on inductive objects.

Lastly, as the resistance of metals changes significantly according to the temperature, it is a good idea to present the result at a given reference temperature. The instruments with the best performance automatically perform this calculation according to the type of metal, its temperature coefficient (approximately 0.4 %/°C for copper or aluminium), the ambient temperature and the reference temperature.

MEASUREMENT OF THE TRANSFORMER RATIO AND EXCITATION CURRENT

Strict compliance with the primary / secondary ratio values of the voltage, power and current transformer is crucial because any variation of these values over time is a sign of problems in the transformer, such as internal damage, possible deterioration of the insulants due to mechanical damage or contamination or short-circuits between loops. In addition, accurate measurement of the excitation current can identify problems in the magnetic core of the transformer, such as type and thickness of the material, mechanical stresses and air-gap and assembly variations.



By checking the winding polarity and the presence of open circuits or groups of terminals in open circuit, it is possible to detect rewiring errors after maintenance operations. **Transformer ratio measurements performed using the method described in the IEEE C57.12-90™- 2006 reference document ensure standard, repeatable measurements.**

As such measurements are often performed in environments where a lot of noise is present, it is important for the operator to

be able to choose different filters in order to obtain more reliable results in such environments. Operator safety is ensured by a technique involving primary excitation, thus guaranteeing that no hazardous signal can occur at the secondary terminals of the transformer being tested.
Storage of different "boilerplates" (specifications) in the instrument and direct display of the ratio value and its percentage deviation from the rated value help to speed up interpretation of the measurements performed.
Their long battery life and their storage capacity for the results make digital ratiometers particularly useful for performing and analysing measurements.

MOTOR DIRECTION AND PHASE ROTATION TESTS

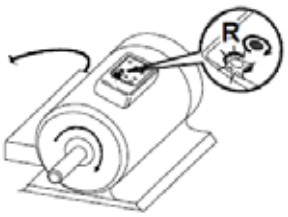
Interconnection of several sections of the electrical network or several buildings on the same site in a three-phase system requires the phase sequence to follow the normal direction. This is **particularly crucial for the power supplies of rotating machines** as **the rotation order of the phases connected determines the direction of the rotating field and therefore the rotation direction of the rotor.**

Phase rotation direction

The phase rotation direction can be determined by connecting the three phases of the electrical network to be tested to the tester, in accordance with the markings. **The tester then indicates the phase rotation direction**: clockwise or anticlockwise. In this case, the tester is self-powered via the measurement inputs.
To cover a wide range of applications, **the equipment must be capable of operating at frequencies from 15 to 400 Hz.**

Rotating field direction or rotation direction without connection

For some phase sequence detectors, the possibility of testing without connection, simply by positioning the tester on the casing of the motor, allows you to obtain a quick indication of the rotating field direction. In this mode, the tester must be set up in parallel to the rotor and in the prescribed direction. This principle is not valid when controlling a motor by means of a frequency converter.



Determination of the phase connection direction on a motor

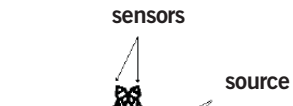
If you connect the motor's power supply phases to the tester and turn the rotor half a turn to the right by hand, the tester indicates whether or not the phase wires are connected in the right order.

Indication of solenoid valve activation without connection

On testers capable of testing without connection, the activation of a solenoid valve can be detected by placing the tester close to the valve. The clockwise or anticlockwise LED then indicates the direction of the field generated.

BATTERY CAPACITY MEASUREMENT

Research carried out by battery manufacturers has shown that **the internal impedance of a rechargeable battery increases with its age and the number of discharges which it has undergone.** By analysing the internal impedance, you can therefore assess the condition of the elements inside and determine whether the battery needs to be replaced or not.
Instead of the absolute value of the battery's internal resistance, it is the variation of the value which is important. Indeed, a 25% increase causes performance to fall by approximately 80%. These values may vary according to the battery technology involved. These values are compared with the instantaneous measurements made and noted when the batteries were installed.
Preventive maintenance equipment should simultaneously measure and display the internal resistance by means of a 4-wire method for AC at a frequency close to 1 kHz, **as well as the open-circuit voltage**. As the internal resistance values measured may be low, you have to compensate the resistance of the measurement leads and retractable test probes. A large number of alarm comparison systems are used to quickly detect battery deterioration. On the basis of this comparison, the result is assessed and one of the LEDs (PASS, WARNING, FAIL) is then activated accordingly.



CHOOSING YOUR INSTALLATION TESTER

C.A 6030
page 63

C.A 6113
page 64

C.A 6116N
page 64

C.A 6117
page 64

	C.A 6030	C.A 6113	C.A 6116N	C.A 6117
Insulation				
50 / 100 / 250 / 1000 V		■	■	■
RCD tests				
No-trip tests	■	■	■	■
Trip time (pulse)	■	■	■	■
Trip current (Ramp)	■	■	■	■
Management of standards or selective RCDs, type AC or A	■	■	■	■
Management of type-B RCDs				■
Earth management				
2P/3P earth		■	■	■
1P live earth (RA)	■	■	■	■
Selective earth with 1 clamp (RA Sel)		■	■	■
Impedance & loop resistance				
Z-loop (L-PE)	■	■	■	■
Z-Line (L-N or LL)		■	■	■
Ik calculation (PFC)	■	■	■	■
Isc calculation (PSCC)		■	■	■
Integrated fuse table				■
Voltage drop				■
Resistance / Continuity				
Manual & automatic measurements		■	■	■
Other functions				
Voltage / frequency	■	■	■	■
Current / leakage current on clamp	■	■	■	■
Phase sequence	■	■	■	■
Power values			■	■
Harmonics			■	■
Wiring polarity: test + reversal		■	■	■
Alarms	■	■	■	■
Storage / Communication				
Storage	■		■	■
Storage of 3 tree-structure levels			■	■
Optical interface	■			
USB interface			■	■
Display and power supply				
Black and white LCD	■			
Black and white graphical LCD		■		
Colour graphical LCD			■	■
Online help		■	■	■
Battery operation	■			
Operation with rechargeable batteries		■ Ni-Mh	■ Li-ion	■ Li-ion
PC software				
ICT/ DataView®			■	■
Transfer View	■			
Safety / Standards				
IEC 61010-1 600 V CAT III	■	■	■	■
IEC 61557	■	■	■	■

C.A 6030

Ref. : P01191511

600 V CAT III

IP 54

STRENGTHS

- Dedicated to RCD testing
- Earth loop measurement without tripping the RCD
- Automatic detection of the L/N/PE positions on the mains socket
- Optical communication for data printing and transfer

SPECIFICATIONS

	C.A 6030
Voltage measurement	2 to 550 V (DC or RMS) at connection
Frequency	15.3 Hz to 450 Hz at connection
Wiring polarity: test + inversion	Yes
RCD tests	
Rated voltage / frequency of the installation	90 to 550 V / 15.3 to 65 Hz
IΔn	10 / 30 / 100 / 300 / 500 mA + variable from 6 mA to650 mA
No-trip test	½ IΔn
Trigger time	IΔn, 2 IΔn, 5 IΔn, 150 mA, 250 mA
Trigger current	Step mode
L-PE loop measurement (without RCD trip > 30 mA)	Measurement of Z and R
Rated voltage / frequency of the installation	90 to 550 V /15.3 to 65 Hz
Measurement range	0.1 Ω to 4,000 Ω
Accuracy	10 % of the value +15 cts
Measurement current	0.1 to 0.5 IΔn
Short-circuit current calculation (Isc)	Up to 2.75 kA
Live earth measurement (1 stake) (no RCD trip > 30 mA)	
Rated voltage / frequency of the installation	90 to 550 V / 15.3 to 65 Hz
Measurement range	0.1 Ω to 4000 Ω
Accuracy	10 % of value + 15 cts
Measurement current	0.1 to 0.5 IΔn
Phase rotation	90 < voltage present < 550 V
Current / leakage current (with optional current clamp)	
MN20 clamp	5 mA to 20 A
C172 clamp	5 mA to 20 A
C176 clamp	50 mA to 200 A
Cable compensation	Yes
Alarms	In each function
Memory	100 measurements
Communication output	Optical interface
Power supply /Electrical safety	6 x 1.5 V batteries / IEC 61010-1 - 600 V CAT III
Display	Backlit 4,000-count LCD
Dimensions / weight	211 x 108 x 60 mm / 0.9 kg

ADDITIONAL INFO

- The C.A 6030 is delivered as standard with a European mains power socket
- It can also be delivered with a 1P loop-measurement kit:
- C.A 6030 + 1P loop kit ____ P01299921

CONTENTS

- C.A 6030 delivered in a “neck-strap” bag with 1 shoulder bag for accessories containing 1 measurement lead with a European mains power socket,
- 1 measurement lead with 3 separate cables,
- 3 crocodile clips
- 3 test probes
- Data transfer software
- 1 optical communication cable

ACCESSORIES / REPLACEMENT PARTS

- C172 current clamp ____ P01120310
- C176 clamp ____ P01120330
- See all the accessories on page 102

INSTALLATION TESTERS

C.A 6113 - C.A 6116N - C.A 6117

Ref. : P01145445 P01145455 P01145460

600 V CAT III | IP 53

STRENGTHS

- Tests on RCDs (types AC, A and B)
- Battery life of up to 30 hours
- Testing according to IEC 60364-6, NF C 15-100, VDE 100, FD C 16-600…
- Automatic continuity measurement
- Colour screen (except C.A 6113)
- Measurements: voltage, current via clamp, power, waveforms and harmonics
- Loop measurement with 1 mΩ resolution

CONTENTS

- C.A 6113 delivered in a shoulder bag with:
- 1 x PA 30 W power pack
- 1 Euro 3-point lead - 3 safety leads (red, blue, green)
- 3 test probes Ø 4 mm (red, blue, green)
- 3 crocodile clips (red, blue, green)
- 2 elbowed-straight safety leads (red and black) 3 m long
- 1 three-point Euro mains lead
- 1 remote-control probe
- 1 anti-scratch film mounted on the instrument
- 1 wrist-strap
- 1 x 4-point hands-free strap
- 1 CD-ROM containing the user manual

- C.A 6116N and C.A 6117 delivered in a shoulder bag with:
- 1 mains power / charger pack (type 2)
- 1 Li-Ion rechargeable battery pack mounted on the instrument
- 1 USB A/B cable 1.80 m long with ferrite
- 1 three-point lead - 3 safety leads (red, green and blue)
- 3 test probes Ø 4 mm (red, green and blue)
- 3 crocodile clips (red, green and blue)
- 2 elbowed-straight safety leads 3 m long (red and black)
- 1 three-point EURO mains lead
- 1 two-point EURO mains lead
- 1 remote-control probe
- 1 anti-scratch film mounted on the instrument
- 1 wrist-strap
- 1 x 4-point hands-free strap
- ICT data export software on CD-ROM
- 1 CD-ROM containing the user manual

ACCESSORIES / REPLACEMENT PARTS

- Three-point lead with separated wires 2.5 m — P01295398
- Three-point lead for testing European mains sockets — P01295393
- See all the accessories on page 102

EFFECTIVE CONTEXTUAL HELP AND GUARANTEED SAFETY

These testers are equipped with **clear, detailed contextual help**. This makes them suitable for both experts and less-experienced users.

There is dedicated help for each measurement, including a guide to the connections to be set up and **help for interpreting the results**. For greater safety, if it is incorrectly connected or if a hazardous voltage is present, the instrument displays an error message in order to warn the user.

ADDITIONAL INFO

- Integrated fuse table for quick result readings on the instrument
- User-friendly interface
- Extra-wide graphical screen
- Integrated contextual help for each function
- ICT data export software provided
- Compatible with the DataView® software
- Delivered as standard with a three-point European mains lead

INSTALLATION TESTERS

SPECIFICATIONS

		C.A 6113	C.A 6116N	C.A 6117
Continuity / Resistance				
	Measurement current	I > 200 mA up to 39.99 Ω and 12 mA approx. up to 400 Ω		
	Accuracy	± (1.5% of measurement + 2 cts), with audible beep		
	Range	4kΩ / 40kΩ - 400kΩ		
Insulation				
	Test voltage	50 /100 / 250 / 500 / 1,000 V DC		
	Range / accuracy	0.01 MΩ to 2 GΩ / ±(5 % of measurement + 3 cts)		
	Short-circuit current	≤ 3mA		
Earth				
3P earth	Range	0.50 Ω to 15 kΩ		
	Accuracy	±(2 % of measurement + 2 cts)		
	Others	RH & RS auxiliary-stake resistance measurement (up to 40 kΩ)		
1P selective earth	Range / accuracy	0.20 Ω to 399.9 Ω ±(10 % of measurement + 10 cts) (ISel via clamp)		
Loop impedance (Zs (L-PE) and Zi (L-N or L-L)) – 1P live earth				
Live earth	Installation voltage / freq.	990 to 500 V / 15.8 to 17.5 Hz - 45 to 65 Hz		
High-current mode - Zs (L-PE) (TRIP) & Zi (L-N or L-L) Range / accuracy		Max. test current: 7.5 A 0.100 Ω to 399.99 Ω / ±(5% of measurement + 2 cts)		
NO TRIP mode (Zs (L-PE))		Test current: 6 mA – 9 mA – 12 mA (as required) - 0.20 Ω to 3,999 Ω ±(5% of measurement + 2 cts)		
Calculation of short-circuit current Ik (PFC (Zs)) , I Sc (PSCC (Zi))		Fault and short-circuit current: display range 0.1 A to 6 kA		
Integrated fuse table				Yes
Voltage drop ΔU% (Zi)				-40% to + 40%
Others		Measurement of the resistive and inductive components of the impedances Zs and Zi		
RCDs				
RCD types AC and A	Installation voltage / freq.	90 V to 500 V / 15.8 Hz to 17.5 Hz and 45 Hz to 65 Hz		
	IΔn	10/30/100/300/500/650/1000 mA (90V – 280V) or variable - 10/30/100/300/500 mA (280-550V) or variable Ramp and pulse test		
	No-trip test	½ IΔn – Duration: 1,000 ms or 2,000 ms		
	Trip current Ramp mode	0.3 x IΔn to 1.06 x IΔn per increment of 3.3% x IΔn		
	Trip time measurement Pulse mode	0.2 à 0.5 x IΔn (Uf) / 0.5 x IΔn / 2 x IΔn (selective) / 5 x IΔn. Pulse: 0 to 500 ms, Ramp mode: 0 to 200 ms		
Type-B RCDs	Installation voltage / freq.			90 V to 275 V / 15.8 Hz to 17.5 Hz and 45 Hz to 65 Hz
	IΔn: ramp / pulse 2 x IΔn pulse 4 x IΔn			10/30/100/300/500 mA 10/30/100 mA
	Test in Ramp mode			0.2 x IΔn to 2.2 x IΔn
	Trip test			1.1x2 or 2.2x2 or 2.2x4 x IΔn
Other measurements				
	Current	(1 mA*) 5.0 mA to 19.99 A (MN77 clamp) / 5.0 mA to 199.9 A (C177A clamp)		
	Voltage	0 to 550 V AC/DC / DC and 15.8 to 500 Hz		
	Frequency	10 to 500 Hz		
	Phase rotation	20 to 500 V_{AC}		
	Active power		0 to 110 kW single-phase - 0 to 330 kW three-phase Simultaneous display of the voltage and current waveforms	
	Harmonics		Voltage and current / up to 50th order / THD-F / THD-R	
General specifications				
	Large backlit LCD screen, 320 x 240 pts	monochrome graphical 5.7 ''	colour graphical 5.7''	
	Memory/Communication		1,000 tests, via USB for data transfer and report creation	
	Power supply: rechargeable battery	NiMH 9.6 V rated 4 Ah.	Lithium-ion 10.8 V rated 5.8 Ah	
	Battery life	up to 24 hours	up to 30 hours	
	Dimensions / weight	280 x 190 x 128 mm / 2,2 kg		
	Ingress protection / EMC	IP 53 / IK04 / IEC 61326-1		
	Electrical safety / standards	IEC 61010 -1 – 600 V CAT III – 300 V CAT IV – IEC 61557		

*if a voltage is connected to the instrument

CHOOSE YOUR PORTABLE INSULATION TESTER

	C.A 6501	C.A 6503	C.A 6511	C.A 6513	C.A 6522	C.A 6524	C.A 6526	C.A 6532	C.A 6534	C.A 6536	F62 / F65
	page 68	page 68	page 69	page 69	page 70	page 70	page 70	page 71	page 71	page 71	page 77
Type	Hand-cranked		Analogue		Portable digital						
Test voltage (in Vdc)											
10									■	■ 1 V increments	
25									■	■ 1 V increments	
50						■	■	■		■ 1 V increments	
100						■	■	■	■	■ 1 V increments	
250		■			■	■	■		■		
500	■	■	■	■	■	■	■		■		
1,000		■		■	■	■	■				
Max. measured value											
200 MΩ	■										
1 GΩ			■	■							
5 GΩ		■									
20 GΩ								■		■	
40 GΩ					■						
50 GΩ									■		
200 GΩ						■	■				
Continuity	■		■	■	■	■	■	■	■	■	
Resistance	■			■		■	■	■	■	■	■
Capacitance							■	■			
Leakage current						■	■	■	■	■	■
Chronometer					■	■	■	■	■	■	
Test duration programming					■	■	■	■	■	■	
Quality ratios											
PI						■	■	■			
DAR						■	■	■			
Graphical											
Storage						■	■	■	■		
Bluetooth							■	■	■		
Display											
Analogue	■	■	■	■							
LCD + bargraph					■	■	■	■	■	■	
Power supply											
Hand-cranked	■	■									
Batteries			■	■	■	■	■	■	■	■	■

CHOOSE YOUR PORTABLE INSULATION TESTER

	C.A 6541	C.A 6543	C.A 6505	C.A 6545	C.A 6547	C.A 6549	C.A 6550	C.A 6555
	page 72	page 72	page 73	page 74	page 74	page 75	page 76	page 76
Type								
	On-site digital							
Test voltage (in Vdc)								
50	■	■	■	■	■	■	■	■
100	■	■	■	■	■	■	■	■
250	■	■	■	■	■	■	■	■
500	■	■	■	■	■	■	■	■
1,000	■	■	■	■	■	■	■	■
2,500			■	■	■	■	■	■
5,000			■	■	■	■	■	■
variable from 50 to 5,100			■	■	■	■	■	■
10,000							■	■
variable from 40 to 10,000							■	■
15,000								■
variable from 40 to 15,000								■
Max. measured value								
4 TΩ	■	■						
10 TΩ			■	■	■	■		
25 TΩ							■	
30 TΩ								■
Continuity	■	■						
Resistance	■	■		■	■	■	■	■
Capacitance	■	■	■	■	■	■	■	■
Leakage current				■	■	■	■	■
Chronometer	■	■		■	■	■	■	■
Programming of test duration	■	■	■	■	■	■	■	■
Quality ratios								
PI	■	■	■	■	■	■	■	■
DAR	■	■	■	■	■	■	■	■
DD				■	■	■	■	■
Graphical								
R(t)	■	■		■	■	■	■	■
u(t) + i(t)							■	■
i(u)							■	■
Ramp							■	■
Ramp by voltage steps						■	■	■
R calculation (Tref)						■	■	■
I limit							■	■
Early break / burn-in							■	■
Storage	■	■			■	■	■	■
RS 232		■			■	■		
USB							■	■
Display								
LCD + bargraph	■	■	■	■	■			
Graphical						■	■	■
Power supply								
Batteries	■							
Rechargeable battery		■	■	■	■	■	■	■

HAND-CRANKED INSULATION TESTERS

C.A 6501 - C.A 6503

Ref. : P01132503 P01132504

300 V CAT III

IP 54

STRENGTHS

- Rugged plastic casing ideal for all-terrain use
- Special for on-site use
- No power supply required

CONTENTS

- C.A 6501 delivered in a shoulder bag
- 2 elbowed / straight PVC leads 1.5 m long (black/red)
- 2 crocodile clips (black/red)
- 1 black test probe

- C.A 6503 delivered in a shoulder bag
- 3 elbowed/straight PV leads 1.5 m long (black/red/blue)
- 3 crocodile clips (black/red/blue)
- 1 black test probe

SPECIFICATIONS

	C.A 6501	C.A 6503
Insulation		
Test voltage (DC)	500 V	250 V / 500 V / 1000 V
Range	0.5 to 200 MΩ	1 to 5,000 MΩ
Accuracy	2.5 % of full scale	2.5 % of full scale
Resistance		
Range	45 to 500 kΩ	-
Accuracy	2.5 % of full scale	
Continuity		
Range	0 to 100 Ω	-
Accuracy	2.5 % of full scale	
Voltage		
Range	0… 600 VAC	
Frequency	45 to 450 Hz	
Accuracy	3 % of full scale	
Display	Analogue	
Dimensions / weight	120 x 120 x 130 mm / 1.06 kg	
Power supply	Hand-cranked magneto providing a stable voltage	
Ingress protection	IP 54 with cover IP 52 without cover	
Electrical safety	IEC 61010 - 600 V CAT II / 300 V CAT III	

ACCESSORIES / REPLACEMENT PARTS

- Shoulder bag no. 2 — P01298006
- C.A 846 thermo-hygrometer — P01156301Z
- See all the accessories on page 102

ANALOGUE INSULATION TESTERS

C.A 6511 - C.A 6513

Ref. : P01140201 P01140301

600 V CAT III

IP 40

STRENGTHS

- Simple to use
- Rugged thanks to their shockproof sheath

SPECIFICATIONS

	C.A 6511	C.A 6513
Insulation		
Test voltage (DC)	500 V	500 V / 1000 V
Range	0.1 to 1,000 MΩ	
Accuracy	± 5 % of measurement	
Resistance		
Range	-	0 to 1,000 Ω
Accuracy	-	± 3 % of full scale
Continuity		
Range	–10 Ω to +10 Ω	
Accuracy	± 3 % of full scale	
Measurement current	≥ 200 mA	
Current reversal	Yes	
Voltage		
Range	0… 600 VAC	
Frequency	45 to 400 Hz	
Accuracy	± 3 % of full scale	
Display	Analogue	
Dimensions / weight	167 x 106 x 55 mm / 500 g (excl. sheath)	
Power supply	4 x 1.5 V LR06 batteries	
Electrical safety	IEC 61010 - 600 V CAT III	

ADDITIONAL INFO

- C.A 6511 : insulation at 500 V, continuity at 200 mA
- C.A 6513 : insulation at 1,000 V, continuity at 200 mA and resistance

CONTENTS

- C.A 6511 and C.A 6513 delivered mounted in their shockproof sleeves
- 2 elbowed/straight PVC leads 1.5 m long (black/red)
- 1 black test probe
- 1 red crocodile clip
- 4 x 1.5 V LR06 batteries
- 1 replacement fuse

ACCESSORIES / REPLACEMENT PARTS

- C.A 861 thermometer + K thermocouple P01650101Z
- C.A 846 thermo-hygrometer P01156301Z
- See all the accessories on page 102

DIGITAL INSULATION TESTERS

C.A 6522 - C.A 6524 - C.A 6526

Ref. : P01140822 P01140824 P01140826

600 V CAT IV | IP 54 | IEC 61557 | Bluetooth | TRMS

STRENGTHS

- Test voltage from 50 to 1,000 V
- Measurement range from 10 kΩ to 200 GΩ
- PI and DAR ratios to determine the quality of the insulation
- Alarms and Pass/Fail indicator LEDs (C.A 6526)
- Storage of up to 1,300 measurements

CONTENTS

- C.A 6522, C.A 6524 or C.A 6526
- 1 "hands-free" bag
- 2 elbowed-straight safety leads (red and black) 1.50 m long
- 1 red crocodile clip
- 1 black test probe
- 6 x LR6 batteries
- 1 CD-ROM containing the multilingual user manual
- 1 safety datasheet in 20 languages
- In addition, for the C.A 6526: 1 CD-ROM containing the Megohmmeter Transfer software

ACCESSORIES / REPLACEMENT PARTS

- Type-3 remote-control probe ____ P01102092A
- 2 elbowed-straight safety leads (red and black) 1.50 m long ____ P01295453Z
- See all the accessories on page 102

SPECIFICATIONS

	C.A 6522	C.A 6524	C.A 6526
	Industrial maintenance		
Voltage			
Measurement range / resolution	0.3 V - 399.9 V / 0.1 V; 400 V - 700 V / 1 V		
Accuracy / Input impedance	± (3 % + 2 cts) / 400 KΩ		
Operating frequency	DC; 15.3 - 800 Hz		
Frequency			
Measurement range / resolution / accuracy	-	15.3 Hz - 399.9 Hz / 0.1 Hz / ± (1 % + 2 cts) 400 - 800 Hz / 1 Hz / ± (1 % + 1 ct)	
Insulation			
Test voltage	250-500-1,000 V	50 - 100 - 250 - 500 - 1,000 V	
Range at maximum test voltage	40 GΩ	200 GΩ	
Compliance with IEC 61557-2 standard	2 GΩ		
Measurement range: 50 V	-	10 kΩ - 10 GΩ	
100 V	-	20 kΩ - 20 GΩ	
250 V	50 kΩ - 10 GΩ	50 kΩ - 50 GΩ	
500 V	100 kΩ - 20 GΩ	100 kΩ - 100 GΩ	
1,000 V	200 kΩ - 40 GΩ	200 kΩ - 200 GΩ	
Measurement range / resolution	10(1) - 999 KΩ and 1.000 - 3.999 MΩ / 1 KΩ; 4.00 - 39.99 MΩ / 10 kΩ 40.0 - 399.9 MΩ / 100 KΩ; 400 - 3,999 MΩ / 1 MΩ 4.00 - 39.99 GΩ / 10 MΩ; 40.0 - 200 GΩ / 100 MΩ		
Accuracy	± (3 % + 2 cts)(2)		
Test voltage (I < 1 mA)	-0 % + 20 %		
Test voltage display	± (3 % + 3 cts)		
Test current / resolution	-	0.01 µA - 39.99 µA / 10 nA; 40.0 - 399.9 µA / 100 nA; 0.400 - 2.000 mA / 1 µA	
Test current accuracy	-	± (10 % + 3 cts)	
PI/DAR ratios	-	10 min / 1 min - 1 min / 30 s	
Timer (min:s)	0:00 - 39:59		
Discharge time (at 25 V)	< 2 s/µF		
Alarms	-	2 fixed thresholds + 1 prog. threshold	
Continuity			
Continuity measurement range	0.00 Ω -10.00 Ω (200 mA)	0.00 Ω - 10.00 Ω (200 mA) 0.0 - 100.0 Ω (20 mA)	
Accuracy / Open-circuit voltage	± (2 % + 2 cts) / ≥ 6 V		
Measurement current	200 mA : 200 mA (-0 mA +20 mA) - 20 mA : 20 mA ± 5 mA		
Continuity thresholds (fast beep)	2 Ω fixe	2 Ω, 1 Ω , programmable threshold	
Cable compensation	Up to 9.99 Ω		
Resistance			
Measurement range / resolution	-	0 - 3,999 Ω / 1 Ω 4.00 kΩ - 39.99 kΩ / 10 Ω 40.0 kΩ - 399.9 kΩ / 100 Ω 400 kΩ - 1,000 kΩ / 1 kΩ	
Accuracy	± (3 % + 2 cts)		
Capacitance			
Measurement range / resolution	-	-	0.1 nF - 399.9 nF / 0.1 nF 400 nF - 3,999 nF / 1 nF 4.00 µF - 10.0 µF / 10 nF
Accuracy	-	-	± (3 % + 2 cts)
Line length			
General specifications			
Display	2 x 4,000 cts + logarithmic bargraph		
Storage	-	300 measurements	1,300 measurements
Communication	-	-	Bluetooth® Class II
Power supply / automatic power-off	6 x LR6 batteries / 5 min, deactivatable		
Battery life	1,500 measurements : U_N x 1 kΩ @ U_N (5 s ON / 55 s OFF) 3,000 continuity measurements (5 s ON / 55 s OFF)		
Dimensions / weight / IP rating	211 x 108 x 60 mm / 850 g / IP 54 / IK 04		
EMC / Electrical safety	IEC 61326-1 / IEC 61010-1 and IEC 61010-2-030, 600 V CAT IV		
Compliance with standards	IEC 61557 parts 1, 2, 4 and 10		

(1): 2 kΩ for the C.A 6532, C.A 6534 and C.A 6536.
(2): To be added: 10 V: 1 % per 0.1 GΩ; 25 V: 0.4 % per 0.1 GΩ, 50 V: 2 % per GΩ, 100 V: 1 % per GΩ; 250 V : 0.4 % per GΩ; 500 V: 0.2 % per GΩ; 1,000 V: 0.1 % per GΩ.

DIGITAL INSULATION TESTERS

C.A 6532 - C.A 6534 - C.A 6536

Ref. : P01140832 P01140834 P01140836

600 V CAT IV | IP 54 | IEC 61557 | Bluetooth | TRMS

STRENGTHS

- Test voltage from 50 to 500 V
- Measurement range from 2 kΩ to 50 GΩ
- ΔRel mode and configurable alarms
- Measurement of capacitance per unit length in nF/km (C.A 6532)
- 200 mA / 20 mA continuity with active fuseless protection

CONTENTS

- C.A 6532, C.A 6534 ou C.A 6536
- 1 “hands-free” bag
- 2 elbowed-straight safety leads (red and black) 1.50 m long
- 1 red crocodile clip
- 1 black test probe
- 2 wire grips (red/black)
- 6 x LR6 batteries
- 1 CD-ROM containing the multilingual user manual
- 1 safety datasheet in 20 languages
- 1 CD-ROM containing the Megohmmeter Transfer software (except C.A 6536)

ACCESSORIES / REPLACEMENT PARTS

- Type 3 remote-control probe ____ P01102092A
- 2 elbowed-straight safety leads (red and black) 1.50 m long ____ P01295453Z
- See all the accessories on page 102

SPECIFICATIONS

	C.A 6532 Telecom	C.A 6534 Electronics	C.A 6536 Avionics, ESD, aerospace, defence
Voltage			
Measurement range / resolution	0.3 V - 399.9 V / 0.1 V; 400 V - 700 V / 1 V		
Accuracy / input impedance	± (3 % + 2 cts) / 400 KΩ		
Operating frequency	DC ; 15.3 - 800 Hz		
Frequency			
Measurement range / resolution / Accuracy	15.3 Hz - 399.9 Hz / 0.1 Hz / ± (1 % + 2 cts) 400 - 800 Hz / 1 Hz / ± (1 % + 1 ct)	-	-
Insulation			
Test voltage	50 - 100 V	10-25-100-250-500 V	10 to 100 V 1 V increments
Range at maximum test voltage	20 GΩ	50 GΩ	20 GΩ
Compliance with IEC 61557-2 std	2 GΩ		
Measurement range: 10 V		2 kΩ - 1 GΩ	2 kΩ - 2 GΩ
25 V		5 kΩ - 2 GΩ	(UN/5) kΩ to
50 V	10 kΩ - 10 GΩ		(UN/5) GΩ
100 V	20 kΩ - 20 GΩ	20 kΩ - 10 GΩ	20 kΩ - 20 GΩ
250 V		50 kΩ - 25 GΩ	
500 V		100 kΩ - 50 GΩ	
Variable test voltage			10 to 100 V
Measurement range / resolution	10[1] - 999 KΩ and 1.000 - 3.999 MΩ / 1 KΩ; 4.00 - 39.99 MΩ / 10 KΩ 40.0 - 399.9 MΩ / 100 KΩ; 400 - 3,999 MΩ / 1 MΩ 4.00 - 39.99 GΩ / 10 MΩ; 40.0 - 200 GΩ / 100 MΩ		
Accuracy	± (3 % + 2 cts)[2]		± (3 % + 2 cts)[3]
Test voltage (I < 1 mA)	-0 % + 20 %		± 0.5 V
Test voltage display	± (3 % + 3 cts)		
Test current / resolution	0.01 µA - 39.99 µA / 10 nA; 40.0 - 399.9 µA / 100 nA 0.400 - 2.000 mA / 1 µA		
Accuracy of test current	± (10 % + 3 cts)		
PI/DAR ratios	10 min / 1 min - 1 min / 30 s	-	-
Timer (min:s)	0:00 - 39:59		
Discharge time (at 25 V)	< 2 s/µF		
Alarms	2 fixed thresholds + 1 programmable threshold		
Continuity			
Continuity measurement range	0.00 Ω - 10.00 Ω (200 mA); 0.0 - 100.0 Ω (20 mA)		
Accuracy / open-circuit voltage	± (2 % + 2 cts) / ≥ 6 V		
Measurement current	200 mA : 200 mA (-0 mA +20 mA) - 20 mA : 20 mA ± 5 mA		
Continuity thresholds (fast beep)	2 Ω, 1 Ω , programmable threshold		
Cable compensation	up to 9.99 Ω		
Resistance			
Measurement range / resolution	0 - 3,999 Ω / 1 Ω ; 4.00 kΩ - 39.99 kΩ / 10 Ω / ± (3 % +2 cts) 40.0 kΩ - 399.9 kΩ / 100 Ω 400 kΩ - 1,000 kΩ / 1 kΩ / ± (3 % + 2 cts)		
Capacitance			
Measurement range / resolution	0.1 nF - 399.9 nF / 0.1 nF 400 nF - 3,999 nF / 1 nF 4.00 µF - 10.0 µF / 10 nF	-	-
Accuracy	± (3 % + 2 cts)	-	-
Line length	0 - 100 km	-	-
General specifications			
Display	2 x 4,000 cts + logarithmic bargraph		
Storage	1,300 measurements		-
Communication	Bluetooth® Class II		-
Power supply / Automatic power-off	6 x LR6 battery / 5 min, deactivatable		
Battery life	1,500 measurements: UN x 1 kΩ @ UN (5 s ON / 55 s OFF) 3,000 continuity measurements (5 s ON / 55 s OFF)		
Dimensions / weight / IP rating	211 x 108 x 60 mm / 850 g / IP 54 / IK 04		
EMC / electrical safety	IEC 61326-1 / IEC 61010-1 and IEC 61010-2-030, 600 V CAT IV		
Compliance with standards	IEC 61557 parts 1, 2, 4 and 10		

(1) : 2 kΩ for the C.A 6532, C.A 6534 and C.A 6536.
(2) : To be added: 10 V: 1 % per 0.1 GΩ; 25 V: 0.4 % per 0.1 GΩ, 50 V: 2 % per GΩ, 100 V: 1 % per GΩ; 250 V: 0.4 % per GΩ; 500 V: 0.2 % per GΩ; 1,000 V: 0.1 % per GΩ.
(3) : To be added: 10 % /UN per 100 MΩ

DIGITAL INSULATION TESTERS

C.A 6541 - C.A 6543

Ref. : P01138901 P01138902

600 V CAT III

IP 53

STRENGTHS

- Test voltages from 50 V to 1,000 V
- Wide measurement range from 2 kΩ to 4 TΩ
- Automatic calculation of DAR / PI quality ratios
- Communication for C.A 6543

SPECIFICATIONS

	C.A 6541	C.A 6543
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 40 GΩ	±5 % of value ± 3 cts	
40 GΩ to 4 TΩ	±15 % of value ± 10 cts	
Programming of 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	
Adjustable PI	Time adjustable from 30 s to 59 min.	
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	
Memory - Communication		
Storage of R(t)	20-kbyte memory	128-kbyte memory
Storage of measurements	20 measurement results	Up to 1,500 measurement results
Direct report printing	-	On locally-connected printer, fixed format
Communication port	No	RS232
PC software	No	DataView® (option)
Display	Giant LCD + bargraph	Giant LCD + bargraph
Power supply	8 x LR14 batteries	NiMH rechargeable battery
Dimensions / weight	240 x 185 x 110 mm / 3.4 kg	240 x 185 x 110 mm / 3.4 kg
Electrical safety	IEC 61010 600 V CAT III – IEC 61557	IEC 61010 600 V CAT III – IEC 61557

ADDITIONAL INFO

- Site-proof casing with highly shock-resistant lid
- Delivered with an accessories bag which can be clipped onto the site-proof casing

CONTENTS

- C.A 6541 delivered with an accessories bag containing:
- 1 set of 2 leads 1.5 m long (red/blue)
- 1 black guarded lead 1.5 m long
- 3 crocodile clips (red/blue/black)
- 1 test probe (black)
- 8 x LR14 batteries
- C.A 6543 delivered with an accessories bag containing:
- 1 set of 2 leads 1.5 m long (red/blue)
- 1 black guarded lead 1.5 m long
- 3 crocodile clips (red/blue/black)
- 1 test probe (black)
- 1 power-supply lead 2 m long
- 1 communication cable

ACCESSORIES / REPLACEMENT PARTS

- Remote-control probe P01101935
- C.A 861 thermometer + K thermocouple P01650101Z
- See all the accessories on page 102

C.A 6505

Ref. : P01139704

1000 V CAT III | IP 53

STRENGTHS

- Fixed and programmable test voltages from 40 V to 5,100 V
- Wide measurement range from 10 kΩ to 10 TΩ
- Large LCD screen
- Automatic calculation of the DAR / PI quality ratios
- Measurement of voltage, capacitance and leakage current

SPECIFICATIONS

	C.A 6505
Insulation	
Test voltage	
500 V	10 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 400 GΩ	±5 % of value ± 3 cts
400 GΩ to 10 TΩ	±15 % of value ± 10 cts
Programming of test duration	1 to 59 min.
DAR (1 min. / 30 sec.)	0.02 to 50.00
PI (10 min. / 1 min.)	0.02 to 50.00
Customizable PI	Time adjustable from 30 s to 59 min.
Voltage test / Safety	0 to 1,000 VAC/DC
Voltage alert indicator	Yes > 25 V
Test inhibition	Yes > 25 V
Capacitance	0.001 to 49.99 µF
Leakage current measurement	0.001 nA to 3 mA
Display	Giant LCD + bargraph
Power supply	NiMH rechargeable battery
Dimensions / weight	270 x 250 x 180 mm / 4.3 kg
Electrical safety	IEC 61010 1000 V CAT III – IEC 61557

ADDITIONAL INFO

- Site-proof casing with highly shock-resistant lid
- Delivered with a shoulder bag

CONTENU

- C.A 6505 delivered with a shoulder bag containing:
- 2 simplified measurement leads 2 m long, equipped with an HV plug at each end
- 1 guarded safety lead 2 m long, equipped 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, equipped with an HV plug at one end and an HV plug with rear connection at the other end
- 3 crocodile clips (red, blue and black)
- 1 mains power-supply lead 1.80 m long

ACCESSORIES / REPLACEMENT PARTS

- C.A 846 thermohygrometer ____ P01156301Z
- C.A 846 thermometer + K thermocouple ____ P01650101Z
- See all the accessories on page 102

DIGITAL INSULATION TESTERS

C.A 6545 - C.A 6547

Ref. : P01139701 P01139702

1000 V CAT III

IP 53

STRENGTHS

- Fixed and programmable test voltages from 40 V to 5,100 V
- Wide measurement range from 30 kΩ to 10 TΩ
- Measurement filtering functions
- Automatic calculation of DAR / PI / DD ratios
- Storage and communication with the C.A 6547

SPECIFICATIONS

	C.A 6545	C.A 6547
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		
30 kΩ to 40 GΩ	±5 % of value ± 3 cts	
40 GΩ to 10 TΩ	±15 % of value ± 10 cts	
Programming of test duration	1 to 59 min.	
DAR (1 min. / 30 sec.)	0.02 to 50.00	
PI (10 min. / 1 min.)	0.02 to 50.00	
Customizable PI	Time adjustable from 30 s to 59 min.	
DD	0.02 to 50.00	
Voltage test /Safety	0 to 1,000 VAC/DC	
Voltage alert indicator	Yes > 25 V	
Test inhibition	Yes – Adjustable according to test voltage	
Smoothing function	Configurable – Digital filtering stabilizing the measurements	
Capacitance	0.005 to 49.99 µF	
Leakage current measurement	0.001 nA to 3 mA	
Memory – Communication		
Storage of R(t)	4-kbyte memory	128-kbyte memory
Storage of measurements	20 measurement results	Up to 1,500 measurement results
Direct report printing	No	On locally-connected printer, fixed format
Communication port	No	RS232
PC software	No	DataView® (option)
Display	Giant LCD + bargraph	
Power supply	NiMH rechargeable battery	
Dimensions / weight	270 x 250 x 180 mm / 4.3 kg	
Electrical safety	IEC 61010 1000 V CAT III – IEC 61557	

ADDITIONAL INFO

- Compatible with the DataView® software
- Delivered with a shoulder bag

CONTENTS

- C.A 6545 delivered with a shoulder 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 rear-connection HV plug and HV crocodile clip (black)
- 1 cable with rear connection (blue) 0.35 m long
- 1 mains power cable 2 m long
- C.A 6547 delivered with a shoulder 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 rear-connection HV plug and HV crocodile clip (black)
- 1 cable with rear connection (blue) 0.35 m long
- 1 mains power cable 2 m long
- 1 communication cable

ACCESSORIES / REPLACEMENT PARTS

- C.A 846 thermo-hygrometer P01156301Z
- C.A 861 thermometer+K thermocouple P01650101Z
- See all the accessories on page 102

C.A 6549

Ref. : P01139703

1000 V CAT III | IP 53

STRENGTHS

- Calculation of the resistance at a reference temperature
- Graphical display of R(t) curves
- Fixed and programmable test voltages from 40 V to 5,100 V
- Wide measurement range from 30 kΩ to 10 TΩ
- Test by voltage ramp

ADDITIONAL INFO

- Compatible with the DataView® software
- Delivered with a shoulder bag

CONTENTS

- C.A 6549 delivered with a shoulder 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 rear-connection HV plug and HV crocodile clip (black)
- 1 cable with rear connection (blue) 0.35 m long
- 1 mains power cable 2 m long
- 1 communication cable

ACCESSORIES / REPLACEMENT PARTS

- C.A 846 thermo-hygrometer P01156301Z
- C.A 861 thermometer+K thermocouple P01650101Z
- See all the accessories on page 102

SPECIFICATIONS

	C.A 6549
Insulation	
Test voltage	
500 V	30 kΩ to 2 TΩ
1,000 V	100 kΩ to 4 TΩ
2,500 V	300 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
Automatic voltage increments	Programmable value and duration up to 5 steps, three profiles stored
Accuracy	
30 kΩ to 40 GΩ	±5 % of value ± 3 cts
40 GΩ to 10 TΩ	±15 % of value ± 10 cts
test duration programming	1 to 59 min.
DAR (1 min. / 30 sec.)	0.02 to 50.00
PI (10 min. / 1 min.)	0.02 to 50.00
Customizable PI	Time adjustable from 30 s to 59 min.
DD	0.02 to 50.00
Voltage test / Safety	0 to 1,000 VAC/DC
Voltage alert indicator	Yes > 25 V
Test inhibition	Yes – Adjustable according to test voltage
Smoothing function	Configurable – Digital filtering stabilizing the measurements
Capacitance	0.005 to 49.99 µF
leakage current measurement	0.001 nA to 3 mA
Memory– Communication	
Storage of R(t)	Viewing on display + Storage of the samples
Storage of measurements	Up to 1,500 measurement results
Direct report printing	On locally-connected printer, fixed format
Communication port	RS-232
PC software	DataView® (option)
Display	Wide graphical screen
Power supply	NiMH rechargeable battery
Dimensions / weight	270 x 250 x 180 mm / 4.3 kg
Electrical safety	IEC 61010 1000 V CAT III – IEC 61557

DIGITAL INSULATION TESTERS

C.A 6550 - C.A 6555

Ref. : P01139705 P01139706

1000 V CAT IV

IP 54

STRENGTHS

- Fixed and programmable test voltages from 40 V to 10/15 kV
- Wide measurement range from 10 kΩ to 30 TΩ
- 5 mA charging current
- Digital graphical display and bargraph of the R(t) + U(t), i(t) and i(u) curves in real time
- Ramp and voltage step tests

ADDITIONAL INFO

- Resistance calculation at a reference temperature
- memory capacity: 80,000 measurements
- Optically-isolated USB communication
- 2 levels of diagnostics available :
  - Go / No go
  - Qualitative measurement for preventive maintenance

CONTENTS

- C.A 6550 and C.A 6555 delivered with a shoulder bag containing:
- 2 safety leads 3 m long equipped with an HV plug at each end (red/blue)
- 1 guarded safety lead 3 m long equipped with an HV plug at one end and an HV plug with rear connection at the other end (black)
- 3 crocodile clips (red, blue, black)
- 2 x CAT IV 1000 V test probes (red/black) for voltage measurement
- 1 blue lead 0.5 m long with rear connection
- 1 mains power cable 2 m long
- DataView® software
- 1 optical / USB communication cable
- 1 CD-Rom containing the user manual

ACCESSORIES / REPLACEMENT PARTS

- 2 red/black test probes — P01295454Z
- 3 crocodile clips (red/blue/black) — P01103062
- See all the accessories on page 102

SPECIFICATIONS

	C.A 6550	C.A 6555
Test voltages	10 kV	15 kV
Insulation measurement		
Ranges	500 V : 10 kΩ to 2 TΩ	
	1,000 V : 10 kΩ to 4 TΩ	
	2,500 V : 10 kΩ to 10 TΩ	
	5,000 V : 10 kΩ to 15 TΩ	
	10,000 V : 10 kΩ to 25 TΩ	
		15,000 V : 10 kΩ to 30 TΩ
Fixed test voltages	500 / 1,000 / 2,500 / 5,000 / 10,000 V	500 / 1,000 / 2,500 / 5,000 / 10,000 / 15,000 V
Variable test voltages	40 V - 10,000 V 3 preconfigurable voltage values	40 V - 15,000 V 3 preconfigurable voltage values
Adjustment increment for variable voltages	Variable: 40-10 kV Increment: 40 V - 1 kV: 10 V 1 kV - 10 kV: 100 V	Variable: 40-15 kV Increment: 40 V - 1 kV: 10 V 1 kV - 15 kV: 100 V
Ramp mode	3 preconfigurable ramps: start voltage / end voltage / duration	
Ramp configuration range	40-1,100 V / 500-10,000 V	40-1,100 V / 500-15,000 V
Step mode	Up to 10 plateaux (values and duration configurable for each plateau)	
Voltage measurement before and after test	AC : 0 - 2,500 V DC : 0 - 4,000 V	
Capacitance measurement (> 500 V)	0.001-9.999 µF / 10.00-49.99 µF	
Leakage current measurement	0 - 8 mA	
Discharge after test	Yes / automatic	
Additional test stop modes		
I-limit	Programmable 0.2 - 5 mA	
Early-break	di/dt	
Timer	Up to 99:59 minutes	
Debug mode		
Burn-in	Permanent test	
Calculation of ratios	PI, DAR, DD, SV, ΔR (ppm/V)	
Calculation of R at ref. temp.	Yes	
Measurement display filter	3 filters with variable time constant	
Graphs on display	R(t)+u(t) ; i(t) ; i(u)	
Storage	256 recordings, 80,000 cts R, U, I and date-stamp	
Communication	Optically-isolated port for USB and RS232 connection	
PC software	DataView®	
Power supply	NiMH rechargeable batteries, 8 x 1.2 V / 4,000 mAh Charging by 90-260 V 50/60 Hz external voltage	
Electrical safety	1000 V CAT IV - IEC 61010-1 and IEC 61557	
Dimensions / weight	406 x 330 x 174 mm, 6 kg approx.	

MULTIMETER CLAMPS FOR LEAKAGE CURRENT

F62 - F65

Ref. : P01120760 P01120761

10 µA | **10,000 counts**

STRENGTHS

- Quick leakage-current testing
- Troubleshooting of insulation faults on live installations
- 50/60 Hz filter

CONTENTS

- F62 & F65 delivered with 1 shoulder bag
- 1 set of straight banana/elbowed banana leads
- 1 set of safety test probes
- 2 x 1.5 V LR03 batteries

ACCESSORIES / REPLACEMENT PARTS

- Red + black crocodile clips in blister pack (set of 2) _____ P01295457Z
- Elbowed test-probe leads, 1.5 m (1 red /1 black) _____ P01295456Z
- See all the accessories on page 102

SPECIFICATIONS

				F62		F65	
Display				10,000 counts - 2 measurements / s			
Acquisition				AVG		TRMS	
Function	**Unit**	**Calibre**	**Resolution**	**Accuracy**			
				with 50-60 Hz filter		with 50-60 Hz filter	
Current	mA AC	60 mA	10 µA	1.2% ± 5 cts	2.5% ± 5 cts 60 - 500 Hz	1.2% ± 5 cts	2.5% ± 5 cts (60-500 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 60 - 500 Hz	1.2% ± 5 cts	2.5% ± 5 cts (60-500 Hz)
		80 A	10 mA				3.5% ± 10 cts (500-3 kHz)
		100 A		5% ± 5 cts	5% ± 5 cts (50-60 Hz)	5% ± 5 cts	5% ± 5 cts (50-60 Hz)
Voltage	V AC	600 V	0.1 V	1.0% ± 5 cts (50-60 Hz) 1.2% ± 5 cts (60-500 Hz)		1.0 % ± 5 cts (50-60 Hz) 1.2% ± 5 cts (60-500 Hz) 2.5 % ± 5 cts (500-3 kHz)	
	V DC	600 V	0.1 V	1% ± 2 cts			
Resistance	Ω	1 kΩ	0.1 Ω	1% + 3 cts (VTest ≤ 3.3 VDC)			
Audible continuity	Buzzer < 35 Ω						
Frequency	A	100 Hz 1 kHz	0.1 Hz 1 Hz	0.5% ± 2 cts (I > 10 mA)			
	V	100 Hz 1 kHz	0.1 Hz 1 Hz	0.5% ± 2 cts (V > 5 VAC)			
Max. value				100 ms			
Backlighting				Yes			
Deactivatable automatic power-off				Yes			
Clamping diameter				28 mm			
Dimensions / weight				218 x 64 x 30 mm / 280 g (with batteries)			
Standards				IEC 61010-1 / IEC 61010-2-032 / IEC 61010-2-033			
Installation category				300 V CAT III			
Enclosure protection rating				IP 30 as per EN 60529			

CHOOSE YOUR EARTH TESTER

C.A 6421
page 80

C.A 6423
page 80

C.A 6460
page 81

C.A 6462
page 81

Type				
	Earth testers			
Earth				
3P method	■	■	■	■
4P method			■	■
Automatic coupling				
Selective earth				
Earth clamp				
4P + clamp method				
2-clamp method				
Pylon earth measurement				
Resistivity				
Manual			■	■
Automatic				
Contact voltage measurement				
Measurement of potential			■	■
Continuity				
Earth potential				
Measurement frequency				
Single frequency: 128 Hz	■	■	■	■
Single frequency: 2,083 Hz				
41 to 512 Hz				
41 to 5,078 Hz				
Measurement of Rs, Rh				
Measurement of Ustray				
Display				
Analogue	■			
LCD		■	■	■
3-display LCD				
OLED				
Storage / Communication				
Storage				
Communication				
Optical USB interface				
Bluetooth®				
Power supply				
Batteries	■	■	■	
Rechargeable batteries				■
PC / Tablet software				
GTT/ DataView®				
GTC				
Tablet application				

CHOOSE YOUR EARTH AND RESISTIVITY TESTER





	C.A 6470N TERCA 3 page 82	C.A 6471 page 83	C.A 6472 page 84	C.A 6416 page 86	C.A 6417 page 86
Type	Earth and resistivity testers			Earth testers	
Earth					
3P method	■	■	■		
4P method	■	■	■		
Automatic coupling	■	■	■		
Selective earth					
Earth clamp				■	■
4P + clamp method		■	■		
2-clamp method		■	■		
Pylon earth measurement*			■		
Resistivity					
Manual					
Automatic	■	■	■		
Contact voltage measurement				■	■
Measurement of potential	■	■	■		
Continuity	■	■	■		
Earth potential			■		
Measurement frequency					
Single frequency: 128 Hz					
Single frequency: 2,083 Hz				■	■
41 to 512 Hz	■	■			
41 to 5,078 Hz			■		
Measurement of Rs, Rh	■	■	■		
Measurement of Ustray	■	■	■		
Display					
Analogue					
LCD					
3-display LCD	■	■	■		
OLED				■	■
Storage / Communication					
Storage	■	■	■	■	■
Communication	■	■	■		■
Optical USB interface	■	■	■		
Bluetooth®					■
Power supply					
Batteries				■	■
Rechargeable batteries	■	■	■		
PC / Tablet software					
GTT/ DataView®	■	■	■		
GTC					■
Tablet application					■

*Used with the C.A 6474

EARTH TESTERS

C.A 6421 - C.A 6423

Ref. : P01123011 P01127013

IP 54

STRENGTHS

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

SPECIFICATIONS

	C.A 6421	C.A 6423
Measurement	Earth	
Type	2P & 3P	
Resistivity	No	
Measurement range	0.5 to 1,000 Ω	0.01 to 2,000 Ω (in 3 automatic calibres)
Resolution	-	10 mΩ / 100 mΩ / 1 Ω (depending on calibre)
Accuracy	± (5 % + 0.1 % at full scale)	± (2 % + 1 pt)
No-load voltage	≤ 24 V	≤ 48 V
Frequency	128 Hz	
Alarms	3 fault indicator LEDs	
Power supply	8 x 1.5 V LR06 batteries	
Display	Analogue	2,000-count digital LCD
Electrical safety	IEC 61010 & IEC 61557	
Dimensions / weight	238 x 136 x 150 mm / 1.3 kg	

CONTENTS

- C.A 6421 and C.A 6423 delivered with transport strap
- 8 x 1.5 V LR06 batteries

ACCESSORIES / REPLACEMENT PARTS

- Transport strap P01298005
- HRC fuse, 0.1 A - 250 V (x 10) P01297012
- See all the accessories on page 102

EARTH / RESISTIVITY / COUPLING TESTERS

C.A 6460 - C.A 6462

Ref. : P01126501 P01126502

IP 53

CONTENTS

- C.A 6460 delivered with 8 x 1.5 V LR06 batteries
- C.A 6462 delivered with 1 mains lead for recharging

STRENGTHS

- 3-in-1 testers: resistivity, earth and coupling
- Validation of the measurement by self-diagnosis: 3 LEDs indicating the presence of faults liable to make the measurement result invalid
- Highly-resistant site-proof casing with lid for use in severe field conditions
- Large LCD display with backlighting

SPECIFICATIONS

	C.A 6460	C.A 6462
Measurement	Earth / resistivity / coupling	
Type	3P & 4P	
Measurement range	0.01 to 2,000 Ω (in 3 automatic calibres)	
Resolution	10 mΩ / 100 mΩ / 1 Ω (depending on calibre)	
Accuracy	± (2 % + 1 ct)	
No-load voltage	≤ 42 V peak	
Frequency	128 Hz	
Alarms	3 fault indicator LEDs	
Power supply	8 x 1.5 V LR06 batteries	NiMH rechargeable battery
Display	2,000-count digital LCD	
Electrical safety	IEC 61010 & CEI 61557	
Dimensions	273 x 247 x 127 mm (handle folded away)	
Weight	2.8 kg	3.3 kg

ACCESSORIES / REPLACEMENT PARTS

- European 2P mains lead P01295174
- HRC fuse, 0.1 A - 250 V (x 10) P01297012
- See all the accessories on page 102

EARTH / RESISTIVITY / COUPLING / CONTINUITY TESTER

C.A 6470N TERCA 3

Ref. : P01126506

IP 53 | 50 V CAT IV

STRENGTHS

- 4-in-1 tester: Earth / Resistivity / Coupling / Continuity
- Suitable for industry, housing and electricity companies

SPECIFICATIONS

	C.A 6470N
3P method	
Range (automatic selection)	0.01 Ω to 99.9 kΩ
Resolution	0.01 to 100 Ω
Test voltage	16 or 32 V, selectable
Measurement frequency	41 to 513 Hz, automatic or manual
Test current	Up to 250 mA
Accuracy	± 2 % of value ± 1 ct
4P method	
Range	0.001 Ω to 99.99 kΩ
Resolution	0.001 to 10 Ω
Test voltage	16 V or 32 V
Measurement frequency	41 to 513 Hz, automatic or manual
Test current	Up to 250 mA
Measurement accuracy	± 2 % of value ± 1 ct
Soil resistivity measurement - 4P method	
Measurement method	Wenner or Schlumberger method with automatic calculation of the results and display in Ω-metre
Range (automatic selection)	0.01 Ω to 99.99 kΩ
Resolution	0.01 Ω to 100 Ω
Test voltage	16 or 32 V, selectable
Measurement frequency	41 to 128 Hz
External voltage measurement	
Range (automatic selection)	0.1 to 65.0 VAC/DC - DC and 15-440 Hz
Accuracy	± 2 % of value + 1 ct
Resistance / continuity measurement - earth connection test)	
Measurement type	2P or 4P method, selectable
Range (automatic selection)	2P : 0.01 Ω to 99.9 kΩ 4P : 0.001 Ω to 99.99 kΩ
Accuracy	± 2 % of value + 3 cts
Test voltage	16 VDC (polarity +, – or auto)
Test current	> 200 mA for R < 20 Ω
Storage	
Memory capacity	512 test results
Communication	Optically-isolated USB
Power supply	Rechargeable battery
Charger power supply	External power supply with 18 VDC / 1.5 A output or 12 VDC vehicle power supply
Dimensions / weight	272 x 250 x 128 mm / 3.2 kg
Electrical safety	50 V CAT IV

CONTENTS

- C.A 6470N delivered with:
- 1 mains adapter
- 1 x 2-pole mains power cable for battery recharging on the mains
- Data export software
- 1 optical / USB communication cable
- 1 CD-Rom containing the user manual
- 5 specifications labels

ACCESSOIRES / RECHANGES

- DataView® report generation software ____ P01102095
- Adapter for battery-charging on vehicle cigarette-lighter ____ P01102036
- See all the accessories on page 102

EARTH / SELECTIVE EARTH / RESISTIVITY / COUPLING / CONTINUITY TESTER

C.A 6471

Ref. : P01126505

IP 53 | 50 V CAT IV

STRENGTHS

- 5-in-1 tester: Earth / Selective earth / Resistivity / Coupling / Continuity
- Ideal for industry and electricity companies

CONTENTS

- C.A 6471 delivered with:
- 1 mains adapter
- 1 x 2-pole main power cable for battery recharging on the mains
- Data export software
- 1 optical / USB communication cable
- 2 x C182 clamps with 2 safety leads
- 1 carrying bag
- 1 CD-Rom containing the user manual
- 5 specifications labels

ACCESSORIES / REPLACEMENT PARTS

- DataView® report generation software ____ P01102095
- Adapter for battery recharging on vehicle cigarette lighter _ P01102036
- See all the accessories on page 102

SPECIFICATIONS

	C.A 6471
Measurements with 2 clamps	
Range	0.01 to 500 Ω
Resolution	0.01 to 1 Ω
Measurement frequency	Auto : 1,611 Hz Manual : 128 Hz - 1,367 Hz - 1,611 Hz - 1,758 Hz
3P method	
Range (automatic selection)	0.01 Ω to 99.9 kΩ
Resolution	0.01 Ω to 100 Ω
Test voltage	16 V or 32 VRMS rated voltage, selectable
Measurement frequency	41 to 513 Hz, automatic or manual
Test current	Up to 250 mA
Accuracy	± 2 % of value + 1 ct at 128 Hz
4P method / 4P+clamp measurement	
Range	0.001 Ω to 99.99 kΩ
Resolution	0.001 to 100 Ω
Test voltage	16 V or 32 V, selectable
Measurement frequency	41 to 513 Hz, automatic or manual
Test current	Up to 250 mA
Measurement accuracy	± 2 % of value ± 1 ct
Soil resistivity measurement	
Measurement method	Wenner or Schlumberger method with automatic calculation of the results and display in Ω-metre
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 128 Hz, selectable
External voltage measurement	
Range (automatic selection)	0.1 to 65.0 VAC/DC - DC and 15-440 Hz
Accuracy	± 2 % of value + 1 ct
Resistance / Continuity measurement - (earth connection test)	
Measurement type	2P or 4P method, selectable
Range (automatic selection)	2P: 0.01 Ω to 99.9 kΩ; 4P : 0.001 Ω to 99.99 kΩ
Accuracy	± 2 % of value + 2 cts
Test voltage	16 VDC (polarity +, – or auto)
Test current	> 200 mA for R < 20 Ω
Storage	
Memory capacity	512 test results
Communication	Optically-isolated USB
Power supply	Rechargeable battery
Charger power supply	External power supply with 18 VDC / 1.9 A output or 12 VDC
Dimensions / weight	272 x 250 x 128 mm / 3.2 kg
Electrical safety	50 V CAT IV

EARTH AND RESISTIVITY TESTERS

EARTH / SELECTIVE EARTH / RESISTIVITY / COUPLING / CONTINUITY / PYLON EARTH TESTER

STRENGTHS

- All types of earth resistance measurement & pylon earth measurement (with the C.A 6474)
- Resistivity (Wenner + Schlumberger methods)
- Earth coupling
- Soil potential measurement
- Continuity / resistance

CONTENTS

- C.A 6472 delivered with:
- 1 mains adapter
- 1 x 2-pole mains power cable for battery recharging on the mains
- Data export software
- 1 optical / USB communication cable
- 2 x C182 clamps with 2 safety leads
- 1 carrying bag
- 1 CD-Rom containing the user manual
- 5 specifications labels

ACCESSORIES / REPLACEMENT PARTS

- DataView® report generation software ____ P01102095
- Adapter for battery charging on vehicle cigarette lighter ____ P01102036
- See all the accessories on page 102

C.A 6472

Ref. : P01126504

IP 53 | 50 V CAT IV

SPECIFICATIONS

	C.A 6472
3P measurements	
Range (automatic selection)	0.01 Ω to 99.9 kΩ
Resolution	0.01 Ω to 100 Ω
Test voltage	16 V or 32 VRMS rated voltage, selectable
Measurement frequency	41 to 5.078 Hz, automatic or manual
Test current	Up to 250 mA
Accuracy	± 2 % R +1 ct at 128 Hz
Measurements with 2 clamps	
Range	0.01 to 500 Ω
Resolution	0.01 to 1 Ω
Measurement frequency	Auto: 1,611 Hz - Manual: 128 Hz - 1,367 Hz - 1,611 Hz - 1,758 Hz
4P method / 4P+clamp measurement	
Range	0.001 Ω to 99.99 kΩ
Resolution	0.001 to 10 Ω
Test voltage	16 V or 32 V, selectable
Measurement frequency	41 to 5,078 Hz, automatic or manual
Test current	Up to 250 mA
Measurement accuracy	± 2 % of value ± 1 ct
Soil resistivity measurement - 4P method	
Measurement method	Wenner or Schlumberger method with automatic calculation of the results and display in Ω-metre
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
Earth potential measurement	
Measurement range	0.00 to 65.00 V
Resolution	0.01mV to 10 mV
Measurement frequency	41 to 5,078 Hz
Accuracy	± 5% + 1 ct at 128 Hz
External voltage measurement	
Range (automatic selection)	0.1 to 65.0 VAC/DC - DC and 15-450 Hz
Accuracy	± 2 % of value + 1 ct
Resistance / Continuity measurement	
Measurement type	2P or 4P method, selectable
Range (automatic selection)	2P : 0.01 Ω to 99.9 kΩ 4P : 0.001 Ω to 99.99 kΩ
Accuracy	± 2 % of value + 2 cts
Test voltage	16 VDC (polarity +, – or auto)
Test current	> 200 mA for R < 20 Ω
Storage	
Memory capacity	512 test results
Communication	Optically-isolated USB
Power supply	Rechargeable battery
Charger power supply	External power supply with 18 VDC / 1.9 A output or 12 VDC vehicle power supply
Dimensions / weight	272 x 250 x 128 mm / 3.2 kg
Electrical safety	50 V CAT IV

SPECIALLY FOR MEASUREMENTS ON PYLONS

C.A 6474

Ref. : P01126511

IP 53

STRENGTHS

- **Used with the C.A 6472 for measurements on pylons**
- Overall line impedance
- Pylon earth resistance
- Resistance of each pylon footing
- Quality of overhead earth wire connection

SPECIFICATIONS

	C.A 6474 / PYLON BOX
Measurements	
Measurement type	Overall pylon earth resistance Earth resistance of each pylon footing Overall line impedance Quality of overhead earth wire connection. Active measurement (injection by the C.A 6472) Passive measurement (use of eddy currents)
Range	0.067 Ω to 99.99 kΩ
Accuracy	± (5 % + 1 ct)
Frequency	41 to 5,078 Hz
Frequency sweep	Yes
Dimensions	272 x 250 x 128 mm
Weight	2.3 kg
Power supply / Storage / Display	Provided by the C.A 6472

ADDITIONAL INFO

Possibility of connecting several AmpFlex® sensors in series for a length > 8 metres

The complete Pylon Earth Kit is available to order with the code P01299930. It comprises:

- C.A 6472
- C.A 6474
- 5 m AmpFlex®
- 100 m earth kit

For the 8 m AmpFlex® version of the complete pylon earth kit, order:

- C.A 6472 — P01126504
- C.A 6474 — P01126511
- 100 m earth kit — P01102024

CONTENTS

- C.A 6474 delivered with an accessories bag containing:
- 1 connection cable
- 6 BNC/BNC cables 15 m long
- 4 AmpFlex® flexible current sensors 5 m long
- 1 set of 12 identification rings for AmpFlex®
- 2 cables (5 m green, 5 m black) with safety plugs on winder
- 5 spade lug/Ø 4 mm banana plug adapters
- 3 adjustable clamps
- 1 calibration loop
- 5 specifications labels

Available with 8 m AmpFlex® sensor

ACCESSORIES / REPLACEMENT PARTS

- Connection cable between the C.A 6472 and C.A 6474 — P01295271
- 15 m BNC/BNC cable — P01295272
- See all the accessories on page 102

EARTH AND RESISTIVITY TESTERS

C.A 6416 - C.A 6417

Ref. : P01122015 P01122016

600 V CAT IV

IP 40

STRENGTHS

- Quick earth-loop testing
- OLED screen and force compensation system
- Simultaneous display of Ω and A
- Contact voltage alarm

ADDITIONAL INFO

- Automatic measurement HOLD when the clamp is opened
- Android application downloadable from Google Play

CONTENTS

- 1 clamp delivered in a shoulder bag
- 4 x 1.5 V LR06 batteries
- 1 verification certificate
- 1 CD-ROM containing the user manual
- The C.A 6417 is delivered with the simplified GTC driver as well

ACCESSORIES / REPLACEMENT PARTS

- Bluetooth USB modem P01102112
- CL1 calibration loop P01122301
- See all the accessories on page 102

SPECIFICATIONS

	C.A 6416	C.A 6417
Loop ohmmeter 1,500-count display	Measurement ranges (Ω) / Resolution (Ω) / Accuracy	
	0.010 to 0.099 / 0.001 / ±1.5 % ±0.01	
	0.10 to 0.99 / 0.01 / ±1.5 % ±2 r (r = resolution)	
	1.0 to 49.9 / 0.1 / ±1.5 % ±r	
	50.0 to 99.5 / 0.5 / ±2 % ±r	
	100 to 199 / 1 / ±3 % ±r	
	200 to 395 / 5 / ±5 % ±r	
	400 to 590 / 10 / ±10 % ±r	
	600 to 1,150 / 50 / Approx. 20 %	
	1,200 to 1,500 / 50 / Approx. 25 %	
Frequencies	Measurement frequency: 2,083 Hz Translation frequency: 50, 60, 128 or 2,083 Hz	
Loop inductance measurement	Measurement ranges (µH) / Resolution (µH) / Accuracy	
	10 to 100 / 1 / ±5 %±r	
	100 to 500 / 1 / ±3 %±r	
Contact voltage (calculated)	Measurement ranges (V) / Resolution (V) / Accuracy	
	0.1 to 4.9 / 0.1 / ±5 %+r	
	5.0 to 49.5 / 0.5 / ±5 %+r	
	50.0 to 75.0 / 1 / ±10 %+r	
Ammeter 4,000-count display	Measurement ranges (A) / Resolution (A) / Accuracy	
	0.200 to 0.999 mA / 1 µA / ±2 % ±50 µA	
	1.000 to 2.990 mA - 3.00 to 9.99 mA / 10 µA / ±2 % ±50 µA	
	10.00 to 29.90 mA - 30.0 to 99.9 mA / 100 µA / ±2 %±r	
	100.0 to 299.0 mA - 0.300 to 0.990 A / 1 mA / ±2 %±r	
	1.000 to 2.990 A - 3.00 to 39.99 A / 10 mA / ±2 %±r	
Setup		
Modes	Standard or advanced	
Alarms	Configurable on Z, V and A	
Buzzer	Active / Inactive	
HOLD	Manual or automatic PRE-HOLD	
Automatic power-off	Active / Inactive	
General specifications		
Display	152-segment OLED. Active area: 48 x 39 mm	
Max. clamping diam.	Ø 35 mm	
Storage	300 time/date-stamped measurements	2,000 time/date-stamped measurements
Communication		Bluetooth® Class 2
Power supply	4 x 1.5 V LR06 alkaline batteries or 4 x Ni-MH rechargeable batteries	
Battery life	1,440 x 30-second measurements	
Calibration	Automatic at startup	
Electrical safety	IEC 61010 600 V CAT IV	
Ingress protection	IP40	
Dimension / weight	55 x 95 x 262 mm / Approx. 935 g with batteries	

CHOOSE YOUR ELECTRICAL EQUIPMENT TESTER

	C.A 6121 page 88	C.A 6160 page 89	C.A 6155 page 90
Insulation			
250 VDC		■	■
500 VDC	■	■	■
1,000 VDC	■	■	
Dielectric tests			
1,000 / 1,250 / 1,500 VAC	■		
1,000 / 1,890 / 2,500 VAC			■
100 to 5,000 VAC		■	
Continuity			
I test > 10 A	■	■	■
I test 0.2 A		■	■
I test 0.1 A		■	
I test 25 A		■	
Voltage drop			
I test 10 A	■	■	
Via Zi			■
Discharge time			
Discharge time at 60 V	■	■	■
Leakage current			
Via socket		■	■
Substitution method (residual)		■	■
Contact leakage current		■	■
Direct method via clamp			■
Functional testing			
Apparent power S, voltage V		■	■
Active power, current, frequency & cos φ		■	
Loop impedance & loop resistance			
Zs-loop (L-PE) (Trip), Calculation of Ik (PFC)			■
Zs-loop (L-PE) (No Trip), Calculation of Ik (PFC)			■
Zi-loop (L-N or LL), Calculation of Isc (PSCC)			■
RCD & PRCD testing			
PRCD x 0.5 / x 1 / x 5x IΔn			■
RCD x 0.5 / x 1 / x 2 / x 5x IΔn			■
Other functions			
Alarms	■	■	■
Phase sequence			■
Storage / communication			
Storage	■ (999)	■ (1600)	■ (6000)
RS232 / USB communication	■	■	■ ■
Transmission of results to printer	■	■	■
Interface for pedal (START/STOP, SAVE) and lamps	■	■	
Interface for barcode		■	■
DOOR OPEN interface		■	
PC software	MachineLink	CELink	CALink

ELECTRICAL EQUIPMENT TESTERS

C.A 6121

Ref. : P01145601

600 V CAT III

IP 40

STRENGTHS

- Insulation
- Dielectric test
- Continuity
- Voltage drop
- Discharge time

CONTENTS

- C.A 6121
- 1 accessories bag
- 2 dielectric 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 supply cable

ACCESSORIES / REPLACEMENT PARTS

- Machine Link Windows processing software (supplied with communication cable) — P01101915
- Series printer no. 5 — P01102903
- See all the accessories on page 102

SPECIFICATIONS

	C.A 6121
Insulation	
Test voltage	500 / 1,000 VDC
Measurement range	1 kΩ to 500 MΩ
Accuracy 0 to 200 MΩ	± (2 % R + 2 cts)
Dielectric tests	
Test voltage	1,000 / 1,250 / 1,500 VAC (50 Hz) for Umains = 230 V and at 500 VA
Measurement range	0 to 500 mA
Accuracy	± (2 % R + 0.3 mA) For trigger current set to 1, 3, 5, 10 or 20 mA
	± (2 % R + 0.5 mA) For trigger current set to 30, 40, 50, 60, 70, 80, 90 or 100 mA
	± (2 % R + 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	± (2 % R + 2 mΩ)
Voltage drop	
Test current	10 A
Measurement range	0 to 10 V
Accuracy	± (2 % R + 0.02 V)
Discharge time	External (2 cts) or internal (4 cts)
Range	0 - 10 s
Accuracy	± (2 % R + 0.2 s)
Storage	999 measurements
Communication output	RS232
Power supply	230 V / 50 Hz mains supply
Dimensions / weight	400 x 260 x 250 mm / 11 kg
Electrical safety	IEC 61010-1 - 600 V CAT III

C.A 6160

Ref. : P01145801

300 V CAT III

IP 50

STRENGTHS

- Insulation
- Dielectric test
- Continuity
- Voltage drop
- Discharge time
- Leakage current

SPECIFICATIONS

	C.A 6160
Insulation	
Test voltage	250 / 500 / 1,000 VDC
Measurement range	0.000 MΩ to 999 MΩ
Accuracy	0.000 to 1.999 MΩ: ±(5 % R + 10 cts) 2.000 to 199.9 MΩ: ±(3 % R + 3 cts) 200 to 999 MΩ: ±(10 % R + 10 cts)
Dielectric test	
Test voltage	100 to 5,000 VAC - 50 Hz/60 Hz for Umains = 230 V at 500 VA
Trigger current	0.5 to 500 mA up to 500 VA
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
Accuracy at 10 / 25 A	(3 % R + 3 cts)
Voltage drop	0.00 to 99.99 V at 10 A
Discharge time	External (at mains socket) Internal (components)
Leakage current	
Measurement range	0.00 to 20.0 mA
Accuracy	±(5 % R + 3 cts)
Residual leakage current	
Measurement range	0.00 to 20.0 mA
Accuracy	±(5 % R + 3 cts)
Contact leakage current	
Measurement range	0.00 to 2.00 mA
Accuracy	±(5 % R + 3 cts)
Functional testing	Active power, apparent power, current, voltage, frequency, cos φ
Storage	1,600 measurements
Communication output	RS232
Power supply	Mains 230 V / 50-60 Hz
Dimensions / weight	410 x 175 x 370 mm / 13.5 kg
Ingress protection	IP 50: closed product
Electrical safety	IEC 61010-1 - 600 V CAT II - 300 V CAT III

ADDITIONAL INFO

- AUTOTEST function for automatic execution of a measurement sequence
- Storage of up to 1,600 measurements
- Checking and certification according to the European standards

CONTENTS

- C.A 6160
- 1 bag
- 2 dielectric test guns with 2 m cable
- 2 insulation test leads 3 m long
- 4 crocodile clips
- 2 test probes
- 4 continuity test leads 2.5 m long
- 1 discharge-time cable
- 1 power supply cable

ACCESSORIES / REPLACEMENT PARTS

- CE- LINK processing software — P01101996
- DB9F-DB25M adapter — P01101841
- See all the accessories on page 102

CE Link software (option) for C.A 6160

- download the recorded data
- create measurement sequences and upload them into the instrument
- perform tests remotely and recover the data directly in the software
- create and print measurement reports

ELECTRICAL EQUIPMENT TESTERS

C.A 6155

Ref. : P01146001

300 V CAT III

IP 50

STRENGTHS

- Integration of all the measurements required by the new editions of the IEC 60204 (edition5), VDE0701/0702 and IEC 61439 (ex-IEC 60439) standards
- Preprogrammed test sequences based on the standards or customizable
- Extended memory, up to 6,000 measurements stored

ADDITIONAL INFO

- Large backlit graphical display with an intuitive user interface
- Contextual help for each function
- Built-in keypad for quick, simple customization of the measurements recorded
- Possibility of connecting a barcode reader

CONTENTS

- C.A 6155
- 1 accessories bag containing 1 high-voltage test probe
- 1 test cable for mains power socket
- 1 test cable with separated wires
- 1 red lead 1.5 m long
- 1 black lead 1.5 m long
- 1 green lead 1.5 m long
- 1 red lead 4 m long
- 4 test probes
- 3 crocodile clips
- 1 USB communication cable
- 1 RS232 communication cable
- CALink data transfer software

SPECIFICATIONS

		C.A 6155
Dielectric test	Test voltage	1,000 V / 1,890 V / 2,500 V
	I limit	0.1 to 100 mA (1,890 V / 2,500 V) 0.1 to 200 mA (1,000 V)
	Timer	2, 3, 5, 10, 30 s
Insulation resistance measurement	U test	250 / 500 Vdc
	Range	up to 200 MΩ
	Timer	5, 10, 30, 60, 120 s
Continuity test	Range	0.01 to 1.99 Ω - Indication range: 2.00 Ω to 19.9 Ω
	I test	0.20 / 10 A
	U test	< 9 V
	Timer	5, 10, 30, 60, 120, 180 s
Leakage current measurement	Substitution method	0.00 to 20.0 mA
	Differential method	0.00 to 9.99 mA
	Accuracy	± (5 % R + 5 cts)
Contact leakage current measurement	Measurement range	0.00 to 2.50 mA
	Accuracy	± (10 % R + 5 cts)
Measurement of 60 V / 120 V discharge time		10 % R
	Voltage range (peak value)	0 to 550 V
	Time range	0 to 10 s
Functional testing	Apparent power	0.00 to 4.00 kVA
Power-cable polarity test		Yes
Current measurement with clamp		0.00 mA to 24.9 A
PRCD test	Calibre	10, 15, 30 mA
	Test current	0,5 x IΔn, IΔn, 5 x IΔn
	Other	Automatic PRCD test
RCD test	Calibre	10, 30, 100, 300, 500, 1,000 mA
	Test current	0.5 x IΔn, IΔn, 2 x IΔn, 5 x IΔn
	Current range	AC / AC (pulsed) / DC
	Type of RCD	General / Selective
	Type of test	Ramp / Pulse
	Uc contact voltage measurement	Yes
	Other	Automatic RCD test
High-current Zs loop measurement	Measurement current	6.5 A
	Range	0.00 to 1,999 Ω
	Accuracy	±(5 % R + 5 digits)
	Calculation of Ik	0.00 to 23.0 kA
Zs loop measurement (no RCD trip)	Range	0.00 to 1,999 Ω
	Accuracy	±(5 % R + 10 digits)
	Calculation of Ik	0.00 to 23.0 kA
Zi loop measurement	Measurement current	6.5 A
	Range	0.00 to 1,999 Ω
	Accuracy	±(5 % R + 5 digits)
	Calculation of Ik	0.00 to 199 kA
Voltage / frequency		0 to 550 V / DC, 14.0 to 499.9 Hz
Phase rotation	Voltage	100 to 550 V AC
	Frequency	14 to 500 Hz
Communication	RS 232	1 barcode/ RFID reader connection + 1 printer / PC connection
	USB	1 printer / PC connection
Alarms		Yes for all functions
Storage		6,000 memory locations
Software		Yes, delivered as standard, Pro version available as an option
Power supply		230 V / 50-60 Hz
Dimensions / weight		33.5 cm × 16.0 cm × 33.5 cm / 8.4 kg
Functional standards		VDE 701 702 / IEC 60204 Ed.5 / IEC 60439 / IEC 61439
Electrical safety		IEC 61010-1 / IEC 61557 (parts 1, 2, 3, 4, 6, 7, 10) 300 V CAT II, 300 V CAT III (TP1)
Ingress protection		IP 50: closed product

MICRO-OHMMETERS

	C.A 6240 page 93	C.A 6250 page 94	C.A 6292 page 95
4-wire measurement method (Kelvin)	■	■	■
Measurement range	400 Ω	2,500 Ω	1 Ω
Resolution	1 µΩ	0.1 µΩ	0.1 µΩ
Measurement current	10 A / 1 A / 100 mA / 10 mA	10 A / 1 A / 100 mA / 10 mA / 1 mA	Automatic 50 / 100 / 150 and 200 A Manual from 20 to 200 A
Inductive mode	Normal	Inductive, non-inductive, auto non-inductive	Normal / BSG* = Both Sides Grounded
Alarms		■	
Temperature compensation		■	
USB / RS232 communication	■	■	■
Memory (number of measurements)	100	1500	8000
Automatic recording	■		■
Power supply	NiMH batteries	NiMH batteries	Mains

**BSG = Both Sides Grounded*

RATIOMETERS

	DTR 8510 page 96
Range of VT/PT ratios	0.8000 to 8,000 / 1
Range of CT ratios	0.8000 to 1,000 / 1
Power supply	up to 10 hours
Memory	10,000 tests
Communication	Optical USB

CHOOSE YOUR TESTER

PHASE ROTATION AND/OR MOTOR TESTERS

	C.A 6608 page 97	C.A 6609 page 97
Operating mode	With connection	Avec et sans connexion
Operating voltage with connection	40 to 850 VAC between phases	40 to 600 VAC between phases
Operating voltage without connection		120 to 400 VAC between phases
Power supply	Via the measurement	9 V battery

CABLE AND METAL CONDUCTOR LOCATOR

	C.A 6681 E/R page 98
Operation with/without voltage	■ ■
Location of a short-circuit / circuit break	■ ■
Location of cables, conductors or metal pipes	■

BATTERY CAPACITY TESTERS

	C.A 6630 page 99
Min / max measurement range	40 mΩ / 40 Ω
Min / max resolution	10 µΩ / 10 mΩ
Measurement frequency	1 kHz
Comparison function	99 sets of settings
Manual storage (number of locations)	999
Automatic storage (number of locations)	9,600

C.A 6240

Ref. : P01143200

50 V CAT III | IP 53

STRENGTHS

- 4-wire measurement method
- Automatic current reversal
- Test current up to 10 A
- 1 µΩ resolution
- Automatic recording “on the fly” or manual recording

SPECIFICATIONS

	C.A 6240					
Measurement method	4-wire method					
Range	4,000 µΩ	40 mΩ	400 mΩ	4,000 mΩ	40 Ω	400 Ω
Accuracy	0.25 % ±2 cts	0.25 % ±2 cts	0.25 % ±2 cts	0.25 % ±2 cts	0.25 % ±2 cts	0.25 % ±2 cts
Resolution	1 µΩ	10 µΩ	0.1 mΩ	1 mΩ	10 mΩ	100 mΩ
Measurement current	10 A	1 A	1 A	100 mA	10 mA	10 mA
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 - 50 V CAT III					

ADDITIONAL INFO

- The C.A 6240 is compatible with the DataView® software

CONTENTS

- C.A 6240
- 1 shoulder bag
- 1 set of 2 x 10 A Kelvin clamps with 3 m cable
- 1 European 2P mains power cable
- Data export software
- 1 optical / USB communication cable

ACCESSORIES / REPLACEMENT PARTS

- Double 1 A test probes (x 2) — P01102056
- Mini Kelvin clamp (set of 2) — P01101783
- See all the accessories on page 102

MICRO-OHMMETERS

C.A 6250

Ref. : P01143201

50 V CAT III

IP 53

STRENGTHS

- 4-wire measurement method
- Automatic compensation of stray currents
- Test current up to 10 A
- 0.1 µΩ resolution
- Integrated “temperature compensation” function

SPECIFICATIONS

	C.A 6250						
Measurement method	4-wire method						
Range	5,000mΩ	25,000 mΩ	250,00 mΩ	2500,0 mΩ	25,000 Ω	250,00 Ω	2500,0 Ω
Accuracy	0.05 % +1.0 µΩ	0.05 % +3 µΩ	0.05 % +30 µΩ	0.05% +0.3 mΩ	0.05 % +3 mΩ	0.05 % +30 mΩ	0.05 % +300 mΩ
Resolution	0.1 µΩ	1 µΩ	10 µΩ	0.1 mΩ	1 mΩ	10 mΩ	100 mΩ
Measurement current	10 A	10 A	10 A	1 A	100 mA	10 mA	1 mA
Measurement modes	Inductive, non-inductive, non-inductive with automatic trigger						
Temperature compensation	By temperature sensor or manual						
Memory	1500 measurements						
Communication output	RS232 link						
Power supply	Rechargeable NiMH battery						
Dimensions	270 x 250 x 180 mm / 4 kg						
Electrical safety	IEC 61010 - CAT III 50 V						

ADDITIONAL INFO

- The C.A 6250 is compatible with the DataView® software
- Possibility of connecting the Pt100 sensor (option) directly to the instrument

CONTENTS

- C.A 6250
- 1 shoulder bag with 1 power cable 2 m long
- 1 set of 2 x 10 A Kelvin clamps with 3 m cables
- Data export software
- 1 RS 232 communication cable

ACCESSORIES / REPLACEMENT PARTS

- Doubles 1 A test probes (x 2) — P01102056
- Mini Kelvin clamp (set of 2) — P01101783
- See all the accessories on page 102

C.A 6292

Ref. : P01143300

STRENGTHS

- Permanent test at 100 A and for up to 120 s at 200 A
- Test current up to 200 A
- Resistance from 0.1 µΩ to 1 Ω
- Safe measurements: BSG method (Both Sides Grounded)
- Storage of up to 8,000 measurement results

SPECIFICATIONS

	C.A 6292		
Test current	Programmable from 20 to 200 A		
Resistance	0.1 µΩ to 2 mΩ	2 to 200 mΩ	200 mΩ to 1 Ω
Resolution	0.1 µΩ (200 A max)	10 µΩ (25 A max to 200 mΩ)	1 mΩ (5 A max to 1 Ω)
Accuracy	± 1% from 50 µΩ to 1Ω		
Output voltage	110 VAC : 4.2 V @ 200 A 220 VAC : 8.6 V @ 200 A		
Maximum load resistance	110 VAC : 20 mΩ @ 200 A 220 VAC : 42 mΩ @ 200 A		
Measurement method	4 Kelvin-type connection terminals		
Test mode	Normal or BSG		
Test duration	Adjustable from 5 to 120 s @200 A, unlimited below 100 A		
Storage	Up to 8,000 measurement results		
Interface	USB 2.0		
Software	DataView®		
Power supply	100 to 240 VAC - 50/60 Hz		
Dimensions	502 x 394 x 190 mm		
Weight	13 kg approx.		
Operating temperature	0 °C to +55 °C		
Storage temperature	-10 °C to +70 °C		
Humidity	95% RH		
Protection	Protected against voltage surges, short-circuits, overheating and overvoltage on the safety terminals		
Ingress protection	IP54		
Electrical safety	IEC 61010-1		
Consumption	1,500 VA max.		
Current measurement with the optional MR6292 clamp			
Measurement range	1.0 - 50.0 ADC		
Resolution	0.1 mA		
Intrinsic uncertainty	± (1.5% + 2 cts)		
Output signal	10 mV / ADC		
Load impedance	> 100 kΩ // 100 pF		
Influence of conductor position in jaws	0.50 %		

ADDITIONAL INFO

- The backlit LCD screen with its 4 lines of 20 characters is easy to read whatever the environment.

CONTENTS

- C.A 6292 delivered with a hard case containing:
- 1 set of 2 Kelvin leads 6 m long (red / black) with adjustable-clamp connections
- 1 green earth lead 3m long with 1 crocodile clip
- 1 USB cable 1.5 m long
- 1 T1 5 A 250 V fuse mounted in the instrument
- 1 European mains power lead
- 1 CD-ROM containing the DataView® software
- 1 CD-ROM containing the user manual in 5 languages

ACCESSORIES / REPLACEMENT PARTS

- 1 set of 2 Kelvin leads 6 m long (red / black) adjustable-clamp connections — P01295486
- 1 green earth lead with crocodile clip — P01295488
- See all the accessories on page 102

RATIOMETER

DTR 8510

Ref. : P01157702

50 V CAT IV | IP 53

STRENGTHS

- Measurement of the transformation ratio of power, voltage and current transformers
- Storage of up to 10,000 measurement results
- Displays the transformation ratio, the excitation current, the winding polarity and the percentage deviation from the rated values
- Direct reading of the transformation ratio from 0.8000:1 and up to 8000.0:1
- Tests performed by excitation of the primary with measurement on the secondary

SPECIFICATIONS

	DTR 8510	
Range of ratios (VT/PT)	Automatic: 0.8000 to 8000:1	
Accuracy (VT/PT)	Range of ratios	Accuracy (% of reading)
	0.8000 to 9.9999	± 0.2 %
	10.000 to 999.99	± 0.1 %
	1000.0 to 4999.9	± 0.2 %
	5000.0 to 8000.0	± 0.25 %
Range of ratios (CT)	Autoranging: 0.8000 to 1000.0	
Accuracy (CT)	± 0.5 % of reading	
Excitation signal	VT/PT mode: 32 Vrms max CT mode: auto-level 0 to 1 A, 0.1 to 4.5 Vrms	
Display of excitation current	Range: 0 to 1,000 mA; Accuracy: ± (2 % of reading + 2 mA)	
Excitation frequency	70 Hz	
Display	Alphanumeric LCD, 2 lines of 16 characters with adjustment of the contrast and backlighting. Easy to read in both day and night conditions	
Languages available	French, English, Spanish, Italian, German, Portuguese	
Measurement method	As per IEEE Std C57.12.90™	
Power supply	Two 12 V rechargeable NiMH batteries, 1,650 mAH	
Battery life	Up to 10 hours in continuous operation; low-battery alert	
Battery charger	Universal input (90 to 264 Vrms), smart charger	
Charging time	< 4 hours for full charge	
Memory	10,000 tests	
Date / time	Powered by dedicated battery, real-time clock	
Communication	USB 2.0, optical isolation, 115.2 kB	
Software	Delivered with the DataView® analysis software	
Dimensions / weight	272 x 248 x 130 mm / 3.7 kg	
Connection	XLR connectors	
Cables	Shielded H and X cables 4.6 m (15 ft) long, equipped with colour-coded crocodile clips	
Casing	Rugged polypropylene casing, UL 90 V0	
Vibrations	IEC 68-2-6 (1.5 mm at 55 Hz)	
Shocks	IEC 68-2-27 (30 G)	
Falls	IEC 68-2-32 (1 m)	
Ingress protection	IP 40 with lid open as per EN 60529 IP 53 with lid closed as per EN 60529	
Safety	EN 61010-1, 50 V CAT IV; pollution degree 2	

ADDITIONAL INFO

- Up to 10 hours' continuous operation thanks to the rechargeable NiMH batteries

CONTENTS

- DTR 8510
- 1 shoulder bag
- 1 set of leads 4.6 m long with crocodile clips
- 1 external battery charger with mains lead
- 1 USB cable
- 1 NiMH battery datasheet
- DataView software on CD-Rom

ACCESSORIES / REPLACEMENT PARTS

- Set of 2 leads 4.6 m long ____ P01295143A
- USB cable ____ P01295293
- See all the accessories on page 102

PHASE ROTATION AND/OR MOTOR TESTERS

C.A 6608, C.A 6609

Ref. : P01191304 P01191305

600 V CAT III

IP 40

STRENGTHS

- 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 connections have been set up
- Terminals and cables identified by colour coding to simplify connection

SPECIFICATIONS

	C.A 6608	C.A 6609
Operating voltage for phase rotation function	40 to 850 VAC between phases	With connection: 40 to 600 VAC between phases Without connection: 120 to 400 VAC between phases
Frequency range	15 to 400 Hz	
Power supply	Self-powered via measurement inputs	9 V battery
Dimensions	130 x 69 x 32 mm	
Weight	130 g	170 g
Electrical safety	IEC 61010-1 600 V CAT III IEC 61557-7	

CONTENTS

- C.A 6608 phase rotation testers delivered in a shoulder bag with:
- 3 test leads
- 3 crocodile clips
- C.A 6609 phase rotation and motor tester delivered in a shoulder bag with:
- 3 test leads
- 3 crocodile clips

CABLE AND METAL CONDUCTOR LOCATOR

C.A 6681

Ref. : P01141626

STRENGTHS

- Can be used on live or non-current-carrying installations
- Digital, visual and audible indication to track the conductor intuitively
- Large LCD screen with indication of the transmission power, the digital identification code and the voltage present on the circuit tested.

SPECIFICATIONS

	C.A 6681 E
Transmitted signal frequency	125 kHz
External voltage measurement	12~300 V DC/AC(50~60 Hz)
Dimensions	190 × 89 × 42.5 mm
Weight	420 g approx. with battery

	C.A 6681 R
Detection depth	Single-pole application: 0 to 2 m approx. Two-pole application: 0 to 0.5 m approx. Simple looping line: up to 2.5 m
Identification of network voltage	0~0.4 m approx.
Dimensions	241.5 × 78 × 38.5 mm
Weight	360 g approx. with battery

ADDITIONAL INFO

- Automatic or manual adjustment of signal reception sensitivity
- The transmitter and receiver units are equipped with:
  - A battery status indicator
  - An additional lighting system (torch) for use in dark environments

CONTENU

- 1 hard case containing 1 C.A 6681E transmitter
- 1 C.A 6681R receiver
- 1 set of 2 red/black leads, straight male isolated Ø 4 mm banana / elbowed make isolated Ø 4 mm banana, 1.5 m long
- 1 set of 2 red/black crocodile clips
- 1 earthing stake
- 1 adapter for mains power socket
- 1 male plug adapter for B22 bayonet socket
- 1 male plug adapter for E27 screw socket
- 1 x 9 V 6LR61 battery
- 6 x 1.5 V LR03 batteries

ACCESSORIES / REPLACEMENT PARTS

- 33 m reel of green wire with battery clip/4 mm male banana on winder with handle — P01295268
- 15 m reel of green wire with battery clip/4 mm male banana on H winder with 1 stake — P01102019
- See all the accessories on page 102

BATTERY CAPACITY TESTERS

C.A 6630

Ref. : P01191303

STRENGTHS

- Zero adjustment function for compensation of the voltage circuit displayed
- 2-display LCD screen
- 7-hour battery life in continuous operation with 6 x 1.5 V batteries (not supplied)
- Capacity test from 35 Ah to 500 Ah
- Lead and AGM batteries

SPECIFICATIONS

	C.A 6630			
Resistance measurement				
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	± (1 % R + 8 digits) Temp. coeff.: ± (0.1 % R + 0.5 digit) / °C			
Measurement voltage	1.5 mV_{AC}			
Measurement frequency	1 kHz ± 10 %			
Voltage measurement				
Range	4 V		40 V	
Resolution	1 mV		10 mV	
Accuracy	± (0.1 % R + 6 digits)			
Max. consumed power	1 VA			
Mechanical specifications				
Dimensions	250 x 100 x 45 mm			
Weight	500 g including batteries			

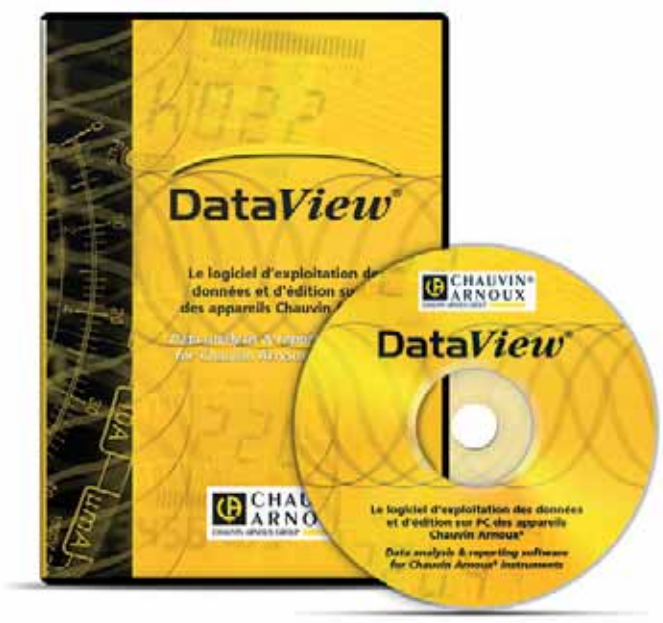
CONTENTS

- 1 hard case containing:
- C.A 6630
- 1 set of 2 measurement leads 1 m long terminated by retractable test probes
- PC data transfer software to export and process the stored data
- 1 C.A 6630 / PC connection cable

ACCESSORIES / REPLACEMENT PARTS

- Set of 2 leads with retractable test probes _____ P01102103
- See all the accessories on page 102

DATA PROCESSING SOFTWARE



DATAVIEW®

Réf. : P01102095

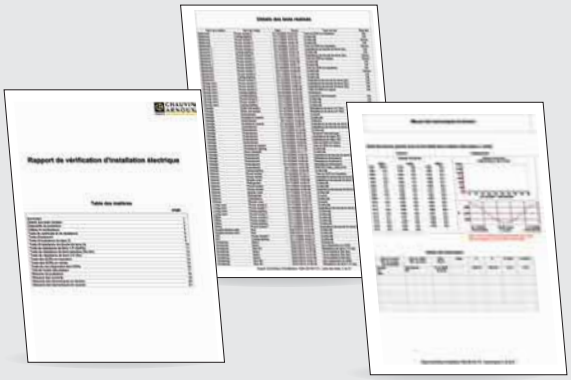
ICT | MEG | GTT | GTC | MOT | DTR

FUNCTIONS

- Configuration of all the functions of instruments connected to a PC or via Bluetooth®
- Recovery of the recorded measurement data
- Backup of measurement files
- Opening of saved files
- Processing and creation of reports
- Export into an Excel spreadsheet
- Export in .pdf format
- Database management
- Remote test activation by simply pressing a button
- Data capture and display in real time
- Display of DAR, PI and DD ratios
- Graphical plotting of programmed-duration tests and voltage ramp tests in real time
- Possibility of creating a library of configurations for specific applications
- Printing of measurement reports

ICT REPORTS ACCORDING TO THE APPLICABLE STANDARDS

The ICT module of DataView® proposes to **define the tree-structure** which will be used during the actual test campaign (sites, parts, objects), as well as the tests to be performed for each of them. Once defined in this way, the campaign can be recorded in the instrument via the communication link. This **saves significant time in the field.**



REQUIRED CONFIGURATION

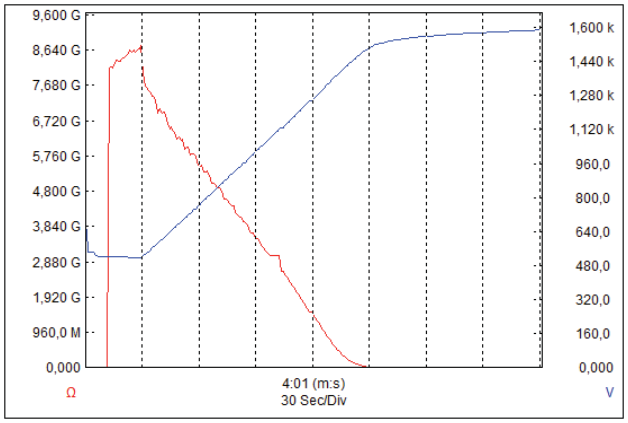
- Windows XP / 256MB of RAM
- Windows Vista & Windows 7/8/10 (32/64 bit)
- 1 GB of RAM for Windows Vista & Windows 7/8 (32 bit)
- 2 GB of RAM for Windows Vista & Windows 7/8 (64 bit)
- 80 MB available space on hard disk (200 MB recommended)

ADDITIONAL INFO

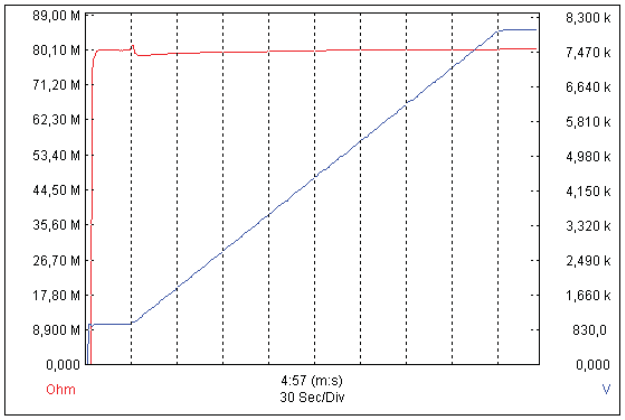
- The DataView® software:
- Automatically recognizes the instrument connected when it is hooked up to the PC and opens the corresponding menu. Users then have direct access to the configuration and the recorded data
- Is equipped with a large number of predefined report templates for quick generation in compliance with the applicable standards. Users can also create their own templates, as required, and directly add their own comments.

DataView® Modules	ICT	MEG	GTT	GTC	MOT	DTR
Associated products	C.A 6116N	C.A 6543	C.A 6470N	C.A 6417	C.A 6240	DTR 8510
	C.A 6117	C.A 6547	C.A 6471		C.A 6250	
		C.A 6549	C.A 6472		C.A 6292	
		C.A 6550	C.A 6474			
		C.A 6555				
		C.A 6526				
		C.A 6532				
		C.A 6534				

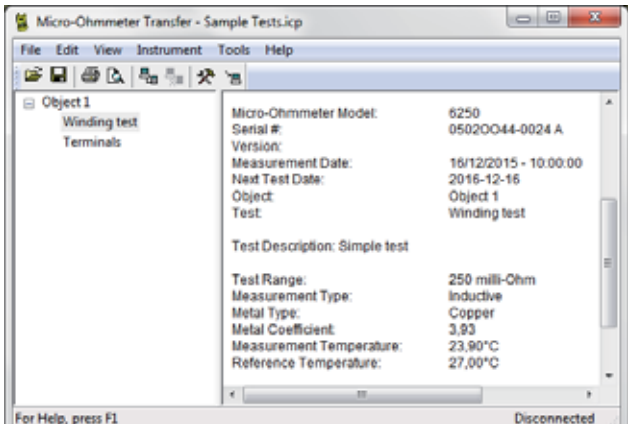
DATA PROCESSING SOFTWARE



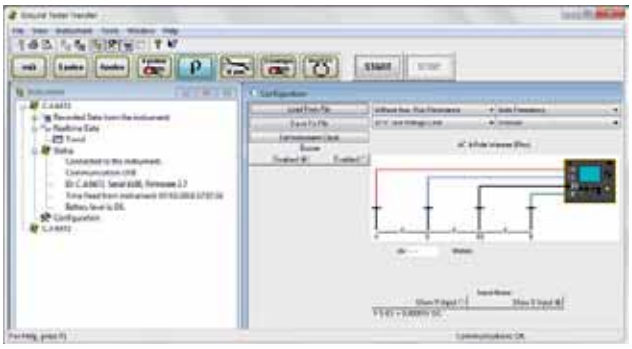
MEG MODULE Graphical plotting of the V(t) and R(t) tests on a non-linear insulation resistance (surge suppressor)



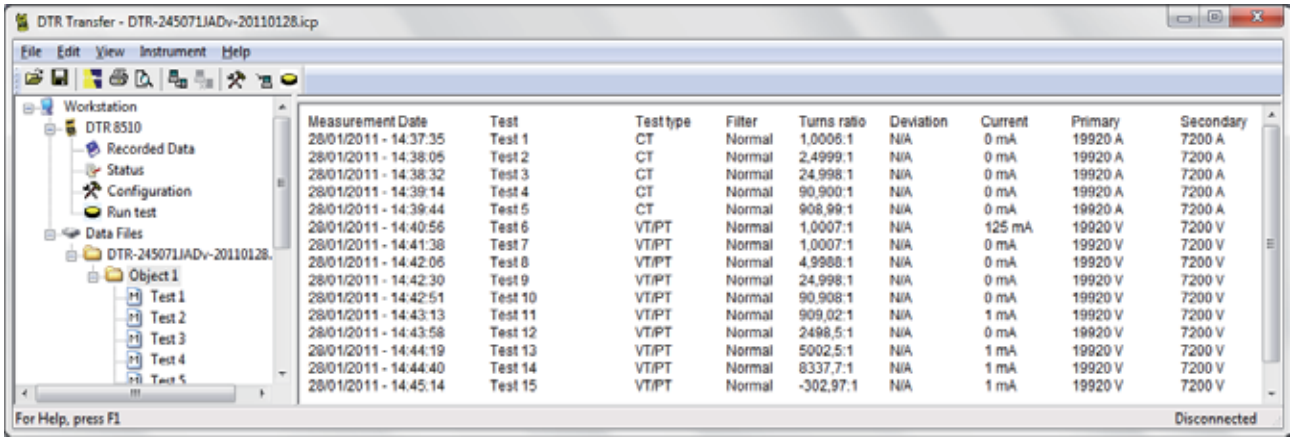
MEG MODULE Graphical plotting of the V(t) and R(t) tests on a fixed insulation resistance



MOT MODULE Results of motor winding test



GTT MODULE Example of configuration



DTR MODULE Recovery of the measurement data recorded in the ratiometer

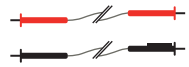
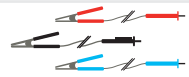
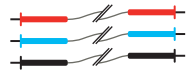
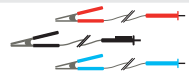
ACCESSORIES FOR MULTI-FUNCTION INSTALLATION TESTERS

Accessories ■ Included in the original delivery

		ARTICLE CODE	DESCRIPTION	C.A 6113	C.A 6116N	C.A 6117
MEASUREMENT LEADS AND SENSORS		P01295398	2.5 m three-point lead with separate wires	■	■	■
		P01295393	Three-point lead for EURO mains socket test	■	■	■
		P01295094	2 elbowed-straight safety leads - (red and black) 3 m long	■	■	■
		P01101921	3 test probes Ø 4 mm - (red, blue and green)	■	■	■
		P01101922	3 crocodile clips (red, blue and green)	■	■	■
		P01102092A	Remote-control probe for C.A 6116N	■	■	■
		P01101943	Replacement black test probe for remote-control probe	■	■	■
		P01120335	C177 clamp (20 A)	■		
		P01120336	C177A clamp (200A)	■	■	■
		P01120460	MN77 clamp (20A)	■	■	■
POWER SUPPLY / BATTERIES		P01102057	PA 30 W power pack	■		
		P01102129	Type-2 power pack / charger without mains lead (requires P01295174)		■	■
		P01296024	NiMH 35 Wh battery pack	■		
		P01296047	Li-Ion battery pack		■	■
		P01102130	Li-Ion charger support without mains lead		■	■
		P01295174	2P EURO mains lead	■	■	■
		HX0061	DC/DC charger for vehicle cigarette lighter	■		
MISCELLANEOUS		P01102084A	Continuity rod	■	■	■
		P01102017	15 m earth kit (red / blue / green)	■	■	■
		P01102018	Black 30 m 1P earth kit	■	■	■
		P01102021	3P earth kit (50 m)	■	■	■
		P01102022	3P earth kit (100 m)	■	■	■
		P01298081	4-point hands-free strap - model 2	■	■	■
		P01298057	Hand strap	■	■	■
		P01102094	C.A 61 screen protection film	■	■	■
		P01298056	Shoulder bag no. 22	■	■	■
		P01295293	USB-A USB-B cable	■	■	■
		P01102095	DataView® software		■	■
		P01298082	Comfort strap	■	■	■

MEASUREMENT LEADS FOR INSULATION TESTERS

■ Accessories ■ Included in the original delivery

		CODE ARTICLE	DESCRIPTION	LENGTH	C.A 6505	C.A 6545	C.A 6547	C.A 6549	C.A 6550	C.A 6555
5 KV RANGE		P01295231	Red simplified HV safety lead / black with rear connection	3 m	■	■	■	■		
		P01295232	Blue simplified HV safety lead + blue crocodile clip	3 m	■	■	■	■		
		P01295221	Guarded blue simplified HV safety lead with rear connection	0.35 m	■	■	■	■		
		P01295220	Set of 3 safety leads with HV crocodile clips - red, blue and black	3 m	■	■	■	■		
		P01295214	Safety lead with blue HV crocodile clip	8 m	■	■	■	■		
		P01295215	Safety lead with red HV crocodile clip	8 m	■	■	■	■		
		P01295216	Safety lead with rear connection and black HV crocodile clip	8 m	■	■	■	■		
		P01295217	Safety lead with blue HV crocodile clip	15 m	■	■	■	■		
		P01295218	Safety lead with red HV crocodile clip	15 m	■	■	■	■		
		P01295219	Safety lead with rear connection and black HV crocodile clip	15 m	■	■	■	■		
10/15 KV RANGE		P01295465	Set of 3 red, blue and black simplified HV safety leads with rear connection	3 m					■	■
		P01295466	Set of 3 safety leads with red, blue and black HV crocodile clips with rear connection	3 m					■	■
		P01295467	Guarded blue HV safety lead with rear connection	0.5 m					■	■
		P01295468	Safety lead with blue HV crocodile clip	8 m					■	■
		P01295469	Safety lead with red HV crocodile clip	8 m					■	■
		P01295470	Safety lead with rear connection and black HV crocodile clip	8 m					■	■
		P01295471	Safety lead with blue HV crocodile clip	15 m					■	■
		P01295472	Safety lead with red HV crocodile clip	15 m					■	■
		P01295473	Safety lead with rear connection and black HV crocodile clip	15 m					■	■
		P01295471A	Safety lead with blue HV crocodile clip	20 m					■	■
		P01295472A	Safety lead with red HV crocodile clip	20 m					■	■
		P01295473A	Safety lead with rear connection and black HV crocodile clip	20 m					■	■

CONTENTS OF THE EARTH & RESISTIVITY KITS

	To order		Contents of the earth and resistivity kits							Recommended associated products									
			Reels and winders				Other accessories			Installation testers			3P	3/4P+ρ	Expert			Pylon
	Article code	Description	Green	Red	Blue	Black	Stake(s) / Mallet	Spade-lug / banana adapter	Bag	C.A 6030	C.A 6113	C.A 6116N C.A 6117	C.A 6421 C.A 6423	C.A 6460 C.A 6462	C.A 6470N	C.A 6471	C.A 6472	C.A 6474
1P Kit	P01102018	Black 30 m 1P earth kit				33 m	1 / -				■	■						
	P01102020	33 m 1P loop kit	33 m				1 / -			■								
3P Kit	P01102017	15 m 3P earth kit (red, green, blue)	5 m	15 m	10 m		2 / -				■	■						
	P01102021	50 m 3P earth kit	10 m	50 m	50 m		2 / 1	5	Standard		■	■	■	■				
	P01102022	100 m 3P earth kit	10 m	100 m	100 m		2 / 1	5	Standard				■	■	■	■	■	
	P01102023	166 m 3P earth kit	10 m	166 m	166 m		2 / 1	5	Prestige					■	■	■	■	
4P Kit	P01102040	50 m 4P resistivity kit	33 m	50 m	50 m	33 m	4 / 1	5	Standard					■	■	■	■	
	P01102024	100 m earth & resistivity kit	100 m 10 m	100 m	100 m	33 m	4 / 1	5	Prestige					■	■	■	■	
	P01102025	166 m earth & resistivity kit	100 m 10 m	166 m	166 m	33 m	4 / 1	5	Prestige						■	■	■	
Add-on	P01102030	100 m add-on for resistivity	100 m			33 m	2 / -		Standard					■	■	■	■	

OTHER ACCESSORIES

Article code	Description	Reels and winders			
		Green	Red	Blue	Black
P01102026	Green cable winder	10 m			
P01102028	Set of 5 adapters for terminals				
P01102029	Set of 4 reel handles				
P01102031	T earth stake				
P01102046	Set of 3 adjustable clamps				
P01102047	10 m black cable H winder				10 m
P01120310	C172 clamp				
P01295260	166 m reel of red cable		166 m		
P01295261	100 m reel of red cable		100 m		
P01295262	50 m reel of red cable		50 m		
P01295263	166 m reel of blue cable			166 m	
P01295264	100 m reel of blue cable			100 m	
P01295265	50 m reel of blue cable			50 m	
P01295266	100 m reel of green cable	100 m			
P01295267	33 m reel of black cable				33 m
P01295268	33 m reel of green cable	33 m			
P01295270	2 m black cable winder (2 m cable for clamps)				2 m
P01295291	5 m green cable winder	5 m			
P01295292	5 m black cable H winder				5 m

Article code	Description	Installation testers			3P	3/4P+ρ	Expert			Pylon
		C.A 6030	C.A 6113	C.A 6116N C.A 6117	C.A 6421 C.A 6423	C.A 6460 C.A 6462	C.A 6470N	C.A 6471	C.A 6472	C.A 6474
P01102037	C.A 647x continuity kit (4 croc. clips - red, black, blue and yellow), (2 red/ black test probes), (4 x 1.5m cables, red, black, blue and yellow)						■	■	■	
P01120550	5m AmpFlex™ flexible current sensors									■
P01120551	8m AmpFlex™ flexible current sensors									■
P01102046	Set of 3 adjustable clamps									■
P01120310	C172 clamp	■								
P01120335	C177 clamp		■							
P01120336	C177A clamp			■						
P01120333	C182 clamp							■	■	

ADDITIONAL INFO

- Possibility of ordering the carrying bag:
- Standard version P01298066
- Prestige version P01298067

ACCESSORIES FOR ELECTRICAL EQUIPMENT TESTERS

■ Optional accessories ■ Included in the original delivery

	ARTICLE CODE	DESCRIPTION	LENGTH	C.A 6121	C.A 6155	C.A 6160
Measurement and test leads						
	P01295097	4 mm banana cable - red + black	3 m	■		■
	P01295137	Double crocodile cable - black	2.5 m	■		
	P01295140	Double crocodile cable - red	2.5 m	■		
	P01295141	Discharge lead (EURO)	2 m	■		■
	P01295236	Double continuity cables	2.5 m			■
	P01295234	Power supply cable (EURO)	2 m			■
	P01102139	Test lead - red	4 m		■	
	P01102136	Plug-in test cable	1.5 m		■	
	P01102137	Test cable with separate wires	3 m		■	
	P01102138	Black + red test lead	1.5 m		■	
	P01102140	Green test lead	1.5 m		■	
	P01102141	Black test probe for C.A 6155			■	
	P01102142	Red test probe for C.A 6155			■	
	P01102143	Green test probe for C.A 6155			■	
	P01102144	Blue test probe for C.A 6155			■	
	P01102145	Set of 3 black crocodile clips			■	
HV test guns and probes						
	P01101919	HV test gun	2 m	■		■
	P01102135	HV test probe for C.A 6155			■	
	P01101918	HV test gun	6 m	□		□
Remote control, indication and communication						
	P01101916	Remote-control pedals		□		□
	P01101917	Red / green indicator lamps		□		□
	P01101841	DB9F-DB25M adapter		□		□
	P01295172	DB9F-25F cable x 2		□		□
	P01295173	DB9F-DB9M cable no. 1		□		
	P01101915	MachineLink software with communication cables		□		
		CALink software			■	
	P01101996	CELink software with communication cables				□
Fuses						
	P01297086	F 6x32T 16 A 250 V (set of 10 fuses)			■	■

ACCESSORIES FOR OTHER TESTERS

■ Optional accessories ■ Included in the original delivery

	ARTICLE CODE	DESCRIPTION	CONNECTIONS	C.A 6240	C.A 6250	C.A 6292	DTR 8510	C.A 6681	C.A 6630
Double test probes and Kelvin clamps for pour micro-ohmmeters									
	P01101794	10 A Kelvin clamps (set of 2), L=3 m	Spade lug	■	■				
	P01101783	1A mini Kelvin clamps (set of 2)	Spade lug	■	■				
	P01103065	10 A double gun-type test probe (set of 2) L= 3.15m	Spade lug and 4 mm banana	■	■				
	P01103063	10 A double pivoting test probe (set of 2) L= 3.15m	Spade lug and 4 mm banana	■	■				
	P01102056	1 A double test probe (set of 2) L=2.85m	Spade lug and 4 mm banana	■	■				
	P01295486	Set of 2 Kelvin leads 6 m long (red / black) with adjustable-clamp connections				■			
	P01295487	Set of 2 Kelvin leads 15 m long (red / black) with adjustable-clamp connections				■			
	P01295488	Green earth lead with crocodile clip				■			
	P01120470	MR6292 clamp				■			
Other accessory for micro-ohmmeters									
	P01102013	Pt 100 sensor			■				
Measurement lead for ratiometer									
	P01295143A	Set of 2 replacement leads, H primary, X secondary L= 4.6m , compatible with DTR 8500 / DTR 8510	4 mm banana				■		
Adapters for cable and metal conductor locator									
	P01102114Z	Kit of 3 measurement adapters for housing (B22, E27, mains socket)	B22 bayonet E27 screw socket 2P mains socket					■	
Measurement lead for battery capacity tester									
	P01102103	Set of 2 double-contact current / voltage measurement leads for C.A 6630 battery tester. L=1m	Jack						■

ACCESSORIES / REPLACEMENT PARTS

INSTALLATION TESTERS

C.A 6030

▪ C172 current clamp	P01120310
▪ C176 clamp	P01120330
▪ MN20 current clamp	P01120440
▪ Series printer no. 5	P01102903
▪ 1P loop kit	P01102020
▪ 3 crocodile clips (red/white/yellow)	P01101905
▪ 3 test probes (red/white/yellow)	P01101906A
▪ Optical / RS232 connection cable	P01295252
▪ 10 m green cable H winder	P01102026
▪ T earth stake	P01102031
▪ 100 m reel of green cable	P01295266
▪ 33 m reel of green cable	P01295268
▪ Standard bag no. 5	P01298066

INSULATION TESTERS

C.A 6501 and C.A 6503

▪ Bag no. 2	P01298006
▪ C.A 846 thermo-hygrometer	P01156301Z
▪ C.A 861 K thermocouple	P01650101Z
▪ 0.2 A / HRC fuse for C.A 6501	P01297095
▪ 2 crocodile clips (red/black	P01295457Z
▪ 2 test probes (red/black	P01295458Z
▪ 2 leads 1.5 m long (red/black	P01295289Z
▪ 3 crocodile clips (red, black, blue	P01103062
▪ 3 safety leads 1.5 m (red, black, blue	P01295171

C.A 6511 and C.A 6513

▪ C.A 861 thermometer + K thermocouple C.A 861	P01650101Z
▪ C.A 846 thermo-hygrometer	P01156301Z
▪ 2 crocodile clips (red/black)	P01295457Z
▪ 2 test probes (red/black)	P01295454Z
▪ 2 leads 1.5 m long (red/black)	P01295288Z
▪ 1.5 V LR6 battery	P01296033
▪ 1.6 A fuse	P01297022
▪ Shockproof sheath no. 13	P01298016

C.A 6522, C.A 6524, C.A 6526, C.A 6532, C.A 6534 and C.A 6536

▪ Remote-control probe	P01101935A
▪ C.A 861 thermometer + K thermocouple C.A 861	P01650101Z
▪ C.A 846 thermo-hygrometer	P01156301Z
▪ Hands-free bag	P01298049
▪ 1.5 V LR6 battery	P01296033
▪ Test probes (red + black)	P01295454Z
▪ Crocodile clips (red + black)	P01295457Z
▪ Elbowed-straight safety leads (red + black) 1.5 m long	P01295453Z
▪ DataView® software	P01102095

C.A 6541 and C.A 6543

▪ Remote-control probe	P01101935
▪ C.A 861 thermometer + K thermocouple C.A 861	P01650101Z
▪ C.A 846 thermo-hygrometer	P01156301Z
▪ AN1 artificial neutral box	P01197201
▪ Bag no. 6 for accessories	P01298051
▪ 1.5 V LR14 battery	P01296034
▪ Fuse F 2.5 A - 1,200 V - 8 x 50 mm - 15 kA (x 5)	P01297071
▪ Fuse F 0.1 A - 660 V - 6.3 x 32 mm - 20 kA (x 10)	P01297072

C.A 6543

▪ Series printer no. 5	P01102903
▪ Series-parallel adapter	P01101941
▪ DataView® software	P01102095
▪ 1.5 m safety leads (red, blue, black)	P01295171
▪ RS232 PC DB 9F - DB 25F cable x 2	P01295172
▪ RS 232 printer DB 9F - DB 9M cable no. 01	P01295173
▪ European 2P mains lead	P01295174
▪ UK mains lead	P01295253
▪ Battery pack	P01296021

C.A 6505, C.A 6545, C.A 6547 and C.A 6549

▪ C.A 846 thermo-hygrometer	P01156301Z
▪ C.A 861 thermometer + K thermocouple C.A 861	P01650101Z
▪ AN1 artificial neutral box	P01197201
▪ Standard bag for accessories	P01298066
▪ Fuse FF 0.1 A - 380 V - 5 x 20 mm - 10 kA (x 10)	P03297514
▪ European 2P mains lead	P01295174

ACCESSORIES / REPLACEMENT PARTS

C.A 6547 and C.A 6549

- Series printer no. 5 — P01102903
- Series-parallel adapter — P01101941
- DataView® report generation software — P01102095
- RS 232 PC DB 9F - DB 25F cable x 2 — P01295172
- RS 232 printer DB 9F - DB 9M cable no. 01 — P01295173

C.A 6550 and C.A 6555

- 2 red/black test probes — P012954547
- 3 red/blue/black crocodile clips — P01103062
- USB optical cable — HX0056-Z
- Shoulder bag — P01298066
- C.A 861 thermocouple thermometer — P016501017
- C.A 846 thermo-hygrometer — P011563017
- European 2P mains lead — P01295174

MULTIMETER CLAMPS FOR LEAKAGE CURRENT

F62 and F65

- Red / black crocodile clamps (set of 2) — P012954577
- Elbowed test-probe leads, 1.5 m, (1 red/1 black) — P012954567
- Soft case 200 x 100 x 40 mm with belt clip — P012980657
- CMI214S current measurement lead — P03295509
- I/R probe for C.A 1871 multimeter — P016516107
- C.A 801 single-channel temperature adapter — P016524017
- 2-channel temperature adapter with differential measurement for C.A 803 multimeter — P016524117
- Shoulder bag no. 21 (250 x 165 x 60 mm) with strap — P06239502

EARTH AND RESISTIVITY TESTERS

C.A 6421 and C.A 6423

- Carrying bag — P01298005
- Fuse HRC 0.1 A - 250 V (x 10) — P01297012
- 1.5 V LR06 battery — P01296033
- Shoulder bag no. 2 — P01298006

C.A 6416 and C.A 6417

- DataView® software — P01102095
- Bluetooth® / USB modem — P01102112
- Hard case — P01298080
- CL1 calibration loop — P01122301

C.A 6460 and C.A 6462

- European 2P mains lead — P01295174
- Fuse HRC 0.1 A - 250 V (x 10) — P01297012
- Battery pack — P01296021
- 1.5 V LR06 battery — P01296033
- Standard bag — P01298066

C.A 6470N, C.A 6471 and C.A 6472

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

ACCESSORIES / REPLACEMENT PARTS

EARTH AND RESISTIVITY TESTERS

C.A 6471 and C.A 6472

- MN82 clamp (diam. 20 mm) delivered with 2 m cable for connection to ES terminal — P01120452
- C182 clamp (diam. 52 mm) delivered with 2 m cable for connection to ES terminal — P01120333
- Standard bag — P01298066

C.A 6474

- Connection cable — P01295271
- 15 m BNC/BNC cable — P01295272
- 5 m AmpFlex® flexible current sensor — P01120550
- 8 m AmpFlex® flexible current sensor — P01120551
- Set of 12 identification rings for AmpFlex® — P01102045
- Set of 3 adjustable clamps — P01102046
- 5 m green cable (E terminal connection) — P01295291
- 5 m black cable (E terminal connection) — P01295292
- Spade lug/banana plug adapter — P01102028
- Calibration loop — P01295294
- Prestige bag — P01298067

ELECTRICAL EQUIPMENT TESTERS

C.A 6121

- Machine Link Windows processing software (supplied with communication cable) — P01101915
- Series printer no. 5 — P01102903
- DB9F-DB25M adapter — P01101841
- Remote-control pedal — P01101916
- Indicator lamps (green/red) — P01101917
- Roll of paper for series printer (set of 5) — P01101842
- 2 crocodile clips (red/black) — P01295457Z
- 2 test probes (red/black) — P01295458Z
- 2 dielectric test guns with 6 m cable — P01101918
- 2 dielectric test guns with 2 m cable — P01101919
- 2 safety leads 3 m long (red/black) — P01295097
- Continuity test lead 2.5 m long (black) — P01295137
- Continuity test lead 2.5 m long (red) — P01295140
- Discharge-time cable (European) — P01295141

C.A 6160

- CE- Link processing software — P01101996
- DB9F-DB25M software — P01101841
- Remote-control pedal — P01101916
- Indicator lamps (green/red) — P01101917
- 2 dielectric test guns with 6 m cable — P01101918
- 2 dielectric test guns with 2 m cable — P01101919
- 2 safety leads 3 m long (red/black) — P01295097
- European power cable — P01295234
- RS232 DB9F-DB9F communication cable — P01295172
- Set of 10 fuses: 2.5 A-250 V 5 x 20 T — P01297085
- Set of 10 fuses: 16 A-250 V 6 x 32 T — P01297086
- Standard bag — P01298066
- Discharge-time cable — P01295141
- 2 crocodile clips (red/black) — P01295457Z
- 2 test probes (red/black) — P01295458Z

C.A 6155

- 4 m red test lead — P01102139
- Red + black 1.5 m test lead — P01102138
- Red 1.5 m test lead — P01102140
- 1.5 m plug-in test cable — P01102136
- 3 m test cable with separate wires — P01102137
- Black test probe — P01101141
- Red test probe — P01102142
- Green test probe — P01102143
- Blue test probe — P01102144
- Set of 3 black crocodile clips — P01102145
- HV test probe — P01102135
- Set of 10 fuses: 16 A-250 V 6 x 32 T — P01297086

ACCESSORIES / REPLACEMENT PARTS

OTHER TESTERS

C.A 6240 and C.A 6250

- 1 A double test probe (x 2) — P01102056
- Mini Kelvin clamp (set of 2) — P01101783
- UK mains lead — P01295253
- C.A 846 thermo-hygrometer — P01156301Z
- European 2P mains lead — P01295174
- Standard bag — P01298066
- 10 A-P clamp (set of 2) — P01101794
- DataView® — P01102095
- Straight probe with 10 A double pivoting retractable test probe (x 2) — P01103063
- Gun with 10 A double retractable test probe (x 2) — P01103065

C.A 6240

- Set of 10 fuses: 6.3 x 32 / 12.5 A / 500 V — P01297091
- Optical / USB communication cable — HX0056-Z

C.A 6250

- Pt 100 temperature sensor — P01102013
- 2 m cable for remote Pt 100 — P01102014
- Series printer no. 5 — P01102903
- RS 232 PC DB 9F – DB 25F cable x 2 — P01295172
- Set of 10 fuses: 6.3 x 32 / 16 A / 250 V — P01297089
- Set of 10 fuses: 5.0 x 20 / 2 A / 250 V — P01297090

C.A 6292

- 1 set of 2 Kelvin leads 6 m long (red / black) with adjustable-clamp connections — P01295486
- 1 set of 2 Kelvin leads 15 m long (red / black) with adjustable-clamp connections — P01295487
- 1 green earth lead with crocodile clip — P01295488
- 1 set of 5 fuses: T1 5 A 250 V 5x20 mm — P01297101
- 1 USB-A USB-B cable 1.5 m long — P01295293
- 1 MR6292 clamp — P01120470

DTR 8510

- Set of 2 replacement leads 4.6 m long — P01295143A
- Set of 2 replacement leads 10 m long — P01295145
- USB cable — P01295293
- Shoulder bag — P01298066

C.A 6681

- 33 m reel of green wire, battery clip/4 mm male banana on winder with handle — P01295268
- 15 m reel of green wire, battery clip/4 mm male banana on H winder with 1 stake — P01102019
- 10 m reel of green wire, battery clip/4 mm male banana on H winder — P01102026
- Kit of 3 measurement adapters for housing (B22, E27, mains socket) — P01102114Z

C.A 6630

- Set of 2 leads with retractable test probes — P01102103

SEE ALL OUR ACCESSORIES ON PAGE 230

NOTES


C.A 8336
THD
V
A
VA
U

ENERGY QUALITY & INSTALLATION MONITORING

POWER AND DISTURBANCES

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.

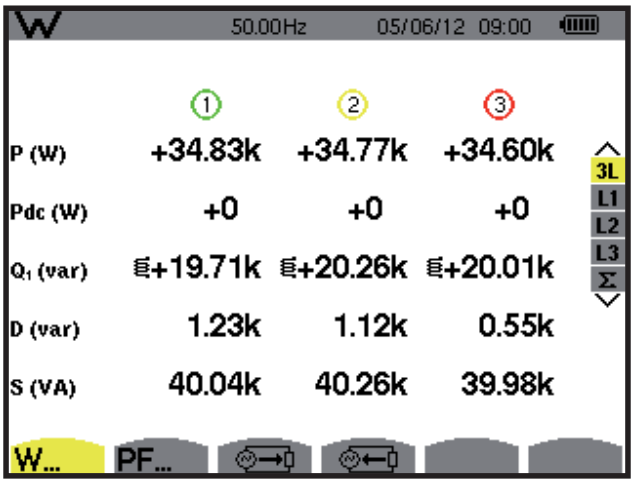
So **measurement** provides **the foundation for optimizing your installations' energy efficiency**, supervising your electrical networks and fairly allocating the costs.

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 which 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 is it 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.

TROUBLESHOOTING DISTURBANCES

With the spread of systems incorporating electronics using switching power supplies, the electrical network is becoming increasingly polluted. A further complication is the fact that electricity market deregulation could lead to more frequent 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, ...).

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

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.

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).

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 wich also depends 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 measuring 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.

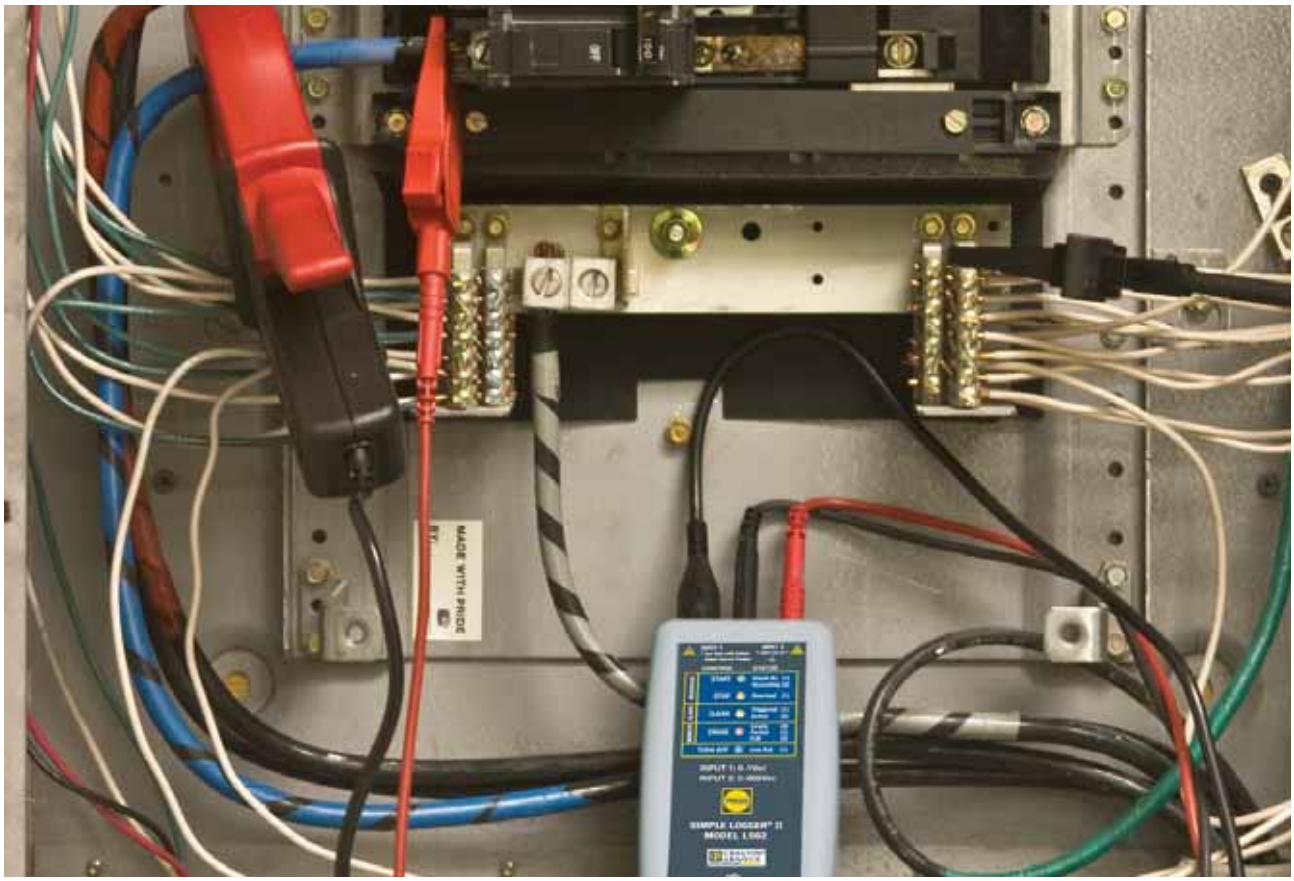
Electrical network analysers capable of recording disturbances for industrial companies and professionals in the electricity sector (producers, transmission companies, electricity users) **are essential tools for satisfactory supervision and timely maintenance of installations.**

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

DATA LOGGING MADE SIMPLE

The **data logger family** is a cost-effective, advanced-design product line incorporating features and functions not found in data loggers costing 2 to 3 times their price. The choice of data storage modes and storage rates allows the operator to effortlessly configure these loggers to optimize memory usage for the application required.
Extended Recording Mode (XRM™) and delayed start time are **just two of the many application-friendly features** in these loggers.
An internal memory of 512 kB allows storage of over 240,000 measurements, more than enough for most data collection needs. **All the AC measurement loggers are True RMS (TRMS)** and all the DC measurement loggers allow the user to program both scale and engineering units. A full set of alarm programming tools allows programming of alarm set points and triggering on high, low, inside or outside trigger points.

Their battery operation and compact size allow **installation in locations where space is restricted** without the need for external power. A series of front-panel LEDs provides a quick overview of the logger's state and memory usage. Software is included as standard, providing real-time viewing of measurement data even while recording. Instrument configuration, data storage and report generation from predefined templates or operator custom-designed templates are also standard features. In addition, several data loggers can be synchronized to record at the same time intervals using DataView®.



MAIN ADVANTAGES

- True RMS measurements provide an accurate representation of measured signals for AC models
- Choice of data storage modes to assist in matching the data collection to the needs of the application
- Stores over 240,000 measurements, ensuring that no valuable data is missed (more than 8 hours at 8 samples per second; approximately 1 week at one sample every 2 seconds)
- Compact size and battery operation
- Display and analyse real-time data through your PC

APPLICATIONS

- DataView® helps electricians or engineers to detect problems occurring randomly during fault/intermittent current detection
- Neutral current monitoring to detect unwanted leakage currents
- Real-time current harmonics monitoring to locate unwanted energy which causes equipment failure
- Load profiling which sizes loads for proper transformer and meter selection
- Split-phase load monitoring for residential voltage and current
- Machine load monitoring detects overload conditions causing premature equipment failure due to overheating
- Process loop monitoring can detect problematic sensors and control systems
- HVAC and general temperature profiling (refrigeration and air-conditioning systems)

CHOOSE YOUR POWER ANALYSER / POWER CLAMP

C.A 404
page 214

C.A 405
page 214

F205
page 43

F407
page 120

F607
page 121

C.A 8220
page 122

C.A 8230
page 123

Strengths	Specially for education		For small and medium power values	Power and harmonics in a clamp		Specially for motor maintenance	Specially for electrical network maintenance
Number of U / I input channels							
	1	1	1	1	1	1	1
Current							
(A)	1	5	600	1,000	2,000	Depending on sensors	Depending on sensors
Display							
Analogue	■	■					
Digital			■	■	■	■	■
Scope mode							■
Electrical network							
Single-phase	■	■	■	■	■	■	■
Balanced three-phase		■	■	■	■	■	■
Three-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-r			■	■	■	■	■
THD-f				■	■	■	■
Decomposition				■	■	■	■
Others							
PST flicker							■
PLT flicker							
Sliding PLT flicker							
Unbalance							
Temperature						■	
Resistance			■	■	■	■	
Rotation speed						■	
Monitoring							
Recording				■	■		■
Transients							
Alarms							■
PC software							
				■	■	■	■

CHOOSE YOUR POWER ANALYSER / POWER CLAMP

C.A 8331
page 124

C.A 8333
page 124

C.A 8336
page 124

C.A 8435
page 124

Comfortable to handle and very compact	Ideal for installation maintenance	Top-of-the-range analysers	Special all-terrain and all-weather	Strengths
				Number of U / I input channels
3	3	4	4	
				Current
Depending on sensors	Depending on sensors	Depending on sensors	Depending on sensors	(A)
				Display
				Analogue
■	■	■	■	Digital
■	■	■	■	Scope mode
				Electrical network
■	■	■	■	Single-phase
■	■	■	■	Balanced three-phase
■	■	■	■	Three-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-r
■	■	■	■	THD-f
■	■	■	■	Decomposition
				Others
■	■	■	■	PST flicker
		■	■	PLT flicker
		■	■	Sliding PLT flicker
■	■	■	■	Unbalance
				Temperature
				Resistance
				Rotation speed
				Monitoring
■	■	■	■	Recording
	■	■	■	Transients
	■	■	■	Alarms
				PC software
■	■	■	■	

POWER AND HARMONICS MULTIMETER CLAMPS

F407

Ref. : P01120947

1000 V CAT IV | IP 54 | Ø 48 mm | 1000 AAC

STRENGTHS

- Measurements up to 1,000 AAC or 1,500 ADC or AAC+DC
- Clamping Ø 48 mm
- Harmonic analysis up to the 25th order
- TrueInrush function
- 3-year warranty

SPECIFICATIONS

	F407
Current(RMS)	
AC	100 mA to 1,000 A
DC and AC+DC	100 mA to 1,500 A
Best accuracy	1 % L + 3 counts
Voltage (RMS)	
AC	100 mV to 1,000 V
DC and AC+DC	100 mV to 1,000 V
Best accuracy	1 % L + 3 counts
Auto AC/DC	Yes (V and A)
Resistance	100 kΩ
Continuity/buzzer	Yes (< 40 Ω)
Power W, var, VA	Yes, single and total three-phase
Crest factor (CF)	Yes
PF and cos φ (DPF)	Yes / Yes
Auto power-off	Yes
Hold function	Yes
Backlighting function	Yes
Min Max key	Yes
Peak +/- 100 ms function	Yes / Yes
TrueInrush function	Yes
THD-f / THD-r harmonics function	Yes / Yes
Decomposition into harmonic orders	25th order
REC storage function	Yes
Recordings (with Min, Max)	Up to 3,000 measurements
Bluetooth communication function	Yes
Frequency	15 Hz to 20 kHz
Clamping Ø	48 mm
Protection	IP 54
Electrical safety	IEC 61010 1000 V CAT IV
Warranty	3 years
Dimensions / weight	272 x 92 x 41 mm - 600 g (with batteries)

CONTENTS

- F407 delivered in a bag pre-equipped for MultiFix
- 1 set of banana/banana leads (red/black)
- 1 set of test probes (red/black)
- 1 set of crocodile clips (red/black)
- 4 x 1.5 V LR6 batteries
- 1 safety datasheet
- 1 CD-Rom containing a user manual and the PC data recovery software (Power Analyser Transfer)

ACCESSORIES / REPLACEMENT PARTS

- Set of banana/banana leads (red/black) P01295451Z
- Set of crocodile clips (red/black) P01295457Z
- See all the accessories on page 144

POWER AND HARMONICS MULTIMETER CLAMPS

F607

Ref. : P01120967

1000 V CAT IV | IP 54 | Ø 60 mm | 2000 Aac

STRENGTHS

- Measurements up to 2,000 Aac or 3,000 Adc or Aac+dc
- Clamping Ø 60 mm
- Harmonic analysis up to the 25th order
- TrueInrush function
- 3-year warranty

SPECIFICATIONS

	F607
Current(RMS)	
AC	100 mA to 2,000 A
DC and AC+DC	100 mA to 3,000 A
Best accuracy	1 % L + 3 counts
Voltage (RMS)	
AC	100 mV to 1,000 V
DC and AC+DC	100 mV to 1,000 V
Best accuracy	1 % L + 3 counts
Auto AC/DC	Yes (V and A)
Resistance	100 kΩ
Continuity/buzzer	Yes (< 40 Ω)
Power W, var, VA	Yes, single and total three-phase
Crest factor (CF)	Yes
PF and cos φ (DPF)	Yes / Yes
Auto power-off	Yes
Hold function	Yes
Backlighting function	Yes
Min Max key	Yes
Peak +/- 100 ms function	Yes / Yes
TrueInrush function	Yes
THD-f / THD-r harmonics function	Yes / Yes
Decomposition into harmonic orders	25th order
REC storage function	Yes
Recordings (with Min, Max)	Up to 3,000 measurements
Bluetooth communication function	Yes
Frequency	15 Hz to 20 kHz
Clamping Ø	60 mm
Protection	IP 54
Electrical safety	IEC 61010 1000 V CAT IV
Warranty	3 years
Dimensions / weight	296 x 111 x 41 mm - 640 g (with batteries)

CONTENTS

- F607 delivered in a bag pre-equipped for MultiFix
- 1 set of banana/banana leads (red/black)
- 1 set of test probes (red/black)
- 1 set of crocodile clips (red/black)
- 4 x 1.5 V LR6 batteries
- 1 safety datasheet
- 1 CD-Rom containing 1 user manual and the PC data recovery software (Power Analyser Transfer)

ACCESSORIES / REPLACEMENT PARTS

- Set of banana/banana leads (red/black) P01295451Z
- Set of crocodile clips (red/black) P01295457Z
- See all the accessories on page 144

MOTOR MAINTENANCE

C.A 8220

Ref. : P01160620

600 V CAT III

IP 54

STRENGTHS

- Access to all the measurements simultaneously
- Low resistance and high current measurements
- Motor temperature measurement
- Motor rotation speed

SPECIFICATIONS

	C.A 8220
Voltage (TRMS)	Phase/Phase : 660 VAC+DC Phase/Neutral : 600 VAC+DC
Current (TRMS)	
MN	MN93: 2 to 240 AAC ; MN93A: 0.005 AAC to 5 AAC / 0.1 AAC to 120 AAC
C	3 A to 1,200 AAC
AmpFlex® or MiniFlex®	30 A to 6,500 AAC
PAC	10 A to 1,000 AAC / 10 A to 1,400 ADC
E3N	50 mA to 10 AAC+DC, 100 mA to 100 AAC+DC
Frequency	40 Hz to 70 Hz
Other measurements	W, var, PF, DPF, VA, temperature, phase rotation, RPM, resistance, continuity, diode test, Wh, VAh, varh
Harmonics	1st to 50th order
Sampling rate	256 samples/period
Recording capacity	≥ 9 complete sets of voltage, current, power and harmonics measurements
Power supply	6 x 1.5 V LR06 batteries, mains power supply available as an option
Battery life	≥ 8 hours with display activated
Communication	Optical USB
Display	Backlit 3-display screen with symbols
Dimensions / weight	211 x 108 x 60 mm / 0.88 kg
Electrical safety	IEC 61010 600 V CAT III, pollution degree 2

ADDITIONAL INFO

- The C.A 8220 analyser is also available with a current sensor:
- C.A 8220 MN93A — P01160621
- C.A 8220 AmpFlex® — P01160622

ACCESSORIES / REPLACEMENT PARTS

- C.A 1711 tachometer probe — P01102082
- 2-wire Pt100 adapter — HX0091
- See all the accessories on page 144

CONTENTS

- C.A 8220
- 2 banana leads
- 2 x 4 mm test probes
- 2 crocodile clips
- 6 x 1.5 V LR06 batteries
- 1 optical USB cable
- Power Analyser Transfer processing software
- 1 CD-ROM containing the user manual

ELECTRICAL NETWORK MAINTENANCE

C.A 8230

Ref. : P01160630

600 V CAT III

IP 54

STRENGTHS

- Access to all the measurements simultaneously
- INRUSH function covering up to 18 s
- Colour graphical display
- Recording and alarms

SPECIFICATIONS

	C.A 8230
Voltage (TRMS)	Phase/Phase : 660 V Phase/Neutral : 600 V
Current (TRMS)	
MN	MN93 : 2 to 240 AAC ; MN93A : 0.005 AAC to 5 AAC / 0.1 AAC to 120 AAC
C	3 A to 1,200 AAC
AmpFlex® or MiniFlex®	30 A to 6,500 AAC
PAC	10 A to 1,000 AAC / 10 A to 1,400 ADC
E3N	50 mA to 10 AAC+DC, 100 mA to 100 AAC+DC
Frequency	40 Hz to 70 Hz
Other measurements	VA, W, var, PF, DPF, Wh, varh, VAh, K factor, flicker, harmonic phase shift, phase rotation
Harmonics	THD, V, A, VA 1st to 50th order: direction, sequence
Sampling rate	256 samples/cycle
Recording capacity	1.5 MB partitioned for the waveforms, alarms and trend recordings
Power supply	6 rechargeable NiMH batteries (supplied) AC power supply: 120/230 Vac (50/60 Hz)
Battery life	≥ 8 h with display activated ≥ 40 with display deactivated (recording mode)
Communication	Optical USB
Display	¼ VGA colour LCD (320 x 240)
Dimensions / weight	211 x 108 x 60 mm / 0.88 kg
Electrical safety	IEC 61010 600 V CAT III, pollution degree 2

ADDITIONAL INFO

- The C.A 8230 analyser is also available with a current sensor:
- C.A 8230 MN93A ____ P01160631
- C.A 8230 AmpFlex® ____ P01160632

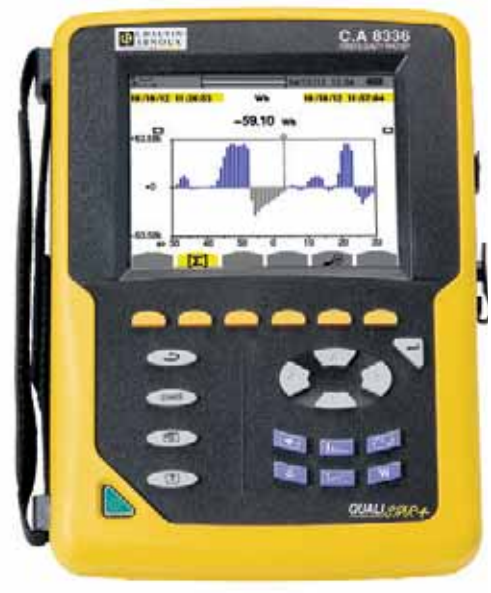
ACCESSORIES / REPLACEMENT PARTS

- Black MN93A clamp ____ P01120434B
- Black AmpFlex A193 450 mm ____ P01120426B
- See all the accessories on page 144

CONTENTS

- C.A 8230
- 2 banana leads
- 2 x 4 mm crocodile clips
- 2 crocodile clips
- 6 rechargeable NIMH batteries
- 1 x 230 V mains adapter
- 1 optical USB cable
- 1 bag no. 5
- Power Analyser Transfer processing software
- 1 CD-ROM containing the user manual

NETWORK AND THREE-PHASE ENERGY ANALYSERS



C.A 8331 - C.A 8333 - C.A 8336

Ref. : P01160511 P01160541 P01160591

C.A 8435

Ref. : P01160585

1000 V CAT III | 600 V CAT IV | 3U 4I | 4U 4I | IP 53 | IEC 61000-4-30 | EN 50160

STRENGTHS

- TRMS AC+DC voltage and current, frequency
- Measurements for power surveys
- Measurements for sizing the anti-harmonic filters
- Simultaneous recording of all the parameters
- Capture of all the transients, alarms and waveforms

CONTENTS

- C.A 8331 / C.A 8333 / C.A 8336 delivered with:
- 1 bag No. 22
- 1 USB lead
- 1 mains adapter
- 4 x 4 mm banana voltage leads 3 m long (5 leads for C.A 8336)
- 4 crocodile clips (5 clips for C.A 8336)
- 1 safety datasheet
- 1 set of 12-colour markers for identifying the leads and inputs
- 1 anti-scratch screen protection film (mounted)
- 1 CD-ROM containing the Power Analyser Transfer PC data recovery software

- C.A 8435 delivered with:
- 1 bag no. 22
- 1 mains power cable
- 1 USB cable
- 1 IP65 mains power cable
- 5 x 4 mm banana voltage leads 3 m long
- 5 crocodile clips
- 1 set of 12-colour markers for identifying the leads and inputs
- 1 anti-scratch screen protection film (mounted)
- 1 safety datasheet
- 1 CD-ROM containing the Power Analyser Transfer PC data recovery software

Don't forget to order your current sensors - see page 210

ADDITIONAL INFO

- The C.A 8435 is also available in a complete version Ref. P01160587
  - 4 AmpFlex® A196 450 IP65 current sensors,
  - 5 IP65 BB196 black banana leads 3 m long
  - 5 lockable crocodile clips
- The Power Analyser Transfer PC data recovery software is supplied as standard

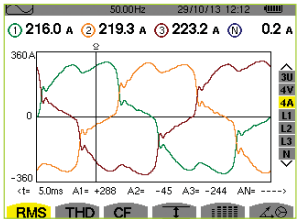
ACCESSORIES / REPLACEMENT PARTS

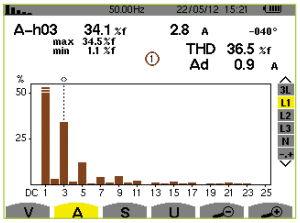
- Black MN93A current sensor P01120434B
- PA31ER mains adapter P01102150
- See all the accessories on page 144

NETWORK AND THREE-PHASE ENERGY ANALYSERS

FUNCTIONS

- Real-time waveform display (5 voltage inputs and 4 current inputs)
- ½-period RMS voltage and current measurements
- Intuitive use
- Automatic recognition of the different types of current sensors
- Integration of all the DC components
- Voltage and current ratios
- Mixing of current sensors
- Measurement, calculation and display of the harmonics up to the 50th order, along with their phase information
- Calculation of the Total Harmonic Distortion (THD)
- Transient capture down to a single sample (1/256th of a period)
- Display of phasor diagram
- Measurement of power values: VA, W, VAD, total var and var per phase
- Measurement of energy values: VAh, Wh, VADh, total varh and varh per phase
- Calculation of K factor and FHL
- Calculation of cos φ displacement power factor and (DPF) and power factor (PF)
- Capture of up to 210 transients
- Calculation of PST & PLT Flicker
- Calculation of unbalance (current and voltage)
- Monitoring of the electrical network with setting of alarms
- Backup and recording of screenshots (image and data)
- Recording and export on PC
- Real-time data recovery and communication software on PC
- EN 50160 reports





SPECIFICATIONS

	C.A 8331	C.A 8333	C.A 8336	C.A 8435
Number of channels	3U / 4I		4U / 4I	
Number of inputs	4V / 3I		5V / 4I	
IEC 61000-4-30	-	EN50160 reports		-
Voltage (TRMS AC+DC)	2 V to 1,000 V			
Voltage ratio	Up to 500 kV			
Current (TRMS AC+DC) MN	MN93 : 500 mA to 200 AAC ; MN93A : 0.005 AAC to 100 AAC			
C193	1 A to 1,000 AAC			
AmpFLEX™ or MiniFlex®	100 mA to 10,000 AAC			30 A to 6,500 AAC
PAC93	1 A to 1,300 AAC/DC			
E3N	50 mA to 100 AAC/DC			
Current ratio	Up to 60 kA			
Frequency	40 Hz to 69 Hz			
Power values	W, VA, var, VAD, PF, DPF, cos φ, tan φ			
Energy values	Wh, varh, VAh, VADh			
Harmonics	Yes			
THD	Yes, 0 to 50th order, phase			
Expert mode	-	Yes		
Transients	-	50	210	
Flicker	Pst		Pst and Plt	
Inrush mode	-	Yes on 4 periods	Yes > 10 minutes	
Unbalance	Yes			
Recording Min/Max	Yes			
parameters at the max. sampling rate	4 hours to 2 weeks	A few days to several weeks	2 weeks to several years	
Alarms	-	4,000 of 10 different types	10,000 of 40 different types	
Peak	Yes			
Vectorial representation	Automatic			
Display	¼ VGA colour TFT screen, 320 x 240, diagonal 148 mm			
Capture of screens and curves	12		50	
Electrical safety	IEC 61010 1000 V CAT III / 600 V CAT IV			
Protection rating	IP53 / IK08			IP67
Languages	More than 27			
Communication interface	USB			
Battery life	Up to 10 hours			
Power supply	Rechargeable 9.6 V NiMH battery or mains power supply			
Dimensions / weight	240 x 180 x 55 mm / 1.9 kg			270 x 250 x 180 mm / 3.7 kg