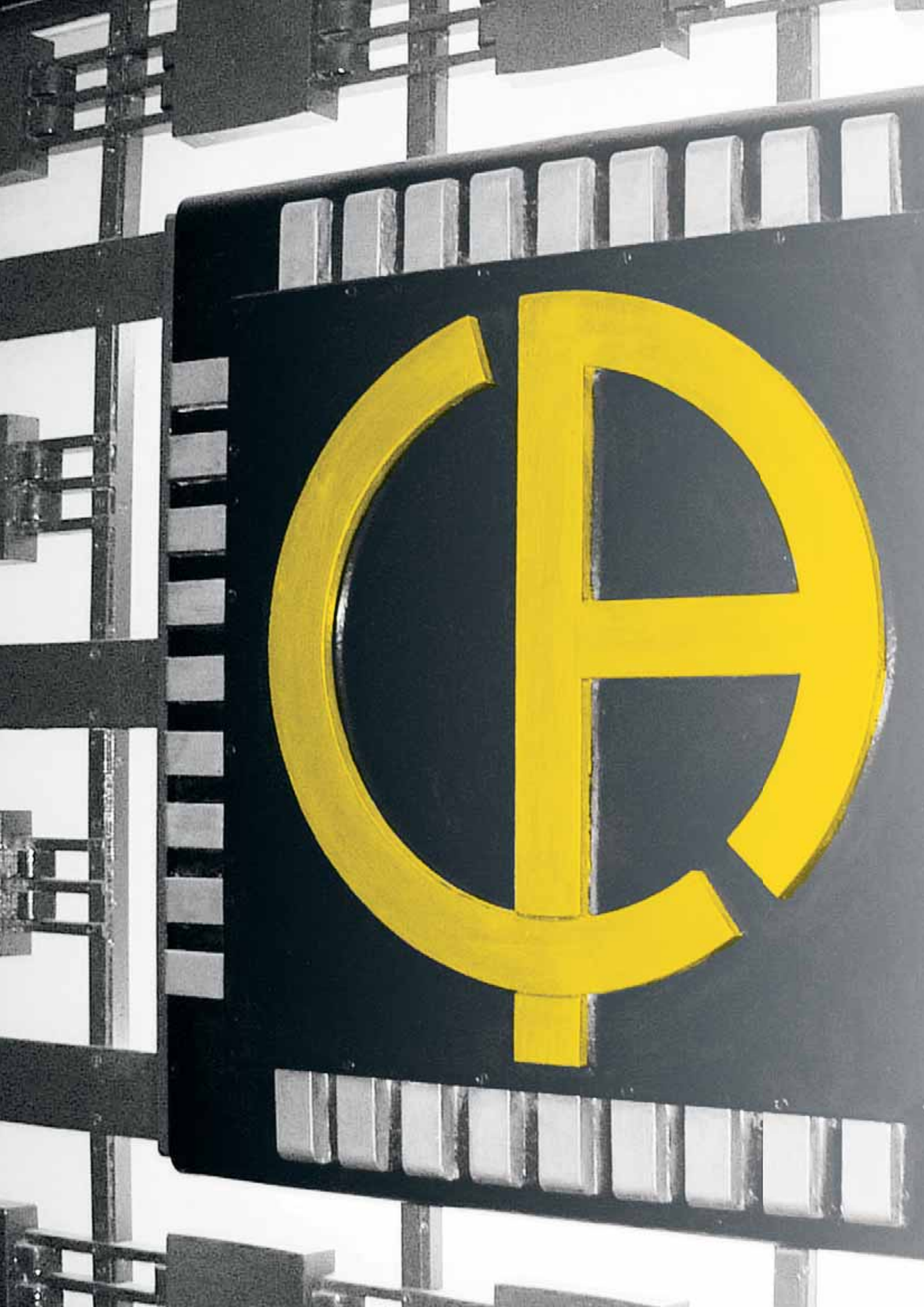
CHAUVIN®
ARNOUX
CHAUVIN ARNOUX GROUP

TEST & MEASUREMENT

2018

Measure up



UNIVERSAL TEST & MEASUREMENT

ELECTRICAL SAFETY

ENERGY QUALITY & INSTALLATION MONITORING

PHYSICAL & ENVIRONMENTAL MEASUREMENTS

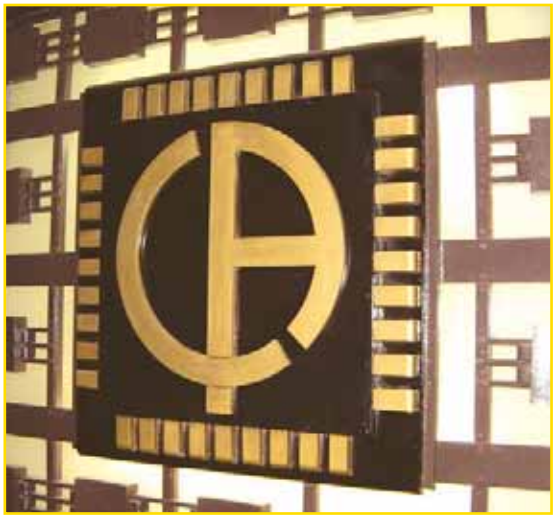
RADIOFREQUENCY & MICROWAVE MEASUREMENTS

LABORATORY & EDUCATIONAL EQUIPMENT

CURRENT MEASUREMENT

ACCESSORIES

ABOUT THE CHAUVIN ARNOUX GROUP



Logo on the company's former main gate

125 YEARS OF DEVELOPMENT

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.

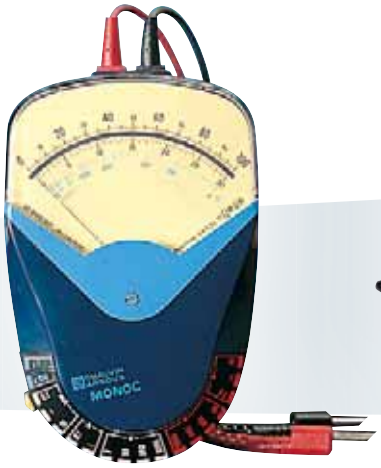
It is often said that at the root of knowledge is language, or that the origin of an innovation was an idea,... yet it is the individual, the person, who is really the source of knowledge and discoveries. This also applies to electricity, which was not invented in the 19th century, but discovered in 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)

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.

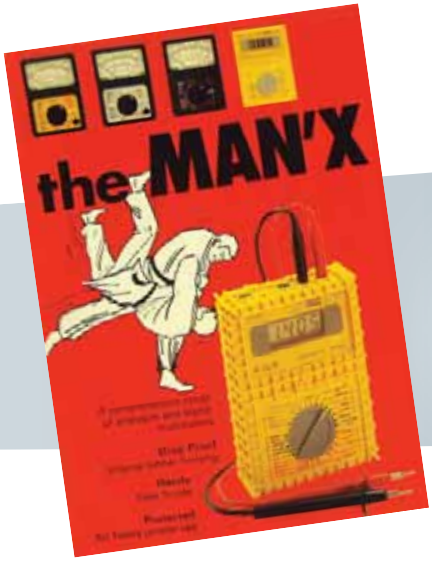
The 1950s saw the arrival of rubber-like materials, used for the bases of portable instruments, and subsequently for the shockproof sheaths made of black neoprene, first designed and patented by Metrix® and Chauvin Arnoux in 1958. These shockproof sheaths later became widely used on the handheld instrument 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
- **1,000** employees
- **6 R&D departments** worldwide
- **7** production sites
- **11% of revenues** invested in R&D

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.

COMMUNICATING WITH YOU, PUBLISHING & DIGITAL MEDIA FOR ADDITIONAL COMMUNICATION

For Chauvin Arnoux, there is no need to choose between traditional or digital communication.
The most important thing is to speak the same language as you!

Due to its strong attachment to dialogue with all its partners and customers/prospects, the Chauvin Arnoux Group makes use of diverse print and digital media, giving priority to multi-channel communication.

A STRUCTURED WEBSITE

Whatever the device used, whether it is a smartphone, tablet or computer, Chauvin Arnoux offers users a website which guides them as they browse. It is simple to find, share and combine information, and offering more relevant information is an obvious target which the Group strives to achieve every day.

Chauvin Arnoux, Chauvin Arnoux Energy, Pyrocontrole, Indatech and Manumesure: each of these entities presents the full extent of its offering through its products, its skills, its applications and its publications, backed by a common visual identity giving a structured image of the Group.

ONLINE SALES FROM 2018

This year, the Group will be proposing online sales of its main products. With just a few clicks, you will be able to order the products and accessories you need, which then be delivered directly to you or to a pick-up location.

PRESENT ON ALL THE SOCIAL MEDIA

Follow all Chauvin Arnoux's news on the three main social media and our YouTube channel.

Facebook
www.facebook.com/ChauvinArnouxFrance

Twitter
twitter.com/ChauvinArnouxFr

Linkedin
www.linkedin.com/company/99353

Youtube
www.youtube.com/c/chauvinarnouxgroup

PUBLICATIONS TO KEEP IN CONTACT

Sales literature, catalogues, customer magazine, informative review for education: Chauvin Arnoux constantly strives to provide publications which meet your expectations.
Nearly 50,000 copies of the magazine Contact Measurement News are distributed and it is also available in our distribution networks worldwide, presenting the Group's news through corporate and technical articles from the Group's five subsidiaries. It includes overviews of the standards, new applications, our production organization and our subsidiaries, providing transparent information which many of our customers have appreciated since the very first issue in black and white.

CHAUVIN ARNOUX, A LONG-TERM PARTNER FOR EDUCATION

Drawing on its long history of close, privileged links with the French National Education system, the Chauvin Arnoux Group supports the players in education by participating in a large number of events, publishing the review "Les Cahiers de l'Instrumentation" and offering measuring instrumentation suited to the teaching requirements. A Measurement Certification and a dedicated website for students and teachers are also proposed to deal with the new constraints and to accompany tomorrow's professionals as closely as possible.

THE" MEASUREMENT CLUB": A GENUINE FORUM FOR EXPERTISE!

The "Club du Mesurage" (Measurement Club) is a genuine think-tank bringing together experts from business and education in order to generate a constant flow of information about the evolution of the standards, the new market requirements, applications and particularly new applications… Open to all members of the Education sector, this Club allows genuine theoretical debate as well as creating a forum of expertise between two communities brought together by common objectives , leading every year to publication of Chauvin Arnoux's magazine for Education, "Les Cahiers de l'Instrumentation".

"LES CAHIERS DE L'INSTRUMENTATION": THE MAGAZINE FOR EDUCATION

The magazine "Les Cahiers de l'instrumentation" is a collection of practical exercises published annually for teachers and their students, providing concrete illustrations of solutions or the use of measuring, testing and energy control instruments.

A PRODUCT OFFERING DEDICATED TO THE EDUCATION SECTOR

The Chauvin Arnoux Group proposes a special dedicated offering for the world of education which is presented every year in the "Selection for Education" catalogue.

Discover Measurement Certification:
certification-mesure.chauvin-arnoux.com

PARTNER OF MANY EDUCATIONAL EVENTS

Every year, the Chauvin Arnoux Group acts as a partner and sponsor for a large number of events linked to the educational sector, intended to promote technical and scientific education by measuring equipment loans, the participation of Chauvin Arnoux managers in the judging panels or the provision of prizes for competitions.

MEASUREMENT CERTIFICATION DEDICATED TO STUDENTS AND TEACHERS

To deal with the new constraints and to support tomorrow's professionals as closely as possible, CHAUVIN ARNOUX has set up a measurement certification programme, in cooperation with the French national education system. The aim of this certification is to confirm students' knowledge of the use of measuring instruments by means of an online multiple-choice questionnaire.

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

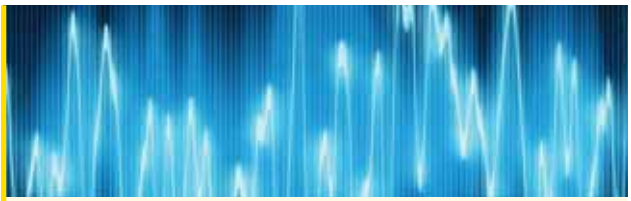
- The advantages of energy auditing
- Economical, environmental and regulatory constraints
- People authorized to perform an energy audit
- Towards a continuous improvement process: the ISO 50001 standard
- Choosing the right measuring tool
- Defining the potential sources of energy savings and the related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

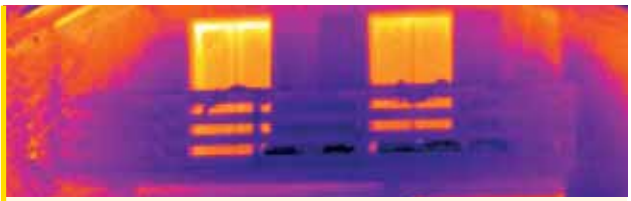
- Excessive consumption of reactive energy leading to penalty payments.
- Loss of service continuity at the first fault on an IT system.
- Untimely tripping of the circuit-breakers protecting industrial electrical equipment.
- Untimely tripping of RCDs.
- Random fault on an electricity distribution system.



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 - REFERENCED BY DATADOCK



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.

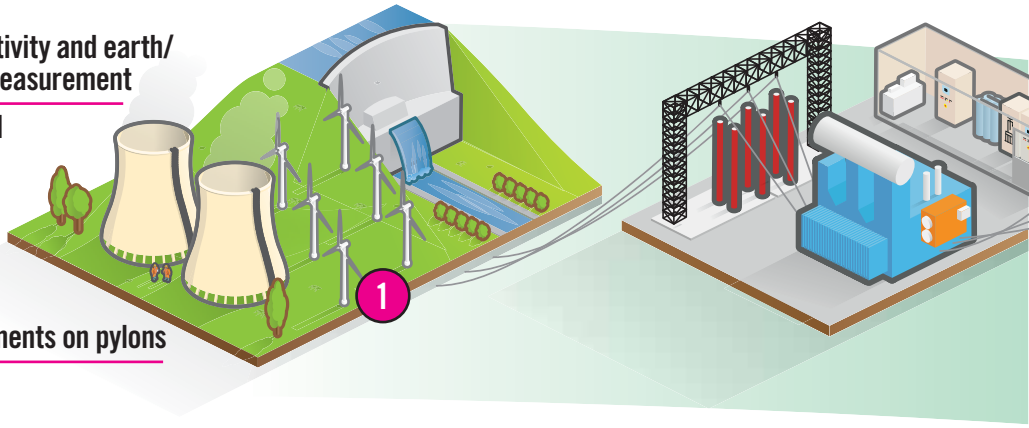
- Favouring skills development
- Gaining access to the different levels of qualification
- Obtaining authorizations

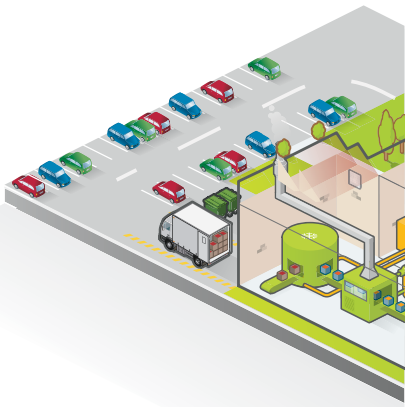
EARTH/GROUND CONNECTION TESTING

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



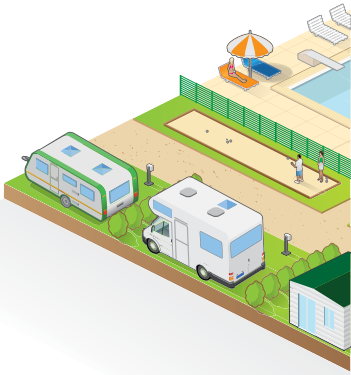


INSTALLATION MAINTENANCE AND TESTING

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

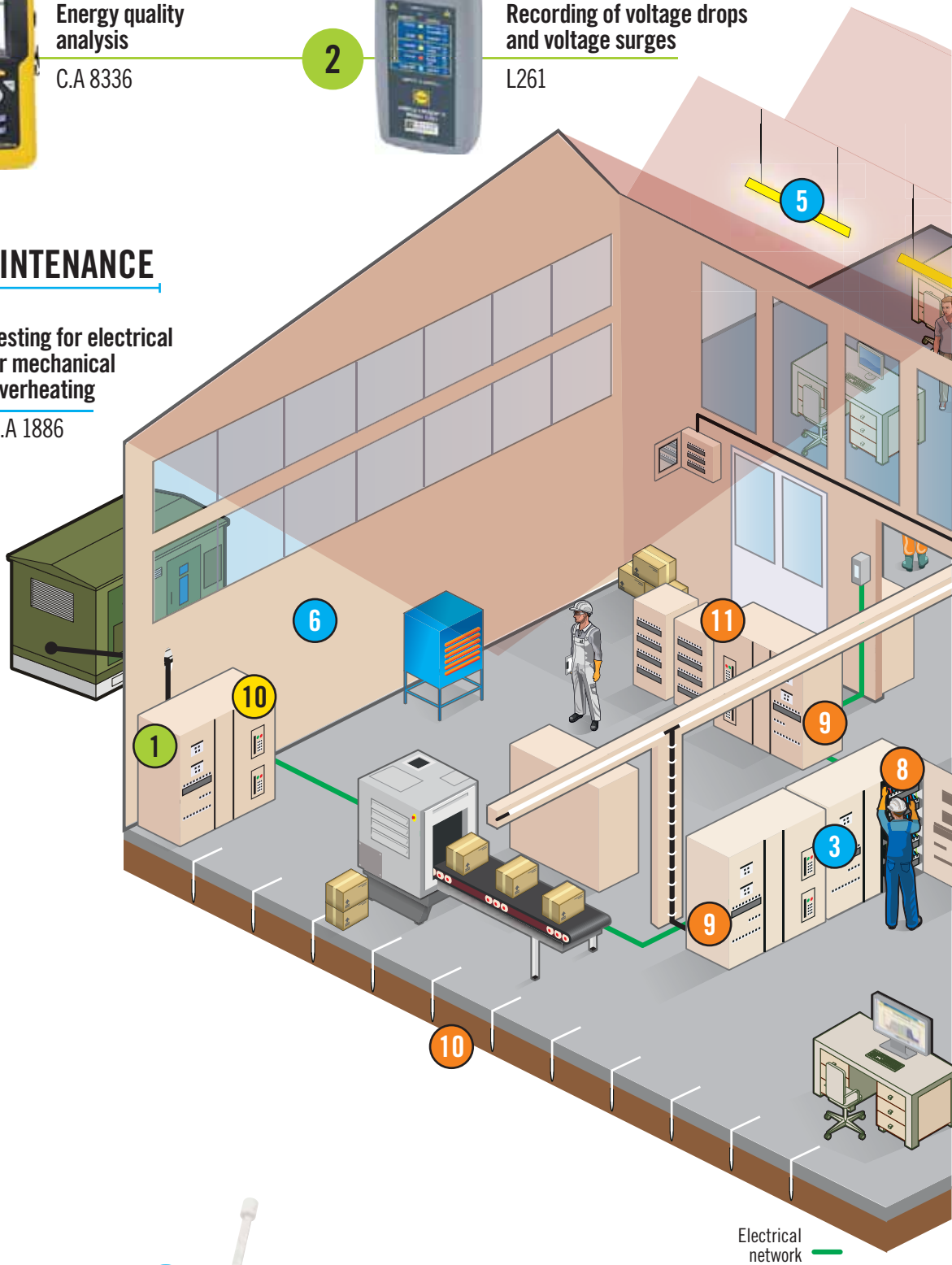
REGULATORY TESTING OF THE WORKING ENVIRONMENT

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
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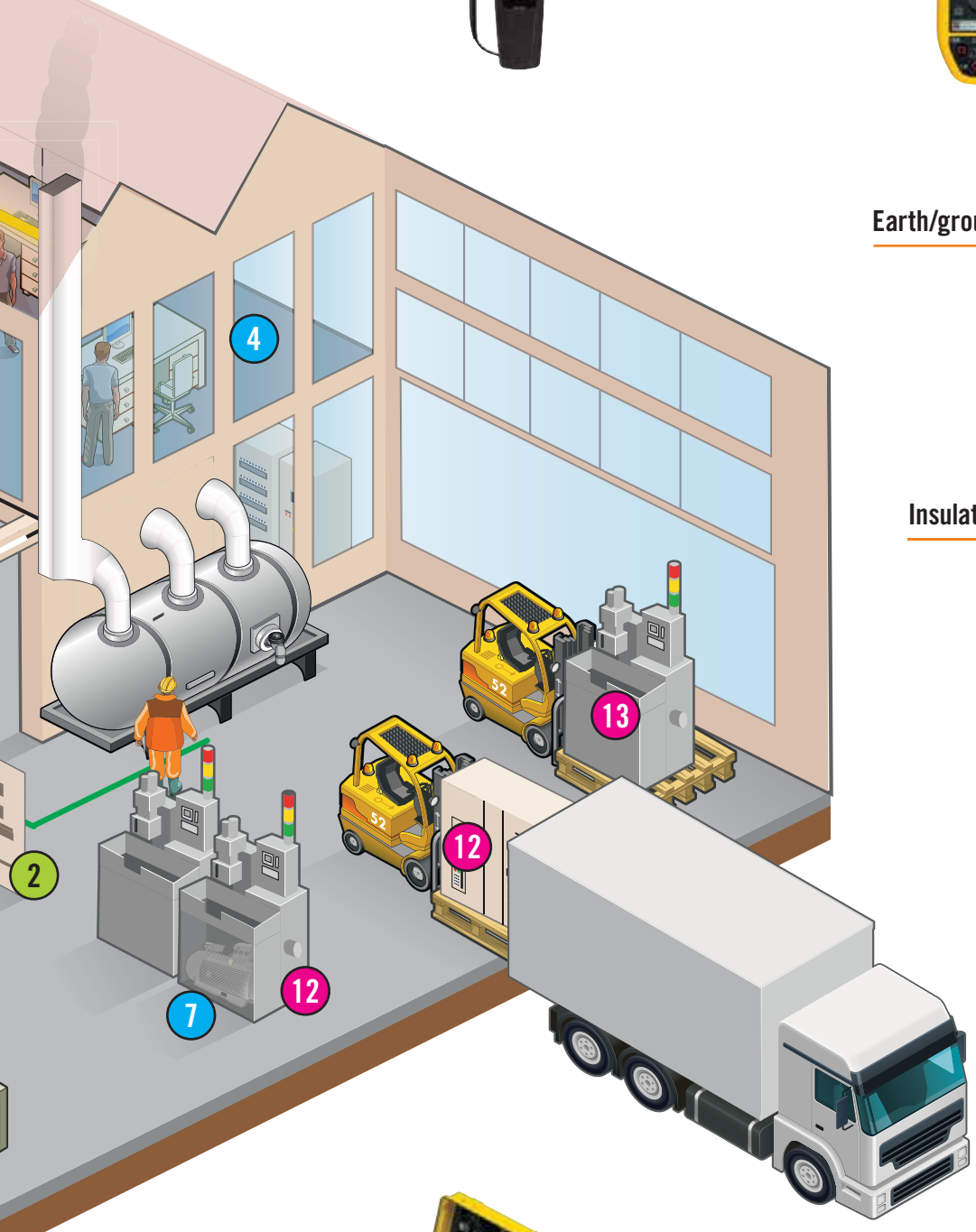
Detection of leakage currents
C.A 5275 + B102
9

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

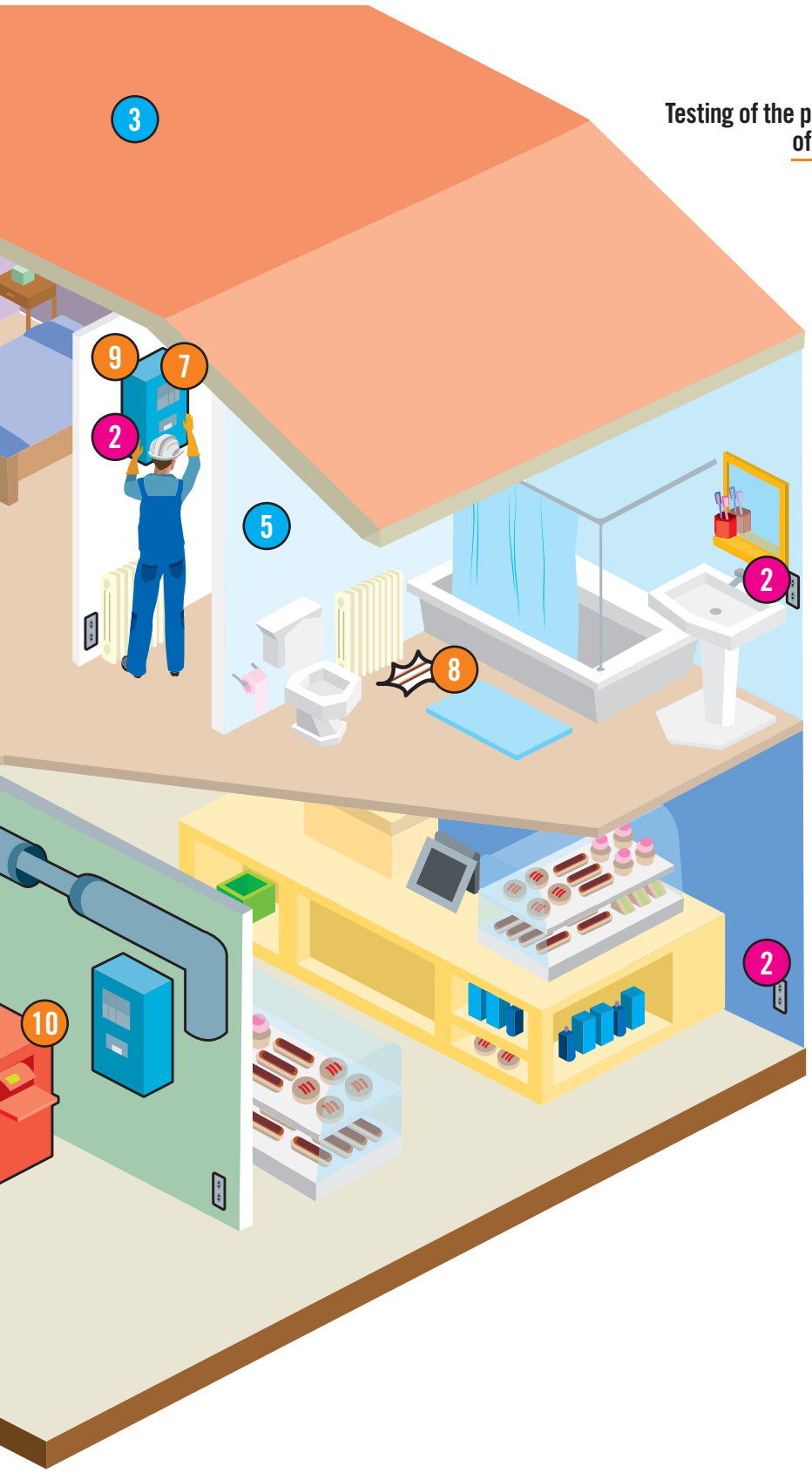
3 **Measurement of insulation, leakproofing and thermal bridges**
C.A 1954
AVAILABLE MID-2018

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

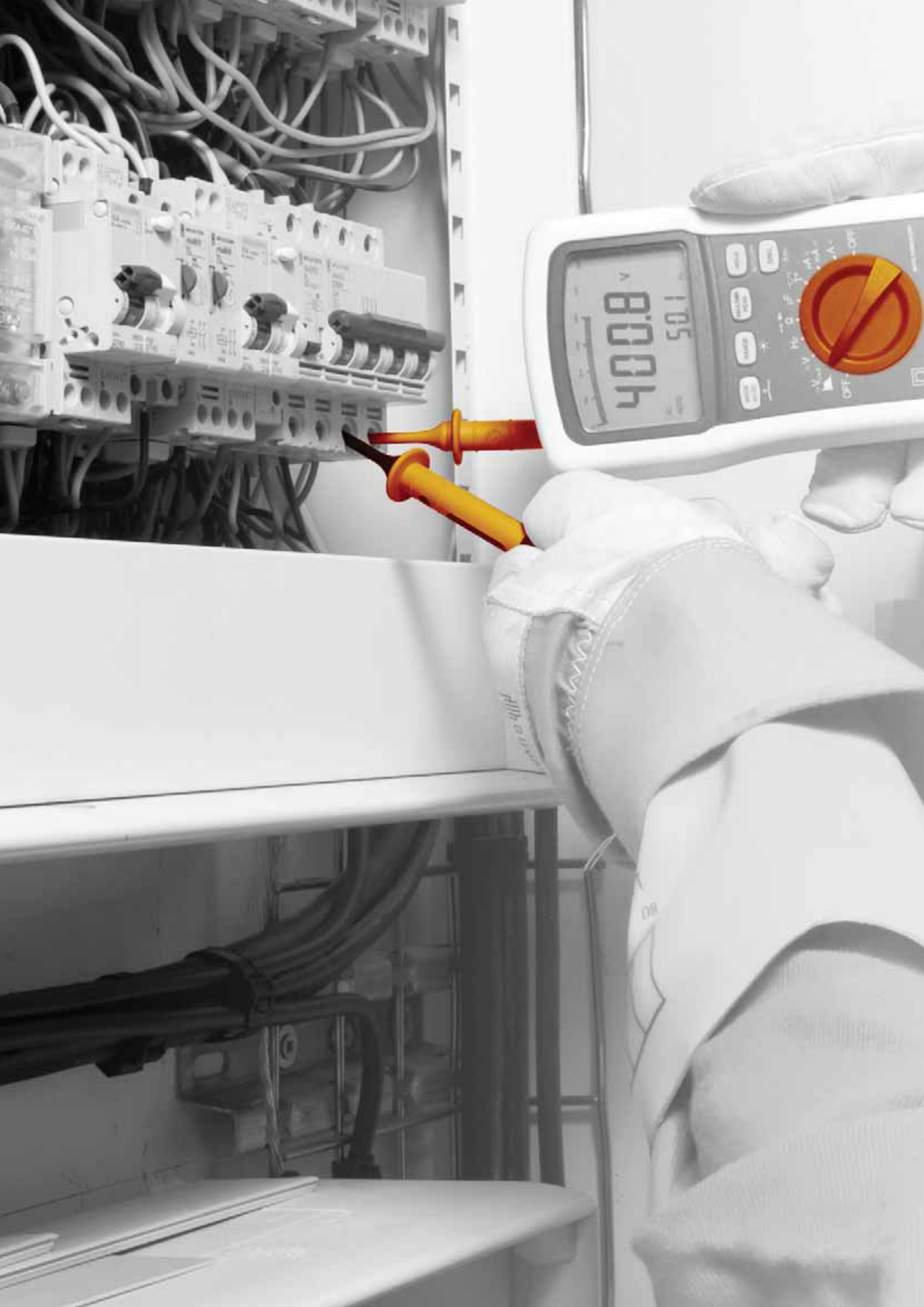
F201

9

Ionization current measurement on gas boiler

C.A 5277

10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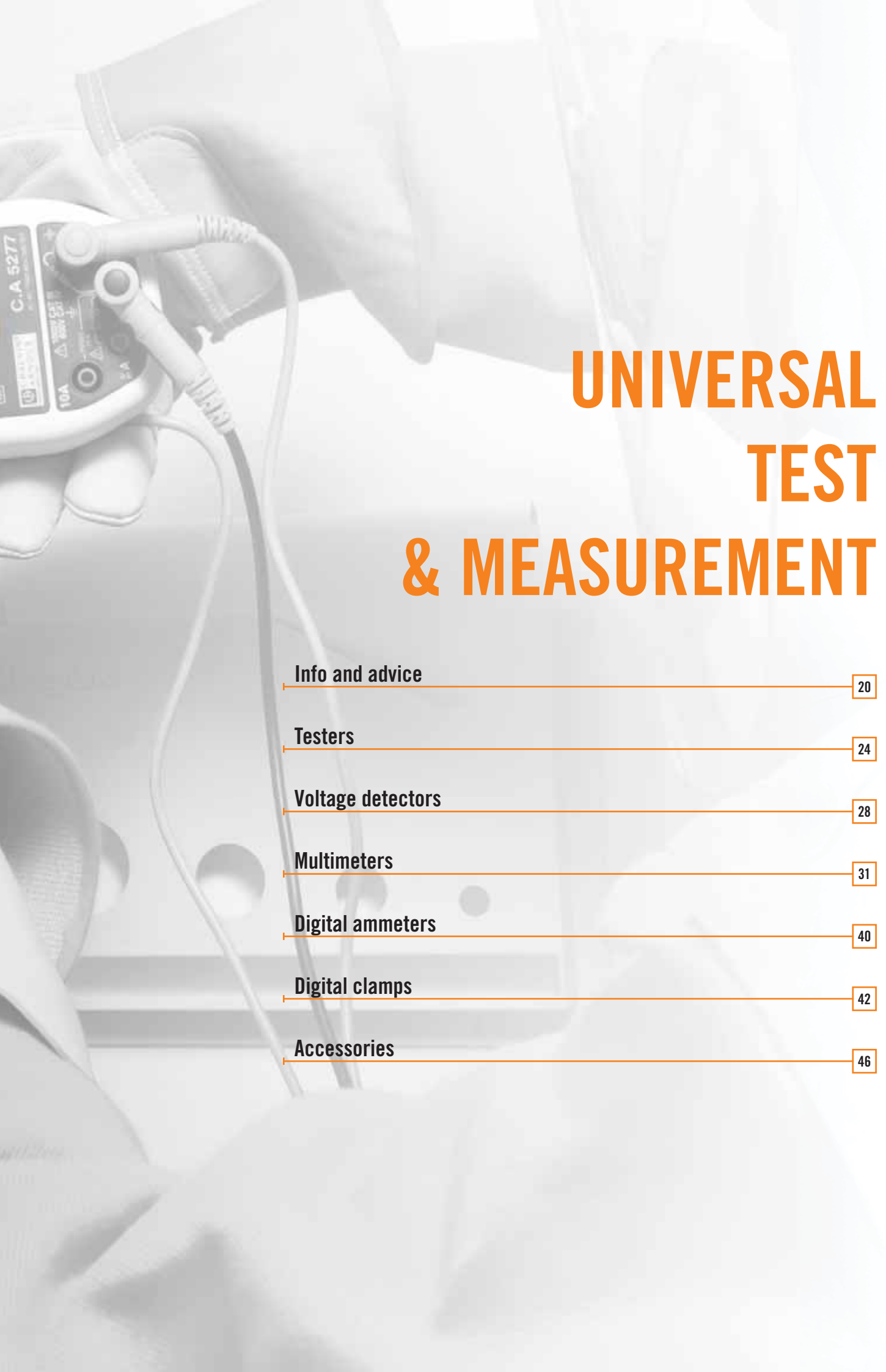


UNIVERSAL TEST & MEASUREMENT

THE STANDARDS

EN 60529

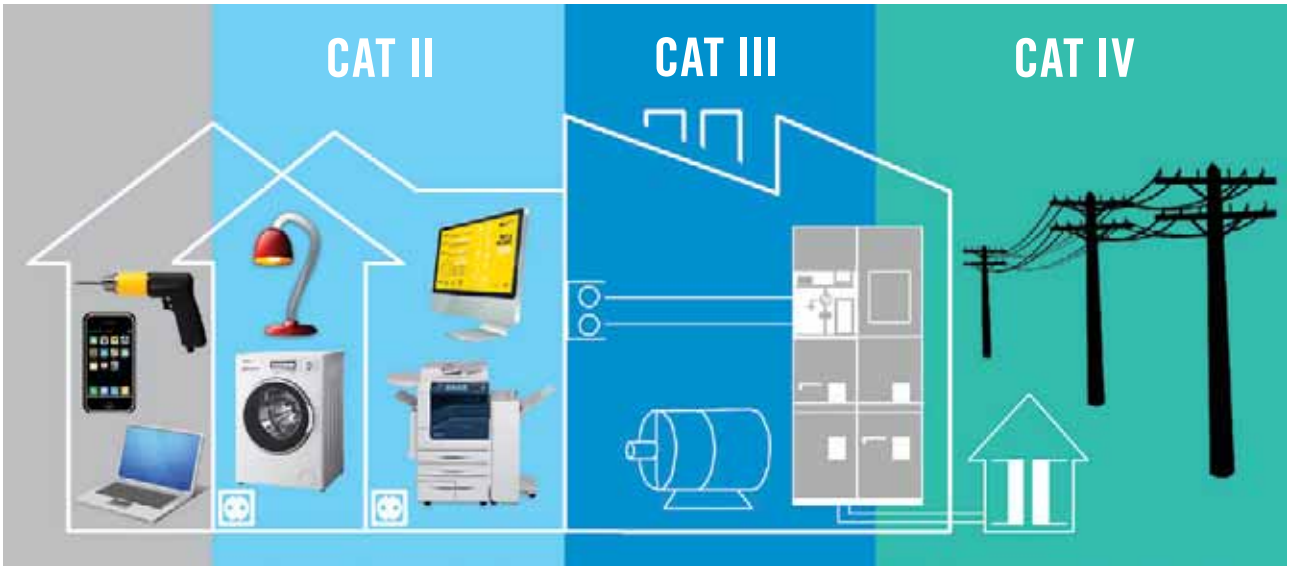
The EN 60529 standard defines the level of tightness(leakproofing) of an instrument against penetration by solids or water. The IP rating corresponds to the instrument's level of protection against penetration by solids (1st digit) and by water (2nd digit). The higher the rating, the more effective the 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.**

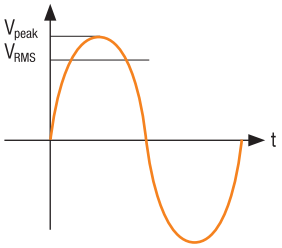
$$V_{RMS}=\sqrt{\frac{1}{T}\int_{o}^{T}v(t)^2}$$

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

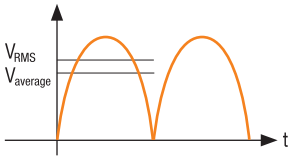
$$V = V_{peak}\cos\omega t$$

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

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

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 V_{AC}	-20 dB … +16 dB
Max. value	Sur 500 ms
Typical accuracy (4)	1% for V_{DC} and Ω, 1.5 % for A_{DC}
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 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 5273

Ref. : 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 5273
Display	2 x 6,000 counts, backlit
Bargraph (63 elements)	Bi-mode (full scale / central zero)
Acquisition	TRMS AC / DC
Measurement rate	5 measurements / second
Automatic / manual ranges	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	
Frequency	600.0 Hz / 6.000 kHz / 50.00 kHz
Capacitance	8 cal.: 6.000 nF to 60.00 mF
Temperature	-59.6 °C to +1,200°C -4°F to +2,192 °F
Hold	Yes
Min / MAX (100 ms)	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 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 5273 delivered delivered with:
- 1 set of banana leads
- 1 set of test probes
- 1 x 9 V 6LR61 battery
- 1 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	0.2 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	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

F603 - F605 - F607

Ref. : 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

	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/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

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 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 — P01296032
- 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 — P01296032
- 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) — P01102032
- 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 — P01298012
- 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
- C.A 753 universal measurement adapter for European 2P+E power socket — P01191748Z

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

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 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.

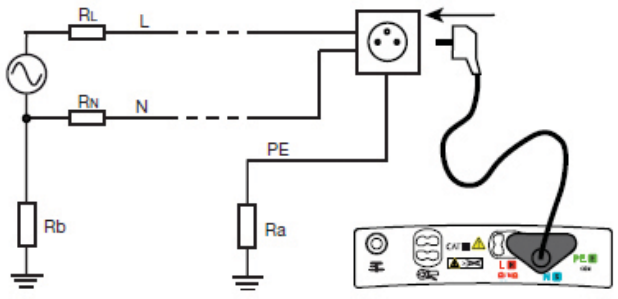
If there is no earth electrode, it may endanger people's lives and damage electrical installations and property.

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.

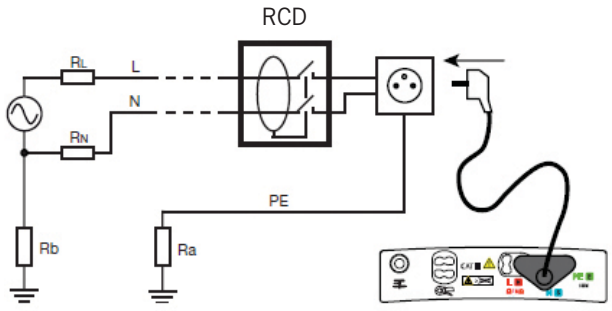
Type-B RCDs are designed to provide a specified response for DC-only leakage currents. A specific test is then required to check RCDs of this type.

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

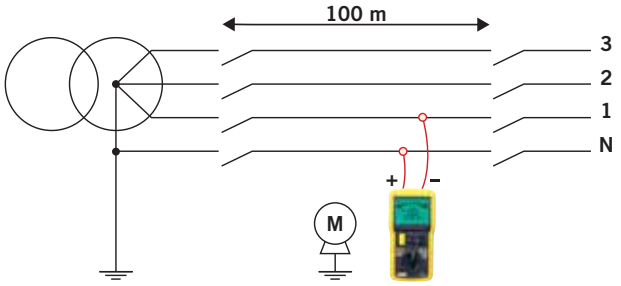
Insulation measurement on electrical installations

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.

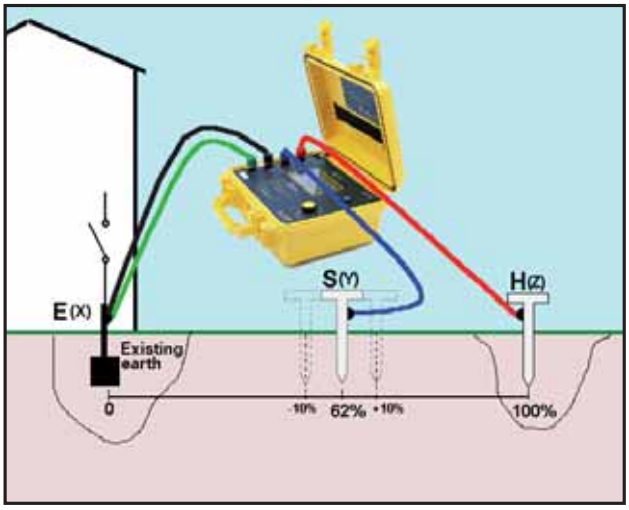
LIST OF THE DIFFERENT EARTH MEASUREMENT METHODS

	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.

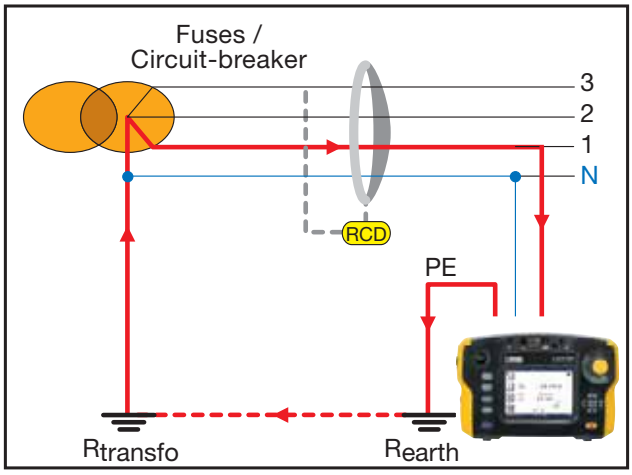
Line-PE loop measurement (only on TT system)

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.

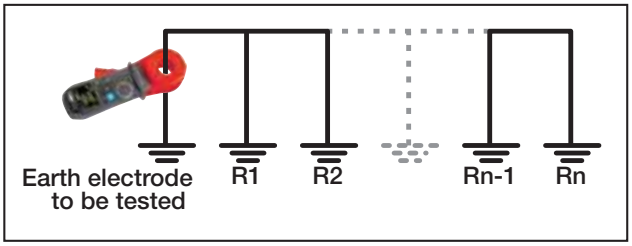
This case involves a network of parallel earths. Knowing that "n" resistances in parallel are equivalent to a resistance Raux with a negligible value, we can measure the local earth value Rx:

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

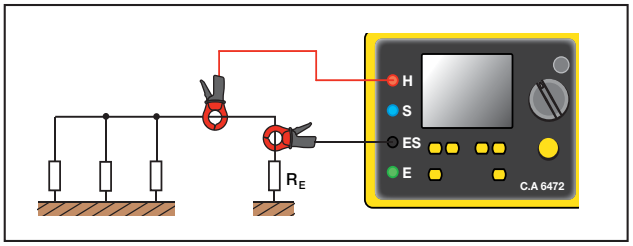
As Rx >> Raux', we obtain the result Rloop # Rx

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.

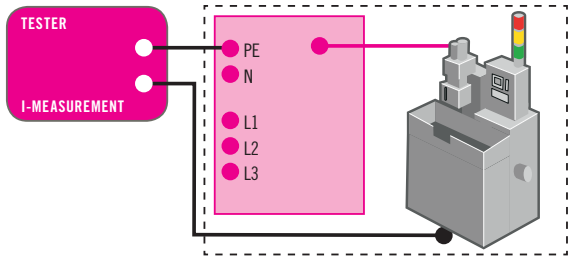
SAFETY OF PORTABLE ELECTRICAL APPLIANCES

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

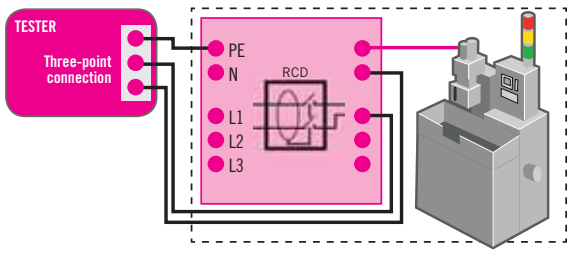
(IEC 61557-4)



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

RCD AND PRCD TEST

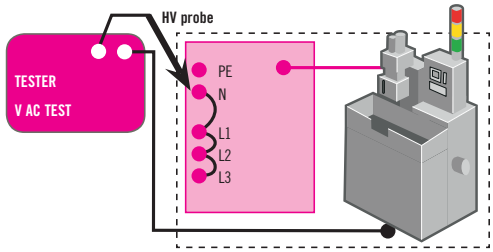
RCD test (Uc, T, I) (IEC 61557-6)



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

HV DIELECTRIC TEST

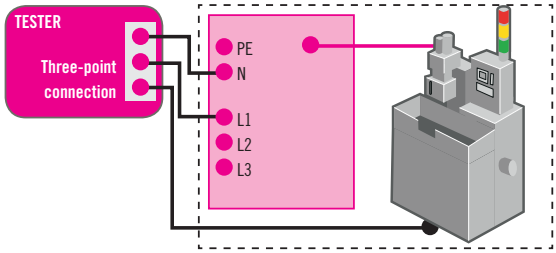
AC dielectric strength



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

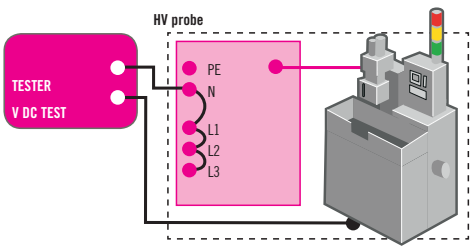
Loop & PFC measurement (IEC 61557-3)



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.

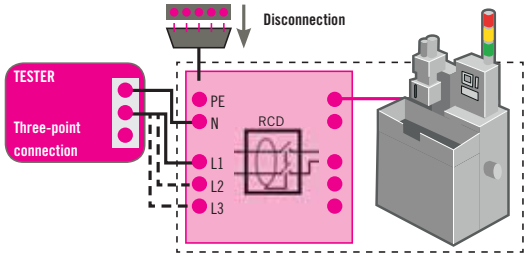
INSULATION RESISTANCE MEASUREMENT

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.

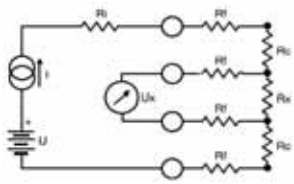
Measurement principle

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:

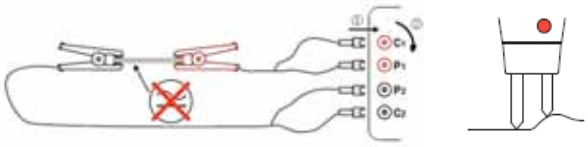
From a DC voltage source U, a generator supplies a current with the value I.

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.

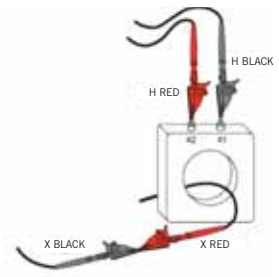


The micro-ohmmeters must offer a resolution of 1 µΩ or even 0.1 µΩ, a wide measurement range and compensation of the thermocouple effects by inversion of the measurement current. To ensure operator safety, the equipment must be protected against accidental overvoltages, prevent measurement in the presence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

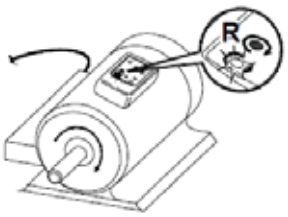
Interconnection of several sections of the electrical network or several buildings on the same site in a three-phase system requires the phase sequence to follow the normal direction. This is **particularly crucial for the power supplies of rotating machines** as **the rotation order of the phases connected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

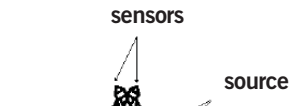
If you connect the motor's power supply phases to the tester and turn the rotor half a turn to the right by hand, the tester indicates whether or not the phase wires are connected in the right order.

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 1821 thermometer P01654821
- C.A 1246 thermo-hygrometer P01654246
- 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 107

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.

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 107

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 1821 thermometer P01654821
- See all the accessories on page 102

C.A 6505

Ref. : P01139704

1000 V CAT III | 600 V CAT IV | 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 - 600 V CAT IV 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 1246 thermo-hygrometer ____ P01654246
- C.A 1821 thermometer ____ P01654821
- See all the accessories on page 102

DIGITAL INSULATION TESTERS

C.A 6545 - C.A 6547

Ref. : P01139701 P01139702

1000 V CAT III | 600 V CAT IV | 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 - 600 V CAT IV - 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 1246 thermo-hygrometer P01654246
- C.A 1821 thermometer P01654821
- See all the accessories on page 102

C.A 6549

Ref. : P01139703

1000 V CAT III | 600 V CAT IV | 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 1246 thermo-hygrometer — P01654246
- C.A 1821 thermometer — P01654821
- 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 - 600 V CAT IV IEC 61557

DIGITAL INSULATION TESTERS

C.A 6550 - C.A 6555

Ref. : P01139705 P01139706

1000 V CAT IV

IP 54

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.	

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

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

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

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

CONTENTS

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

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 6155
page 89

	C.A 6121	C.A 6155
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)	■ (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	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 6155

Ref. : P01146002

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:
- 2 high-voltage test cables (2 m)
- 1 high-voltage test probe (red)
- 1 high-voltage crocodile clip (red)
- 1 plug-in test cable 1.5 m long
- 1 test cable 3 m long with three separate leads
- 3 test cables (green, black, red, 1.5 m)
- 1 test cable (red, 4 m)
- 4 test probes (blue, green, black, red)
- 3 crocodile clips (black)
- PC software on CD-ROM with RS232 cable and USB
- 1 multilingual safety datasheet
- 1 measurement report

SPECIFICATIONS

		C.A 6155
Dielectric test	Test voltage	1,000 V / 1,890 V / 2,200 V
	I limit	0.1 to 100 mA (1,890 V / 2,200 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 - 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 19.99 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 9.9 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		115 V - 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 / IEC 61439
Electrical safety		IEC 61010-1 / IEC 61557 (parts 1, 2, 3, 4, 6, 7) 300 V CAT II, 300 V CAT III (TP1)
Ingress protection		IP 50: closed product

ELECTRICAL EQUIPMENT TESTERS

MICRO-OHMMETERS

	C.A 6240 page 93	C.A 6255 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

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 106

C.A 6255

Ref. : P01143221

50 V CAT III

IP 53

STRENGTHS

- Optimized measurement on inductive objects
- 4-wire measurement method
- Automatic compensation of stray currents
- Test current of up to 10 A
- Measurements up to 2,500 Ω, resolution 0.1 µΩ
- Integrated «temperature compensation» function

SPECIFICATIONS

	C.A 6255						
Measurement method	4-wire method						
Range	5,000 mΩ	25,000 mΩ	250,00 mΩ	2500,0 mΩ	25,000 Ω	250,00 Ω	2500,0 Ω
Accuracy	0.05 % +1 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 6255 is compatible with the DataView® software
- Possibility of connecting the Pt100 sensor (option) directly to the instrument

CONTENTS

- C.A 6255
- 1 set of cables 3 m long terminated by Kelvin clamps
- 1 Euro mains power cable 2 m long
- 1 CD-ROM containing the MOT (Micro-Ohmmeter Transfer) software
- 1 RS 232 communication cable
- 1 CD-ROM containing the user's manual in 9 languages

ACCESSORIES / REPLACEMENT PARTS

- Doubles 1 A test probes (x 2) ____ P01102056
- Mini Kelvin clamp (set of 2) ____ P01101783
- See all the accessories on page 106

C.A 6292

Ref. : P01143300

IP 54 | BSG

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 106

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 106

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
- Nickel-Cadmium, Lithium-Ion, Nickel-Metal-Hybrid or Lead-Acid 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			

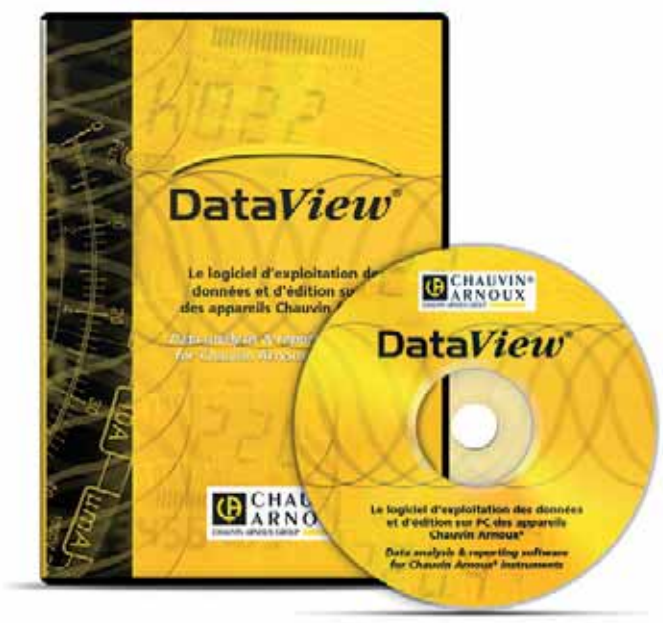
CONTENTS

- 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

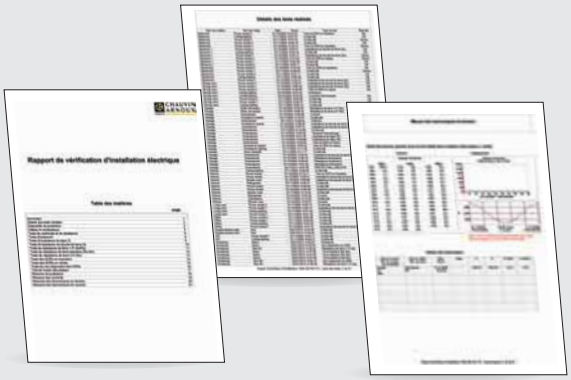
ICT | MEG | GTT | GTC | MOT | DTR

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

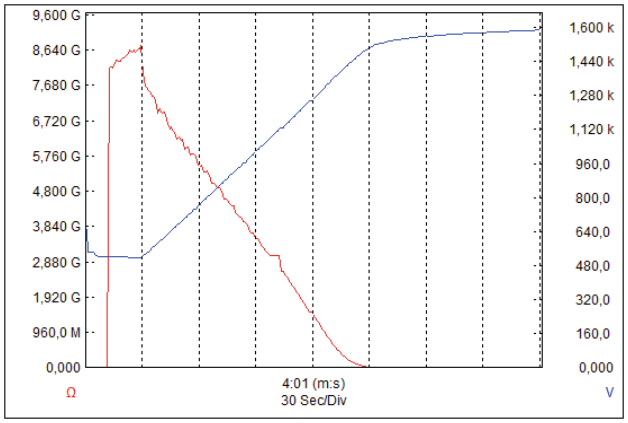
- Windows XP / 256MB of RAM
- Windows Vista & Windows 7/8/10 (32/64 bit)
- 1 GB of RAM for Windows Vista & Windows 7/8 (32 bit)
- 2 GB of RAM for Windows Vista & Windows 7/8 (64 bit)
- 80 MB available space on hard disk (200 MB recommended)

ADDITIONAL INFO

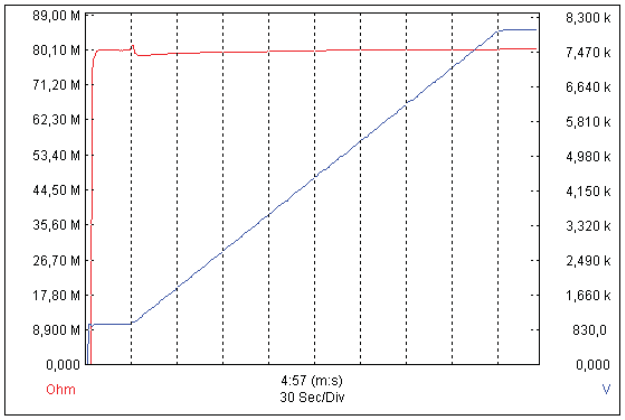
- The DataView® software:
- Automatically recognizes the instrument connected when it is hooked up to the PC and opens the corresponding menu. Users then have direct access to the configuration and the recorded data
- Is equipped with a large number of predefined report templates for quick generation 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 6255	
		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				

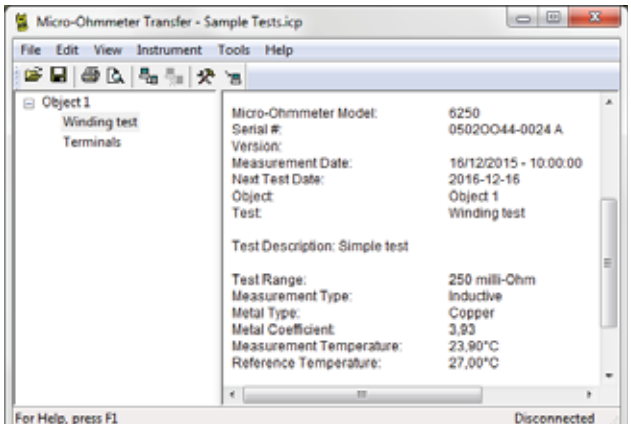
DATA PROCESSING SOFTWARE



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

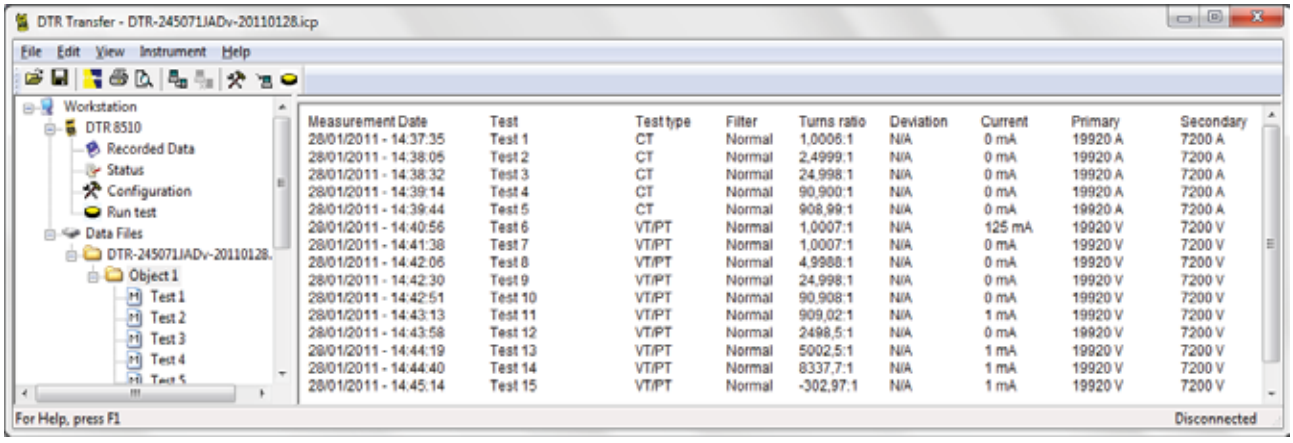


MEG MODULE Graphical plotting of the V(t) and R(t) tests on a fixed insulation resistance



MOT MODULE Results of motor winding test

GTT MODULE Example of configuration



DTR MODULE Recovery of the measurement data recorded in the ratiometer

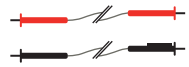
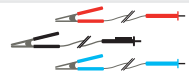
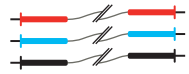
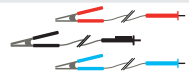
ACCESSORIES FOR MULTI-FUNCTION INSTALLATION TESTERS

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

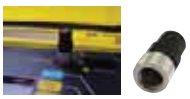
ACCESSORIES FOR ELECTRICAL EQUIPMENT TESTERS

■ 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	■	■				
	P01102056	1 A double test probe (set of 2) L=2.85m	Spade lug and 4 mm banana	■	■				
	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	■	■				
	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 1246 thermo-hygrometer	P01654246
C.A 1821	P01654821
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 1246 thermo-hygrometer	P01654246
C.A 1821	P01654821
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 1246 thermo-hygrometer	P01654246
C.A 1821	P01654821
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 1246 thermo-hygrometer	P01654246
C.A 1821	P01654821
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 1246 thermo-hygrometer	P01654246
C.A 1821	P01654821
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 1246 thermo-hygrometer — P01654246
- C.A 1821 — P01654821
- 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 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
▪ Set of 10 fuses: 16 A-250 V 6 x 32 T	P01297086
▪ Set of 2 HV cables	P01103071
▪ HV crocodile clip	P01103072
▪ HV test probe	P01103073

ACCESSORIES / REPLACEMENT PARTS

OTHER TESTERS

C.A 6240 and C.A 6255

- 1 A double test probe (x 2) — P01102056
- Mini Kelvin clamp (set of 2) — P01101783
- UK mains lead — P01295253
- C.A 1846 thermo-hygrometer — P01654246
- 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 6255

- Pt 100 temperature sensor — P01102013
- 2 m cable for remote Pt 100 — P01102014
- 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
Ah03
34.1%
28A
THD 36.5%
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.

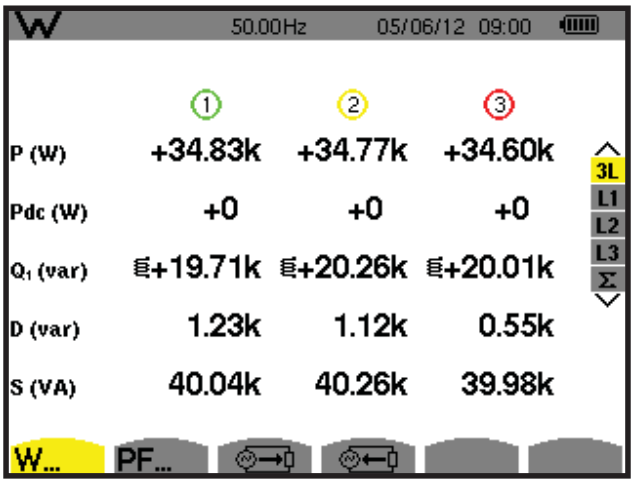
So **measurement** provides **the foundation for optimizing your installations' energy efficiency**, supervising your electrical networks and fairly allocating the costs.

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.

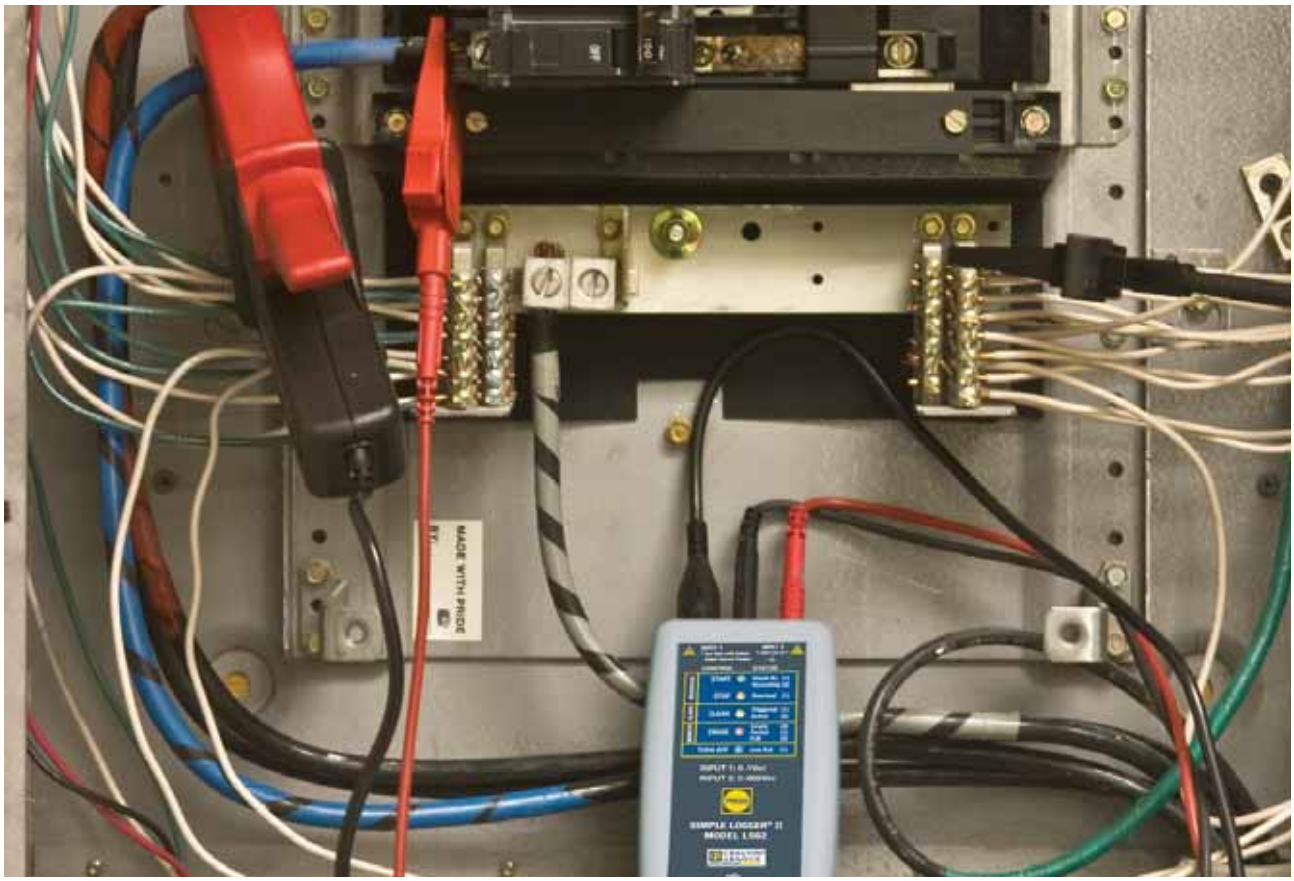
Electrical network analysers capable of recording disturbances for industrial companies and professionals in the electricity sector (producers, transmission companies, electricity users) **are essential tools for satisfactory supervision and timely maintenance of installations.**

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 (S)			■	■	■	■	■
W (P)	■	■	■	■	■	■	■
var (Q_1)			■	■	■	■	■
var (D)							
var (N)							■
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 8331	C.A 8333	C.A 8336	
Comfortable to handle and very compact	Ideal for installation maintenance	Top-of-the-range analysers	**Strengths**
			Number of U / I input channels
3	3	4	
			Current
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 (S)**
■	■	■	**W (P)**
■	■	■	**var (Q_1)**
■	■	■	**var (D)**
■	■	■	**var (N)**
■	■	■	**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 (P), var (Q_1), VA (S)	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 (P), var (Q_1), VA (S)	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

POWER AND ENERGY QUALITY ANALYSERS

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 (P), var (Q_1), PF, DPF, VA (S), 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 (S), W (P), var (Q_1, N), 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

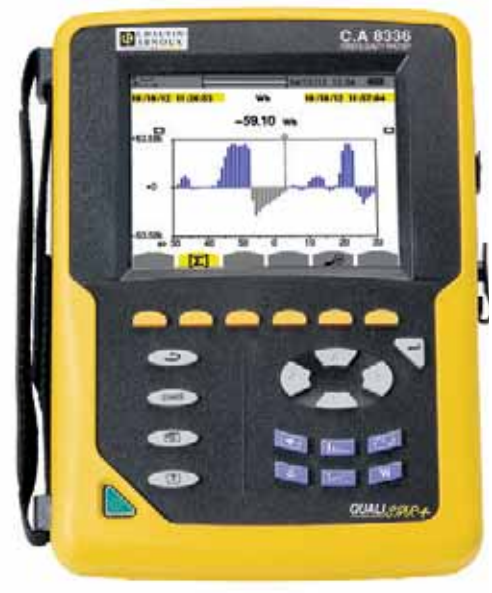
- The C.A 8230 analyser is also available with a current sensor:
- C.A 8230 MN93A ____ P01160631
- C.A 8230 AmpFlex® ____ P01160632

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



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

Ref. : P01160511 P01160541 P01160591

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

Don't forget to order your current sensors - see page 144

ADDITIONAL INFO

- The Power Analyser Transfer PC data recovery software is supplied as standard

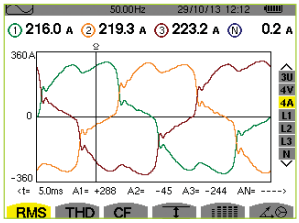
ACCESSORIES / REPLACEMENT PARTS

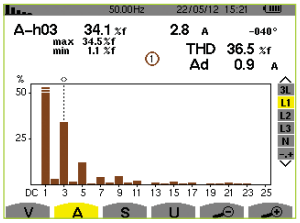
- Black MN93A current sensor P01120434B
- PA31ER mains adapter P01102150
- See all the accessories on page 144

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





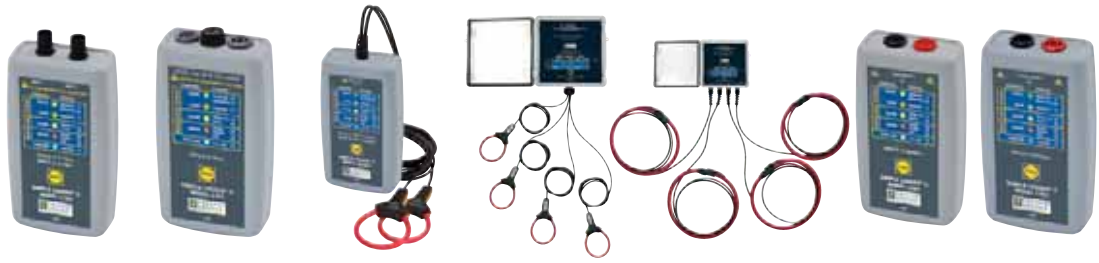
SPECIFICATIONS

	C.A 8331	C.A 8333	C.A 8336
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		
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 (P), VA (S), var (Q_1, N, D), PF, DPF, cos φ, tan φ		
Energy values	Wh, varh (Q_1h, Nh, Dh), VAh		
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		
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		

CHOOSE YOUR ELECTRICAL MEASUREMENT LOGGER

	PEL103 page 128	PEL102 page 128	PEL105 page 129	L562 page 130	CL601 page 131	L101 page 132
With display	■		■			
Without display		■		■	■	■
Power						
Power values	■	■	■	■		
Energy values	■	■	■			
Current						
Clamp format					■	
Voltage inputs (format)	Qualistar	Qualistar	Qualistar	BNC		BNC
Current inputs (format)						
Number of inputs	3	3	4	1	1	1
Sensor type	See acc.	See acc.	See acc.	See acc.		See acc.
Voltage						
RMS	■	■	■	■		
DC	■	■	■			
Number of inputs	3	3	4	1		

CHOOSE YOUR ELECTRICAL MEASUREMENT LOGGER



L102 page 132	L111 page 132	ML912 page 133	ML914 page 134	AL834 page 134	L261 page 135	L481 page 135	
							With display
■	■	■	■	■	■	■	Without display
							Power
							Power values
							Energy values
							Current
							Clamp format
BNC					Banana	Banana	Voltage inputs (format)
	Banana						Current inputs (format)
2	1	2	4	4			Number of inputs
See acc.	See acc.	MiniFlex®	MiniFlex®	AmpFlex®			Sensor type
							Voltage
					■		RMS
					■	■	DC
					1	1	Number of inputs

PEL 102 - PEL 103

Ref. : P01157152 P01157153

1000 V CAT III | 600 V CAT IV | IP 54

STRENGTHS

- Compatible with all electrical networks: single-phase, split-phase, three-phase with or without neutral, etc.
- Implementation without powering down the electrical network
- All the instruments can be powered by the phase
- Data recording on integrated SD card
- Compact and magnetized for mounting in closed cabinets

ADDITIONAL INFO

The PEL Transfer analysis software is delivered as standard for:

- Configuration of the PEL100s
- Verification of the connections before recording starts
- Downloading of the recorded measurements
- Display of the various measurement results and analyses

ACCESSORIES / REPLACEMENT PARTS

- Bag no. 23 — P01298078
- Mains adapter (self-powering) — P01102134
- See all the accessories on page 144

CONTENTS

- A PEL 102 or PEL 103 logger delivered with:
- 4 measurement leads
- 4 crocodile clips (black)
- 1 x 2 GB SD card
- 1 set of markers (for the ends of the leads and current sensors)
- 1 mains power cable
- 1 USB cable (Type A / Type B)
- 1 carrying bag
- 1 safety datasheet
- PEL Transfer PC software
- 1 SD USB adapter
- 1 CD-ROM containing the user manual

SPECIFICATIONS

		PEL 102	PEL 103
Display		None	With triple digital display
Type of installation		Single-phase, split-phase, three-phase with or without neutral, etc.	
Number of channels		3U / 4I	
Number of inputs		4U / 3I	
Measurements			
Network frequency		DC, 50 Hz, 60 Hz & 400 Hz	
Voltage (measurement range)		10.00 to 1,000 VAC/DC	
Current	MN93	500 mA to 200 AAC	
	MN93A	5 mA to 100 AAC	
	C193	1 A to 1,000 AAC	
	AmpFlex® A193 & MiniFlex® MA193	200.0 mA to 10.00 kAAC	
	PAC93	1 A to 1,000 AAC 1 A to 1,300 ADC	
	E3N	50 mA to 10 AAC/DC 100 mA to 100 AAC/DC	
	J93	50 A to 3,500 AAC / 50 A to 5,000 ADC	
Calculated Measurements			
Ratios		Up to 650,000 V / up to 25,000 A	
Power		10 W to 10 GW / 10 var to 10 Gvar (N) 10 VA to 10 GVA	
Energy		Up to 4 EWh / 4 EVAh / 4 Evarh ($E = 10^{18}$)	
Phase		cos φ, tan Φ, PF	
Harmonics		THD	
Additional functions			
Phase sequence		Yes	
Min / Max		Yes	
Mounting		Magnet, hook	
Recording			
Sampling rate / Acquisition interval / Aggregation		128 samples/period - 1 measurement/s from 1 min to 60 min	
Data storage		SD card, 8 GB (SD-HC card up to 32 GB)	
Communication		USB, Ethernet & BlueTooth®	
Power supply		110 V - 250 V (+10%, -15%) @ 50-60 Hz & 400 Hz	
Safety		IEC 61010 600 V CAT IV 1000 V CAT III	
Mechanical specifications			
Dimensions		256 x 125 x 37 mm without sensor	
Weight		900 g	950 g
Casing		IP54, ETL	

PEL 105

Ref. : P01157155

1000 V CAT IV | IP 67

STRENGTHS

- Suitable for installation on an electricity pole
- All-terrain casing resistant to shocks, UV light and high temperatures
- Self-powered by its voltage inputs up to 1,000 V
- Continuous recording with a 200 ms acquisition interval
- Measurements in compliance with the IEEE 1459 standards

ADDITIONAL INFO

- When used with the DataView® software, the measurements made with the PEL105 can be processed directly for measurement report generation.
- Possibility of remote connection via an IRD server

ACCESSORIES / REPLACEMENT PARTS

- A196A current sensor P01120554
- Pole mounting kit P01102146
- See all the accessories on page 144

CONTENTS

- One PEL105 logger delivered with:
- 5 black silicone leads 3 m long, straight banana / straight banana
- 5 black crocodile clips, 1000 V CAT IV
- 1 set of inserts/rings
- 4 AmpFlex® IP67 A196 3 m long
- 1 set of waterproof caps
- 1 SD card
- 1 USB cable
- 1 bag
- 1 safety datasheet
- 1 USB key containing a quick startup guide and a user manual

SPECIFICATIONS

		PEL 105
Display		With triple digital display
Type of installation		Single-phase, split-phase, three-phase with or without neutral, etc.
Number of channels		4U / 4I
Number of inputs		5U / 4I
Measurements		
Network frequencies		DC, 50 Hz, 60 Hz & 400 Hz
Voltage (measurement range)		10.00 V to 1,000 VAC/DC @ 50/60 Hz 600 VAC @ 400 Hz
Current	MN93	500 mA to 200 AAC
	MN93A	5 mA to 100 AAC
	C193	1 A to 1,000 AAC
	AmpFlex® A193 & MiniFlex® MA193	200 mA to 10 kAAC
	PAC93	1 A to 1,000 AAC / 1 A to 1,300 ADC
	E3N	50 mA to 10 AAC/DC / 100 mA to 100 AAC/DC
	J93	50 to 3,500 AAC / 50 to 5,000 ADC
Calculated measurements		
Power		20 W to 10 GW 20 var to 10 Gvar (Q_1, N) 20 VA to 10 GVA
Energy		Up to 4 EWh / 4 EVAh / 4 Evarh ($E = 10^{18}$)
Phase		cos φ, tan Φ, PF
Harmonics		THD
Additional functions		
Phase sequence		Yes
Min / Max		Yes
Recording		
Sampling rate / Acquisition interval / Aggregation		128 samples./period 5 measurements/s From 1 min to 60 min
Data storage		8 GB SD card (SD-HC card up to 32 GB)
Communication		Ethernet, Bluetooth®, WiFi and USB
Power supply		Self-powered internally from 94 to 1,000 V @ 50-60 Hz & 400 Hz / DC
Safety		IEC 61010 - 1000 V CAT IV
Mechanical specifications		
Dimensions		245 x 270 x 180 mm
Weight		< 4 kg
Casing		IP67

TRMS VOLTAGE/CURRENT LOGGER

L562

Ref. : P01157060

600 V CAT III | 300 V CAT IV | TRMS

STRENGTHS

- Detects voltage drops and surges
- Monitors power consumption on single-phase networks, as well as energy consumption
- Up to 240,000 measurements saved in non-volatile memory
- Recording rate from 8/s to 1/day

SPECIFICATIONS

	L562	
Number of channels	2	
Connection	Current channel	Voltage channel
Input connection	BNC	Banana connector
Input range	0 to 1 VAC	0 to 600 VAC
Resolution	0,1 mV	0,1 V
Accuracy (50/60 Hz)	0 to 10 mV: not specified 10 to 50 mV: ± (0.5 % R + 1 mV) 50 to 1,000 mV: ± (0.5 % R + 0.5 mV	0 to 5 V: not specified 5 to 50 V: ± (0.5 % R + 1 V) 50 to 600 V: ± (0.5 % R + 0.5 V)
Sampling rate	64 samples per period	
Storage interval	Programmable from 125 ms to 1 day	
Recording modes	Stop when full, FIFO, XRM™ extended recording mode and recording on alarms	
Recording duration	15 minutes to 8 weeks, programmable using DataView®	
Data storage	240,000 measurements (512 kB). The recorded data are stored in non-volatile memory, even if the battery is low or absent	
Communication	Optically-isolated USB 2.0	
Power supply	2 x 1.5 V LR06 batteries	
Battery life	100 hours to > 45 days (depending on recording interval/duration)	
Mechanical specifications		
Dimensions	136 x 70 x 32 mm	
Max. conductor sizes	Depends on current sensor	
Weight (with battery)	181 g	
Casing	UL94-V0	
Vibration	IEC 60068-2-6 (1,5 mm, 10 à 55 Hz)	
Shocks	IEC 60068-2-27 (30 G)	
Falls	IEC 60068-2-32 (1 m)	
Environment		
Operating temperature	-10 to +50 °C	
Storage temperature	-20 to +60 °C	

ADDITIONAL INFO

- Automatic report generation with the DataView® software

CONTENTS

- L562 delivered with:
- 1 USB cable 2 m long, type A to mini-B 5-pin
- PC communication software
- 2 banana leads 1.5 m long
- 2 crocodile clips
- 2 x 1.5 V LR06 alkaline batteries

ACCESSORIES / REPLACEMENT PARTS

- Standard PVC leads with straight 4 mm male plugs ____ P01295288Z
- 32 A crocodile clips ____ P01102052Z
- See all the accessories on page 144

TRMS LOGGER CURRENT CLAMP

CL601

Ref. : P01157010

600 V CAT III | 300 V CAT IV | TRMS

STRENGTHS

- Stand-alone with safe connections
- Alarm function
- Overload indication
- Monitoring of machine loads, electrical troubleshooting, etc.

SPECIFICATIONS

	CL601
Number of channels	1
Input connection	Split-phase current transformer AC current
Current range	0 to 600 AAC
Resolution	0,1 A
Accuracy (50/60 Hz)	0 to 5 A: not specified 5 to 50 A: ± (1 % R + 1 A) 50 to 400 A: ±(1 % R + 0.5 A) 400 to 600 A: ±(3 % R + 1 A)
Sampling rate	64 samples per period
Storage interval	Programmable from 125 ms to 1 day
Storage modes	Start/end, FIFO and XRM™ extended recording mode
Recording duration	15 minutes to 8 weeks, programmable using DataView®
Data storage	240,000 measurements (512 kB). The recorded data are stored in non-volatile memory, even if the battery is low or absent
Communication	Optically-isolated USB 2.0
Power supply	2 x 1.5 V LR06 batteries
Battery life	100 hours to > 45 days (depending on recording interval/duration)
Mechanical specifications	
Dimensions	235 x 102 x 41 mm
Max. conductor size	1 conductor Ø 42 mm, 2 conductors each with Ø 25.4 mm
Weight (with batteries)	485 g
Electrical safety	IEC 61010, 300 V CAT IV / 600 V CAT III
Casing	UL94-V0
Vibration	IEC 60068-2-6 (1.5 mm, 10 to 55 Hz)
Shocks	IEC 60068-2-27 (30 G)
Falls	IEC 60068-2-32 (1 m)
Environment	
Operating temperature	-10 to +50 °C
Storage temperature	-20 to +60 °C

ADDITIONAL INFO

- Automatic report generation

CONTENTS

- CL601 delivered with:
- 1 USB cable 2 m long, type A to mini-B
- 5 pins
- PC communication software
- 2 x 1.5 V LR06 batteries

TRMS CURRENT LOGGERS

L101 - L102 - L111

Ref. : P01157020 P01157030 P01157080

50 V CAT III | TRMS

STRENGTHS

- L101 records on request and can be used to monitor current on 1 channel
- L102 can be used to monitor the neutral current in relation to the earth, as well as split-phase loads It is equipped with 2 independent channels
- L111 has the same function as the L101 but with single-channelnnection via banana socket for clamps with current output

SPECIFICATIONS

	L101	L102	L111
Number of channels	1	2	1
Input connection	BNC	One BNC connector per channel	2 flush-mounted banana sockets
Current range	0 to 1 VAC depending on sensor		
Resolution	0,1 mV		0,1 mA
Accuracy (50/60 Hz)	0 to 10 mV: not specified 10 to 50 mV: ± (0.5 % R + 1 mV) 50 to 1,000 mV: ± (0.5 % R + 0.5 mV)		0 to 10 mA: not specified 10 to 50 mA: ± (0.5 % R + 1 mA) 50 to 1,000 mA: ± (0.5 % R + 0.5 mA)
Sampling rate	64 samples per period		
Storage interval	Programmable from 125 ms to 1 day		
Storage modes	Start/end, FIFO, XRM™ extended recording mode and recording on alarms		
Recording duration	15 minutes to 8 weeks, programmable using DataView®		
Data storage	240,000 measurements (512 kB). The recorded data are stored in non-volatile memory, even if the battery is low or absent		
Communication	Optically-isolated USB 2.0		
Power supply	2 x 1.5 V LR06 batteries		
Battery life	100 hours to > 45 days (depending on recording interval/duration)		
Mechanical specifications			
Dimensions	136 x 70 x 32 mm		132 x 70 x 32 mm
Max. conductor size	Depends on current sensor		
Weight (with batteries)	180 g		
Electrical safety	IEC 61010, 50 V CAT III		
Casing	UL94-V0		
Vibration	IEC 60068-2-6 (1,5 mm, 10 to 55 Hz)		
Shocks	IEC 60068-2-27 (30 G)		
Falls	IEC 60068-2-32 (1 m)		
Environment			
Operating temperature	-10 to +50 °C		
Storage temperature	-20 to +60 °C		

ADDITIONAL INFO

- Automatic report generation

CONTENTS

- L101 and L102 delivered with:
- 1 USB cable 2 m long, type A to mini-B 5-pin
- PC communication software
- 2 x 1.5 V LR6 batteries
- L111 delivered with:
- 1 USB cable 2 m long, type A to mini-B 5-pin
- PC communication software
- 2 x 1.5 V LR06 batteries

ACCESSORIES / REPLACEMENT PARTS

- Bag with carrying strap ____ P01298076
- USB cable 2 m long, type A to mini-B 5-pin ____ Contact us
- See all the accessories on page 144

ML912

Ref. : P01157130

600 V CAT III | 300 V CAT IV

STRENGTHS

- Two MiniFlex® flexible current sensors for measuring currents from 0.5 A to 1,000 A
- Two ranges: 100 / 1,000 Aac
- Monitoring of loads on the phase
- Intermittent fault detection
- Monitoring of current harmonics

SPECIFICATIONS

	ML912	
Number of channels	2	
Input connection	Built-in MiniFlex® flexible AC current sensors	
Range	0.5 to 100 AAC	5 to 1,000 AAC
Resolution	0.1 mA	0.1 V
Accuracy	0 to 1 A: not specified 1 to 100 A: ±(1 % R + 0.5 A)	0 to 5 A: not specified 5 to 1,000 A: ±(1 % R + 1 A)
Sampling rate	64 samples per period	
Storage interval	Programmable from 125 ms to 1 day	
Storage modes	Start/stop, FIFO, XRM™ extended recording mode and recording on alarms	
Recording duration	15 minutes to 8 weeks, programmable using DataView®	
Data storage	240,000 measurements (512 kB). The recorded data are stored in non-volatile memory, even if the battery is low or absent	
Communication	Optically-isolated USB 2.0	
Power supply	2 x 1.5 V LR06 batteries	
Battery life	100 hours to > 45 days (depending on recording interval/duration)	
Mechanical specifications		
Dimensions	136 x 70 x 32 mm without sensor	
Weight (with batteries)	245 g	
Electrical safety	IEC 61010-1, 600 V CAT III, 300 V CAT IV, Pollution degree 2	
Casing	UL94-V0	
Vibration	IEC 60068-2-6	
Shocks	IEC 60068-2-27 (30 G)	
Falls	IEC 60068-2-32 (1 m)	
Environment		
Operating temperature	-10 to +50 °C	
Storage temperature	-20 to +60 °C	
Safety - electromagnetic compatibility		
Safety	IEC 61010-1 ; 600 V CAT IV ; Pollution degree 2	
Protection	IP40	

ADDITIONAL INFO

- Automatic report generation

CONTENTS

- ML912 delivered with:
- 1 USB cable 2 m long, type A to mini-B 5-pin
- PC communication software
- 2 x 1.5 V LR06 batteries

ACCESSORIES / REPLACEMENT PARTS

- Bag with carrying strap ____ P01298076
- USB cable 2 m long, type A to mini-B 5-pin ____ Contact us
- See all the accessories on page 144

CURRENT LOGGERS WITH FLEXIBLE SENSORS

ML914 - AL834

Ref. : P01157135 **P01157140**

600 V CAT IV | 1000 V CAT III | IP 65 | TRMS

STRENGTHS

- Compact current loggers with flexible sensors
- TRMS measurements up to 1,000 Aac (ML914) or 3,000 Aac (AL 834)
- Safe, accessible, risk-free measurements via the Bluetooth communication function
- DataView® software for effective analysis of your measurements

CONTENTS

- ML 914 delivered with:
- PC communication software
- 4 type-C batteries
- 1 CD-ROM containing the user manual
- 1 safety datasheet
- AL 834 delivered with:
- PC communication software
- 4 x 1.5 V LR14 batteries
- 1 CD-ROM containing the user manual
- 1 safety datasheet

ACCESSORIES / REPLACEMENT PARTS

- DataVIEW® software — P01102095
- Bag no. 23 — P01298078
- See all the accessories on page 144

SPECIFICATIONS

	ML914		AL 834	
Number of channels	4			
Type of sensor	Built-in MiniFlex®		Built-in flexible sensors	
Range	100 A	1,000 A	300 A	3,000 A
Accuracy (50/60 Hz)	0 to 1 A: not specified 1 to 100 A: ± (1% R + 0.5 A)	0 to 5 A: not specified 5 to 1,000 A: ± (1% R + 1 A)	0 to 5 A: not specified 1 to 300 A: ± (1% R + 0.5 A)	0 to 15 A: not specified 15 to 3,000 A: ± (1% R + 1 A)
Resolution	0.1 V			
Sampling rate	64 samples per period			
Acquisition interval	Programmable from 125 ms to 1 day			
Storage modes	Start/stop, FIFO, XRM™ extended mode and on alarm			
Recording duration	15 minutes to 8 weeks, programmable using DataView®			
Data storage	1,000,000 measurements (2 MB)			
Communication	BlueTooth® (Class 2)			
Power supply	4 x 1.5 V LR14 batteries			
Battery life	Up to 180 days			
Safety	IEC 61010 600 V CAT IV and 1000 V CAT III			
Mechanical specifications				
Dimensions	150 x 150 x 90 mm without sensor		150 x 150 x 91 mm without sensor	
Max. conductor size	45 mm		203 mm	
Weight	1.1 kg		1.77 kg	
Casing	IP50 as per IEC 60529		IP65 as per IEC 60529	

L261 - L481

Ref. : P01157040 P01157110

600 V CAT III | 300 V CAT IV | TRMS

STRENGTHS

- L261
- 600 VAC/DC TRMS
- Suitable for industrial, commercial or residential monitoring
- Recording of voltage drops and surges
- L481
- 850 VDC
- Voltage monitoring on machines, wind turbines, railway applications, etc.
- Detection of intermittent voltage faults

SPECIFICATIONS

	L261	L481
Number of channels	1	
Input connection	2 flush-mounted banana sockets	
Current range	0 to 600 VAC/DC	-850 VDC to +850 VDC
Accuracy (50/60 Hz)	0 to 5 V: not specified 5 to 50 V: ± (0.5 % R + 1 V) 50 to 600 V: ± (0.5 % R + 0.5 V)	0 to 5 V: not specified 5 to 50 V: ± (0.5 % R + 1 V) 50 to 850 V: ± (0.5 % R + 0.5 V)
Resolution	0.1 V	
Sampling rate	64 samples per period	8 samples per second
Storage interval	Programmable from 125 ms to 1 day	
Storage modes	Start/stop, FIFO, XRM™ extended measurement mode and recording on alarms	
Recording duration	15 minutes to 8 weeks, programmable using DataView®	
Data storage	240,000 measurements (512 kB). The recorded data are stored in non-volatile memory, even if the battery is low or absent	
Communication	Optically-isolated USB 2.0	
Power supply	2 x 1.5 V LR06 batteries	
Battery life	100 hours to > 45 days (depending on recording interval/duration)	
Mechanical specifications		
Dimensions	125 x 70 x 32 mm	
Weight (with batteries)	180 g	
Electrical safety	IEC 61010-1, 600 V CAT III, 300 V CAT IV, Pollution degree 2	
Casing	UL94-V0	
Vibration	IEC 60068-2-6 (1.5 mm, 10 to 55 Hz)	
Shocks	IEC 60068-2-27 (30 G)	
Falls	IEC 60068-2-32 (1 m)	
Environment		
Operating temperature	-10 to +50 °C	
Storage temperature	-20 to +60 °C	

ADDITIONAL INFO

- Automatic report generation

CONTENTS

- L261 and L481 delivered with:
- 1 USB cable 2 m long, type A to mini-B 5-pin
- PC communication software
- 2 banana leads
- 2 voltage leads 1.5 m long
- 2 crocodile clips
- 2 x 1.5 V LR06 batteries

ACCESSORIES / REPLACEMENT PARTS

- Standard PVC leads with 4 mm straight male plugs P01295288Z
- 32 A crocodile clips P01102052Z
- See all the accessories on page 144

CHOOSE YOUR PHYSICAL MEASUREMENT LOGGER

	L452 page 137	L642 page 138
Number of inputs	2	2
Process		
4-20 mA	■	■
0-10 V	■	
Temperature		■
Programmable storage interval	5 s to 1 day	125 ms to 1 day

L452

Ref. : P01157201

STRENGTHS

- Process data logger with display
- 2 measurement channels
- Events counter
- Dry contact closure
- Detection of logic levels

SPECIFICATIONS

	L452			
	Measurement range	Resolution	Accuracy (% reading)	Sampling
Current DC	4 to 20 mA	0.01 mA	0.05 mA (0.25 %)	5 samples/s
Voltage DC	± 100 mV	± 0.1 mV	± 0.1 mV (0,5 %)	5 samples/s
	± 1 V	± 1 mV	± 1 mV (0,5 %)	
	± 10 V	± 10 mV	± 10 mV (0,5 %)	
Impulsion	-	1 ms	-	-
Digital	-	1 ms	1 s (for recording for 1 month max.)	-
Pulse voltage	3.3 V (with 1,000,000 Ω pull-up)			
Battery life	Acquisition 200 ms, display on: 18 days Acquisition 200 ms, display off: 36 days Acquisition 1 min, display off: 270 days			
Power supply	110 to 240 V (50/60 Hz) – External: via USB connector Internal: 2.4 V rechargeable NiMH batteries (2 x 1.2 V)			
Storage modes	Start/Stop (stop when memory full or when campaign end date is reached)			
Control	Local mode (multi-directional keypad on front panel) Remote mode (control via PC)			
Recording duration	10 minutes to 1 year, configurable			
Examples	2 channels @ 200 ms: 19 days 2 channels @ 1 min: > 1 year (theoretically)			
Acquisition interval	200 ms to 1 hour			
Communication	Bluetooth 2.1, Class 1, USB 2.0			
Dimensions	32.4 x 65.5 x 125 mm (137.5 mm with screw connector)			
Weight	206 g			
Display	LCD 128 x 64 pixels			
Measurement terminal strip	6 screw terminals			
Operating temperature	0 to 50 °C			
Protection	IP42 (terminal block IP20)			
Electrical protection	IEC 61010-1 Ed. 3 and IEC 61010-2-030 Ed. 1			

ADDITIONAL INFO

- To simplify its use, the L452 is equipped with a magnetized rear panel. You can also use the Multifix system or a wall mount.

CONTENTS

- 1 L452 logger
- 1 adapter and 1 µUSB power cable
- 1 CD-ROM containing the Datalogger Transfer software

ACCESSORIES / REPLACEMENT PARTS

- µUSB power-supply cable — P01102148
- Screw-connector kit (x5) — P01295489
- See all the accessories on page 144

TEMPERATURE LOGGER

L642

Ref. : P01157050

50 V CAT III

STRENGTHS

- Monitoring of processes, heating systems and air-conditioning
- 2 input channels for thermocouple (J, K, T, N, E, R, S)
- Storage interval programmable from 1 every 5 seconds up to 1 per day
- Choice of 4 recording modes
- Up to 240,000 measurements saved in non-volatile memory

SPECIFICATIONS

		L642
Number of channels		2
Input connection		2 miniature thermocouple connectors
Measurement range		°C (°F)
	j	-210 to +1,200 (-346 to +2,192)
	k	-200 to +1,372 (-328 to +2,501)
	t	-250 to +400 (-418 to +752)
	n	-200 to +1,300 (-328 to +2,372)
	E	-150 to +950 (-238 to +1,742)
	R	0 to 1,767 (32 to 3,212)
	S	0 to 1,767 (32 to 3,212)
Resolution		0.1 °C/F < 1,000 °C/F; 1 ° ≥ 1,000 °C/F
Accuracy (50/60 Hz)		0.1 % to 0.2 % + 0.6 ° at 1 ° depending on thermocouple range and type
Sampling rate		8 samples acquired at the storage interval
Storage interval		Programmable from 5 s to 1 day
Storage modes		Start-end, FIFO, XRM™ extended recording mode and recording on alarms
Recording duration		15 minutes to 8 weeks, programmable using DataView®
Data storage		240,000 measurements (512 kB). The recorded data are stored in non-volatile memory, even if the battery is low or absent
Communication		Optically-isolated USB 2.0
Power supply		2 x 1.5 V LR06 batteries
Battery life		100 hours to > 45 days (depending on recording interval/duration)
Mechanical specifications		
Dimensions		125 x 70 x 32 mm
Weight (with batteries)		200 g
Casing		UL94-V0
Vibration		IEC 60068-2-6 (1,5 mm, 10 to 55 Hz)
Shocks		IEC 60068-2-27 (30 G)
Falls		IEC 60068-2-32 (1 m)
Environment		
Operating temperature		-10 to +50 °C
Storage temperature		-20 to +60 °C

ADDITIONAL INFO

- Automatic report generation

ACCESSORIES / REPLACEMENT PARTS

- SK6 flexible K thermocouple — P03652906
- Bag with carrying strap — P01298076
- See all the accessories on page 144

CONTENTS

- L642 delivered with:
- 1 USB cable 2 m long, type A to mini-B 5-pin
- PC communication software
- 2 x 1.5 V LR06 batteries

CHOOSE YOUR SOLAR POWER ANALYSER

	FTV 100 page 140	FTV 200 page 141
Solar power installation tester	■	
Solar panel tester		■
DC voltage measurement	■	■
DC current measurement	■	■
AC voltage measurement	■	
AC current measurement	■	
Temperature measurement	■	■
Insolation measurement	■	■
Calculation of the installation's overall efficiency	■	
Calculation of inverter efficiency	■	
I / V curve in Standard Test Conditions		■
Library of panels		■
Report software	■	■

SOLAR POWER ANALYSERS

FTV 100

Ref. : P01160700

1000 V CAT III | 600 V CAT IV | IP 54

STRENGTHS

- Calculation of solar power installation efficiency
- Testing of solar power installation energy efficiency
- Electrical power survey
- Calculation of DC/AC inverter efficiency
- Simultaneous measurements on 1, 2 or 3 rows of panels installed in parallel

SPECIFICATIONS

	FTV 100		
Display	Large 5.7" extra-bright colour digital LCD screen (320 x 240) with anti-reflective treatment		
Inputs	**Functions**	**Range**	**Accuracy**
Pyranometer	Solar irradiance measurement	0 to 2,000 W/m²	± 2 %
Environmental temperature	Measurement with Pt100 sensor	-30 °C to +80 °C	± 1 % ± 1 °C
Solar panel temperature	Measurement with Pt100 sensor	-30 °C to +120 °C	± 1 % ± 1 °C
DC voltage	1 to 3 inputs	1,000 VDC	± 1 %
DC current	1 to 3 inputs	1,400 ADC	± 1 %
AC voltage	1 to 3 inputs	600 VAC	± 1 %
AC current	1 to 3 inputs	3,000 AAC	± 1 %
Functions			
Calculation functions	Efficiency of solar panels with compensation of the modules' temperature coefficient Efficiency of DC/AC conversion by the inverter		
Data logger	Up to 10 instrument configurations pre-recorded in memory (measurements and results)		
Specifications			
Communication	RS232 (remote unit) + USB (PC)		
Internal power supply	Built-in rechargeable Li-Ion battery (4.5 Ah) Battery life 8 hours		
External power supply	230 Vac - 50 Hz external power supply		
Protection	IP67 closed / IP54 open		
Dimensions / weight	360 x 304 x 194 mm / 3 kg		
Electrical safety	IEC 61010-1 - 600 V CAT IV / 1 000 V CAT III		

ADDITIONAL INFO

- Particularly easy to read, even in direct sunlight, thanks to the anti-reflective treatment
- The FTV 100 is also available in a version with 3 DC inputs plus 3 PAC10-FTV DC current clamps and 3 MN-FTV AC clamps — P01160720

CONTENTS

- FTV100 with 1 DC input plus A PAC10-FTV DC current clamp and 3 MN-FTV AC clamps delivered with:
- 1 IP67 site-proof case
- 1 pyranometer for insolation with 5 m cable
- 1 Pt100 sensor for environment temperature with 3 m cable
- 1 Pt100 sensor for panel temperature with 3 m cable
- 3 AC current clamps (MN-FTV) with 3 m cable
- 1 DC current clamp (PAC10-FTV) with 3 m cable
- 4 x 3 m leads with test probes
- 1 rechargeable battery with mains adapter
- Data processing software
- 1 bag
- 1 certificate of conformity

ACCESSORIES / REPLACEMENT PARTS

- 3 -DC-input installation measurement kit comprising:
  2 PAC current clamps (PAC10-FTV) with 3 m cable,
  2 sets of leads with test probes (3 m) — P01160710
- GREENTEST FTV100 REMOTE unit comprising:
  4 x 1.5 V LR6 batteries,
  2 x RS232 M/M connectors for soldering,
  1 mounting strap — P01160736
- See all the accessories on page 144

FTV 200

Ref. : P01160745

600 V CAT IV | IP 54 | EN 60891

STRENGTHS

- Solar panel testing
- I-V curves of all types of solar panels
- Excellent display resolution: 500 measurement counts per curve with zoom
- Measurement of temperature, solar irradiance, peak power, Voc, Isc, etc.
- The specifications of thousands of types of solar panels are referenced in the integrated library

SPECIFICATIONS

	FTV 200
Screen	4.3" colour graphical LCD touch screen
Library	10,000 curves (with panel reference values / manufacturer)
Functions	
Voltage DC	10 to 1,000 V
Current DC	0.1 to 10 A
Power	10 W to 10 kW
Radiation	By pyranometer / 0 to 2,000 W/m2
Temperature	by Pt100 - 20°C to +100°C
I-V graph	Graphic display of voltage/current measurement per panel or string
MPP graph	Graphic display of maximum power point (MPP)
General specifications	
Communication	USB 2.0
Power supply / battery life	Mains or rechargeable Li-Ion battery pack / 12 hours on battery
Safety	IEC 61010, CAT III 600 V
Operating temperature	-5°C to +40°C
Dimensions/weight	270 x 250 x 130 mm / 2.5 kg

ADDITIONAL INFO

- The FTV 200 is also available in a complete version delivered with 1 professional pyranometer and a Pt100 sensor ____ P01160740

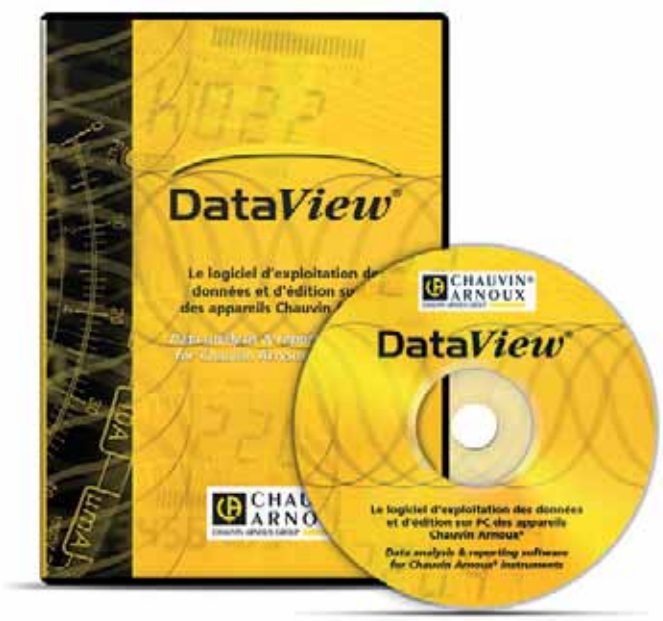
CONTENTS

- FTV 200 delivered with:
- 1 bag
- 1 set of cables 3 m long
- 1 set of MC4 adapters (red/black)
- 1 MC4/banana Ø 4 mm adapter
- 1 magnetic stylus for touch screen
- 1 USB key
- 1 mains adapter
- 1 set of flexible test probes
- PC software
- 1 certificate of conformity

ACCESSOIRES / RECHANGES

- Pyranometer ____ P01160730
- Pt100 ambient temperature sensor ____ P01160731
- See all the accessories on page 144

DATA PROCESSING SOFTWARE



DATAVIEW®

Ref. : P01102095

PAT | PAT 2 | PEL TRANSFER | DATA LOGGER

FUNCTIONS

- Configuration of all the functions of instruments connected to a PC or via Bluetooth®
- Recovery of recorded measurement data
- Backup of measurement files
- Opening of saved files
- Processing and report creation (EN50160)
- Export into an Excel spreadsheet
- Export in .pdf format
- Database management

POWER ANALYZER TRANSFER 2 FOR C.A 8331 / C.A 8336

The PAT 2 module in DataView® offers additional functions:

- Configuration of alarms
- Configuration of transients
- Configuration of trend curves
- Real-time display
- Data recovery, backup and export
- Measurement campaign start after automatic configuration of the associated instrument.

REQUIRED CONFIGURATION

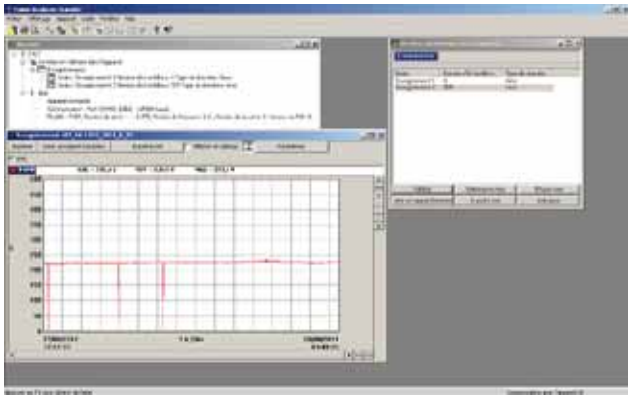
- Windows Vista & Windows 7/8/10 (32/64 bit)
- 1 GB RAM for Windows Vista & Windows 7/8 (32 bit)
- 2 GB RAM for Windows Vista & Windows 7/8 (64 bit)
- 80 MB available hard-disk space (200 MB recommended)

ADDITIONAL INFO

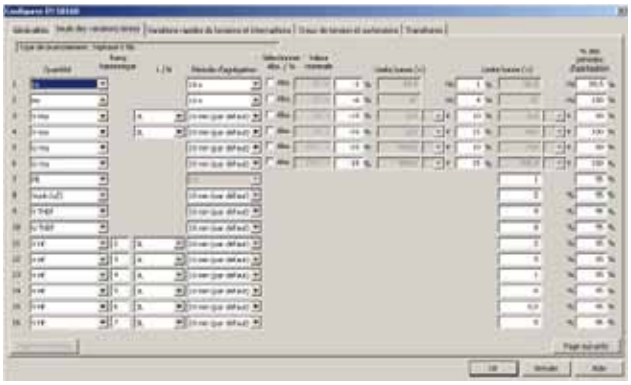
- The Dataview® software:
- Automatically recognizes the instrument connected when it is hooked up to the PC and opens the corresponding menu. Users then have direct access to its configuration and the data stored on it
- Equipped with a large number of predefined report templates for quick generation in accordance with the applicable standards. Users can also create their own templates to meet their needs and directly add their own comments

DataView® modules	PAT	PAT 2	PEL TRANSFER	DATALOGGER
Associated products	F407	C.A 8331	PEL 102	L 562
	F607	C.A 8333	PEL 103	CL601
	C.A 8220	C.A 8336	PEL 105	L101
	C.A 8230			L102
				L111
				ML912
				ML914
				AL834
				L261
				L481
				L452
				L642

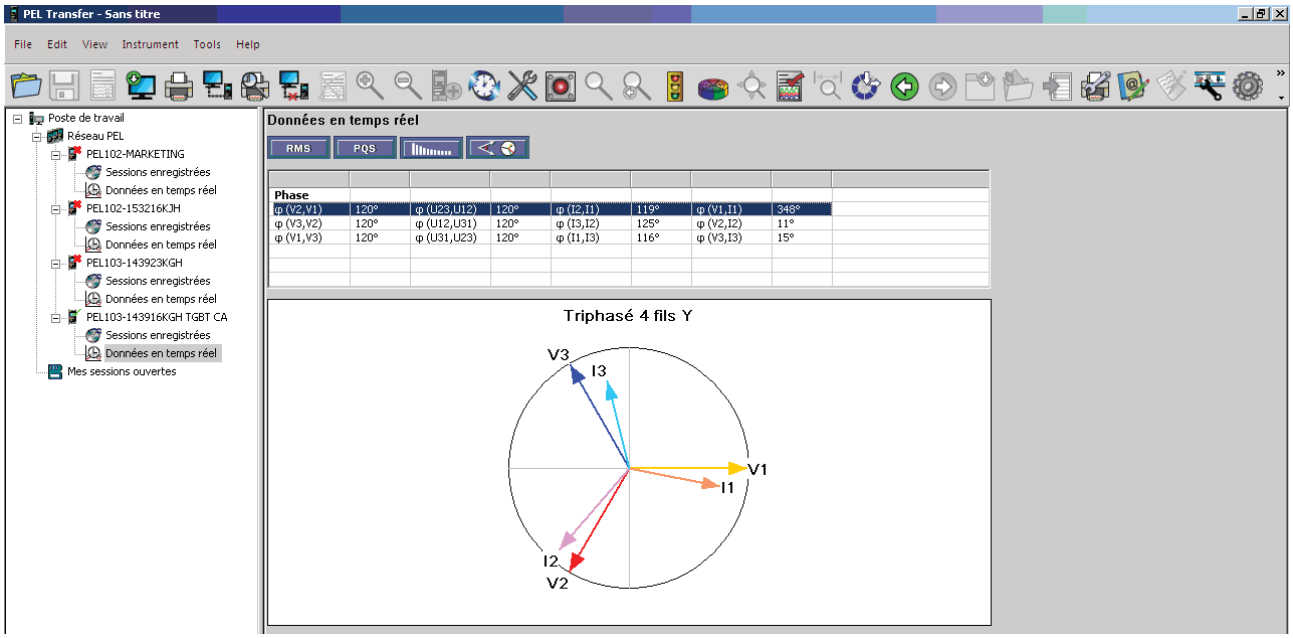
DATA PROCESSING SOFTWARE



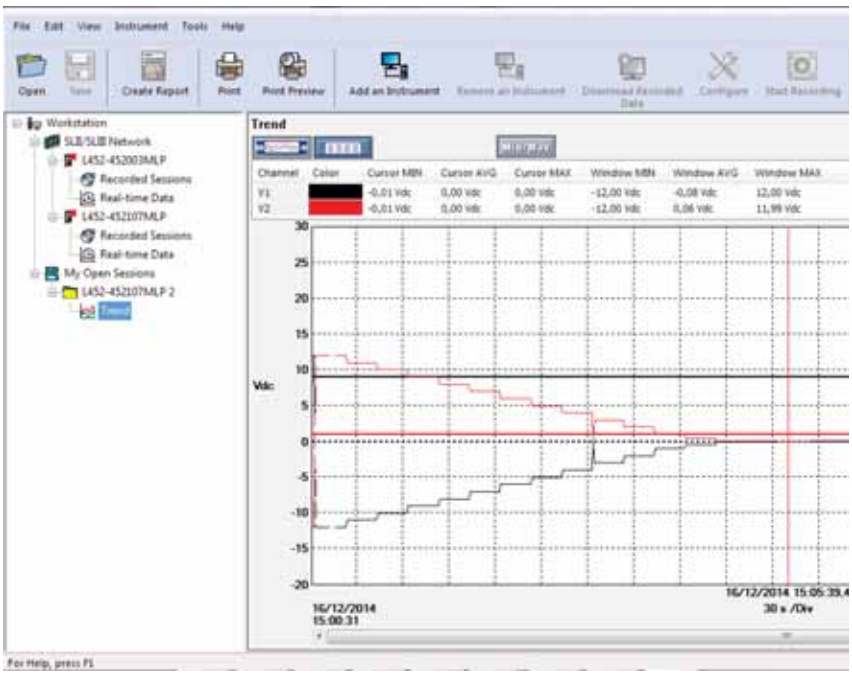
PAT MODULE Display of data stored by an F407 clamp



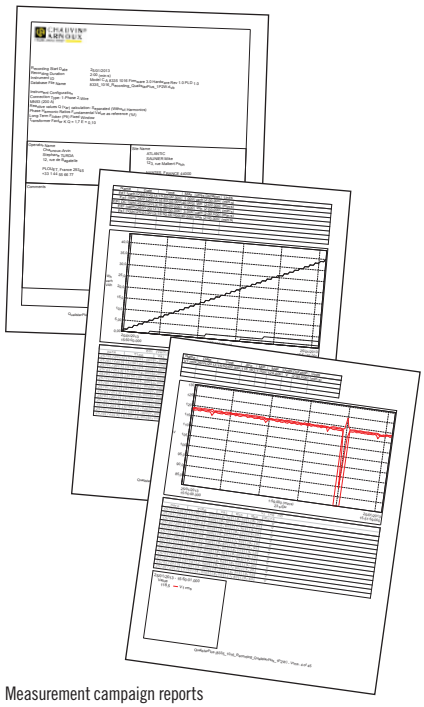
PAT 2 MODULE Configuration of EN 50160 parameters



PEL TRANSFER MODULE Remote display of a vectorial representation



DATA LOGGER MODULE Recording of 0 -10 V - 2 channels



Measurement campaign reports

ACCESSORIES / REPLACEMENT PARTS

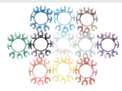
POWER AND ENERGY QUALITY ANALYSERS AND LOGGERS

C.A 8220, C.A 8230, C.A 8331, C.A 8333, C.A 8336, PEL 102, PEL 103 and PEL 105

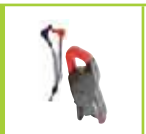
CURRENT SENSORS

	MODEL	MEASUREMENT RANGE	CLAMPING Ø / LENGTH	IEC 61010	REFERENCE
	**MN93**	500 mA to 200 AAC	Ø 20 mm	600 V CAT III / 300 V CAT IV	P01120425B
	**MN 93A**	5 mA to 100 AAC	Ø 20 mm	600 V CAT III / 300 V CAT IV	P01120434B
	**MA193-250** **MA193-350** **MA196-350**	100 mA to 10 kAAC	Ø 70 mm / 250 mm Ø 100 mm / 350 mm Ø 100 mm / 350 mm	1000 V CAT III / 600 V CAT IV	P01120580 P01120567 P01120568
	**PAC93**	1 A to 1,000 AAC / 1 A to 1,300 ADC	1 x Ø 39 mm or 2 x Ø 25 mm	600 V CAT III / 300 V CAT IV	P01120079B
	**J93**	50 A to 3,500 AAC / 50 A to 5,000 ADC	Ø 72 mm	600 V CAT III / 1000 V CAT IV	P01120110
	**A193-450** **A196A-610**	100 mA to 10 kAAC	Ø 140 mm / 450 mm Ø 190 mm / 610 mm	1000 V CAT III / 1000 V CAT IV	P01120526B P01120554
	**A193-800**	100 mA to 10 kAAC	Ø 250 mm / 800 mm	1000 V CAT III / 600 V CAT IV	P01120531B
	**C193**	1 A to 1,000 AAC	Ø 52 mm	600 V CAT IV	P01120323B
	**E3N**	50 mA to 10 AAC/DC 100 mA to 100 AAC/DC	Ø 11.8 mm	600 V CAT III / 300 V CAT IV	P01120043A

OTHER ACCESSORIES

	DESCRIPTION	REFERENCE
	Kit of 5 banana leads + 5 crocodile clips + 1 set of coloured rings	P01295483
	Kit of 4 banana leads + 4 crocodile clips + 1 set of coloured rings	P01295476
	1 set of coloured inserts and rings	P01102080
	5 A adapter unit	P01101959
	Reeling box - MultiFix magnetized casing	P01102149
	USB-A USB-B lead	P01295293
	Bag no. 22	P01298056
	DataView® software	P01102095
	ESSAILEC casing	P01102131

CURRENT SENSORS FOR LOGGERS (EXCLUDING PEL)

		MODÈLE	MEASUREMENT RANGES	OUTPUT SIGNAL	PHASE SHIFT*	MAX. CONDUCTOR SIZE		OUTPUT CONNECTION	COMPATIBLE PRODUCTS	REFERENCE
			AC	VOLTAGE		Ø CABLE	BUSBAR			
VOLTAGE OUTPUT		**E3N**	100 mA to 10 A 1 to 100 A	100 mV/AAC 10 mV/AAC	< 1.5 °	11.8 mm	–	BNC lead	L101 L102 L562	P01120043A
		**MN 60**	0.1 to 24 A 0.5 to 240 A	100 mV/AAC 10 mV/AAC	< 2.5 °	19.8 mm	–	BNC lead		P01120409
		**PAC 12**	0.2 to 40 A 0.5 to 400 A	10 mV/AAC 1 mV/AAC	< 1.5 °	One cable: 30 mm Two: 24 mm	Two 31,5 x 10 mm	BNC lead		P01120072
		**PAC 22**	0.2 to 100 A 0.5 to 1,000 A	10 mV/AAC 1 mV/AAC	< 1.5 °	One cable: 39 mm Two: 25 mm	One 50 x 12 mm Two 50 x 5 mm	BNC lead		P01120073
		**C160**	0.1 to 10 A 0.1 to 100 A 1 to 1,000 A	100 mV/AAC 10 mV/AAC 1 mV/AAC	< 1 °	52 mm	50 x 5 mm	BNC lead		P01120308
		**D38N**	1 to 30 A 1 to 300 A 1 to 3,000 A	10 mV/AAC 1 mV/AAC 0,1 mV/AAC	< 1 °	64 mm 64 x 100 mm	50 x 135 mm	BNC lead		P01120057A
CURRENT OUTPUT		**MN11**	0.5 to 240 A	1 mA/AAC	< 2.5 °	19.8 mm	–	Wire cable with reinforced or double insulation 1.5 m long and terminated by 2 elbowed male banana safety plugs Ø 4 mm	L111	P01120404
		**C103**	0.1 to 1,200 A	1 mA/AAC	< 0.5 °	52 mm	50 x 5 mm	Wire cable with reinforced or double insulation 1.5 m long and terminated by 2 elbowed male banana safety plugs Ø 4 mm		P01120303

**Maximum rated phase shift*

ACCESSORIES / REPLACEMENT PARTS

POWER AND ENERGY QUALITY ANALYSER

C.A 8220

C.A 1711 tachometer probe	P01102082
2-wire Pt100 adapter	HX0091

C.A 8220 / C.A 8230

E3N clamp adapter	P01102081
E3N clamp + mains adapter	P01120047
Bag no. 5	P01298049
Crocodile clips (1 red/1 black)	P01102057Z
Banana/banana leads (1 red/1 black)	P01295288Z
Test probes (1 red/1 black)	P01295454Z
Pack of 6 NiMH rechargeable batteries	P01296037
C.A 82X0 EUR mains power supply	P01160640
Optical/USB cable	HX0056Z
Current measurement lead	P03295509
PAC93 mains adapter	P01101967
DataView® software	P01102095
Set of 2 magnetized test probes (1 red / 1 black)	P01103058Z
RS232 / USB Adapter	HX0055

THREE-PHASE POWER AND ENERGY QUALITY ANALYSER

C.A 8331 / C.A 8333 / C.A 8336

Belt bag no. 21	P01298055
Screen protection film	P01102059
Qualistar bag no. 06	P01298051
In-vehicle charger	HX0061
E3N adapter	P01102081
E3N mains power pack	P01120047
Battery pack	P01296024
PA30W mains power pack (C.A 8331-33-35-36)	P01102057
PA31ER mains adapter	P01102150
PAC93 mains adapter	P01101967
DataView® software	P01102095
Set of 2 magnetized test probes (1 red / 1 black)	P01103058Z
Bag no. 22	P01298067

C.A 8435

Set of IP65 banana leads 3 m long (x5)	P01295479
Set of rubber caps (5 small + 4 large)	P01102117
Bag no. S21	P01298066

POWER AND HARMONICS MULTIMETER CLAMP

F407, F607

Set of red/black banana/banana leads	P01295451Z
Set of red/black crocodile clips	P01295457Z
Magnetized MultiFix kit	P01102100Z
Bluetooth kit	P01637301
Bag no. S03	P01298076
DataView® software	P01102095
Set of 2 magnetized test probes (1 red / 1 black)	P01103058Z

POWER AND ENERGY LOGGERS

PEL 102 and PEL 103

Bag no. 23	P01298078
E3N adapter	P01102081
Mains power cable	P01295174
Mains adapter	P01102134
PAC93 mains adapter	P01101967
DataView® software	P01102095
Set of 2 magnetized test probes (1 red / 1 black)	P01103058Z

PEL 105

Set of rubber caps (5 small + 4 large	P01102147
Pole mounting kit	P01102146
Crocodile clips kit (x5	P01102099
E3N adapter	P01102081
Set of IP 67 banana leads 3 m long (x5)	P01295479
DataView® software	P01102095
Bag no. S21	P01298066
PA30W mains adapter	P01102057
Set of 2 magnetized test probes (1 red / 1 black)	P01103058Z

SOLAR POWER ANALYSER

FTV 100 / FTV200

Pyranometer	P01160730
Pt100 ambient temperature sensor	P01160731
Pt100 contact temperature sensor	P01160732
FTV remote unit	P01160736

ACCESSORIES / REPLACEMENT PARTS

FTV 100

- 3-DC-input installation measurement kit: 2 PAC current clamps (PAC10-FTV) with 3 m cable, 2 sets of leads with test probes (3 m) — P01160710
- GREENTEST FTV100 REMOTE unit: 4 x 1.5 V batteries, 2 RS232 M/M connectors for soldering,1 mounting strap — P01160736
- «Cable» communication kit: 1 series cable 15 m long, RS232 M/M 9-pin connectors — P01160737
- «Bluetooth» communication kit: 2 Bluetooth adapters (transmitter/receiver), 2 RS232 M/F and M/M series cables 20 cm long, adapter programming software — P01160738
- PAC10-FTV DC clamp (200 A$_{DC}$) — P01160734
- PAC20-FTV DC clamp (1,400 A$_{DC}$) — P01120092
- MN13-FTV AC clamp (200 A$_{AC}$) — P01160733
- C107-FTV AC clamp (1,000 A$_{AC}$) — P01120337
- D43-FTV AC clamp (3,000 A$_{AC}$) — P01120100
- Set of crocodile clips ø 4 mm (R/B) — P01102052Z
- FTV100 rechargeable battery — P01160735

SOLAR POWER ANALYSER

FTV 200

- Bluetooth® FTV-200 communication kit — P01160739
- Bag — P01298066
- USB/RS232 adapter — HX0055
- Inclinometer — P01102115
- Flexible test probes — P01102116
- MC4 (1 red/ 1 black) adapters — P01102119

TRMS VOLTAGE/CURRENT LOGGER

L562

- Standard PVC leads with 4 mm straight male plugs — P01295288Z
- 32 A crocodile clips — P01102052Z
- Bag with carrying strap — P01298076
- USB cable 2 m long, type A to mini-B — Contact us
- Banana plug/female BNC adapter — P01101846
- DataView® software — P01102095

CURRENT LOGGERS

L101 and L102

- Bag with transport strap — P01298076
- USB cable 2 m long, type A to mini-B — Contact us
- Mains adapter for E3N clamp — P01101965
- DataView® software — P01102095

L111

- Standard PVC leads with 4 mm straight male plugs — P01295288Z
- 32 A crocodile clips — P01102052Z
- Bag with carrying strap — P01298076
- USB cable 2 m long, type A to mini-B — Contact us
- Mains adapter for E3N clamp — P01101965
- Banana plug/female BNC adapter — P01101846
- DataView® software — P01102095

ML912

- Bag with carrying strap — P01298076
- USB cable 2 m long, type A to mini-B — Contact us
- DataView® software — P01102095

ML914 et AL 834

- DataView® software — P01102095
- Bag no. 23 — P01298078

VOLTAGE LOGGERS

L261 and L481

- Standard PVC leads with 4 mm straight male plugs — P01295288Z
- 32 A crocodile clips — P01102052Z
- Bag with carrying strap — P01298076
- USB cable 2 m long, type A to mini-B 5-pin — Contact us
- Banana plug/female BNC adapter — P01101846
- DataView® software — P01102095

PROCESS DATA LOGGER

L452

- DataView® software — P01102095
- µUSB power cable — P01102148
- Wall mount — P01651024
- MultiFix mounting adapter — P01102100Z
- Screw connector kit (x 5) — P01295489

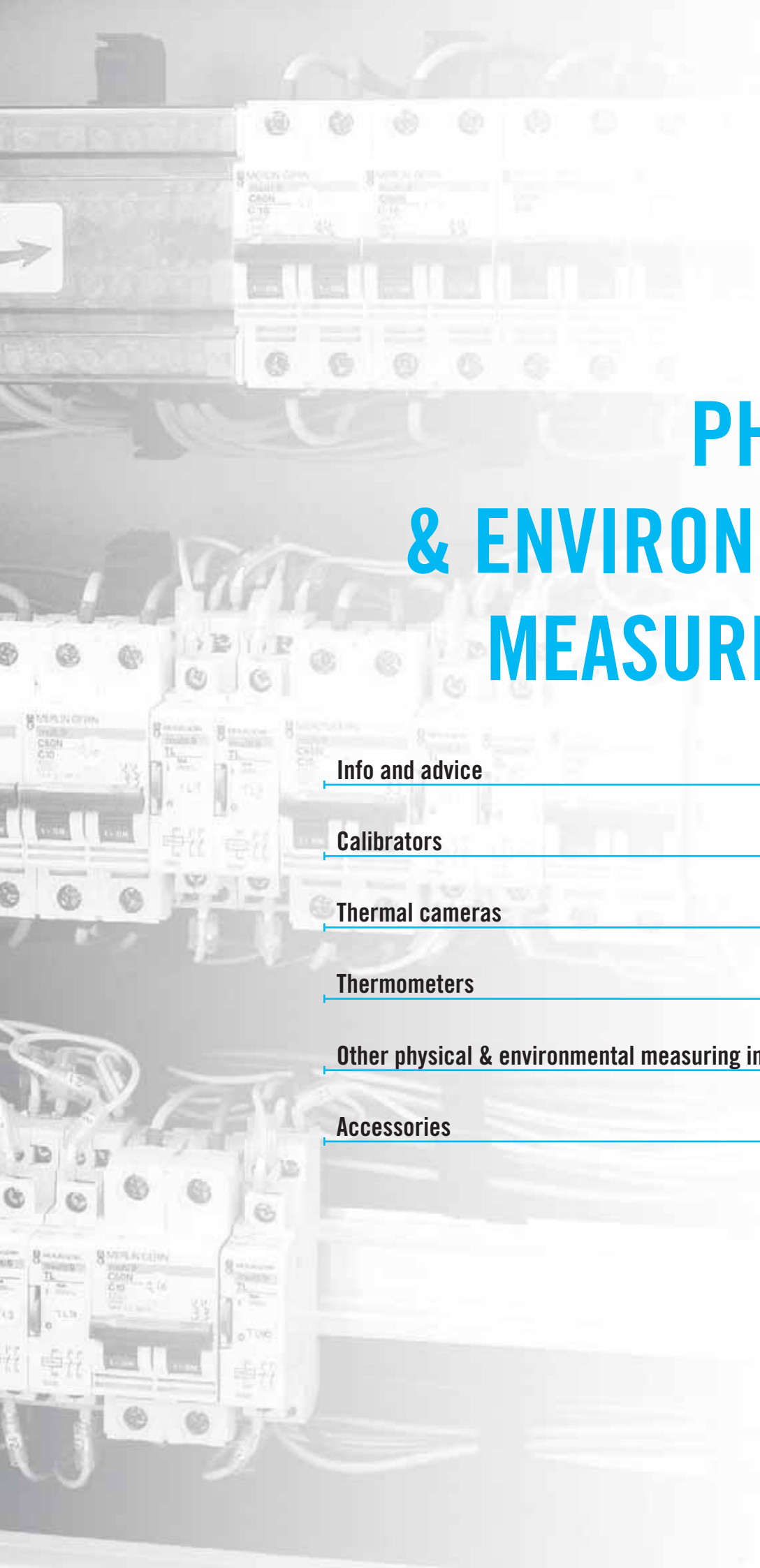
TEMPERATURE LOGGER

L642

- SK6 flexible K thermocouple sensor — P03652906
- Bag with carrying strap — P01298076
- USB cable 2 m long, type A to mini-B — Contact us
- DataView® software — P01102095

FIND ALL OUR ACCESSORIES ON PAGE 230


CHAUVIN ARNOUX
C.A 1954 DiaCAM 2
IR CAMERA IP 54
F1
F2
F3
MERLIN GERIN



PHYSICAL & ENVIRONMENTAL MEASUREMENTS

TEMPERATURE MEASUREMENT

Thermometers have always been essential instruments, used by all industrial companies for:
- Ambient temperature measurement.
- Control of the temperature in a cold room or climatic chamber.
- Temperature measurement on partitions.
- Verification of the hot spots in a an electrical cabinet.
- Verification of foodstuff freshness by inserting a probe in the heart of the product

Chauvin Arnoux offers easy-to-use electronic thermometers which are rugged and accurate:
- Thermocouple thermometers.
- Resistive-probe thermometers.
- No-contact thermometers.
- Thermal cameras.

THERMOCOUPLES

The operating principle of thermocouples is based on the **electromotive force created naturally between two conductor wires of different materials joined at the end** (SEEBECK effect). This electromotive force depends on the temperature to which one of the two junctions is exposed. This temperature is measured as a voltage of a few millivolts. A thermocouple is therefore composed of two junctions (or welds) linking two different metals or alloys. One of the junctions, positioned at the point of measurement, is called the hot junction, while the other is called the cold junction and its known temperature serves as the reference. For two given materials or alloys, there is a relation between the electromotive force and the reference and measurement temperatures. This relation is usually **expressed** by a characteristic curve of **sensitivity in mV/°C.**

RESISTIVE PROBES

Some pure metals have a coefficient of resistivity which varies as a function of temperature in a reproducible way. The metals generally used are platinum and copper. Currently, the widest-used type is platinum, with a resistance of 100 Ω at 0 °C.

OPTICAL OR NO-CONTACT MEASUREMENTS

All bodies emit electromagnetic radiation whose spectrum has an energy distribution which is a function of temperature.
This measurement system offers **quick temperature testing on parts which are current-carrying**, **moving or difficult to access**. It can also be used for measurements of very high temperatures or on poor heat conductors such as ceramics or synthetic materials.

CHOOSING THE RIGHT TEMPERATURE MEASUREMENT SYSTEM

Three types of measurement are used to measure temperature:
- Measurement by penetration (semi-solids, pasty samples, etc.) and by immersion (liquids).
- Ambient measurement (air, gas).
- Surface measurement (solid bodies).

For the latter type, users can choose a system with or without contact, depending on the application involved.
The type of application will determine the instrument and the probe chosen.
In general, thermocouples offer quick response times and wide measurement ranges. Sensors with resistive probes are usually slower, but they are also more accurate.

The sensor selection criteria will depend on:
- the milieu and the operating environment.
- the temperature range.
- the required accuracy.
- the response time.

INFRARED THERMOGRAPHY

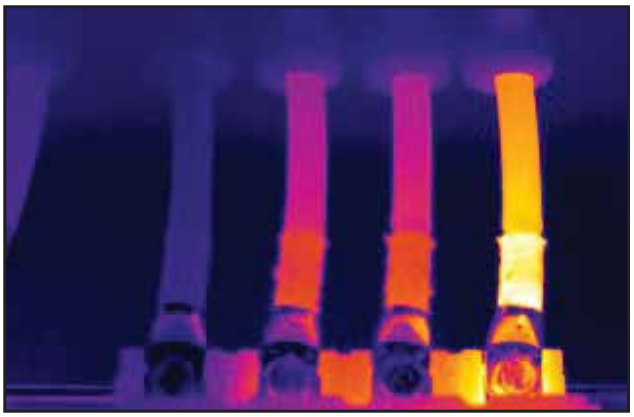
Infrared thermography detection technology has become irreplaceable for ensuring safe conditions for industrial production. Infrared thermal imaging is a no-contact, real-time inspection method for production equipment subject to high voltages, powerful electric currents or high operating speeds.
For this detection method, there is no need to cut off the current, shut down the machines or stop production. It can be used to troubleshoot any latent malfunctions in advance and thus prevent failures and avoid production incidents.

Thermal imaging is an **innovative technique for safe, reliable and quick "no-contact" assessment.**
A thermal camera does not measure temperatures but radiation fluxes. Once the operator has adjusted certain parameters, the camera calculates the temperatures of the target. It then provides the user with a map of the temperatures, called a thermogram: each temperature is represented by a different colour.

ELECTRICAL MAINTENANCE

The purpose of this sort of inspection is to detect any overheating in working electrical systems due to various causes: poor connections, overloads, phase unbalance, faulty contacts, etc. This helps to prevent and avoid costly equipment damage, production shutdowns, operating losses, fires, etc.

The aim is to help with decision-making for corrective action, to prevent incidents, to anticipate any works which might be necessary and to facilitate electrical installation maintenance (time saving and safety).

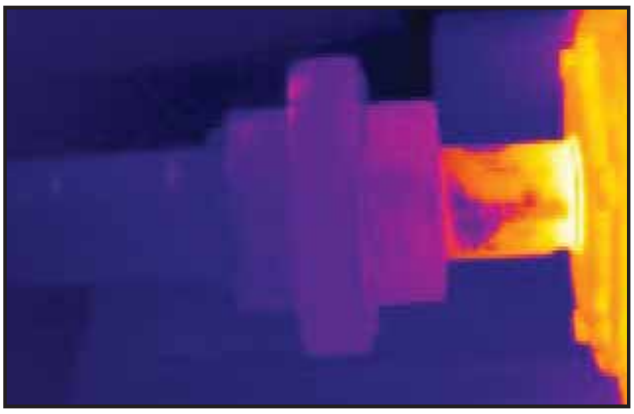


MECHANICAL MAINTENANCE

Moving mechanical parts heat up quite normally due to friction. Infrared thermography reveals abnormal overheating due to wear, misalignment, lubrication problems, etc.

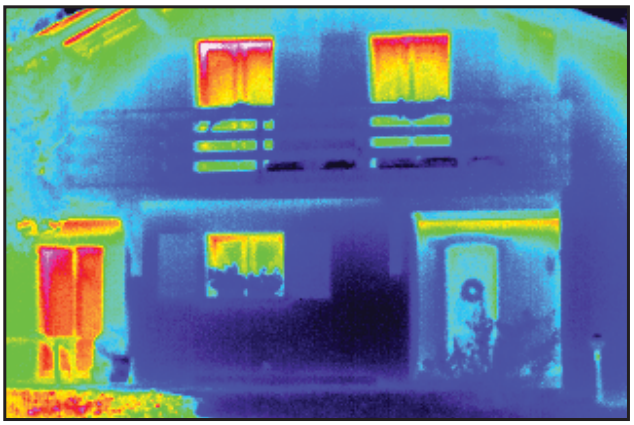
It is used to complement vibratory analysis, which is much more time-consuming to set up.

A single image gives a full health report on the electric motor, its power supply (cables), the bearings and, if necessary, the alignment.



BUILDING THERMICS

These applications of infrared thermography concern architects, heating and sanitary installers, heating operators, electricians, property companies, property experts, owners and insurers.
With an infrared camera, it is easy to view the distribution of heat on the front of a building and it also possible to precisely locate heat losses due to faulty insulation. This helps to produce a thermal survey of the building.



INDOOR AIR QUALITY

Whether in places open to the public (transport, government offices, schools or hospitals), workplaces or private areas, our lifestyles mean we spend most of our time indoors. Human activities and products used in construction, decoration and furniture (paint, floor and wall coverings, varnishes, etc.) are all sources of contamination emitting substances into the air. The issue of indoor air quality has only been raised recently, but it is a major concern because it affects everyone.

CARBON DIOXIDE (CO_2)

Carbon dioxide is a colourless, odourless gas produced by the combustion of carbon-based materials such as wood, oil, coal and their derivatives. It is also produced by humans' and animals' respiration. Plants, however, actually extract CO_2 from the air during photosynthesis, thus contributing to the natural balance.

Nevertheless, the level of CO_2 in outdoor air is increasing. This gradual increase began with the industrial revolution and the growing use of fossil fuels.

WHY MEASURE IT?

Indoors, CO_2 is representative of a level of confinement indicating an accumulation of pollutants in the premises and insufficient air renewal. Links have been found between poor ventilation, leading to high levels of CO_2, and reduced performance by children in tests involving logic, reading and calculations.
Concentrations above 1,000 ppm already cause sleepiness, difficulty in concentrating and even headaches.

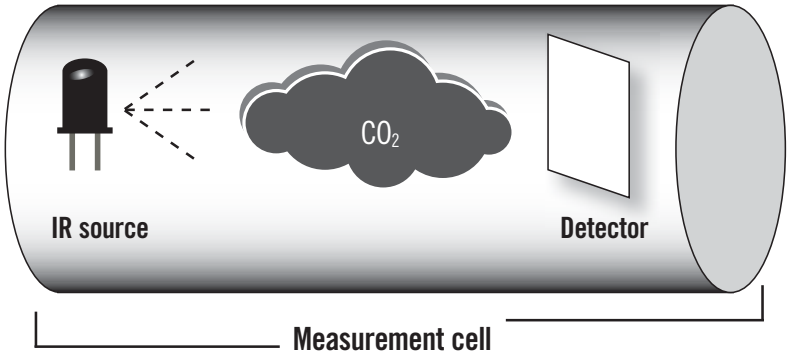
THRESHOLD VALUES

In volume terms, the proportion of CO_2 in the air is 0.0375%, or 375 ppmv (parts per million by volume). In urban environments, it may be as high as 500 ppm.

- 500 to 1,000 ppm - Indoor air quality: Good
- 1,000 ppm - Certain studies have shown an increase in asthma-related symptoms among children on average over a school day
- 1,500 to 2,500 ppm - Indoor air quality: Poor (1,500 ppm is the regulatory limit usually specified, particularly for educational premises in the United Kingdom, Germany and Austria)
- 2,500 to 5,000 ppm - Symptoms: headache, fatigue and loss of concentration
- 5,000 ppm - Average concentration over 8 hours - Occupational Exposure Limit in France and elsewhere

MEASUREMENT PRINCIPLE

The method used by the C.A 1510 to measure CO_2 levels is an NDIR (Non-Dispersive InfraRed) method.



CO_2 and other gases absorb IR radiation in a “specific” way.

- 1 source emits an IR signal in a predefined cavity
- The CO_2 absorbs part of the light in the near-IR spectrum, thus reducing the intensity of the signal
- The IR detector measures the intensity of the signal received at the absorption wavelength of carbon dioxide. The Beer-Lambert Law establishes the relationship between the signal intensity and the gas concentration.

SENSOR POSITIONING AND RECOMMENDATIONS

The measuring instrument should preferably be positioned between 50 cm and 2 m from the ground. In practice, it should be set up in a safe place with access to a power socket if necessary.
The instrument should be kept at least 50 cm away from any intense heat sources (heating) and should be kept out of direct sunlight. The instrument must not be placed in the direct flow of air from outside (windows) or close to the entrance. The CO_2 level varies during the day, depending on how many people are present, the activities involved and the efficiency of the air renewal system; for these reasons, functions for recording and for indicating any threshold overruns are crucial.

CHOOSE YOUR CALIBRATOR

C.A 1621
page 155

C.A 1623
page 155

C.A 1631
page 156

	C.A 1621	C.A 1623	C.A 1631
Measurement / Simulation			
J, K, T, E, R, S, B and N thermocouples	■		
Resistive probes Pt10, Pt50, Pt100, Pt200, Pt500, Pt1000		■	
4-20 mA			■
0-10 V			■
Voltage			
Up to 100 mV	■		■
Up to 20 V			■
Current			
Up to 24 mA			■
Resistance			
0.00 to 3,200.0		■	

C.A 1621 - C.A 1623

Ref. : P01654621 P01654623

°C °F

STRENGTHS

- Large screen for easier reading
- Instrument calibration without removing the sensors
- Comfortable handling due to its dimensions (205x97x45 mm) and weight (472 g)

C.A 1621: thermocouple-probe temperature calibrator capable of measuring and simulating:

- up to 8 types of thermocouple: J, K, T, E, R, S, B and N
- a voltage in mV

C.A 1623: resistive-probe temperature calibrator capable of measuring and simulating:

- up to 7 types of resistive probes: Pt 10, Pt 50, Pt 100, Pt 200, Pt 500, Pt 1000, Pt 100(JIS)
- a resistance

SPECIFICATIONS

C.A 1621

Input/output range	Resolution	Accuracy
-10 mV … 100 mV	0.01 mV	± 0.025 % + 2 counts

Function	Range	Resolution	Accuracy	Ref. junction error
Type J	-200 … +1,200 °C	0.1°C	± (0.3 °C + 10 µV)	± 0.3 °C
Type K	-200 … +1,370 °C	0.1°C	±(0.3 °C +10 µV)	± 0.3 °C
Type T	-200 … +400 °C	0.1°C	±(0.3 °C +10 µV)	± 0.3 °C
Type E	-200 … +950 °C	0.1°C	±(0.3 °C +10 µV)	± 0.3 °C
Type R	-20 … +1,750 °C	1°C	±(1 °C +10 µV)	± 0.3 °C
Type S	-20 … +1,750 °C	1°C	±(1 °C +10 µV)	± 0.3 °C
Type B	+600 … +1,800 °C	1°C	±(1 °C +10 µV)	± 0.3 °C
Type N	-250 … +1,300 °C	0.1°C	±(0.3 °C +10 µV)	± 0.3 °C

C.A 1623

Range	4-wire measurement accuracy ± Ω	Simulation accuracy ± Ω	Acceptable excitation mA
0.00 Ω … 400.0 Ω	0.1	0.15	0.1 … 0.5
		0.1	0.5 … 3.0
400.0 Ω … 1,500.0 Ω	0.5	0.5	0.05 … 0.8
1,500.0 Ω … 3,200.0 Ω	1	1	0.05 … 0.4
	2		

Mode	Range	Accuracy in °C			Excitation admissible mA
		4-wire input	2-wire / 3-wire input	Output	
Pt10 385	-200 … +800 °C	0.1 … 3.0			0.1 … 3.0
Pt50 385	-200 … +800 °C	0.7	1.0	0.7	0.1 … 3.0
Pt100 385	-200 … +800 °C	0.33	0.5	0.33	0.1 … 3.0
Pt200 385	-200 … +250 °C	0.2	0.3 1.6	0.2 0.8	0.1 … 3.0
Pt500 385	+250 … +630 °C	0.8	0.3	0.3 0.4	0.05 … 3.0
Pt1000 385	-200 … +500 °C	1.6	0.4 0.5	0.2 0.2	0.1 … 3.0
Pt100 JIS	+500 … +630 °C	0.3	0.5	0.3	0.1 … 3.0

ADDITIONAL INFO

- Power supply via optional mains lead:
- Input: 100 V/240 V - 50/60 Hz – 1.8 A
- Output: 12 VDC, 2 A max
- Battery-powered (6 x 1.5 V supplied) or via mains lead (option)

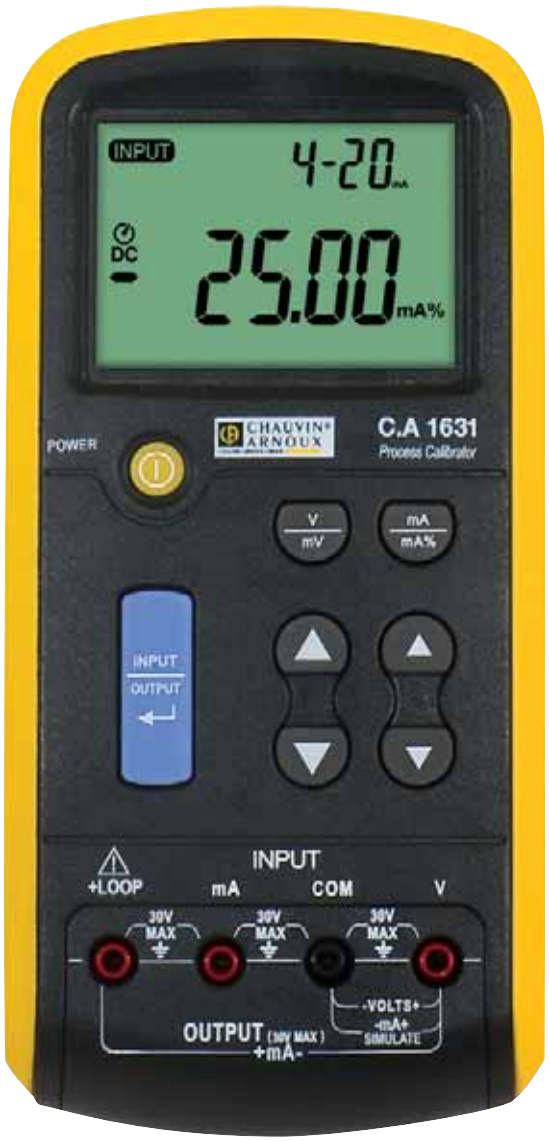
CONTENTS

- 1 calibrator
- 1 soft case
- 6 x 1.5 V LR06 batteries
- C.A 1621 delivered with 2 additional thermocouple adapters
- C.A 1623 delivered with 2 additional test leads and 2 additional crocodile clips

ACCESSORIES / REPLACEMENT PARTS

- Mains power cable P01103057
- MultiFix bag - 120x245x60 mm P01298075
- See all the accessories on page 188

PROCESS SIGNAL CALIBRATORS



C.A 1631

Ref. : P01654402

STRENGTHS

Voltage/current process signal calibrator used to measure or supply:
- a 0 -24 mA DC current loop
- a 0 - 20 V DC voltage

SPECIFICATIONS

C.A 1631		
Calibre	**Resolution**	**Accuracy ± (% of reading + counts)**
100 mV	0.01 mV	0.02 % + 3
20 V	0.001 V	0.02 % + 3
Input impedance: 2 MΩ (rated value), < 100 pF Protection against overvoltages: 30 V - Current supplied at 20 V: 1 mA		
Calibre	**Resolution**	**Accuracy ± (% of reading + counts)**
24 mA	0.001 mA	0.015 % + 3
Protection against overloads: 125 mA 250 V quick-response fuse Percentage display: 0 % = 4 mA 100 % = 20 mA Source mode: 1,000 Ω load at 20 mA for a battery voltage ≥ 6.8 V (700 Ω at 20 mA for a battery voltage between 5.8 and 6.8 V) Simulation mode: external loop voltage condition: 24 V (rated value), 30 V maximum, 12 V minimum.		
Loop voltage power supply: 24 V ± 10 %		

ADDITIONAL INFO

- Power supply via optional mains lead:
- Input: 100 V/240 V - 50/60 Hz – 1.8 A
- Output: 12 Vdc, 2 A max
- Powered by batteries (6 x 1.5 V supplied) or via mains lead (option)

CONTENTS

- 1 calibrator
- 1 soft case
- 6 x 1.5 V LR06 batteries
- 2 test leads
- 2 crocodile clips
- 2 test probes

ACCESSORIES / REPLACEMENT PARTS

- Mains power cable — P01103057
- MultiFix bag - 120x245x60 mm — P01298075
- See all the accessories on page 188

CHOOSE YOUR THERMAL CAMERA

Available mid-2018




	C.A 1950 page 158	C.A 1954 page 159	C.A 1886 page 160	C.A 1888 page 161
Detectors				
80 x 80	■			
160 x 120		■	■	
384 x 288				■
Thermal sensitivity (N.E.T.D)				
0.08°C @ 30°C	■	■	■	
0.05°C @ 30°C				■
Temperature range				
-20°C to +250°C	■	■		
-20°C to +600°C			■	■
1,000°C / 1,500°C (option)			■	■
Display mode				
Thermal image	■	■	■	■
Real image and merge	Merge via software	Merge via software	■	■
Display	2.8 inches	2.8 inches	3.5 inches	3.5 inches
Analysis functions				
Manual cursor	1	1	3	3
Min / Max on area	■	■	■	■
Average on area		■	■	■
Isotherm	■	■	■	■
Temperature profile	■	■	■	■
Temperature differential			■	■
Alarms			■	■
Correction parameters				
Emissivity, environmental temp., relative humidity, distance	■	■	■	■
Others				
CNPP Approval			■	■
Wide-angle or telephoto lenses available as options			■	■
Analysis and report creation software	CAm Report	CAm Report	RayCAm Report	RayCAm Report

C.A 1950

Ref. : P01651901

IP 54 | 80 x 80 | 2 m | USB | Bluetooth | SD | BMP

STRENGTHS

- 13-hour battery life and startup in only 3 seconds
- Withstands falls of up to 2 m without interrupting operation
- Focus-free with 20° x 20° field of view
- Voice annotation for recording your comments directly on the image (earphone supplied)
- Connectivity with current clamps and multimeters

ADDITIONAL INFO

- Recording of thermal image and real image simultaneously. Image merge function available via the CAmReport software supplied
- Large number of measurement tools: manual cursor, automatic detection, temperature profile, etc.
- Built-in brightness sensor

CONTENTS

- C.A 1950 delivered in site-proof hard case with:
- 4 x NiMH batteries
- 1 battery charger
- 1 x 2 GB micro SD HD card
- 1 USB cable
- 1 Bluetooth® earphone
- 1 CD-ROM containing the CAmReport software
- 1 measurement report

SPECIFICATIONS

	C.A 1950
Detector	80 x 80
Type	UFPA microbolometer, 8 ~14 µm
Frequency	9 Hz
Sensitivity (N.E.T.D)	80 mK @ 30 °C (0.08 °C @ 30 °C)
Temperature measurement	
Temperature range	-20 °C to +250 °C
Accuracy	±2 °C or ±2 % of reading
Imaging performance (thermal image)	
Field of view	20° x 20°
IFOV (spatial resolution)	4.4 mrad
Focus	Fixed
Minimum focal distance	40 cm
Real image	Yes (320 x 240 pixels)
Display mode	Thermal image, real image with automatic parallax compensation. Image merge available with PC software
Analysis functions	
Measurement tools	1 manual cursor + 1 automatic detection + Min Max on adjustable area + Temperature profile + Isotherm
Parameter settings	Emissivity, environmental temperature, distance, relative humidity
Voice comments	Yes by Bluetooth® (earphone supplied)
Connectivity	F407, F607, MTX 3292 and MTX 3293 clamps
Data storage	On 2 GB removable micro SD card (approx. 4,000 images), up to 32 GB
Image format	.bmp (thermal and real images recorded simultaneously)
Image presentation	
Adjustment	Automatic or manual adjustment of palette min/max
Image hold	Animated or fixed image
Image display	Multi-palette
Screen	2.8 inches
Power supply	
Type	Rechargeable NiMH batteries with low self-discharge
Recharging	External (charger supplied)
Battery life	13 hrs 30 min (typical) / 50 % brightness, Bluetooth® off
Environmental specifications	
Operating temperature	-15 °C to +50 °C (-4 °F to +122 °F)
Storage temperature range	-40 °C to +70 °C (-40 °F to +158 °F)
Humidity	10 % to 95 %
Compliance with standards	EN 61326-1 : 2006 / EN 61010-1 Ed. 2
Fall resistance	2 metres on all surfaces
Shock resistance	25 G
Vibration resistance	2 G
Physical specifications	
Weight /dimensions	700 g with rechargeable batteries / 225 x 125 x 83
Ingress protection	IP 54
Interfaces	- USB link and Mass Storage: the product is then recognized as a USB key for easy image transfer - Bluetooth for connectivity with earphone (voice comments) and Chauvin Arnoux® Metrix® measuring instruments (F407, F607, MTX 3292, MTX 3293)
Tripod mounting	Yes, ¼'' insert on camera
General specifications	
Report creation software	Supplied as standard with automatic report generation in .pdf or .docx (Word) format / Compatible with W7, W8, 32 and 64 Bits
Warranty	2 years

C.A 1954

Réf. : P01651904

IP 54 | 160 x 120 | 2 m | USB | Bluetooth | SD | PNG

Available mid-2018

STRENGTHS

- **Unprecedented!** Battery life of up to 9 hrs in continuous use
- Withstands falls from up to 2 m without interrupting operation
- Focus-free with 38° x 28° field of view
- Recovery of data from other measuring instruments (current, humidity, dew point, etc.)
- Practical: voice recording, user-enhanceable emissivity table, organization of folders by site

ADDITIONAL INFO

- Simultaneous recording of thermal image and real image. Image merging possible with the CAmReport software supplied
- Large number of measurement tools: manual cursor, automatic detection, temperature profile, etc.
- Built-in ambient light sensor

CONTENTS

- C.A 1954 delivered in set-proof case with:
- 4 NiMH batteries
- 1 battery charger
- 1 x 2 GB HD micro SD card
- 1 USB cable
- 1 Bluetooth earpiece
- 1 CD-ROM containing the CAmReport software
- 1 measurement report

SPECIFICATIONS

	C.A 1954
Detector	160 x 120
Type	UFPA microbolometer, 8 ~14 µm
Frequency	9 Hz
Sensitivity (N.E.T.D)	80 mK @ 30 °C (0.08 °C @ 30 °C)
Temperature measurement	
Temperature range	-20 °C to +250 °C
Accuracy	±2 °C or ±2 % of reading
Imaging performance (thermal image)	
Field of view	38° x 28°
IFOV (spatial resolution)	4.1 mrad
Focus	Fixed
Minimum focal distance	30 cm
Real image	Yes (320 x 240 pixels)
Display mode	Thermal image, real image with automatic parallax compensation. Image merging available with PC software
Analytical functions	
Measuring tools	1 manual cursor + 1 automatic detection + Min Max Avg on adjustable area + temperature profile + isotherm
Parameter settings	Emissivity, environmental temperature, distance, relative humidity
Voice comments	Oui par Bluetooth (oreillette fournie)
Connectivity	C.A 1821/22/23, C.A 1246, C.A 1227, F407, F607, MTX 3292, MTX 3293
Storage	Sur carte micro SD 2 Go (environ 4000 images) amovible jusque 32 Go
Image format	.png (thermal and real images saved simultaneously)
Laser pointer	Yes
Image display	
Settings	Automatic or manual adjustment of the min max for the palette
Freezing of image	Animated or fixed image
Display of the images	Multi-palette
Screen	2.8 inches
Power supply	
Type	NiMH rechargeable batteries with low self-discharge
Recharging method	External (charger supplied)
Battery life	9 hrs (typical) / 50 % brightness and Bluetooth deactivated
Environmental specifications	
Operating temperature	-15 °C to +50 °C (-4 °F to +122 °F)
Storage temperature range	-40 °C to +70 °C (-40 °F to +158 °F)
Humidity	10 % to 95 %
Compliance	EN 61326-1: 2006 / EN 61010-1 Ed. 2
Resistance to falls	2 metres on all surfaces
Shock resistance	25 G
Vibration resistance	2 G
Physical specifications	
Weight	700 g with rechargeable batteries
Dimensions	225 x 125 x 83 mm
Ingress protection	IP 54
Interfaces	- USB link and Mass Storage function. - Bluetooth for connectivity with earpiece (C.A 1821/22/23, C.A 1246, C.A 1227, F407, F607, MTX 3292, MTX 3293)
Mounting on tripod	Yes, ¼" insert on the camera
General specifications	
Report generation software	Supplied as standard with automatic report generation (.pdf / .docx) Compatible with W7, W8, W10, 32 and 64 Bits
Warranty	2 years

C.A 1886

Ref. : P01651260

IP 54 | 160 x 120 | CNPP APPROVAL N° 2010-0020

STRENGTHS

- 160 x 120 matrix
- Sensitivity: 0.08 °C at 30 °C
- Temperature up to 600 °C as standard
- Large, multi-directional 3.5" screen for easier reading
- MixVision function which links a thermogram to a real image

SPECIFICATIONS

	C.A 1886
Detector	160 x 120
Type	UFPA microbolometer, 8-14 microns
Sensitivity (NETD)	0.08 °C @ 30 °C
Temperature	-20 °C to +600 °C as standard Up to 1,500 °C as an option
Accuracy	±2 °C or ±2 %
Optics	Field of view: 20° x 15°, IFOV: 2.2 mrad Min. focal distance: 10 cm
"MixVision" mode	Merge function with adjustment of percentage of thermal image in real image from 0 to 100%
Image size	640 x 480 pixels
Adjustment	Emissivity, environmental temperature, distance, humidity
Measurement tools	3 manual cursors + 1 auto. Max/Min/Avg detection on area, isotherm, temperature differential, temperature profile
Data storage	1,000 images (radiometric format) in 250 folders + 2 GB on mini-SD card
Power supply	Battery life: 3 hrs (continuous use) Recharging via external charger

CONTENTS

- C.A 1886 delivered in a case with:
- 1 battery charger
- 2 batteries
- 1 x 2 GB mini SD card
- 1 SD card reader
- 1 video cable
- 1 CD-ROM containing the RayCAm Report software
- 1 measurement report

ADDITIONAL INFO

- Refresh rate:
- 50 Hz in the EU
- 9 Hz outside the EU

ACCESSORIES / REPLACEMENT PARTS

- Sun shade — P01651531
- Photo tripod adapter — P01651526
- See all the accessories on page 188

C.A 1888

Ref. : P01651270

IP 54 | 384 x 288 | CNPP APPROVAL N° 2010-0029

STRENGTHS

- 384 x 288 matrix
- Sensitivity: 0.05 °C @ 30 °C
- Temperature up to 600 °C as standard
- Large multi-directional 3.5" screen for easier reading
- MixVision which links a thermogram to a real image

SPECIFICATIONS

	C.A 1888
Detector*	384 x 288
Type	UFPA microbolometer, 8-14 microns
Sensitivity (NETD)	0.05 °C @ 30 °C
Temperature	-20 °C to +600 °C as standard Up to 1,500 °C as an option
Accuracy	±2 °C or ±2 %
Optics	Field of view: 24° x 18°, IFOV: 101 mrad Min. focal distance: 10 cm
"MixVision" mode	Merge function with adjustment of percentage of thermal image in real image from 0 to 100%
Image size	640 x 480 pixels
Adjustment	Emissivity, environmental temperature, distance, humidity
Measurement tools	3 manual cursors + 1 auto. Max/Min/Avg detection on area, isotherm, temperature differential, temperature profile
Mémoire Data storage	1,000 images (radiometric format) in 250 folders + 2 GB on mini-SD card
Power supply	Battery life: 3 hrs (continuous use) Recharging via external charger

*Refresh rate: 50 Hz in the EU / 9 Hz outside the EU

CONTENTS

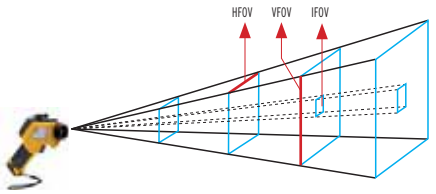
- C.A 1888 delivered in a case with:
- 1 battery charger
- 2 batteries
- 1 x 2 GB mini SD card
- 1 SD card reader
- 1 video cable
- 1 CD-ROM containing the RayCAm Report software
- 1 measurement report

ADDITIONAL INFO

- The C.A 1888 thermal camera is also available in other configurations:
- C.A 1888 with 1,000 °C high-temperature option ____ P01651271
- C.A 1888 with 1,500 °C high-temperature option ____ P01651272
- C.A 1888 Bluetooth ____ P01651273
- RayCAm Report software supplied for area analysis (polygons or polylines) and studying the temperature distribution on a histogram

ACCESSORIES / REPLACEMENT PARTS

- Sun shade ____ P01651531
- Photo tripod adapter ____ P01651526
- See all the accessories on page 188



HFOV : (metres) Horizontal field of view

VFOV : (metres) Vertical field of view

IFOV : Spatial resolution

LENSES FOR C.A 1888

Lens	IFOV spatial resolution		0.1 m	0.3 m	0.5 m	1 m	2 m	6 m	10 m	30 m	100 m
12°× 9° Telephoto lens	0.55 mrad	HFOV	0.02	0.06	0.11	0.21	0.42	1.27	2.11	6.34	21.12
		VFOV	0.02	0.05	0.08	0.16	0.32	0.95	1.58	4.75	15.84
		IFOV	0.055	0.17	0.28	0.55	1.10	3.30	5.50	16.50	55.00
24°× 18° Standard lens	1.1 mrad	HFOV	0.05	0.15	0.25	0.50	1.00	3.00	4.99	14.98	49.92
		VFOV	0.04	0.11	0.19	0.37	0.75	2.25	3.74	11.23	37.44
		IFOV	0.13	0.39	0.65	1.30	2.60	7.80	13.00	39.00	130.00
48°× 36° Wide-angle lens	2.2 mrad	HFOV	0.08	0.253	0.42	0.84	1.69	5.07	8.45	25.34	84.48
		VFOV	0.06	0.190	0.32	0.63	1.27	3.80	6.34	19.01	63.36
		IFOV	0.22	0.660	1.10	2.20	4.40	13.20	22.00	66.00	220.00

CAmReport

C.A 1950 | C.A 1954 | W | PDF

STRENGTHS

- Dedicated to the C.A 1950 and C.A 1954 thermal cameras
- Supplied as standard at no additional cost
- Complete, with all the functions needed for reliable analysis of the measurement results
- Automatic creation of analytical reports which can be exported in Word or pdf format.

REQUIRED CONFIGURATION

WINDOWS XP :

- SP3 minimum
- 850 MB RAM for 32 bit
- 2 GB for 64 bit
- NET Framework 4.0 minimum
- Monitor resolution: super VGA (800 x 600) or higher

WINDOWS VISTA / 7 / 8 / 10 :

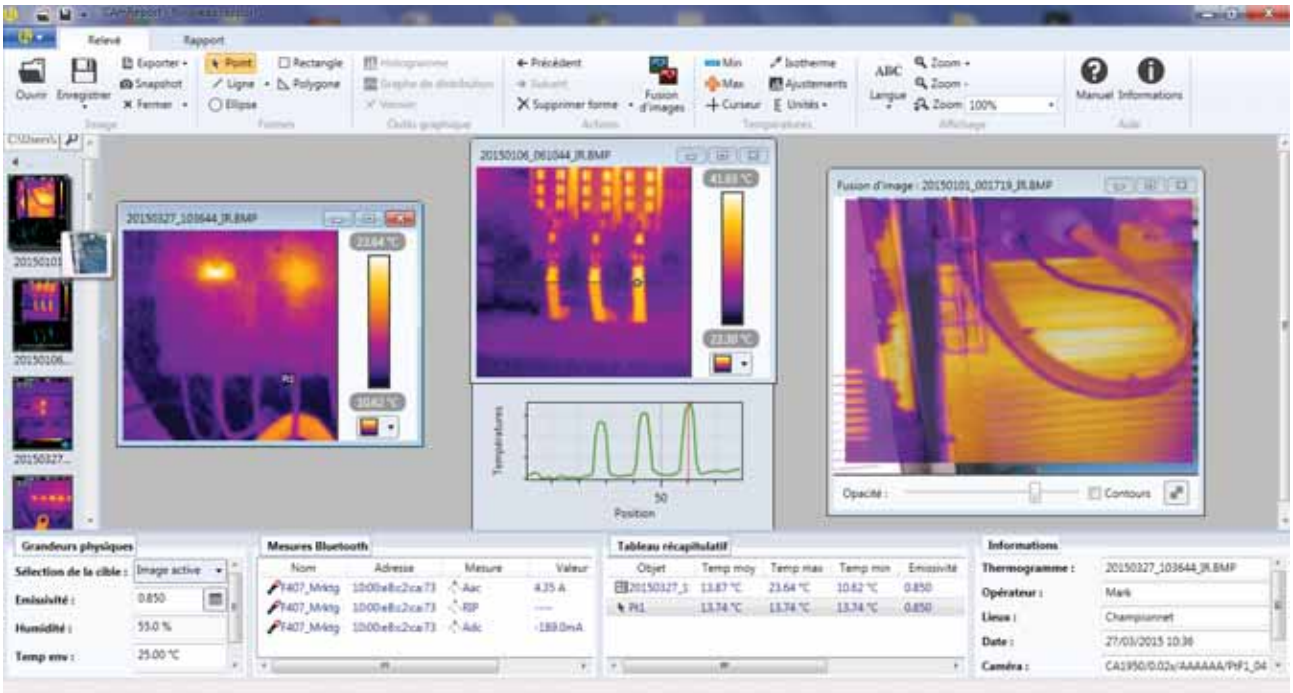
- SP1 minimum
- 850 MB RAM for 32 bit
- 2 GB for 64 bit
- NET Framework 4.0 minimum

PRECISE ANALYSIS TOOLS

- Cursors (automatic display of the temperature at the selected point)
- Thermal profile (automatic display of the Min/Max/Avg temperatures of the line)
- A square or circle for area analysis
- Polygons and polylines for more precise analysis of certain areas in the thermogram
- Results tables quickly and automatically display all the information
- Recovery of the voice comments or related measurements
- Automatic merging of the thermal and real images recorded simultaneously
- Automatic report creation for export in .pdf or .docx format

AVAILABLE LANGUAGES

- French, English, German, Spanish, Italian , Dutch, Polish, Romanian, Czech, simplified Chinese, Portuguese, Swedish, Finnish



RayCAm Report

C.A 1886
C.A 1888
TXT
CSV

STRENGTHS

- Specially developed for the C.A 1886 and C.A 1888 thermal cameras
- Supplied as standard at no additional cost
- Complete, with all the functions needed for reliable analysis of the measurement results
- Creation of analysis reports exportable in Word or PDF format
- Very simple user interface

REQUIRED CONFIGURATION

WINDOWS XP :

- SP2 minimum
- 512 MB RAM minimum
- CPU 700 Hz minimum
- NET Framework 2.0 minimum
- Monitor resolution: 1,024 x 768 minimum

WINDOWS VISTA / 7 / 8 / 10 :

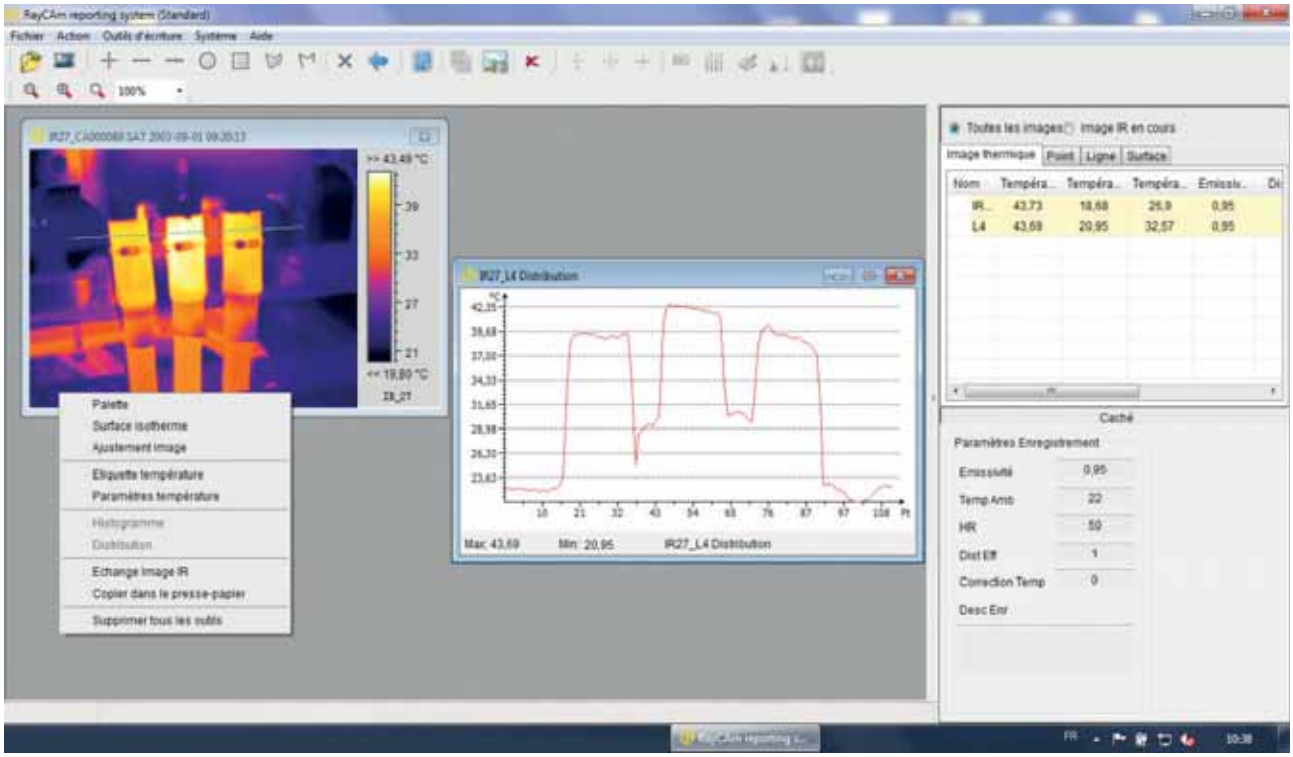
- SP1 minimum
- 1 GB RAM minimum
- CPU 1 GHz minimum
- NET Framework 2.0 minimum
- Monitor resolution: 1,024 x 768 minimum

AVAILABLE LANGUAGES

- French, English, German, Spanish, Italian.

PRECISE ANALYSIS TOOLS

- Cursors (automatic display of the temperature at the selected point)
- Thermal profile (automatic display of the Min/Max/Avg temperatures of the line)
- A square or circle for area analysis
- Polygons and polylines for more precise analysis of certain areas in the thermogram
- Results tables quickly and automatically display all the information
- The “Max” function automatically indicates the hot point in the whole thermogram or in a predefined area for analysis
- A histogram for studying the temperature distribution according to several intervals
- Display of a value label next to the measurement tool
- Assignment of a different emissivity from that of the rest of the thermogram
- Automatic merging of the thermal and real images recorded simultaneously
- Automatic customizable report generation for export in .pdf or .docx format



CHOOSE YOUR THERMOMETER

	C.A 1871	C.A 871	C.A 879	C.A 1864	C.A 1866	C.A 876	C.A 1821	C.A 1822	C.A 1823	TK 2000	TK 2002
	page 167	page 165	page 165	page 166	page 166	page 168	page 170	page 170	page 171	page 169	page 169
Measurement by infrared											
	■	■	■	■	■	■					
Field of view											
8/1	■	■									
10/1						■					
12/1			■								
30/1				■							
50/1					■						
Emissivity											
Fixed: 0.95	■	■	■								
Variable: 0.1 to 1				■	■	■					
Laser sighting	■	■	■	■	■	■					
Contact measurement											
K sensor - 1 input						■	J, K, T, N, E, R, S	J, K, T, N, E, R, S		K	K
K sensor - 2 inputs								J, K, T, N, E, R, S			K
Pt100 sensor									Pt100 Pt1000		
General functions											
HOLD	■	■	■	■	■	■	■	■	■	■	■
Max				■	■	■	■	■	■		
Min				■	■	■	■	■	■		
Avg				■	■		via Data Logger Transfer	via Data Logger Transfer	via Data Logger Transfer		
Alarm				■	■	■	■	■	■		
Choice of units	■	■	■	■	■	■	■	■	■		
Backlighting	■	■	■	■	■	■	■	■	■		

C.A 871 - C.A 879

Ref. : P01651302Z P01651805Z

°C °F IR

STRENGTHS

- Small and easy to handle
- Simple to use
- Ideal for everyone
- Ergonomics specially designed for comfortable handling
- Laser sighting for precise targeting of measuring area

SPECIFICATIONS

	C.A 871	C.A 879
Field of view	8/1	12/1
Emissivity	Fixed: 0.95	
Measurement range	-40 °C to +538 °C	- 50 °C to +550 °C
Resolution	0.1 °C up to 100 °C 1 °C for > 100 °C	
Accuracy*	±2.5% ±2 °C	±1.5% ±2 °C
Functions		
Laser sighting	Yes	
Continuous measurement	Yes (continuous press on trigger)	
Hold	Yes	
Measurement unit	°C / °F	
Display	2,000 counts, backlighting	
Dimensions / weight	160 x 82 x 41.5 mm 180 g	230 x 100 x 56 mm 290 g

**Depending on temperature measurement range. See User Manual for further details.*

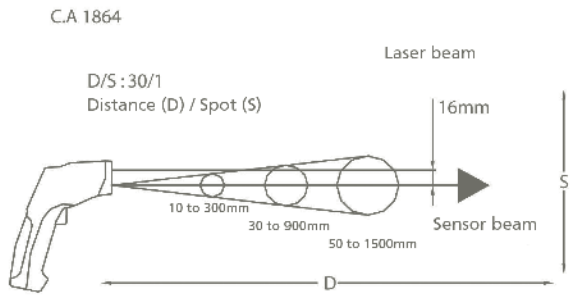
ACCESSORIES / REPLACEMENT PARTS

- 9 V LR14 battery — P01100620
- Soft case — P01298033

CONTENTS

- C.A 871 and C.A 879 delivered with:
- 1 bag
- 1 x 9 V LR14 battery

Distance / Spot ratio: explanatory diagram



C.A 1864 - C.A 1866

Ref. : P01651813 P01651814

°C °F IR

STRENGTHS

- Extended temperature range: measure up to 1,000 °C
- Use the variable emissivity to perform your inspections in accordance with reality
- High distance/spot ratio for better accuracy at long distances
- Set your alarm thresholds so that you are alerted every time there is an abnormal temperature!

SPECIFICATIONS

	C.A 1864	C.A 1866
Distance/spot ratio	30/1	50/1
Emissivity	0.1 to 1	
Measurement range	- 50 °C to +1,000 °C	
Resolution	0.1 °C	
Accuracy	- 50 °C to - 20 °C: ± 5 °C - 20 °C to +200 °C: ±1.5 % R + 2 °C +200 °C to +538 °C: ±2.0 % R + 2 °C +538 °C to +1,000 °C: ±3.5 % R ± 5 °C	
Functions	Max., Min., Avg., DIFF, HOLD	
Alarms	High and Low	
Measurement unit	°C, °F	
Laser sighting	Yes, Class II laser	
Display	20,000 counts, backlighting	
Dimensions / weight	230 x 100 x 56 mm / 290 g	

ACCESSORIES / REPLACEMENT PARTS

- 9 V LR14 battery — P01100620
- Soft case — P01298033

CONTENTS

- C.A 1864 and C.A 1866 delivered with:
- 1 bag
- 1 x 9 V LR14 battery

C.A 1871

Ref. : P01651610Z

°C IR

STRENGTHS

- Infrared probe suitable for use with all multimeters
- Point the probe at the surface of the object. The sensor supplies a voltage proportional to the temperature measured (1 mV / °C)

SPECIFICATIONS

	C.A 1871
Distance/Spot ratio	8/1
Emissivity	Fixed 0.95
Measurement range	- 30 °C to + 550 °C
Accuracy	± 2 % of reading
Dimensions / weight	164 x 50 x 40 mm / 182 g

CONTENTS

- C.A 1871 delivered with:
- 1 x 9V LR14 battery

C.A 876

Ref. : P01651403Z

°C °F IR

STRENGTHS

- Rugged thanks to their shockproof protective sheath
- Temperature measurement up to 1,350 °C
- Measurement accuracy
- Stability of the sensor over time
- Infrared measurement possible with the C.A 876

SPECIFICATIONS

	C.A 876	
	IR measurement	Contact measurement
Distance/Spot ratio	10/1	-
Emissivity	0.1 to 1	-
Measurement range	- 20 °C to + 550 °C	- 40 °C to + 1350 °C
Accuracy	± 2 % R or ± 3 °C	± 0.1 % R +1 °C
Functions	Max., Min., Avg., HOLD, Alarms	
Dimensions / weight	173 x 60.5 x 38 mm / 255 g	

CONTENTS

- 1 shockproof sheath
- 1 flexible K-thermocouple sensor

ACCESSORIES / REPLACEMENT PARTS

- K thermocouples page 180
- CK extensions page 180

TK 2000 - TK 2002

Ref. : P01653100 P01653110

IP 65 °C

STRENGTHS

- Compact, accurate and simple to use: connect the sensor and start measuring!
- Usable in all environments thanks to their IP 65 protection
- Measures the temperature difference by means of the 2 thermocouple inputs on the TK 2002

SPECIFICATIONS

	TK 2000	TK 2002
No. of inputs	1	2
Range	- 50 °C to +1,000 °C	
Accuracy	± 1.5 % + 0.5 °C	
Functions	HOLD, °C	
Dimensions	163 x 63 x 37.5 mm	
Weight	200 g	

CONTENTS

- 1 battery
- TK 2000 delivered with:
- 1 flexible K-thermocouple sensor
- 1 x 9 V 6LR61 battery
- TK 2002 delivered with:
- 2 flexible K-thermocouple sensors
- 1 x 9 V 6LR61 battery

ACCESSORIES / REPLACEMENT PARTS

- K-thermocouples page 180
- CK extensions page 180

C.A 1821 - C.A 1822

Ref. : P01654821 P01654822

STRENGTHS

- J, K, T, N, E, R, S thermocouples
- Recording of up to 1 million points
- Magnetized product compatible with MultiFix
- USB and Bluetooth communication
- Backlit digital display

SPECIFICATIONS

	C.A 1821	C.A 1822
Sensor	Thermocouple J, K, T, N, E, R, S	
No. of inputs	1	2
Measurement range	J: 210 to + 1,200 °C / 346 to + 2,192 °F K: 200 to + 1,372 °C / 328 to + 2,501 °F T: 250 to + 400 °C / 418 to + 752 °F N: 200 to + 1,300 °C / 328 to + 2,372 °F E: 150 to + 950 °C / 238 to + 1,742 °F R 0 to + 1,767 °C / 32 to + 3,212 °F S 0 to + 1,767 °C / 32 to + 3,212 °F	
Resolution	Display in °C: ø < 1,000 °C: 0.1 °C and ø ≥ 1,000°C: 1 °C Display in °F: ø < 1,000 °F: 0.1 °F and ø ≥ 1,000°F: 1 °F	
Accuracy	(J. K. T. N. E) ø ≤ - 100°C ± (0.2% Reading + 0.6°C) - 100°C < ø ≤ + 100°C ± (0.15% R + 0.6°C) + 100°C < ø ± (0.1% R + 0.6°C) (R. S) ø ≤ + 100°C ± (0.15% R + 1.0°C) + 100°C < ø ± (0.1% R + 1.0°C)	
Functions	Min., Max., HOLD, alarms, temperature differential (C.A 1822)	
Recording	Manual Start / Stop on the product Programmed recording	
Alarms	Visual alert on threshold overrun set via Data Logger Transfer Recording can be triggered on alarm threshold	
Data storage	More than one million points	
Power supply	3 x 1.5V LR6 alkaline batteries or NiMH rechargeable battery Mains connection possible with the mains / micro USB adapter (option)	
Battery life	1,000 hrs (portable mode) 3 years for recording (15-minute measurement interval)	
Dimensions/ weight	150 x 72 x 32 mm / 260 g with batteries	
Ingress protection	IP54 casing	
Operating temperature/ humidity	-10 to +60 ° C / 10 to 90 % RH	
Standards	IEC61010-1 / IEC 61326-1	

ADDITIONAL INFO

- Shockproof sheath available as an accessory
- Compatible with the Data Logger Transfer module of the Dataview® software for:
  - data display
  - programming of recordings
  - automatic export of the report

CONTENTS

C.A 1821 and C.A 1822 delivered with:

- 1 bag
- 3 x 1.5 V LR6 batteries
- 1 USB cable
- 1 measurement report

ACCESSORIES / REPLACEMENT PARTS

- Thermocouple Page 188
- Shockproof sheath + MultiFix accessory P01654252
- CK extensions page 188
- See all the accessories on page 188

C.A 1823

Ref. : P01654823

STRENGTHS

- Pt100 or Pt1000 resistance probe
- Recording of up to 1 million points
- MultiFix-compatible magnetized product
- USB and Bluetooth communication
- Backlit digital display

SPECIFICATIONS

	C.A 1823
Sensor	Pt100 or Pt1000 probe
No. of inputs	1
Measurement range	- 100 to + 400°C -148 to + 752°F
Resolution	Display in °C: 0.1 °C Display in °F: 0.1 °F
Accuracy	± (0.4% R + 0.3°C)
Functions	Min., Max., HOLD, alarms
Recording	Manual Start / Stop on the product Programmed recording
Alarms	Visual alert on threshold overrun set via Data Logger Transfer Recording can be triggered on alarm threshold
Data storage	More than one million points
Power supply	3 x 1.5V LR6 alkaline batteries or NiMH rechargeable battery Mains connection possible with the mains / micro USB adapter (option)
Battery life	800 hrs (portable mode) 3 years for recording (15-minute measurement interval)
Dimensions / weight	150 x 72 x 32 mm / 260 g with batteries
Ingress protection	IP54 casing
Operating temperature/ humidity	-10 to +60 ° C / 10 to 90 % RH
Standards	IEC61010-1 for 50 V voltages in category II / IEC 61326-1

ADDITIONAL INFO

- Shockproof sheath available as an accessory
- Compatible with the Data Logger Transfer module of the Dataview® software for:
  - data display
  - programming of recordings
  - automatic export of the report

CONTENTS

C.A 1823 delivered with:

- 1 bag
- 3 x 1.5 V LR6 batteries
- 1 USB cable
- 1 measurement report

ACCESSORIES / REPLACEMENT PARTS

- Thermocouple assembly ____ Page 188
- Shockproof sheath + MultiFix accessory ____ P01654252
- CK extensions ____ page 188
- See all the accessories on page 188

CHOOSE YOUR INSTRUMENT FOR PHYSICAL MEASUREMENTS








	C.A 847 page 175	C.A 1246 page 174	C.A 1227 page 176	C.A 850 page 178	C.A 852 page 178	C.A 895 page 185	C.A 1510 page 184	C.A 1052 page 177
Temperature measurement								
CMOS		■					■	
Pt 100 sensor								■
CTN			■					
2-input K sensor								■
Relative humidity measurement								
RH air		■					■	■
Dew point measurement		■						■
RH material	■							
Air-speed measurement								
Rotating-vane sensor			■					■
Hot-wire sensor								■
Flow-rate measurement			■					■
Air-pressure measurement								
Differential pressure				■	■			■
High pressure (=> 10 bars)				■				
Low pressure (=> 100 mbar)					■			■
Gas measurement								
CO gas measurement						■		
CO_2 gas measurement							■	
General functions								
HOLD		■	■	■	■	■	■	■
Max		■	■	■	■	■	■	■
Min		■	■	■	■		■	■
Avg		Via Data Logger Transfer	■					■
Choice of units		■	■	■	■		■	■
Backlighting		■	■	■	■	■	■	■
Alarm		■				■	■	
Recording		■	■				■	■
Software		■	■				■	■

CHOOSE YOUR INSTRUMENT FOR PHYSICAL MEASUREMENTS





	C.A 1110 page 179	C.A 832 page 180	C.A 834 page 181	C.A 1725 page 182	C.A 1727 page 182
Lighting measurement					
< 200,000 lux	■				
Spectral correction	■				
Incidence correction	■				
Noise measurement					
A and C frequency weighting		■	■		
Slow/fast time weighting		■	■		
Analogue output		■	■		
Speed measurement					
With and without contact				■	■
Rotation speed				■	■
Linear speed				■	■
Frequency, period				■	■
Duty cycle				■	■
Metering					■
General functions					
HOLD	■		■	■	■
Max	■	■	■	■	■
Min	■		■	■	■
Avg	■				
Choice of units	■			■	■
Backlighting	■	■	■		
Alarm					■
Recording	■		■		■
Software	■		■		■

C.A 1246

Ref. : P01654246

%RH °C °F

STRENGTHS

- Hygrometry, temperature and dew point
- Recording up to 1 million points
- Visual alarm on threshold overrun
- MultiFix-compatible magnetized product
- Recording trigger on alarm threshold

SPECIFICATIONS

	C.A 1246
RH range	3.0 to 98.0 %RH
RH accuracy	10 to 90 %RH: ± (2 %RH ± 1 ct), outside that range: ± (4 %RH ± 1 ct)
Temp. range °C/°F	- 10.0 to + 60.0°C +14.0 to + 140.0°F
Temp. accuracy °C/°F	10 to 40°C: ± (0.5°C ± 1 ct) outside that range: ± (0.032 x (T-25) ± 1 ct) / T= temperature in °C
Dew point range	- 10 to + 60°Ctd -4 to + 140°Ftd
Dew point accuracy	1.5 °C from 20 % RH to 30 % RH 1 °C above 30 % RH
Functions	Min., Max., HOLD, alarms
Recording	Manual Start / Stop on the product Programmed recording
Alarms	Visual alert on threshold overrun set via Data Logger Transfer Recording can be triggered on alarm threshold
Data storage	More than 1 million points
Power supply	3 x 1.5V AA / LR6 alkaline batteries or NiMH rechargeable battery Mains connection possible with the mains / micro USB adapter (option)
Battery life	1,000 hrs (portable mode) 3 years for recording (15-minute measurement interval)
Dimensions/weight	187 x 72 x 32 mm / 260 g with batteries
Ingress protection	IP54 casing
Operating temperature/ humidity	-10 to +60°C / 10 to 90 % RH
Standards	IEC61010-1 / IEC 61326-1

ADDITIONAL INFO

- Compatible with the Data Logger Transfer module of the Dataview® software for:
  - data display
  - programming of recordings
  - automatic export of the report

CONTENTS

- C.A 1246 delivered with:
- 1 bag
- 3 x 1.5 V LR6 batteries
- 1 USB cable
- 1 measurement report

ACCESSORIES / REPLACEMENT PARTS

- 75 % salt cartridge P01156401
- 33 % salt cartridge P01156402
- See all the accessories on page 188

C.A 847

Ref. : P01156302Z

STRENGTHS

- Measure the humidity of your materials very simply: prick the material and note the value corresponding to the LED which lights up.

SPECIFICATIONS

	C.A 847
RH range	6 to 100 % RH
Accuracy RH	± 1 LED
Dimensions	173 x 60.5 x 38 mm
Weight	160 g

CONTENTS

- The C.A 847 is delivered with one 9 V 6LR61 battery

THERMO-HYGROMETERS

C.A 1227

Ref. : P01654227

m/s km/h | m³/s m³/h | °C | °F | USB | Bluetooth

STRENGTHS

- Temperature, air speed and air flow rate
- Mapping of measured air speeds (MAP mode)
- Min, Max, Average and Hold functions
- Recording up to 1 million points

SPECIFICATIONS

	C.A 1227
Air speed / flow rate sensor	Rotating vane with optical detection
Air speed range	0.25 m/s to 35.0 m/s (49.0 to 6890.0 fpm)
Air speed accuracy	± 3 % of reading ± 4 counts
Air flow rate range	0 to 2,999 m3/h
Air flow rate accuracy	± 8% of reading
Temp. range °C/°F	- 20.0 to + 50.0 °C / - 4 to + 122 °F
Temp. accuracy °C	0 to 50 °C: ± 0.8 °C / -20 to 0 °C: ± 1.6 °C
Functions	Min., Max., HOLD, Average
Recording	Manual Start / Stop on the product
Data storage	Programmed recording
Power supply	3 x 1.5V LR6 alkaline batteries Mains connection possible with the mains / micro-USB adapter offered as an accessory
Battery life	200 hrs (portable mode) / 8 days of recording (15-minute intervals)
Dimensions	Casing: 150 x 72 x 32 mm Sensor: 160 x 80 x 38 mm Spiral cable: 24 to 120 cm
Weight	Approx. 400 g
Ingress protection	IP40 casing
Operating temperature / humidity	-10 to +60 ° C / 10 to 90 % RH
Standards	IEC 61010-1 - IEC 61326-1

ADDITIONAL INFO

- Compatible with the Data Logger Transfer module of the Dataview® software for:
  - data display
  - programming of recordings
  - automatic export of the report

ACCESSORIES / REPLACEMENT PARTS

- Cones kit for flow-rate measurement with rotating vane (circular cross-section Ø 210mm and rectangular cross-section 346x346mm) — P01654250
- Vane sensor Ø80mm — P01654251
- See all the accessories on page 188

CONTENTS

- C.A 1227 delivered with:
- 1 bag
- 3 x 1.5 V LR6 batteries
- 1 USB cable
- 1 measurement report

C.A 1052

Ref. : P01175020

STRENGTHS

- Can be used for comprehensive surveys of air-conditioning, heating and ventilation systems
- Accurate, 5-in-1 instrument: measurement of air speed, relative humidity, flow-rate, pressure and temperature
- Complete: the instrument is delivered as standard with its probes in a case
- Particularly easy to use: connect the probe (recognized automatically) and measure!
- Data backup

SPECIFICATIONS

	C.A 1052	
	Measurement range	Accuracy
Hot-wire speed	0.15 to 3 m/s	± 3 % R + 0.03 m/s
	3.1 to 35 m/s	± 3 % R + 0.1 m/s
Ø 100 mm rotating-vane speed	0.25 to 3 m/s	± 3 % R + 0.1 m/s
	3.1 to 35 m/s	± 1 % R + 0.3 m/s
Environmental temperature	–20 °C to +80 °C	± 0.4 % R + 0.3 °C
Flow-rate	0 to 99,999 m3/h	3 % R
Relative humidity	3 to 98 % RH	± 1 % R + 1.5 % RH
Dew point	–50 °C to +70 °C	± 0.8 % R + 0.6 °C
Pressure	0 to 1,000 mm H2O	± 0.2 % R + 1
Temperature (2 K-thermocouple inputs)	–200 °C to +1,300 °C	±0.4 % R or 1.1 °C
	–100 °C to +750 °C	±0.4 % R or 0.8 °C
	–200 °C to +400 °C	±0.4 % R or 0.5 °C
Function	HOLD, Min., Max., Avg.	
Recording	8,000 counts	
Dimensions	161.9 x 80.8 x 57.4 mm	
Weight	380 g	

CONTENTS

- C.A 1052 delivered with:
- 1 case with all its probes
- 4 x 1.5 V LR06 batteries
- PhysicsLog software

ACCESSORIES / REPLACEMENT PARTS

- Straight extension ____ P01102010
- Elbowed extension ____ P01102011
- See all the accessories on page 188

Physics-Log software
Choice of campaigns to be downloaded
Linking of operator and customer to the campaigns
C.A 1052 memory dump
Display of the curves corresponding to the downloaded data
Customization of the graphs
Backup in pdf format for distribution to customer

MULTI-FUNCTION INSTRUMENT

C.A 850 - C.A 852

Ref. : P01184101 P01184102

STRENGTHS

- Accurate and simple to use
- Time/date-stamped monitoring
- Differential measurements

SPECIFICATIONS

	C.A 850	C.A 852
Measurement range	–6.89 to +6.89 bar	–138 to +138 mbar
Accuracy	0.3 % full scale	
Unit	psi, bar, mbar, mmH_2O, inH_2O	
	kbar, cmH_2O, FtH_2O, mmHg, $OZin^2$, kg/cm^2	-
Functions	Differential meas., Min., Max., HOLD	
Dimensions	182 x 72 x 30 mm	
Weight	220 g	

CONTENTS

- C.A 850 delivered with:
- 1 hard case
- 2 connection tubes
- 1 x 9 V 6LR61 battery
- C.A 852 delivered with:
- 1 hard case
- 2 connection tubes
- 1 x 9 V 6LR61 battery

C.A 1110

Ref. : P01654110

LUX | FC | CLASS C NF C 42-710 | LED FLUO

STRENGTHS

- Totally compliant lighting measurement in all directions
- Measures up to 200,000 lux
- Mapping of lighting measured for an area or room (MAP mode)
- Metrological compensation on Fluo LEDs.
- Min., Max., Avg. and HOLD
- Recording up to 1 million points

SPECIFICATIONS

	C.A 1110
Measurement range	0.1 lx to 200,000 lx (lux) 0.01 fc to 18,580 fc
Accuracy in standard mode	
Incandescent lamp	± 3% of reading
LED	± 6% of reading (3,000 K to 6,000 K)
Fluorescent lamp	± 9% of reading
Accuracy in compensation mode	
LED mode	± 4% of reading (at 4,000 K)
Fluo mode	± 4% of reading (type F11, 4,000 K)
Functions	Min., Max., HOLD, Average
Recording	Manual Start / Stop on the product Programmed recording
MAP mode	The MAP function can be used to map the lighting on a surface or in a room. In this way, the lighting measurements are saved in the same file.
Data storage	More than 1 million points
Power supply	3 x 1.5V AA / LR6 alkaline batteries or NiMH rechargeable battery Mains connection possible with the mains / micro USB adapter (option)
Battery life	500 hrs (portable mode) / 3 years of recording (15-minute measurement interval)
Dimensions	Casing: 150 x 72 x 32 mm Sensor: 67 x 64 x 35 mm (with protective cover) Spiral cable: 24 to 120 cm
Weight	345 g with batteries
Ingress protection	IP50 casing
Operating temperature / humidity	-10 to +60 ° C / 10 to 90 % RH
Standards	Class C as per the French NF C 42-710 standard based on the CIE guidelines

ADDITIONAL INFO

- Compatible with the Data Logger Transfer module of the Dataview® software for:
  - data display
  - programming of recordings
  - automatic export of the report

ACCESSORIES / REPLACEMENT PARTS

- Shockproof sheath + MultiFix accessory — P01654252
- Mains adapter — P01651023
- See all the accessories on page 188

CONTENTS

- C.A 1110 delivered with:
- 1 bag
- 3 x 1.5 V LR6 batteries
- 1 USB cable
- 1 measurement report

C.A 832

Ref. : P01185501Z

dBA dBC

STRENGTHS

- Sound-level testing
- Simple to use

SPECIFICATIONS

	C.A 832
Measurement range	37 to 130 dB
Calibres	3 calibres: 37 to 80 dB 50 to 100 dB 80 to 130 dB
Accuracy	±2 dB
Frequency range	31.5 Hz to 8,000 Hz
Functions	A and C frequency weighting curves Fast and slow time weighting
	-
Analogue output	10 mV/dB or 1 VRMS
Data storage	-
Software	-
Dimensions	237 x 60.5 x 38 mm
Weight	230 g

CONTENTS

- C.A 832 delivered with:
- 1 shockproof sheath
- 1 jack socket for analogue output
- 1 universal adapter for tripod mounting
- 1 x 9 V 6LR61 battery

ACCESSORIES / REPLACEMENT PARTS

- 94 dB or 114 dB sound-level meter calibrator, C.A 833 ____ P01185301
- See all the accessories on page 188

C.A 834

Ref. : P01185502

dBA dBC

STRENGTHS

- Monitoring of noise-exposure levels: recording of up to 32,000 values!
- Process the data on PC with the software supplied as standard

SPECIFICATIONS

	C.A 834
Measurement range	30 to 130 dB
Calibres	4 calibres: 30 to 80 dB 50 to 100 dB 80 to 130 dB Auto 30 to 130 dB
Accuracy	±1.5 dB
Frequency range	31.5 Hz to 8,000 Hz
Functions	A and C frequency weighting curves Fast and slow time weighting
	Min., Max, HOLD
Analogue output	10 mV/dB or 1 V_{RMS}
Data storage	32,000 values
Software	Yes
Dimensions	275 x 64 x 30 mm
Weight	285 g

CONTENTS

- C.A 834 delivered with:
- 1 hard case with data processing software
- 1 jack/USB cable
- 1 jack socket for analogue output
- 1 x 9 V 6LR61 battery

ACCESSORIES / REPLACEMENT PARTS

- 94 dB or 114 dB sound-level meter calibrator, C.A 833 — P01185301
- Microphone extension for C.A 834 — P01102085
- See all the accessories on page 188

C.A 1725 - C.A 1727

Ref. : P01174810 P01174830

STRENGTHS

- Measurements up to 100,000 RPM
- Measurement with and without contact
- Multiple functions available: rotation speed, linear speed, counting, frequency, period
- Possibility of programming and storage capacity
- C.A 1727
- USB connection to process the recordings on PC

SPECIFICATIONS

	C.A 1725	C.A 1727
RPM functions		
Range	60 to 100,000 RPM	
Accuracy	10^{-4} R ± 6 cts	
m/min function		
Range	60 to 10,000 m/min.	
Accuracy	10^{-4} R ± 1 increment	
Hz function		
Range	1 to 10,000 Hz	
Accuracy	4 x 10^{-5} R ± 4 cts	
ms function		
Range	0.1 to 1,000 ms	
Accuracy	10^{-4} R ±5 cts	
Report function		
Range	0.1 to 100 %	
Accuracy	0.1 % to 1 %	
Counting function		
Range	-	0 to 100,000 events
Accuracy	-	± 1 events
Functions	Min., Max., HOLD, Smooth	
	-	High and low alarms
Data storage	-	4,000 counts
Dimensions	21 x 72 x 47 mm	
Weight	250 g	

CONTENTS

- C.A 1725 delivered with:
- 1 hard case
- 1 FRB F connector
- 1 x 9 V LR14 battery
- 1 set of 15 strips of reflective tape (0.1 m long)
- 1 CD-ROM containing the user manual
- C.A 1727 delivered with:
- 1 hard case
- 1 FRB F connector
- 1 x 9 V LR14 battery
- 1 set of 15 strips of reflective tape (0.1 m long)
- 1 CD-ROM containing the TACHOGRAPH software

ACCESSORIES / REPLACEMENT PARTS

- Mechanical accessories kit ____ P01174902
- End-fittings (set of 3) ____ P01174903
- See all the accessories on page 188

STROBOSCOPE

CDA 9452

Ref. : P03197704

Flashes /min

STRENGTHS

- Frequency or speed measurement without contact with rotating parts
- Digital frequency display
- Quartz time base
- White flash lamp, 40 joules

SPECIFICATIONS

	CDA 9452
LED display	10,000 points
Measurement range	100… 1,000 flashes/min 1000… 10,000 flashes/min
Resolution	1 flash/min
Accuracy	0.05 %
Power supply	220 V – 50/60 Hz
Climatic conditions	0… + 50 °C / RH < 80 %
Dimensions	210 x 120 x 120 mm
Weight	1 kg

ADDITIONAL INFO

- When the flashes from the stroboscope are directed at an object moving periodically and have the same frequency as the phenomenon observed, the object appears immobile. All you then need to do is read the frequency expressed in flashes/minute on the CDA 9452. To obtain the frequency in Hz, simply divide the reading by 60.

CONTENTS

- CDA 9452 delivered with mains power cable

CO2, TEMPERATURE & HUMIDITY LOGGER

C.A 1510

Ref. : P01651011

PPm CO_2 | °C | °F | RH

STRENGTHS

- CO_2, temperature and humidity logger (up to 1 million points)
- Compact: for fixed or portable use
- User-friendly: thanks to the comfort-level indicators based on the level of CO_2 and hygrothermal criteria
- Accurate: complies with the latest regulations on air-quality monitoring
- Low gas consumption thanks to its in-situ calibration kit

ADDITIONAL INFO

- C.A 1510 also available in black P01651010
- Delivered in a metal case

CONTENTS

- Delivered in cardboard box with:
- 2 x 1.5 V LR06 batteries
- 1 USB mains adapter
- 1 USB-micro USB cable
- 1 desk stand
- Software
- 1 user manual (5 languages) on CD-ROM
- 1 verification certificate

ACCESSORIES / REPLACEMENT PARTS

- In-situ calibration kit P01651022
- Metal case P01298071
- See all the accessories on page 188

SPECIFICATIONS

	C.A 1510
Specifications for CO_2	
Measurement range	0 to 5,000 ppm
Accuracy	± 50 ppm ± 3% of measured value
Resolution	1 ppm
Temperature measurement	
Measurement range	-10 °C to +60 °C
Accuracy	± 0.5 °C
Resolution	0.1 °C
Humidity measurement	
Measurement range	5 to 95 % RH
Accuracy	± 2% RH
Resolution	0.1% RH
Product capabilities	
Portable measurement	Quick measurement and display of the CO_2, temperature and relative humidity values
Indicator	**Mode 1D :** CO_2 confinement indication Visual indication (two-colour backlighting and pictograms) and/or audible indication of high confinement when the CO2 concentration is between 1,000 ppm and a 1,700 ppm threshold. **3D mode:** indication of optimum comfort zone on the basis of hygrothermal criteria and the CO_2 concentration
Energy saving (ECO)	For fixed use on battery power, the product performs measurements every 10 minutes over a programmable time range for a battery life of up to one year
Logger	Activation of programmed recording (P_REC) The start date, recording rate and end date can be customized with the PC software or the Android application. Possibility of locking the display in this mode (no values displayed). Manual activation (M_REC) Manual start and stop controls on the product. Recording is performed at the rate of the mode currently selected.
Specifications	
Recording rate	Customizable from 1 minute to 2 hours
Data storage	More than 1 million points
Buzzer and units	Yes / °C or °F
Backlighting / Hold / Min Max	Yes
Dimensions / weight	125 x 65.5 x 32 mm / 190 g with batteries
Power supply	Batteries: 2 x 1.5 V AA / LR6 or rechargeable battery Connection to mains possible with mains / micro USB adapter supplied as standard
Interfaces	2 communication modes possible: Bluetooth wireless communication and USB link; the product is then recognized as a USB key for easy file transfer
Mounting	C.A 1510 casing equipped with a magnet, a wall-suspension system and a slit for hanging the product. A wall support for use with a padlock (padlock not supplied) is available as an accessory, as is a desktop stand (supplied as standard with the C.A 1510W).
Processing software delivered as standard	Graphic representation or as table of values - Data export - Real-time mode- Report generation

C.A 895

Ref. : P01651001Z

PPm CO

STRENGTHS

- Measures the level of carbon monoxide present in a room
- Checks the operation of combustion equipment
- Warning buzzer to indicate when there is a risk

SPECIFICATIONS

	C.A 895
Measurement range	0 to 1,000 ppm
Accuracy	± 5 % + 5 ppm
Measurement mode	Normal or Avg.
Functions	Alarm, Max., HOLD
Dimensions	237 x 60.5 x 38 mm
Weight	190 g

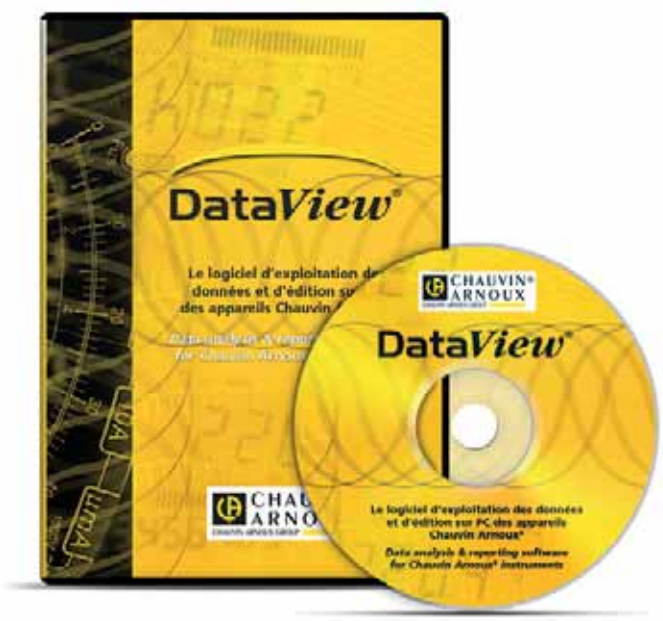
CONTENTS

- C.A 895 delivered with:
- 1 shockproof protective sheath
- 1 x 9 V LR14 battery

ACCESSORIES / REPLACEMENT PARTS

- Aspiration kit with pump and extension ____ P01651101

DATA PROCESSING SOFTWARE



DATAVIEW®

Ref. : P01102095

Data Logger Transfer

FUNCTIONS

- Configuration of all the functions of instruments connected to a PC or via Bluetooth
- Display of the data in table and graph form
- Export to an Excel spreadsheet or jpeg image
- Programming of recordings (date and rate)
- Automatic export of reports in Word format

ADDITIONAL INFO

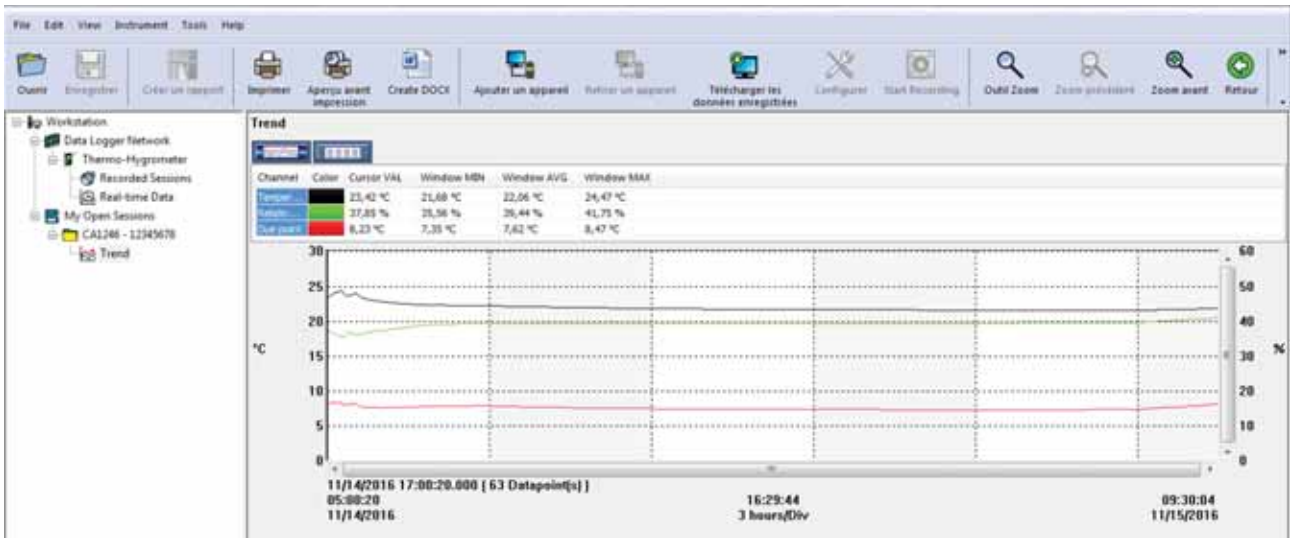
- Totally configurable alarms and recordings on alarms
- The Dataview® software automatically recognizes the instrument connected when it is hooked up to the PC and launches the corresponding menu. Users then have direct access to its configuration and to the stored data.

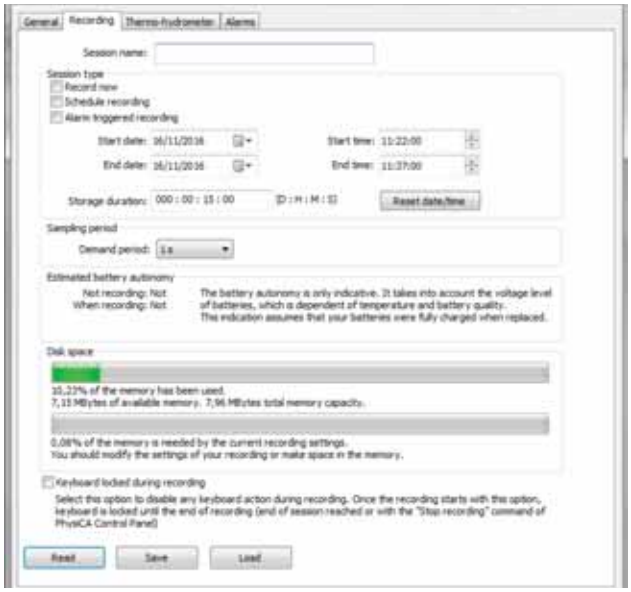
REQUIRED CONFIGURATION

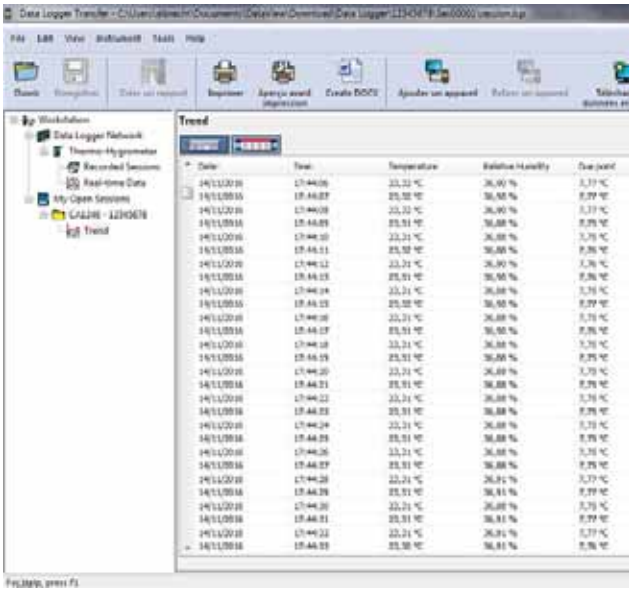
- Windows Vista & Windows 7/8/10 (32/64 bit)
- 1 GB RAM for Windows Vista & Windows 7/8 (32 bit)
- 2 GB RAM for Windows Vista & Windows 7/8 (64 bit)
- 80 MB available space on hard disk (200 MB recommended)

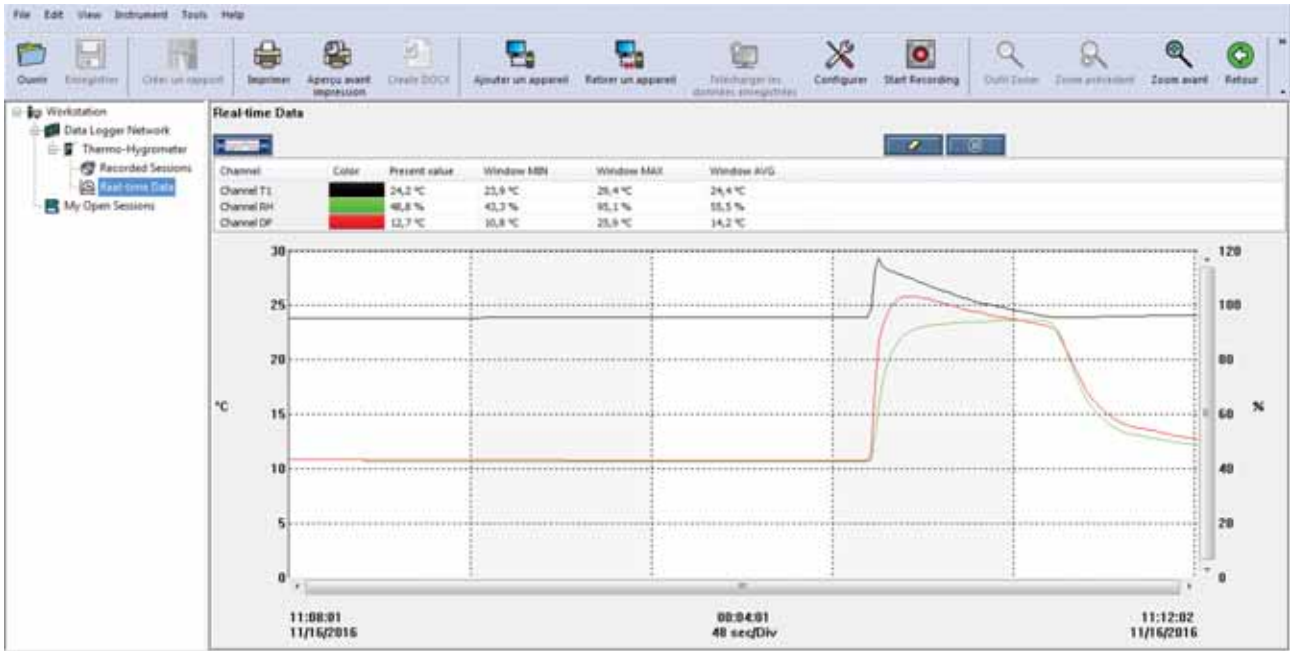
DataView® modules	Data Logger Transfer
Related products	C.A 1821
	C.A 1822
	C.A 1823
	C.A 1246
	C.A 1227
	C.A 1110
	C.A 1510

DATA PROCESSING SOFTWARE



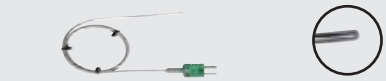
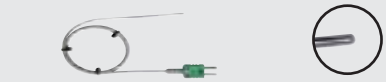
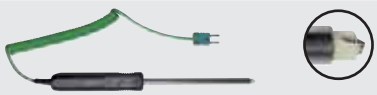






THERMOMETERS

K-THERMOCOUPLE SENSORS

Model	Model	Description
	SK20	Sheathed sensor as per the NF EN 61615 standard. Hot junction isolated from chassis-earth. Inconel 600 protective sheath
	SK6	“General-purpose” sensor recommended for measurements where access is difficult. Do not use in liquids (tip is not leakproof)
	SK2	Sensor with stainless-steel sheath which can be bent as required Radius of curvature > 4 mm
	SK3	Slightly bendable sensor with stainless-steel sheath
	SK13	Sensor with stainless-steel sheath
	SK7	In “calm” conditions without air movement, shake the sensor to encourage heat exchange
	SK17	In “calm” conditions without air movement, shake the sensor to encourage heat exchange
	SK1	Sensor with stainless-steel sheath for penetration (20 mm min.) in pasty, viscous or liquid specimens
	SK11	Sensor with stainless-steel sheath for penetration (20 mm min.) in pasty, viscous or liquid specimens
	SK4	Sheathed sensor with stainless-steel sensing element and Teflon base. For small flat surfaces. Contact can be improved by using silicone grease.
	SK14	For surface temperatures when access is difficult
	SK5	For flat surfaces. The spring ensures optimum contact even if the sensor is not positioned perpendicularly. Contact can be improved by using silicone grease.
	SK15	For flat surfaces. The spring ensures optimum contact even if the sensor is not positioned perpendicularly. Contact can be improved by using silicone grease.
	SK8	For measurements on pipes. The copper sheet is applied to the clean, dry pipe. The two-sided Velcro strip ensures contact by winding.
	SK19	Sensor with magnet for flat metal surfaces

Class I accuracy / -40 °C to +375 °C: ± 1.5°C / +375 °C to +1,000°C: ± 0.004 x T °C.
Class II accuracy / -40 °C to +333 °C: ± 2.5°C / +333 °C to +1,200°C : ± 0.0075 x T °C.

ACCESSORIES / REPLACEMENT PARTS

Type / Application	Measurement range	Tolerance class	63% response time	Plunger diameter	Plunger length	Ref.	Model
Flexible general-purpose sensor	-40°C to 450°C	Cl. 1	1 s	1.5 mm	1 m	P01655010	SK20
Flexible sensor	-50°C to 285°C	Cl. 2	1 s contact	1 mm	1 m	P03652906	SK6
Bendable general-purpose sensor	-50°C to 1,000°C	Cl. 2	3 s ambient	2 mm	1 m	P03652902	SK2
Semi-rigid general-purpose sensor	-50°C to 1,000°C	Cl. 2	2 s	4 mm	50 cm	P03652903	SK3
General-purpose sensor	-50°C to 1,100°C	Cl. 2	6 s	3 mm	30 cm	P03652918	SK13
Air sensor for ambient measurements	-50°C to 250°C	Cl. 2	12 s	5 mm	15 cm	P03652907	SK7
Air sensor for ambient measurements	-50°C to 600°C	Cl. 2	5 s	6 mm	13 cm	P03652921	SK17
Needle sensor for penetration	-50°C to 800°C	Cl. 2	1 s	3 mm	15 cm	P03652901	SK1
Needle sensor for penetration	50°C to 600°C	Cl. 2	12 s	3 mm	13 cm	P03652917	SK11
Surface sensor	0°C to 250°C	Cl. 2	1 s	5 mm	15 cm	P03652904	SK4
Elbowed surface sensor	-50°C to 450°C	Cl. 2	8 s	6 mm	13 cm	P03652919	SK14
Surface sensor with spring	-50°C to 500°C	Cl. 2	1 s	5 mm Ø in contact 8.5 mm	15 cm	P03652905	SK5
Surface sensor with spring	-50°C to 900°C	Cl. 2	2 s	8 mm	13 cm	P03652920	SK15
Pipe sensor	-50°C to 140°C	Cl. 2	10 seconds on stainless-steel pipe with 12 mm diameter	Ø 10-90 mm	32 cm	P03652908	SK8
Magnetic sensor	-50°C to 200°C	Cl. 2	7 s	4 mm	1 m	P03652922	SK19

Standard compensated miniature male 2-pole connector
Spiral cable: 45 cm to 1m

ACCESSORIES / REPLACEMENT PARTS

EXTENSIONS FOR THERMOCOUPLES

	CK 1	CK 2	CK 3	CK 4
Models	Description		Ø	Length
CK 1	Terminated by male plug / female plug		4 mm	1 m
CK 2	Terminated by male plug / 2 bare wires		4 mm	1 m
CK 3	Terminated by 5-pin DIN plug / female socket		4 mm	1 m
CK 4	Terminated by 2 banana plugs / female socket		4 mm	1 m
Temperature withstand of extensions: -40 °C to +100 °C				

CK 3 CK 2 CK 1 CK 4

REFERENCES TO ORDER

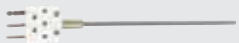
- CK 1 ..... P03652909
- CK 2 ..... P03652910
- CK 3 ..... P03652913
- CK 4 ..... P03652914

ACCESSORIES / REPLACEMENT PARTS

- PP1 handle for CK extensions P03652912
- Compensated miniature male 2-pole connector P03652925

CAPTEURS DE TEMPÉRATURE PT 100 Ω

- Pt 100 Ω temperature sensors

Models	Type	Type / Application	Description	Measurement range	Classe de tolérance	Response time	Ø	Length	Ref.
	SP 10	Surface sensor with spring	For flat surfaces The spring ensures optimum contact, even if the sensor is not set up perpendicularly.	-50 °C to +200 °C	Cl. B	6 s	5 mm	13 cm	P03652712
	SP 11	Needle sensor	For penetration (20 mm minimum) in pasty, viscous or liquid media.	-100 °C to +600 °C	Cl. B	7 s	3 mm	13 cm	P03652713
	SP 12	Air sensor	Suitable for all ambient air measurements (moving air). If the air is stationary, agitate the sensor to favour heat exchange.	-100 °C to +600 °C	Cl. B	5 s	5 mm	13 cm	P03652714
	SP 13	Immersion sensor	Sensor with stainless-steel sheath specially designed for liquids	-100 °C to +600 °C	Cl. B	7 s	3 mm	13 cm	P03652715
	SP 14	General-purpose sensor	316L stainless-steel sensor for general use	-100 °C to 450 °C	Cl. A	7 s	3 mm	20 cm	P01655020

Accuracy class A / 0.15 °C + 0.002 x T °C
Accuracy class B / 0.3 °C + 0.005 x T °C
Miniature 3-pole flat-pin connector
Spiral cable from 45 cm to 1m

ACCESSORIES / REPLACEMENT PARTS

CALIBRATORS

C.A 1621, C.A 1623 and C.A 1631

▪ Mains power supply	P01103057
▪ MultiFix bag 120 x 245 x 60 mm	P01298075
▪ Set of 2 red/black crocodile clips	P01295457Z
▪ Set of 2 red/black moulded PVC leads	P01295451Z
▪ Set of 2 moulded test probes Ø 4 mm	P01295458Z

THERMAL CAMERAS

C.A 1886 and C.A 1888

▪ Sun shade	P01651531
▪ Photo tripod adapter	P01651526
▪ Lens cover	P01651522
▪ USB cable	P01295274
▪ Battery	P01296041
▪ Battery charger	P01296043
▪ Mains power supply	P01651527
▪ In-vehicle adapter (cigarette lighter)	HX0061

THERMOMETERS

C.A 1821, C.A 1822 and C.A 1823

▪ Shockproof sheath + Multifix	P01654252
▪ Multifix	P01102100Z
▪ Mains adapter	P01651023
▪ Bag	P01298075
▪ Metal case	P01298071
▪ Dataview® software	P01102095
▪ Bluetooth BLE / USB modem for PC	P01654253
▪ Set of 4 x 1.5 V AA/LR6 rechargeable batteries + charger	HX0053

THERMO-HYGROMETER

C.A 1246

▪ 75%RH salt cartridge	P01156401
▪ 33%RH salt cartridge	P01156402
▪ Shockproof sheath + Multifix	P01654252
▪ Multifix	P01102100Z
▪ Mains adapter	P01651023
▪ Bag	P01298075
▪ Metal case	P01298071
▪ Dataview® software	P01102095
▪ Bluetooth BLE / USB modem for PC	P01654253
▪ Set of 4 x 1.5 V AA/LR6 rechargeable batteries + charger	HX0053

THERMO-ANEMOMETER

C.A 1227

▪ Cones kit for vane flow-rate measurement (circular cross-section Ø 210mm and rectangular cross-section 346x346mm)	P01654250
▪ Vane sensor Ø80mm	P01654251
▪ Shockproof sheath + Multifix	P01654252
▪ Multifix	P01102100Z
▪ Mains adapter	P01651023
▪ Bag	P01298075
▪ Metal case	P01298071
▪ Dataview® software	P01102095
▪ Bluetooth BLE / USB modem for PC	P01654253
▪ Set of 4 x 1.5 V AA/LR6 rechargeable batteries + charger	HX0053

LUXMETER

C.A 1110

▪ Shockproof sheath + Multifix	P01654252
▪ Multifix	P01102100Z
▪ Mains adapter	P01651023
▪ Bag	P01298075
▪ Metal case	P01298071
▪ Dataview® software	P01102095
▪ Bluetooth BLE / USB modem for PC	P01654253
▪ Set of 4 x 1.5 V AA/LR6 rechargeable batteries + charger	HX0053

MULTI-FUNCTION INSTRUMENT

C.A 1052

▪ Straight extension	P01102010
▪ Elbowed extension	P01102011
▪ Telescopic extension	P01102012
▪ Rotating-vane flow-rate cone	P01173105
▪ C.A 828 hot-wire flow-rate cone	P01173107
▪ Pitot tube	P01102048
▪ Case	P01298072
▪ Set of 4 x 1.5 V AA/LR6 rechargeable batteries + charger	HX0053

ACCESSORIES / REPLACEMENT PARTS

SOUND-LEVEL METERS

C.A 832 and C.A 834

- C.A 833, 94 dB or 114 dB sound-level meter calibrator — P01185301
- Microphone extension for C.A 834 (5 metres) — P01102085
- Wind cap — P01102083
- Jack/USB cable for C.A 834 — P01295478

TACHOMETERS

C.A 1725 and C.A 1727

- Mechanical accessories kit — P01174902
- End-fittings (set of 3) — P01174903
- Reflective tape (15 x 0.1 m strips) — P01101797
- FRB F socket — P01101785
- TACHOGRAPH software on CD-ROM — P01174835
- USB-A to USB-B cable — P01295293

CO2, TEMPERATURE & HUMIDITY LOGGER

C.A 1510

- In-situ calibration kit — P01651022
- Hard case — P01298071
- Desk stand — P01651021
- Wall support — P01651020
- USB mains adapter — P01651023
- USB-Bluetooth adapter — P01102112
- Set of 4 x 1.5 V AA/LR6 rechargeable batteries + charger — HX0053

CO DETECTOR

C.A 895

- Aspiration kit with pump and extension — P01651101

FIND ALL OUR ACCESSORIES ON PAGE 232

ACCESSORIES / REPLACEMENT PARTS

For the C.A 834
- 75% RH salt cartridge — P01156401

For the C.A 1227 - C.A1110 - C.A1821/22/23 - C.A1246
- Shockproof sheath + Multifix — P01654252

For the C.A 1227 - C.A1110 - C.A1821/22/23 - C.A1246 - C.A1510
- Mains adapter — P01651023

For the C.A 1227
- Cones kit for vane flow-rate measurement — P01654250

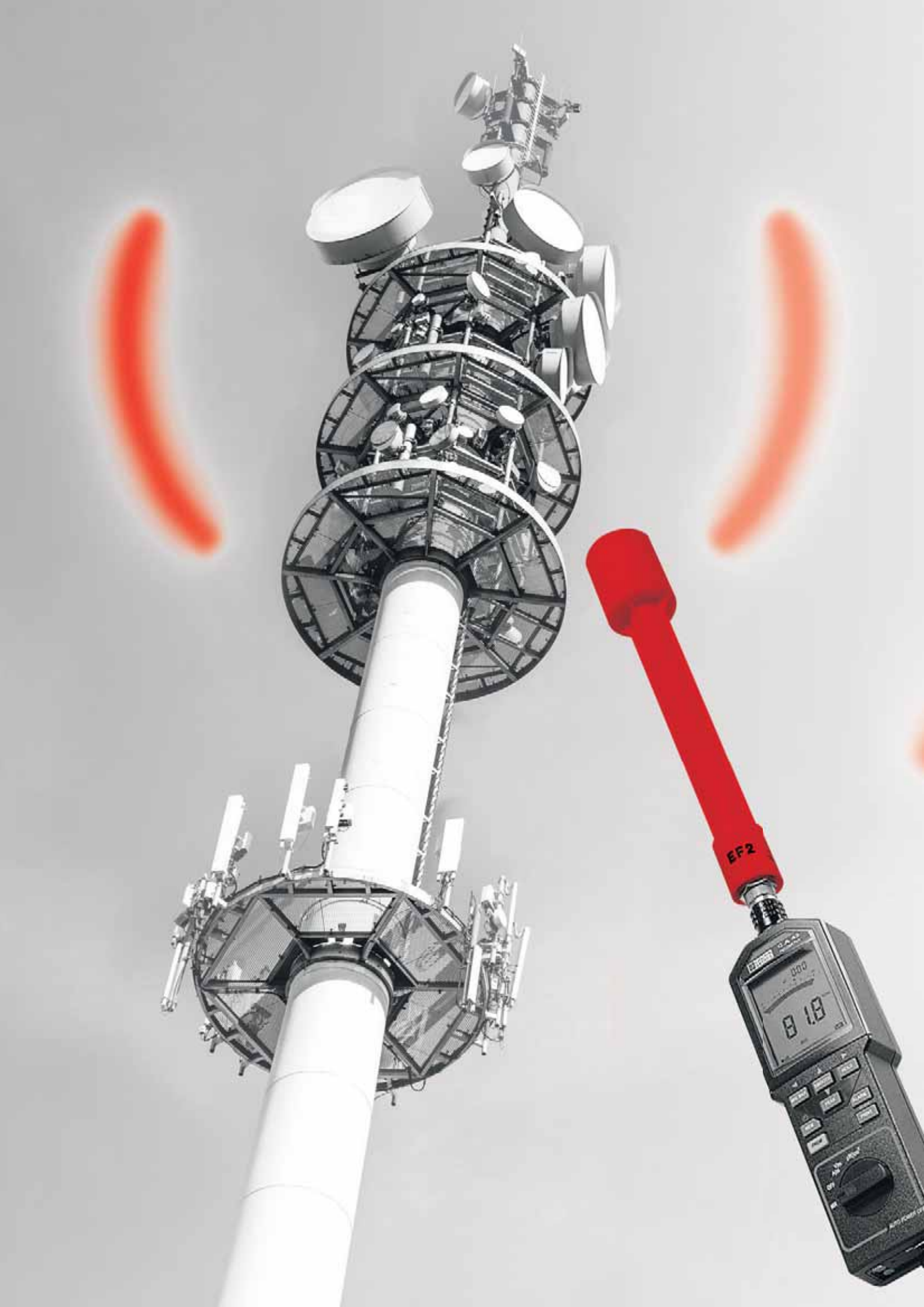
For the C.A 832 - C.A834
- Sound-level meter calibrator — P01185301

For the C.A 1225 - C.A1727
- Mechanical accessories kit — P01174902

For the C.A1510
- In-situ calibration kit — P01651022

For the C.A1510
- Desktop stand — P01651021

For the C.A1510
- Wall-mount — P01651020


EF2

RADIOFREQUENCY & MICROWAVE MEASUREMENTS

COMPUTER NETWORK AND TELECOM TESTING

The wiring of a physical infrastructure may be defined as a set of specific elements through which it is possible to transfer information. Usually linked to computer networks, the performance requirements of wiring systems are evolving rapidly and they must now be capable of conveying other types of information, such as voice or video.

COPPER NETWORK WIRING

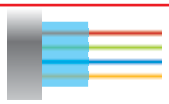
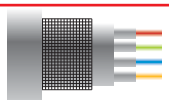
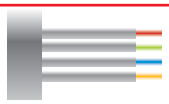
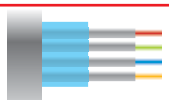
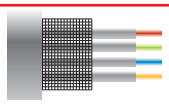
A category-5 or higher network cable comprises an external sheath, 8 copper wires organized in 4 pairs and an earth wire. There are different levels of cable shielding, with shielding per pair, global shielding or both.

THE DIFFERENT TYPES OF CABLES

The ISO/IEC 11801 standard defines official naming conventions for copper cables. The names describe the global protection of the cable, on the one hand, and the protection of the pairs of copper conductors, on the other.

Copper cables are named as follows: X / Y TP
X: Global protection of the cable
Y: Protection of the pairs
TP: Twisted Pairs

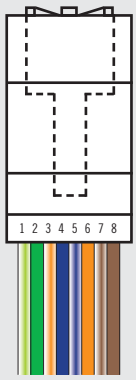
The following values are possible for X and Y:
U = Unshielded, no protection
S = Shielded with a tin-plated braid
F = Foiled, shielded with aluminium foil

		Shielding efficiency
U/UTP Global shielding: None (U) Shielding per pair: None (U)		☹☹☹
F/UTP Global shielding: Aluminium foil (F) Shielding per pair: None (U)		☹☹
SF/UTP Global shielding: Tin-plated braid and aluminium foil Shielding per pair: None (U)		☹
U/FTP Global shielding: None (U) Shielding per pair: Aluminium foil (F)		☺
F/FTP Global shielding: Aluminium foil (U) Shielding per pair: Aluminium foil (U)		☺☺
S/FTP Global shielding: global tin-plated braid Shielding per pair: Aluminium foil per pair		☺☺☺

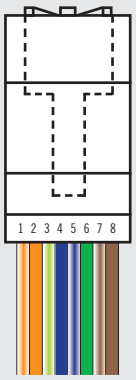
THE RJ45 CONNECTOR

This connector with 8 positions and 8 electrical contacts is very widely used to terminate cables with twisted pairs:

MODULAR MALE RJ45 JACK SOCKET



T568A
(clip below)



T568B
(clip below)

EIA/TIA 568A standard		
Name	**No.**	**Colour**
TD+	1	White/Green
TD-	2	Green
RD+	3	White/ Orange
Not used	4	Blue
Not used	5	White/Blue
RD-	6	Orange
Not used	7	White/Brown
Not used	8	Brown

EIA/TIA 568B standard		
Name	**No.**	**Colour**
RD+	1	White/ Orange
RD-	2	Orange
TD+	3	White/Green
Not used	4	Blue
Not used	5	White/Blue
TD-	6	Green
Not used	7	White/Brown
Not used	8	Brown

MEASUREMENT OF ELECTROMAGNETIC FIELDS

Any system using electricity as an energy source generates electromagnetic radiation when it is in operation. Depending on the design of the system, the electromagnetic fields which it produces may be propagated in the space around it, extending significantly further than the external limits defined by its enclosure (casing) or the site where it is installed. This is the case for electrical machinery, motors, welding units, induction furnaces, high-voltage power lines, transformer stations, household electrical appliances and electronic instruments used for data processing, transmission, monitoring or measurement. These electromagnetic fields interact with matter, both inanimate (interference with nearby electrical devices) and animate (plants, animals, etc.). It is therefore important to be able to measure the values of the radiated magnetic and electric fields propagated around any electrical or electronic device:

- to overcome the purely technical problems linked to the electromagnetic compatibility of instruments and machines,
- but also to make sure that the people living and working near these electrical systems are not exposed to fields liable to cause lasting or even temporary negative effects on them.

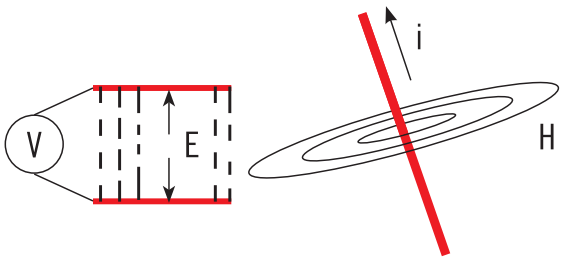
THE ELECTROMAGNETIC WAVE

The electromagnetic wave is **the radiated energy produced by the oscillation of an electrical load**. It is characterized by oscillation of the electrical and magnetic fields. Each system generating or absorbing electrical energy is the source of electromagnetic waves in the form of variable electric fields and magnetic fields which are propagated in the air at the speed of light.

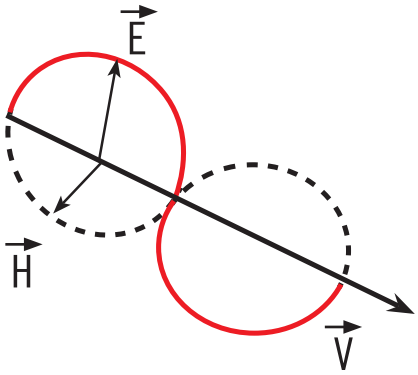
Roughly speaking, an electromagnetic wave comprises:

The electric field (E): generated by the difference in potential between two conductors subjected to an electrical voltage, this field depends on the voltage V.

The magnetic field (H): as this field is generated by a current in a conductor, it depends on the current i.



In the case of a sinusoidal alternating wave, the electric field E and the magnetic field H are sinusoidal and in phase. Their directions are perpendicular to one another and perpendicular to the direction of propagation.



Representation of the three components of an electromagnetic wave

This wave is characterized by its frequency F in Hertz (Hz) or its wavelength in metres; these two quantities are linked by the following relation:

$$\lambda = C_0 / F$$

where Co = the speed of light in m/s,
i.e. 300,000 km/s = 3 x 108 m/s

F = frequency in Hz

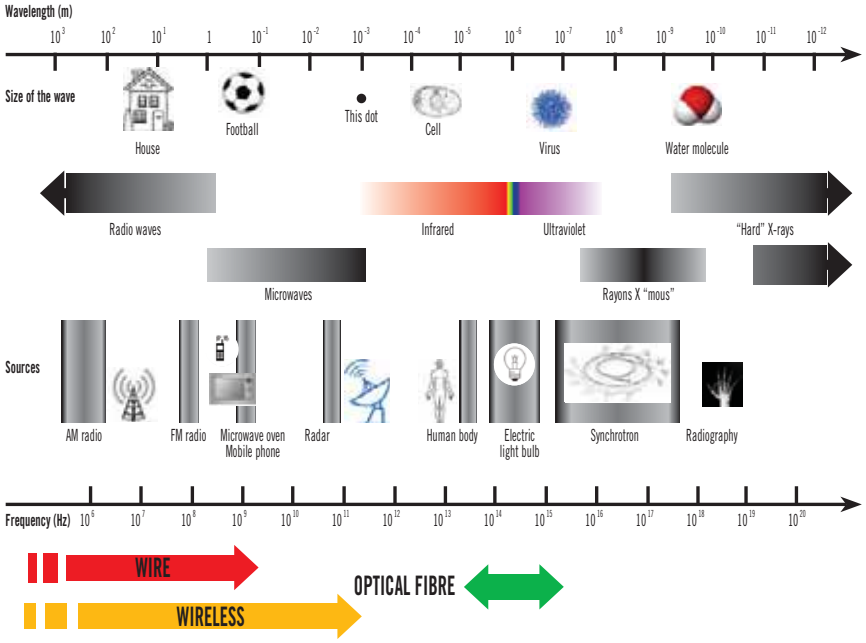
λ = wavelength in m

Example: for a wave at 300 MHz, the wavelength is 1 metre.

MEASUREMENT OF ELECTROMAGNETIC FIELDS

THE ELECTROMAGNETIC SPECTRUM

The electromagnetic spectrum is the decomposition of the electromagnetic radiation into its different components in terms of wavelength. Some waves can be detected with the human eye, while others have much lower frequencies detectable using radio devices.



INTERACTIONS WITH MATTER

The effects of electric and magnetic fields on matter and tissues vary according to their frequency and their intensity. Low-frequency fields are liable to induce electric currents in matter and biological tissues.
Effects described as "thermal" may follow. These thermal effects are the basis for the action of higher-frequency fields used in certain applications (cooking and drying with microwaves).

OBLIGATIONS

The International Commission on Non-Ionizing Radiation Protection (ICNIRP) has defined exposure limits adopted in many countries. The exposure limits adopted by the European Community are based on a recommendation issued by the ICNIRP, including those in Directive 1999 / 519 / CE (public) and the recent directive 2013/35/UE of 26th June 2013 concerning workers' exposure to electromagnetic fields, which must be transposed into law in the member states by 1st July 2016. For the latter directive, the employer's role will be to assess the hazards and determine the exposure which can be measured in order to find out objectively whether the standard recommended thresholds have been exceeded or not.

C.A 7028

Ref. : P01129501

RJ 45

STRENGTHS

- Graphical screen
- Detects, identifies and locates faults from up to 150 m away
- Designed for use on UTP, STP, FTP, & SSTP cables equipped with RJ45 connectors and wired in compliance with the TIA 568A/B, USOC or ISDN specifications

SPECIFICATIONS

	C.A 7028
Connector	RJ 45
Types of cables	UTP, STP, FTP & SSTP
Faults indicated	Short-circuited pair, Wire in open circuit, Short-circuit between pairs, Crossed pairs, Reversed pairs, Shielding continuity
Remote modules	Identifiers nos. 1 to 9
Dimensions	165 x 90 x 37 mm
Weight	350 g

ACCESSORIES / REPLACEMENT PARTS

- Set of 4 identifiers nos. 2 to 5 — P01101994
- Set of 4 identifiers nos. 6 to 9 — P01101995
- See all the accessories on page 203

CONTENTS

- C.A 7028 delivered with:
- 2 RJ45 leads
- 1 identifier no. 1
- 1 soft case
- 4 x 1.5 V LR06 batteries

LOW-FREQUENCY FIELDMETER

C.A 40

Ref. : P01167501

STRENGTHS

- Measurement of low-frequency magnetic fields
- Quick assessment of the radiation from equipment and installations
- Easy-to-handle unidirectional probe

SPECIFICATIONS

	C.A 40		
Magnetic field measurement	20 µT	200 µT	2,000 µT
Accuracy	±(4 %+3 cts)	±(5 %+3 cts)	±(10 %+5 cts)
Frequency range	30 to 300 Hz		
Power density	-		
Output	-		
Probe	Unidirectional		
Alarm	-		
Data storage	-		
Dimensions	163 x 68 x 24 mm		
Weight	285 g		

CONTENTS

- 1 probe
- 1 x 9 V 6LR61 battery

ACCESSORIES / REPLACEMENT PARTS

- Soft case P01298036

C.A 41 - C.A 43

Ref. : P01167001B P01167002A

STRENGTHS

- Measurement of electric fields and detection of radiation sources over a wide frequency band
- Isotropic probe: measures the field in all directions
- Storage of measurement points with the C.A 43

SPECIFICATIONS

	C.A 41		C.A 43	
Electric field measurement	0.1 to 1 V/m	1 to 10 V/m	10 to 100 V/m	100 to 200 V/m
Accuracy	0.7 V/m	0.5 V/m	1 dB	2 dB
Frequency range	100 kHz to 2.5 GHz			
Power density	-		0.1 to 2 mW/cm²	
Output	Analogue		Digital on optical fibre	
Probe	Isotropic			
Alarm	Configurable high and low thresholds			
Data storage	-		1,920 points	
Dimensions	216 x 72 x 37 mm			
Weight	350 g			

CONTENTS

- C.A 41 delivered with:
- 1 hard case
- 1 EF2A probe
- 1 x 9 V 6LR61 battery

- C.A 43 delivered with:
- 1 hard case
- 1 EF2A probe
- Optical fibre
- 1 PC adapter
- 1 CD-ROM containing data processing software
- 1 x 9 V 6LR61 battery

ACCESSORIES / REPLACEMENT PARTS

- EF2A isotropic probe P01167202B
- Shockproof sheath P01298009B
- See all the accessories on page 203

WATTMETERS / REFLECTOMETERS

RW 511 - RW 5012 - RW 501

Ref. : P01255102 P01255104 P01255101

RW 521

Ref. : P01255103

STRENGTHS

Wattmeters developed for military and civilian applications:

- Simple installation testing
- Testing of the assembly comprising the transmitter, cable and antenna
- 1 product for each market:
  - Single side-band transmission (RW 511)
  - VHF networks, police, emergency services (RW 5012)
  - Radio, FM and TV networks (RW 501)
  - Rural VHF – HF networks (RW 521)

SPECIFICATIONS

	RW 521	RW 511	RW 5012	RW 501
Frequencies	1.3 … 2.7 GHz	2 … 30 MHz	25 … 500 MHz	25 … 1,300 MHz
Incident power	+10 … +40 dBm	30 … 1,000 W	1 … 300 W	1 … 300 W
Reflected power	+5 … +35 dBm	10 … 300 W	0.3 … 100 W	0.3 … 100 W
Accuracy	± 6%	± 7.5 %	± 6%	± 6%

CONTENTS

- RW 511 delivered with:
- 1 x 9V 6LR61 battery
- RW 5012, RW 501 and RW 521 delivered with:
- 2 x 1.5 V LR06 batteries

ACCESSORIES / REPLACEMENT PARTS

- Bag _____ P01298046
- SWR chart for RW 501, 511 & 5012 _____ P01255901
- See all the accessories on page 203

ACCESSORIES / REPLACEMENT PARTS

LAN TESTER

C.A 7028

- Set of 4 identifiers nos. 2 to 5 — P01101994
- Set of 4 identifiers nos. 6 to 9 — P01101995
- Bag — P01298532

FIELDMETERS

C.A 40

- Soft case for C.A 40 — P01298036

C.A 41 and C.A 43

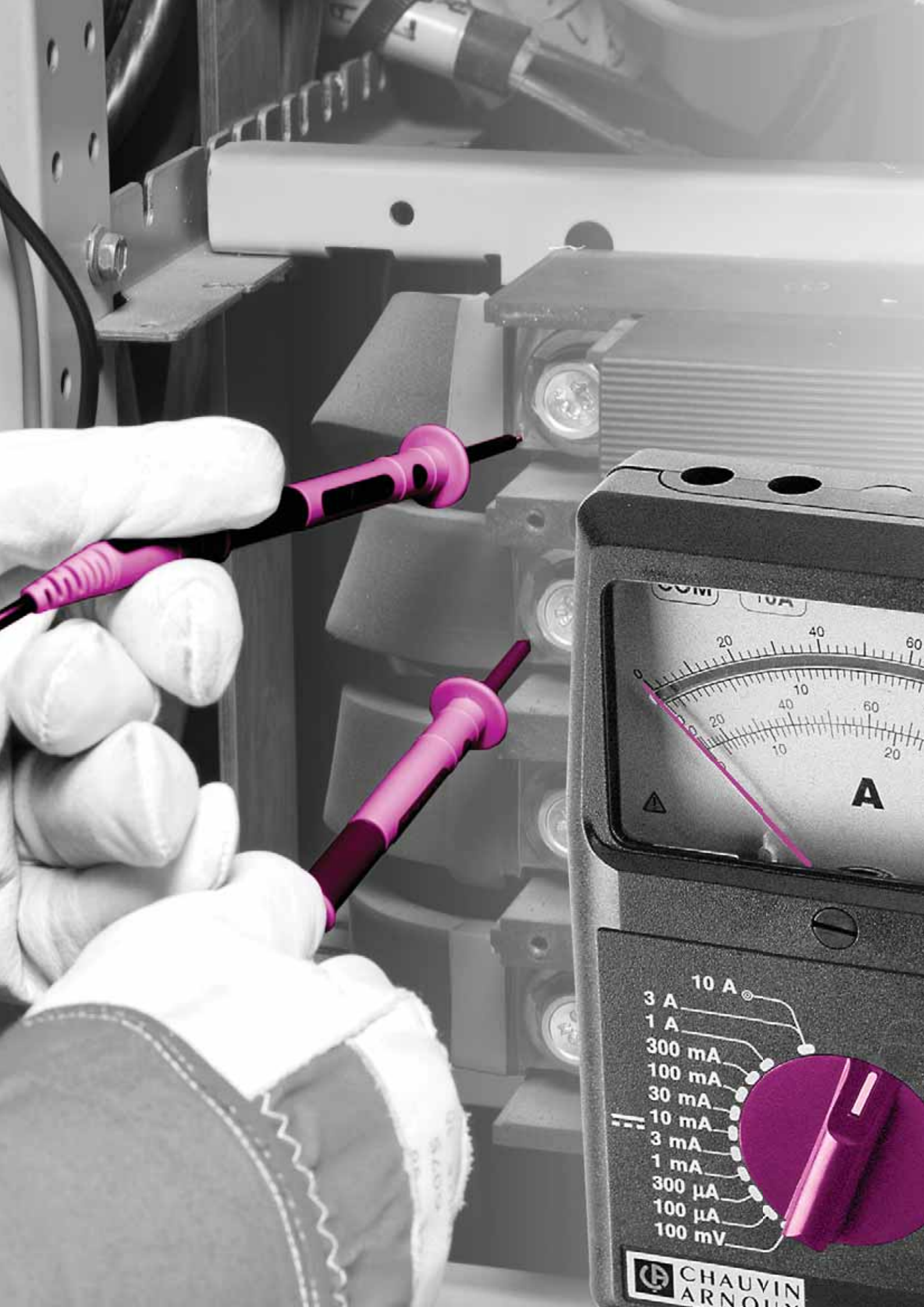
- EF2A isotropic probe — P01167202B
- Shockproof sheath — P01298009B

WATTMETERS/REFLECTOMETERS

RW 511, RW 5012, RW 501 and RW 521

- Bag — P01298046
- SWR chart for RW 501, 511 & 5012 — P01255901
- SWR chart for RW 521 — P01255902

FIND ALL OUR ACCESSORIES ON PAGE 230


COM
10A
A
10 A
3 A
1 A
300 mA
100 mA
30 mA
10 mA
3 mA
1 mA
300 µA
100 µA
100 mV
CHAUVIN ARNOUX

LABORATORY & EDUCATIONAL INSTRUMENTATION

Electricity, electronics, physics, industrial maintenance & the environment: these are disciplines where **measurement is crucial for identifying and understanding** theoretical phenomena through practical experience. We offer **simple, educational equipment to help students to learn** about subjects ranging from the study of electrical signals to the maintenance of electrical systems.

STUDYING SIMPLE ELECTRICAL PHENOMENA

In Electronics training, students discover the techniques using electrical signals to capture, transmit, process, store and view data. To help them, **the electrical quantities may be generated by decade boxes or simulation cases.** These quantities are measured by traditional measuring instruments such as voltmeters, ammeters, wattmeters and multimeters.

These resistance, capacitance or inductance decade boxes are passive elements for insertion into test or development circuits in order to obtain the required resistance, capacitance or inductance values by combination.

Quantity	Unité
Resistance R	Ω (ohm)
Current I	A (ampere)
Voltage V	V (volt)
Power P	W (watt)
Capacitance C	F (farad)
Inductance L	H (henry)


Resistance box

COMPLIANCE WITH THE IEC 61010-1 STANDARD

These **decade boxes comply with the IEC 61010-1 safety standard** which establishes the safety rules for electrical measuring, control and laboratory instruments.
This standard defines the normal environmental conditions of use:

- Indoor use
- Altitude up to 2,000 m
- Temperature from 5 °C to 40 °C
- Maximum relative humidity of 80 % at temperatures up to 31 °C, with a linear decrease down to 50 % relative humidity at 40 °C
- Fluctuations of the network supply voltage from the network not exceeding ±10 % of the rated voltage
- Normal presence of transient overvoltages on the network power supply

PRACTICAL APPLICATIONS ENCOURAGE SUCCESSFUL LEARNING

Electrical installation cases, power and harmonics cases, microwave test benches and an **infrared thermography bench:** Chauvin Arnoux provides students with **ready-to-use** educational units which are ideal **for a large number of experiments.**

Their overall design aims to ensure simple use and measurements. **Delivered with a guide containing practical exercises** accompanied by the corresponding theoretical elements, these training cases enable students to boost their knowledge with practical skills likely to prove useful during their careers.

THERMOGRAPHY TRAINING BENCH

C.A 1875

Ref. : P01651620

PRACTICAL EXERCISES

STRENGTHS

- Highlighting of the various possible errors in thermography: problems linked to emissivity, spatial resolution, angle of measurement, transmission or reflection
- Simple use and simple measurements
- Delivered with a booklet of practical exercises accompanied by the corresponding theoretical principles

SPECIFICATIONS

	C.A 1875
Emissivity of materials	The influence of emissivity on temperature measurement is demonstrated using sheets of different materials
Positioning	Visual demonstration of the influence on temperature measurement of camera positioning in relation to the target
Reflection and transmission	Visual demonstration of reflection and transmission phenomena and their influence
Spatial resolution	Detection of minimum areas for temperature measurement according to the distance from the target
Power supply	230 V – 50 / 60 Hz

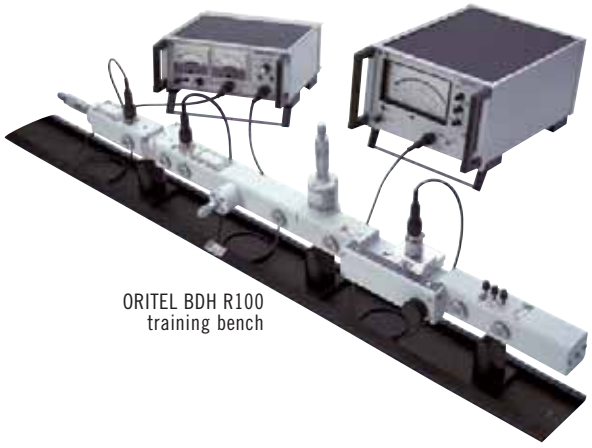
CONTENTS

- C.A 1875 delivered in a bag with:
- 1 mains power cable
- Test sheets
- 1 booklet presenting the theoretical principles and practical exercises

BDH R100

Ref. : P01275101

ORITEL CF 204 GUNN power supply



ORITEL BDH R100
training bench

STRENGTHS

- Dedicated to teaching about 8.5 to 9.6 GHz microwaves with guided propagation
- WR90/R100 waveguide equipped with a quick mounting system
- Supplied with detailed course, teaching and lab work material
- Various accessories for setting up a wide range of experiments

SPECIFICATIONS

	BDH R100
Main possible experiments	
Study	GUNN oscillator
Measurements	Impedance
	Wavelength
	Frequency
	Standing wave ratio
Readings	Quadratic law of a detector

CONTENTS

- BDH R100 delivered in a case with:
- 1 ORITEL OSG 100 GUNN diode oscillator
- 1 ORITEL ISO 100 ferrite isolator
- 1 ORITEL MOD 100 PIN diode modulator
- 1 ORITEL ATM 100 variable attenuator
- 1 ORITEL OND 100 cavity wavemeter with curve
- 1 ORITEL LAF 100 measuring line
- 1 ORITEL ADZ 100/3 impedance adapter
- 1 ORITEL TGN 100 waveguide-to-coaxial transition element
- 1 ORITEL DEN 100 coaxial detector
- 1 ORITEL CHG 100 adapted load
- 1 ORITEL CC 100 short-circuit plate
- 3 ORITEL SUP 100 guide supports

ELEMENTS FOR FREE-SPACE PROPAGATION

		Reference
1	20 dB ANC 100/20 horn antenna	P01275326
2	15 dB ANC 100/15 dB horn antenna	P01275304
3	10 dB ANC 100/10 horn antenna	P01275325
4	RRL100 passive radar responder	P01275333
5	DR100 reflector disk	P01275334
6	AND100 dielectric antenna	P01275329
7	ASP100 patch antenna	P01275328
8	ANF100 adjustable slot antenna	P01275332
	ANF100F fixed slot antenna	P01275331
	IANF100 iris for adjustable slot antenna	P01275330
	ANP100 adjustable parabolic reflector	P01275327
9	ANP100F fixed parabolic reflector	P01275335

MICROWAVE TRAINING BENCHES

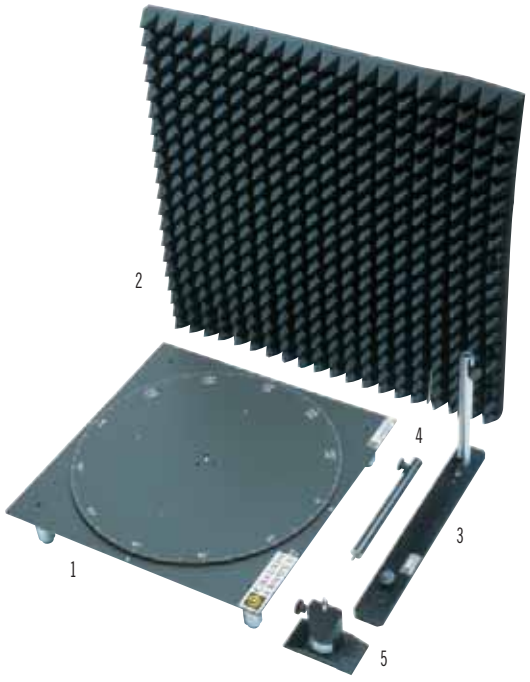
ADDITIONAL COMPONENTS

		Reference
1	ORITEL RD 100 displacement copy (for ORITEL LAF 100 measuring line)	P01275302
2	DPH100 micrometer phase shifter	P01275340
3	JTG100 rotating joint	P01275338
4	CIR100 ferrite circulator	P01275344
5	DEG100 parallel detector on guide	P01275345
6	PEH100 E-H positioner	P01275358
7	GD100/180 180 mm straight waveguide	P01275350
8	COE100/H high plane E bend	P01275346
	COE100/B low plane E bend	P01275347
	COH100 plane H bend	P01275348
9	CCM100 micrometer short-circuit	P01275351
10	Calibrated attenuator	P01275339
11	LAZ100 movable impedance adapter	P01275352
12	KED100 dielectric kit	P01275353
13	CDT100 multi-hole directional coupler	P01275341
	ICDT100/30: 30 dB iris for multi-hole coupler	P01275343
14	CAB100: 1 m coaxial cable	P01275357

ACCESSORIES / REPLACEMENT PARTS

		Reference
ORITEL OSG 100 GUNN diode oscillator	Voltage: 10 VDC - Power: +17 dBm	P01275307
ORITEL MOD 100 PIN diode modulator	Modulation depth > 50% for I = +10 mA	P01275309
ORITEL OND 100 cavity wavemeter with curve	Reading accuracy: 5 MHz	P01275311
ORITEL LAF 100 measuring line	Residual SWR: < 1.05	P01275312
ORITEL DEN 100 coaxial detector	SWR: < 1.3 - Max. power: +19 dBm	P01275315
ORITEL ISO 100 ferrite isolator	Isolation: > 20 dB	P01275308
ORITEL ATM 100 micrometer attenuator	Attenuation: > 20 dB - Max. power: 1 W average	P01275310
ORITEL ADZ 100/3 impedance adapter	Number of transverse plates: 3	P01275313
ORITEL TGN 100 waveguide-to-coaxial transition element	SWR: < 1.25	P01275314
ORITEL CHG 100 adapted load	SWR: < 1.05	P01275316
ORITEL CGX 100/20 dB cross coupler	Coupling: 20 dB - Directivity: 15 dB typ.	P01275305
IRIS 100 coupling iris (for CGX100)	20 and 30 dB coupling	P01275306
ORITEL ANC 100/15 dB horn antenna	Gain: 15 dB Flange: UBR 100/UG 39	P01275304
ORITEL AFR 100	Compatible with UBR 100 / UG 39 flanges	P01275301
ORITEL RD 100 displacement copy	For ORITEL LAF 100 measuring line	P01275302

* You are advised to use the GUNN CF204 power supply to power GUNN diode oscillators safely



ACCESSORIES / REPLACEMENT PARTS

		Reference
1	Manual rotating platform – PTM100	P01275359
2	Set of 2 absorbent panels – ABS100	P01275362
3	Antenna support – SAN100	P01275360
4	Antenna support rod	P01275349
5	Waveguide support– SUP100	P01275318
	Experiment frame	P01275361

CHOOSE YOUR TRAINING CASE

	C.A 6710 case	Power & Harmonics Case
	page 211	page 212
Electrical installation testing and safety		
Earth/ground	■	
Soil resistivity	■	
Loop	■	
Insulation	■	
RCD	■	
Leakage current	■	
Power and Harmonics		
Single & three-phase currents		■
Single & three-phase voltages		■
Active, reactive and apparent power, cos φ, PF… single and three-phase		■
Voltage variation		■
Current variation		■
Current phase-shift variation		■
THD variation on voltage and current		■

C.A 6710

Ref. : P01145901

ELECTRICAL INSTALLATIONS

STRENGTHS

- Ideal for learning about electrical safety measurements
- Simulation of measurements on electrical installations
- Depressurization valve for air transport

SPECIFICATIONS

	C.A 6710
Standards illustrated	NF C 15-100, VDE 0100, IEE 16th, IEC 64-8, ÖVE EN-1, RBT MIE, NIN/NIV…
Simulation of earthing systems	TT, TN and IT
Measurement simulations	Earth, resistivity, loops (earth and internal), insulation, RCD tests (30 mA / 300 mA), current / leakage current
Fault simulations	Phase / neutral or earth interruptions, neutral / earth reversal, leakage current
Electrical safety	Cat. II 230 V
Dimensions	490 x 395 x 195 mm
Weight	10 kg

CONTENTS

- C.A 6710 delivered with:
- 1 x Schuko-type FR-DE mains power cable
- 6 black safety leads 25 cm long with rear connection
- 1 universal adapter for mains power sockets
- 1 FR/DE adapter for mains power sockets

ACCESSORIES / REPLACEMENT PARTS

- Set of 6 black Ø 4 male safety leads 25 cm long with rear connection — P01295212
- 1 universal adapter for mains power sockets — P01101980
- 1 FR/DE adapter for mains power sockets — P01101981

POWER & HARMONICS

Ref. : P01NC5003

POWER AND HARMONICS

STRENGTHS

- Hazard-free simulation of a network and a three-phase load
- Variable currents, voltages, phase shift and THD

SPECIFICATIONS

	Power & harmonics
Network simulations	SINGLE or THREE--phase (230 V mains power supply)
Measurement simulations	U, I, W, W/h, var, φ, THD, etc.
Voltage	Mains ± 15 %
Current	1, 2, 5, 10, 20 A ± 10 %
Voltage variation*	+8 % ; –10 %
Current phase shift*	30°, 45°, 60° ±5° inductive or capacitive
Harmonic distortion on current and voltage*	Network level, 15 %, 25 % and variable
Phase outage	Yes
Power supply	230 V mains - 2 P + E socket
Electrical safety	IEC 61010 300 V Cat II pollution 2
Dimensions	490 x 395 x 195 mm
Weight	10 kg

**on phase 1*

CONTENTS

- Case delivered with:
- 1 mains power cable

ACCESSORIES / REPLACEMENT PARTS

- Measurement leads page 220

ADDITIONAL INFO

- The current sensors are not delivered with the training case.

CHOOSE YOUR INSTRUMENT FOR SIMULATING THE ELECTRICAL QUANTITIES

Specifications	C.A 401	C.A 402	C.A 403	C.A 404	C.A 405	DECADE BOXES					SHUNT	WHEATSTONE
	page 214	page 214	page 214	page 214	page 214	page 215	page 215	page 215	page 215	page 215	page 217	page 215
AC / DC ammeter	■											
AC / DC voltmeter		■										
Null galvanometer			■									
Single/three-phase wattmeter				■	■							
1-decade resistance box						■						
1-decade capacitance box							■					
Multi-decade resistance boxes								■				
Multi-decade capacitance boxes									■			
Multi-decade inductance boxes										■		
Shunts											■	
Wheatstone bridge (sub-assembly for)												■

ANALOGUE TESTERS

C.A 401 - C.A 402 - C.A 403

Ref. : P01170301 P01170302 P01170303

C.A 404 - C.A 405

Ref. : P01170304 P01170305

600 V CAT III

STRENGTHS

- Economical and rugged
- Resistant casing with removable stand
- Single switch
- Safety sockets
- Double insulation

CONTENTS

- C.A 401, C.A 402, C.A 403, C.A 404 and C.A 405 delivered with:
- 1 x 1.5 V LR06 battery

ACCESSORIES / REPLACEMENT PARTS

- Shockproof sheath no. 13 — P01298016
- Fuses — page 230
- Measurement leads — page 230

SPECIFICATIONS

		C.A 401	C.A 402	C.A 403	C.A 404	C.A 405
Function		AC/DC ammeter	AC/DC voltmeter	Null galvanometer 2 black scales (0 to 30 and 0 to 100)	Single-phase AC/DC wattmeter	Single and three-phase AC/DC wattmeter
Switchgear		Magneto-electric rectifying		Magneto-electric	Ferrodynamic	
Calibres	Voltage	100 mV DC cal. for shunts	8 DC cal.:100 mV to 1,000 V* 6 AC cal.: 3 V to 1,000 V*	1 DC cal.: 100 mV for shunts	4 cal.: 60 V to 480 V	6 single-phase cal.:60 V to 480 V 4 balanced three-phase cal.: 60 V√3 to 240 V√3
	Current	11 DC cal.: 100 µA to 10 A 7 AC cal.: 10 mA to 10 A		2 DC cal.: 30 µA, 3 mA	2 cal.: 0,5 A; 1 A	1 cal. 5 A
	Resistance					
Basic accuracy		2 % DC 2,5 % AC		1,5 % DC	1 % AC	2.5 % DC. 1 % AC mono. et 2 % AC tri.
Operating frequency		45 to 400 Hz	20 to 400 Hz		0 to 500 Hz	15 to 500 Hz
Fuses		1 A HPC and 10 A HPC	Internal resistance: 20 kΩ/VDC ; 6.32 kΩ/VAC	315 mA HPC	1,25 A HPC	6,3 A HPC
Electrical safety		600 V CAT III as per IEC/EN 61010-1 Edition 2				
Dimensions		165 x 105 x 50 mm				
Weight		450 g				

*Use limited to 600 V maximum

DECADE BOXES AND SHUNTS

RESISTANCE BOXES

		References
1 decade		
0,1 to 1 Ω		P03197521A
1 to 10 Ω		P03197522A
10 to 100 Ω		P03197523A
100 to 1,000 Ω		P03197524A
1 to 10 kΩ		P03197525A
10 to 100 kΩ		P03197526A
100 to 1,000 kΩ		P03197527A
1 to 10 MΩ		P03197528A
BR 04 :	**4 decades 1 Ω to 10 kΩ**	P01197401
BR 05 :	**5 decades 1 Ω to 100 kΩ**	P01197402
BR 06 :	**6 decades 1 Ω to 1 MΩ**	P01197403
BR 07 :	**7 decades 1 Ω to 10 MΩ**	P01197404

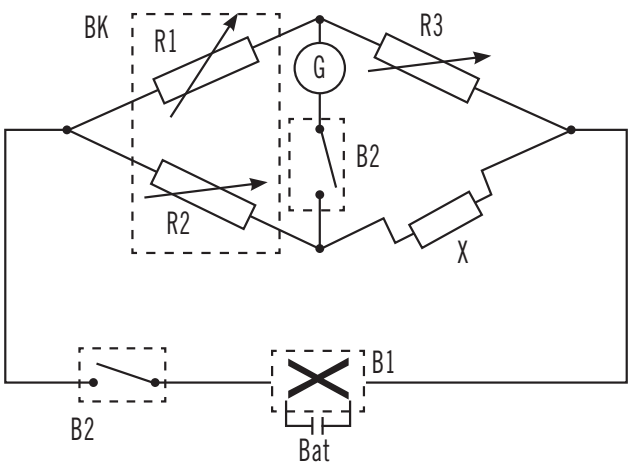
CONTENTS

- 1-decade box delivered with 1 black safety lead 25 cm long, Ø 4 mm male with rear connection
- BR 04/05/06/07 boxes are delivered with a user manual only.

ACCESSORIES / REPLACEMENT PARTS

- 1 black safety lead 25 cm long, Ø 4 mm male with rear connection ____ P01295056
- Black Ø 4 mm male jumper (x10) ____ P01101892A

ASSEMBLY FOR WHEATSTONE BRIDGE



	References
7-ratio K box	P03197531A
Null galvanometer	P03197611A
Dual switch box	P03197529A
Simple changeover-switch box	P03197530A

IEC/EN6110-1 - 150 V CAT II - Pol 2
50 V CAT III

G = null galvanometer

BK = K ratio box - with $K = \frac{R2}{R1}$

R3 = resistance boxes

X = resistance to be measured - with X = K x R3

B1 = simple changeover-switch box

B2 = dual switch box

Bat = battery

DECADE BOXES AND SHUNTS

CAPACITANCE BOXES

STRENGTHS

Elements for mechanical and electrical assemblies
- Selection by rotary switch with contacts
- Typical accuracy: 2%

1-decade boxes
- 3 boxes with 11-position switch (including position 0)
- 2 safety terminals Ø 4mm and one earth terminal
- Dimensions: 72x72x90 mm

5-decade box
- Polystyrene and polypropylene high-accuracy capacitors with a temperature coefficient of 125 ppm/°C and a very high insulation resistance
- Output: Ø 4mm safety sockets
- Metal front panel and casing connected to a safety earth socket with foolproofing

		References
1 decade		
0.01 to 0.1 µF		P03199613A
0.1 to 1 µF		P03199612A
1 to 10 µF		P03199611A
BC 05 :	5 decades 0.1 nF to 10 µF	P01197421

CONTENTS

- 1-decade box delivered with:
- 1 black safety lead 25 cm long, Ø 4 mm male with rear connection
- BC05 box delivered with a user manual only.

ACCESSORIES / REPLACEMENT PARTS

- 1 black safety lead 25 cm long, Ø 4 mm male with rear connection _____ P01295056
- Black Ø 4 mm male jumper (x10) _____ P01101892A

IEC/EN6110-1 - 150 V CAT II - Pol 2
50 V CAT III

INDUCTANCE BOXES

		References
BL 07 :	**7 decades from 1 µH to 10 H**	P01197451

CONTENTS

- BL07 box delivered with a user manual only

100 MV SAFETY SHUNTS IN DOUBLE-INSULATED CASING

STRENGTHS

- 4-wire measurement
- Red “current” terminals
- Black “voltage” terminals

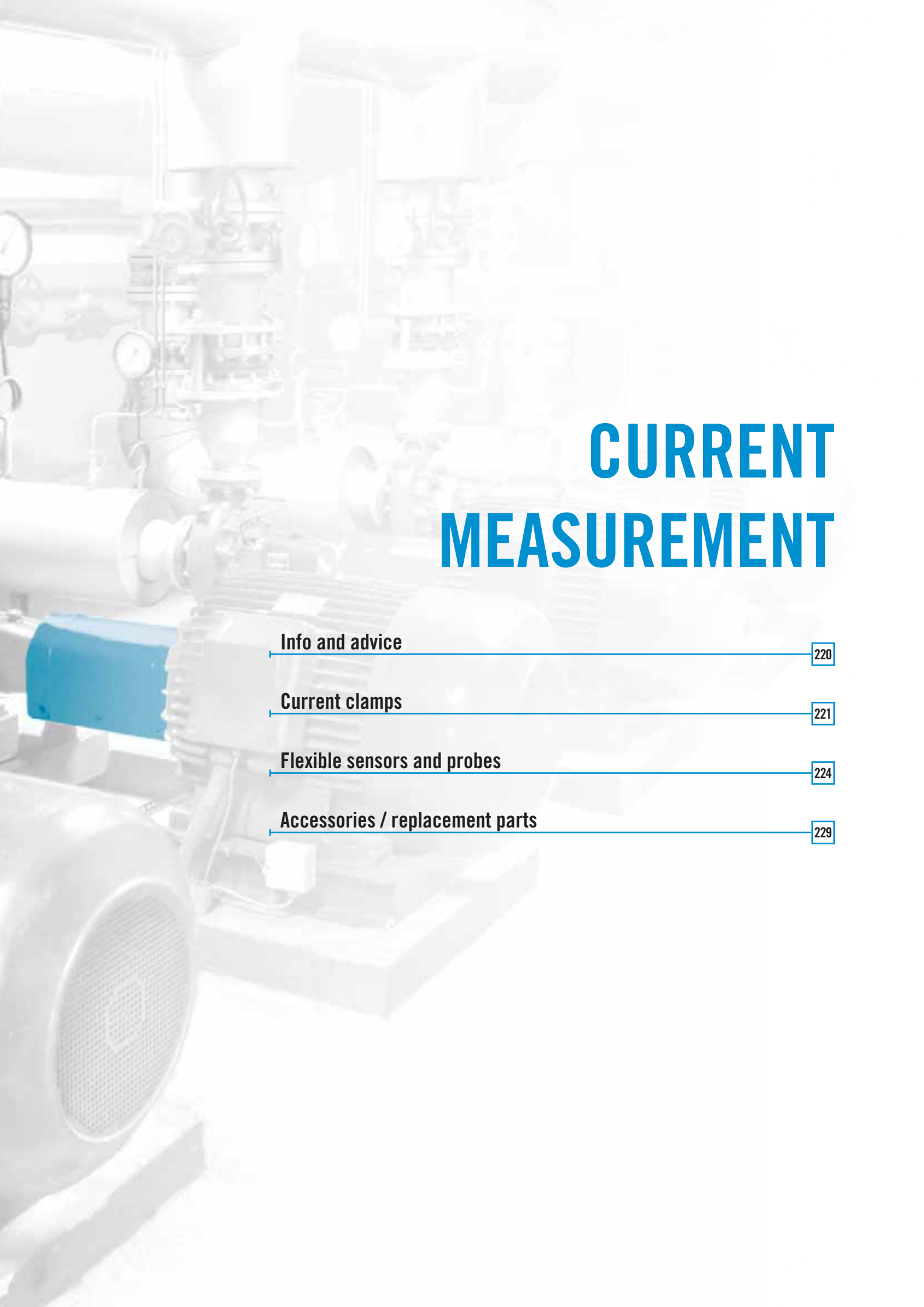
	References
1 A	P01165221
5 A	P01165222
10 A	P01165223
20 A	P01165224
30 A	P01165225

CONTENTS

- Shunt delivered with a user manual only

IEC/EN6110-1 - 150 V CAT II - Pol 2
50 V CAT III


3 A ~
30 A ~
300 A ~
3000 A ~
OFF
OL
Auto Power Off
On
3 A ~ : 1 mV ~ / mA ~
30 A ~ : 100 mV ~ / A ~
300 A ~ : 10 mV ~ / A ~
3000 A ~ : 1 mV ~ / A ~
CHAUVIN ARNOUX
MA 110
AC CURRENT PROBE
600 V CAT IV
1000 V CAT III



CURRENT MEASUREMENT

CHOOSING YOUR CURRENT CLAMP

There is a wide range of criteria for choosing a current clamp. The approach below is designed to help define your requirements and guide you naturally towards the model which best suits your application. The criteria selected are classified from 1 to 6.

To choose your clamp, we advise you to follow this logic:

- Measurement of direct or alternating current?
  ➥ AC/DC clamps table or AC clamps table
- High or low currents?
  ➥ see the "Input" column to define the appropriate families of clamps
- On small wires or large cables?
  ➥ see the diagrams at the bottom of the next page and only choose families with the shapes and dimensions required
- What instrument will it be connected to?
  ➥ see "Output / Connection" column to choose a clamp with compatible signal and connection possibilities
- What are your other criteria?
  ➥ see "Specific features" column to check that the clamp chosen fulfils your requirements perfectly

THE WIDEST RANGE OF IEC 61010-2-032 CLAMPS

Our innovation, technical expertise and determination to manufacture top-quality products that comply with standards have made Chauvin Arnoux the worldwide specialist in current clamps.

On the next pages, you will find a table presenting the clamps for measuring AC/DC current, followed by a diagram giving the clamp form with dimensions and then another table grouping a large number of models for AC current.

As a result of their specifications, certain clamps are specialized for specific applications:

- Clamps for oscilloscopes (BNC output): E3N, PAC12, PAC22, MN60, Y7N, C160, D38N and MA200
- Clamps for leakage currents: MN73, C173 and B102
- Process current clamps: K1 and K2
- Clamp for measurement on the secondary windings of current transformers: MN71

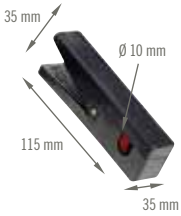
As well as these standard specialized and unspecialized models, "specific" versions can also be produced on request: please ask for details.

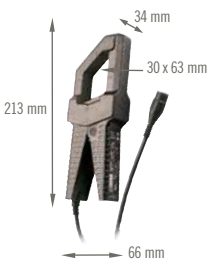
	MINI 0X	MINI 10X	MN	YN	C1XX
	page 222	page 222	page 222	page 222	page 223
For current					
Clamping Ø mm)	10	16	20	30	52
AC	■	■	■	■	■
DC					
Min	5 mA	5 mA	10 mA	1 A	1 mA
MAX	150 A	200 A	240 A	600 A	1200 A
Output					
in mA_{AC}	■	■	■	■	■
in mV_{AC}	■	■	■	■	■
in mV_{DC}	■		■	■	
in mV_{AC+DC}					
Connections					
Insulated Ø 4 mm sockets			■		■
Lead with insulated elbowed Ø 4 mm male plugs	■	■	■	■	■
Insulated Ø 4 mm plug box with standard 19 mm spacing					
Coaxial cable with insulated male BNC			■	■	■
Single-calibre	■	■	■	■	■
Multi-calibre	■		■		■
For multimeters	■		■	■	■
For oscilloscopes			■	■	■
For detecting leaks and insulation faults			■		■
For measuring power values, harmonics, etc.	■	■	■		■
For the process and the 4-20/0-20 mA measurement loop					
Power supply					
Self-contained	■	■	■	■	■
9 V battery					
Mains adapter					

CHOOSE YOUR CURRENT CLAMP

DN page 222	BXX page 222	MiniFlex® Série MA110 page 224	MiniFlex® Série MA130 page 224	MiniFlex® Série MA200 page 224	AmpFlex® Série A110 page 226	AmpFlex® Série A130 page 226	K page 223	EN page 223	MH60 page 223	PAC 1X page 223	PAC 2X page 223	
												For current
64	115	45 70 100	70	45 70 100	140 250 380	250	3,9	8	26	30	42	**Clamping Ø mm)**
■	■	■	■	■	■	■	■	■	■	■	■	**AC**
							■	■	■	■	■	**DC**
100 mA	500 µA	80 mA	500 mA	500 mA	80 mA	500 mA	100 µA	5 mA	1 mA	200 mA	200 mA	**Min**
3600 A	400 A	3000 A	3000 A	3000 A	30000 A	3000 A	4,5 A	150 A	140 A	600 A	1000 A	**MAX**
												Output
■												**in mA_{AC}**
■	■	■	■	■	■	■						**in mV_{AC}**
												in mV_{DC}
							■	■	■	■	■	**in mV_{AC+DC}**
												Connections
■												**Insulated Ø 4 mm sockets**
■	■	■			■			■		■	■	**Lead with insulated elbowed Ø 4 mm male plugs**
							■					**Insulated Ø 4 mm plug box with standard 19 mm spacing**
■			■	■		■		■	■	■	■	**Coaxial cable with insulated male BNC**
■				■					■	■	■	**Single-calibre**
■	■	■	■	■	■	■	■	■	■	■	■	**Multi-calibre**
■	■	■	■		■	■	■	■		■	■	**For multimeters**
■				■				■	■	■	■	**For oscilloscopes**
	■											**For detecting leaks and insulation faults**
■		■	■		■	■		■		■	■	**For measuring power values, harmonics, etc.**
							■					**For the process and the 4-20/0-20 mA measurement loop**
												Power supply
■	■								■			**Self-contained**
		■	■	■	■	■	■	■		■	■	**9 V battery**
		■	■	■	■	■	■	■	■	■	■	**Mains adapter**

AC CURRENT MEASUREMENT

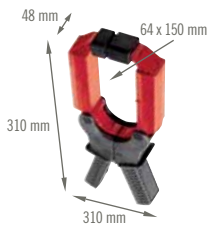


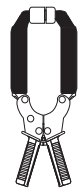


Series	Model	Input – Measurement range(1)						Output - Connections					Specific features					Reference
		Very low current	Low current	Medium current	High current	Alternating current	Direct current	Current	Voltage	Lead + safety plugs ø 4 mm	Female sockets ø 4 mm	BNC connector (coaxial)	Transformation ratio (input/output)	Output protected against overvoltages	Automatic DC zero	Power measurement (low phase shift)	Bandwidth (frequency in Hz)	Typical accuracy	
	MINI 01		2 to 150 A			■		0.15 AAC		■			1,000/1	■			48 Hz…500 Hz	≤ 2.5 %	P01105101Z
	MINI 02	50 mA to 100 A				■		0.15 AAC		■			1,000/1	■		■	48 Hz…10 kHz	≤ 1 %	P01105102Z
	MINI 03		1 to 100 A			■			0.1 VAC	■			1 A / 1 mV					≤ 2 %	P01105103Z
	MINI 05	5 mA to 10 A 1 to 100 A				■			10 VAC 0.1 VAC	■			1 mA / 1 mV 1 A / 1 mV				48 Hz…500 Hz	≤ 3 % ≤ 2 %	P01105105Z
	MINI 09		1 to 150 A			■			15 VDC(2)	■			1 A / 100 mV					≤ 4 %	P01105109Z
	MINI102	0.05 A - 200 A				■		0.2 AAC		■			1000/1	■			48 Hz .. 10 kHz	≤ 1%	P01106102
	MINI103	0.1 A - 200 A				■			0.2 V AC	■			1 A / 1 mV	■			48 Hz .. 10 kHz	≤ 1.5%	P01106103
	MN08		0.5 to 240 A			■		0.2 AAC			■		1,000/1				40 Hz…10 kHz	≤ 1 %	P01120401
	MN09		0.5 to 240 A			■		0.2 AAC		■			1,000/1					≤ 1 %	P01120402
	MN10		0.5 to 240 A			■		0.2 AAC			■		1,000/1	■				≤ 2 %	P01120403
	MN11		0.5 to 240 A			■		0.2 AAC		■			1,000/1	■				≤ 2 %	P01120404
	MN12		0.5 to 240 A			■			2 VAC		■		1 A / 10 mV					≤ 1 %	P01120405
	MN13		0.5 A to 240 A			■			2 VAC	■			1 A / 10 mV					≤ 1 %	P01120406
	MN14		0.5 A to 240 A			■			0.2 VAC		■		1 A / 1 mV					≤ 1 %	P01120416
	MN15		0.5 A to 240 A			■			0.2 VAC	■			1 A / 1 mV					≤ 1 %	P01120417
	MN21		0.1 A to 240 A			■		0.2 AAC		■			1,000/1	■				≤ 2 %	P01120418
	MN23		0.1 A to 240 A			■			2 VAC	■			1 A / 10 mV					≤ 1.5 %	P01120419
	MN38		0.1 A to 24 A 0.5 A to 240 A			■			2 VAC 2 VAC		■		1 A / 100 mV 1 A / 10 mV					≤ 1 %	P01120407
	MN39		0.1 A to 24 A 0.5 A to 240 A			■			2 VAC 2 VAC	■			1 A / 100 mV 1 A / 10 mV					≤ 1 %	P01120408
	MN60		0.1 A to 60 Apeak 0.5 A to 600 Apeak			■			6 Vpeak 6 Vpeak			■	1 A / 100 mV 1 A / 10 mV				40 Hz…40 kHz	≤ 2 % ≤ 1.5 %	P01120409
	MN71	10 mA to 12 A				■			1 VAC	■			1 A / 100 mV				40 Hz…10 kHz	≤ 1 %	P01120420
	MN73	10 mA to 2.4 A 100 mA to 240 A				■			2 VAC 2 VAC	■			1 mA / 1 mV 1 A / 10 mV					≤ 1 % ≤ 2 %	P01120421
	MN88		0.5 A to 240 A			■			20 VDC(2)		■		1 A / 100 mV					≤ 2 %	P01120410
	MN89		0.5 A to 240 A			■			20 VDC(2)	■			1 A / 100 mV					≤ 2 %	P01120415
	Y1N		4 A to 500 A			■		0.5 AAC		■			1,000/1	■			48 Hz…1 kHz	≤ 3 %	P01120001A
	Y2N		4 A to 500 A			■		0.5 AAC		■			1,000/1	■				≤ 1 %	P01120028A
	Y3N		4 A to 500 A			■		5 AAC		■			100/1					≤ 3 %	P01120029A
	Y4N		4 A to 500 A			■			0.5 VDC(2)	■			500 A / 0.5 V					≤ 1 %	P01120005A
	Y7N		1 A to 1,200 Apeak			■			1.2 Vpeak			■	1 A / 1 mV				5 Hz…10 kHz	≤ 2 %	P01120075

(1) The upper value corresponds to 120 % of the max. rated value. (2) Reshaping of AC signal by diodes.

AC/DC CURRENT MEASUREMENT



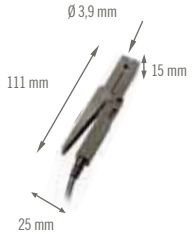


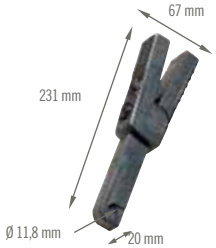
Series	Model	Input – Measurement range[1] – Very low current	Low current	Medium current	High current	Alternating current	Direct current	Output - Connections – Current	Voltage	Lead + safety plugs ø 4 mm	Female sockets ø 4 mm	BNC connector (coaxial)	Specific features – Transformation ratio (input/output)	Output protected against overvoltages	Automatic DC zero	Power measurement (low phase shift)	Bandwidth (frequency in Hz)	Typical accuracy	Reference
	C100	0.1 A to 1,200 A				■		1 AAC			■		1,000/1				30 Hz…10 kHz	≤ 0.5 %	P01120301
	C102	0.1 A to 1,200 A				■		1 AAC			■		1,000/1	■				≤ 0.5 %	P01120302
	C103	0.1 A to 1,200 A				■		1 AAC		■			1,000/1	■				≤ 0.5 %	P01120303
	C106	0.1 A to 1,200 A				■			1 VAC		■		1 A / 1 mV					≤ 0.5 %	P01120304
	C107	0.1 A to 1,200 A				■			1 VAC	■			1 A / 1 mV					≤ 0.5 %	P01120305
	C112	1 mA to 1,200 A				■		1 AAC			■		1,000/1	■		■		≤ 0.3 %	P01120314
	C113	1 mA to 1,200 A				■		1 AAC		■			1,000/1	■		■		≤ 0.3 %	P01120315
	C116	1 mA to 1,200 A				■			1 VAC		■		1 A / 1 mV			■		≤ 0.3 %	P01120316
	C117	1 mA to 1,200 A				■			1 VAC	■			1 A / 1 mV			■		≤ 0.3 %	P01120317
	C122	1 A to 1,200 A				■		5 AAC			■		1,000/5	■				≤ 1 %	P01120306
	C148		1 A to 300 A 1 A to 600 A 1 A to 1,200 A			■		5 AAC			■		250/5 500/5 1,000/5	■			48 Hz…1 kHz	≤ 2 % ≤ 1 % ≤ 1 %	P01120307
	C160		0.1 A to 30 Apeak 0.1 A to 300 Apeak 1 A to 2,000 Apeak			■			3 Vcrête 3 Vcrête 2 Vcrête			■	10 A / 1 V 100 A / 1 V 1,000 A / 1 V				10 Hz …100 kHz	≤ 3 % ≤ 2 % ≤ 1 %	P01120308
	C173		1 mA to 1.2 A 0.01 A to 12 A 0.1 A to 120 A 1 A to 1,200 A			■			1 VAC	■			1 A / 1 V 10 A / 1 V 100 A / 1 V 1,000 A / 1 V				10 Hz…3 kHz	≤ 0.7 % ≤ 0.5 % ≤ 0.3 % ≤ 0.2 %	P01120309
	B102	500 µA to 4 A 0.5 A to 400 A				■			4 VAC 0,4 VAC	■			1 mA / 1 mV 1 A / 1 mV				10 Hz…1 kHz	≤ 0.5 % ≤ 0.35 %	P01120083
	D30N			1 A to 3,600 A		■		1 AAC			■		3,000/1	■		■	30 Hz…5 kHz	≤ 0.5 %	P01120049A
	D30CN			1 A to 3,600 A		■		1 AAC		■			3,000/1	■		■		≤ 0.5 %	P01120064
	D31N		1 A to 600 A 1 A to 1,200 A 1 A to 1,800 A			■		1 AAC			■		500/1 1,000/1 1,500/1	■			30 Hz…1,5 kHz	≤ 3 % ≤ 1 % ≤ 0.5 %	P01120050A
	D32N		1 A to 1,200 A 1 A to 2,400 A 1 A to 3,600 A			■		1 AAC			■		1,000/1 2,000/1 3,000/1	■		■	30 Hz…1 kHz	≤ 1 % ≤ 0,5 % ≤ 0,5 %	P01120051A
	D33N			1 A to 3,600 A		■		5 AAC			■		3,000/5				30 Hz…5 kHz	≤ 1 %	P01120052A
	D34N		1 A to 600 A 1 A to 1,200 A 1 A to 1,800 A			■		5 AAC			■		500/5 1,000/5 1,500/5				30 Hz…1,5 kHz	≤ 3 % ≤ 1 % ≤ 0.5 %	P01120053A
	D35N		1 A to 1,200 A 1 A to 2,400 A 1 A to 3,600 A			■		5 AAC			■		1,000/5 2,000/5 3,000/5			■		≤ 1 % ≤ 0.5 % ≤ 0.5 %	P01120054A
	D36N			1 A to 3,600 A		■		3 AAC			■		3,000/3	■		■		≤ 0.5 %	P01120055A
	D37N	0.1 A to 36 A 1 A to 360 A 1 A to 3,600 A				■			3 VAC		■		30 A/3 V 300 A/3 V 3,000 A/3 V				30 Hz…5 kHz	≤ 2 %	P01120056A
	D38N		1 A to 90 Apeak 1 A to 900 Apeak 1 A to 9,000 Apeak			■			0,9 V crête			■	1 A / 10 mV 1 A / 1 mV 1 A / 0.1 mV				30 Hz…50 kHz	≤ 2 %	P01120057A

(1) The upper value corresponds to 120 % of the max. rated value. (2) Reshaping of AC signal by diodes.

AC CURRENT MEASUREMENT

Series	Model	Input – Measurement range(1) – Very low current	Low current	Medium current	High current	Alternating current	Direct current	Output - Connections – Current	Voltage	Lead + safety plugs ø 4 mm	Female sockets ø 4 mm	BNC connector (coaxial)	Specific features – Transformation ratio (input/output)	Output protected against overvoltages	Automatic DC zero	Power measurement (low phase shift)	Bandwidth (frequency in Hz)	Typical accuracy	Reference
	K1	1 mA to 4.5 Aᴅᴄ 1 mA to 3 A RMS 1 mA to 4.5 Aᴘᴇᴀᴋ							4.5 Vᴀᴄ 3 Vʀᴍs 4.5 Vpeak	(2)			1 mA / 1 mV				DC…2 kHz	≤ 1 %	P01120067A
	K2	100 µA to 450 mAᴅᴄ 100 µA to 300 mARMS 100 µA to 450 mAᴘᴇᴀᴋ							4.5 Vᴀᴄ 3 Vʀᴍs 4.5 Vpeak	(2)			1 mA / 10 mV				DC…1,5 kHz	≤ 1 %	P01120074A
	E1N		0.05 A to 2 Aᴅᴄ 0.05 A to 1.5 Aᴀᴄ 0.5 A to 150 Aᴀᴄ/ᴅᴄ						2 Vᴅᴄ 1.5 Vᴀᴄ 150 mV AC/DC				1 A / 1 V 1 A / 1 mV				DC… 2 kHz DC… 8 kHz	≤ 2 % ≤ 1,5%	P01120030A
	E3N	0.05 A to 10 Apeak 0.05 A to 10 Aᴅᴄ 1 A to 100 Apeak 1 A to 100 Aᴅᴄ							1 Vpeak or DC				1 A / 100 mV 1 A / 10 mV				DC…100 kHz	≤ 3 % ≤ 4 %	P01120043A
	E6N	5 mA to 2 Aᴅᴄ 5 mA to 1.5 Aᴀᴄ 20 mA to 80 Aᴀᴄ/ᴅᴄ							2 Vᴅᴄ 1.5 Vᴀᴄ 0.8 Vᴀᴄ/ᴅᴄ				1 A / 1 V 1 A / 10 mV				DC… 2 kHz DC… 8 kHz	≤ 2 % ≤ 4 %	P01120040A
	MH60	0.01 A - 140A peak							1.4 V peak				10 mV/A				DC .. 1 MHz	≤ 1.5%	P01120612





(1) The upper value corresponds to 120 % of the max. rated value. (2) Cable + electronic unit with Ø 4 mm safety plugs and 19 mm spacing for the K Series

AC/DC CURRENT MEASUREMENT

		Input							Output - Connections					Specific features						
		Measurement range[1]																		
Series	Model	Very low current	Low current	Medium current	High current	Alternating current	Direct current		Current	Voltage	Lead + safety plugs ø 4 mm	Female sockets ø 4 mm	BNC connector (coaxial)	Transformation ratio (input/output)	Output protected against overvoltages	Automatic DC zero	Power measurement (low phase shift)	Bandwidth (frequency in Hz)	Typical accuracy	Reference
	PAC10		0.5 A to 400 Aac 0.5 A to 600 Adc							600 mVac/dc				1 A / 1 mV				DC…5 kHz	≤ 2%	P01120070
	PAC11		0.2 A to 40 Aac 0.4 A to 60 Adc 0.5 A to 400 Aac 0.5 A to 600 Adc							600 mVac/dc				1 A / 10 mV 1 A / 1 mV				DC…10 kHz	≤ 1.5 % ≤ 2%	P01120068
	PAC12		0.2 A to 60 Apeak 0.4 A to 60 Adc 0.5 A to 600 Apeak 0.5 A to 600 Adc							600 mVpeak or DC				1 A / 10 mV 1 A / 1 mV				DC…10 kHz	≤ 1.5 % ≤ 2%	P01120072
	PAC20		0.5 A to 1,000 Aac 0.5 A to 1,400 Adc							1.4 V AC/DC				1 A / 1 mV				DC…5 kHz	≤ 2%	P01120071
	PAC21		0.2 A to 100 Aac 0.4 A to 150 Adc 0.5 A to 1,000 Aac 0.5 A to 1,400 Adc							1.4 Vac/dc				1 A / 10 mV 1 A / 1 mV				DC…10 kHz	≤ 1.5 % ≤ 2.5 %	P01120069
	PAC22		0.2 A to 150 Apeak 0.4 A to 150 Adc 0.5 A to 1,400 Apeak 0.5 A to 1,400 Adc							1.5 Vpeak or DC 1.4 Vpeak or DC				1 A / 10 mV 1 A / 1 mV				DC…10 kHz	≤ 1.5 % ≤ 2.5 %	P01120073

(1) The upper value corresponds to 120 % of the max. rated value. (2) Cable + electronic unit with Ø 4 mm safety plugs and 19 mm spacing for the K Series

MiniFlex® FLEXIBLE PROBES FOR AC CURRENT

MA110 - MA130 - MA200

600 V CAT IV | 1000 V CAT III | 80 mA | 3 kAAC | 4 calibres | IP 67

STRENGTHS

- Flexible sensor comprising an active part (Rogowski coil) and a unit containing electronics
- For multimeters, loggers, oscilloscopes, etc.
- No magnetic saturation constraints: excellent linearity, low phase shift, wide dynamic range for measurement
- Flexibility of the sensors for easier clamping of the conductor to be measured
- Compact instruments which are easy to position in residential or industrial electrical cabinets
- Click system for opening and closing the core even when handling with safety gloves

ADDITIONAL INFO

MA110 model

- Measurement from 80 mA
- Can be connected to the AC voltage input (mVAC / VAC) of any multimeter or measuring instrument equipped with Ø 4 mm female banana plugs
- Can be powered by batteries or via a standard external power supply
- Equipped with an automatic power-off system which can be deactivated at start-up to perform long-duration measurement campaigns
- Possesses 3 LEDs (green, yellow and orange) indicating, respectively, the power-supply status, status of the automatic power-off function and measurement capacity overruns

Three-phase MA130 model

- Can be connected to the AC voltage inputs (mVAC / VAC) of any power analyser, logger or measuring instrument equipped with BNC plugs

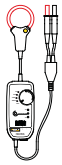
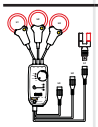
Three-phase MA200 model

- Equipped with a BNC output and can be connected to all types of oscilloscopes
- Offers high bandwidth
- Particularly suitable for viewing transient signals, command signals, tripping currents of thyristors or the output signal from an electronic power supply

CONTENTS

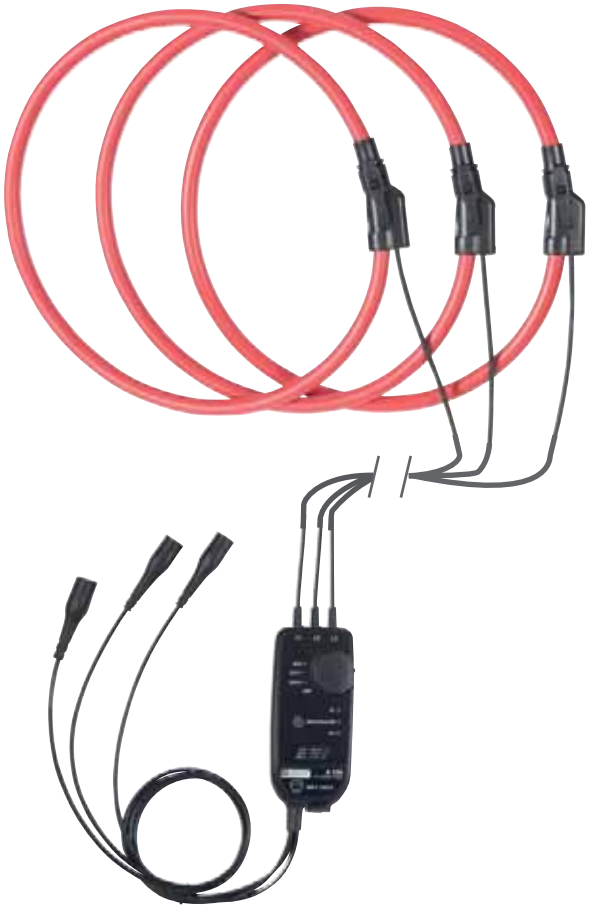
- MA110 delivered with 2 x 1.5V LR6 alkaline batteries, 1 safety datasheet, 1 verification certificate
- MA130 with 2 x 1.5V LR6 alkaline batteries, 1 safety datasheet, 1 verification certificate, 1 set of cloured rings for cable foolproofing/ identification, 3 female BNC /Ø 4 mm male plug adapters
- MA200 delivered with one 9 V battery, 1 verification certificate

MiniFlex® FLEXIBLE PROBES FOR AC CURRENT

Series	Model	Input – Measurement range[1] – Very low current	Input – Measurement range[1] – Low current	Input – Measurement range[1] – Medium current	Input – Measurement range[1] – High current	Input – Alternating current	Input – Direct current	Output - Connections – Current	Output - Connections – Voltage	Output - Connections – Lead + safety plugs ø 4 mm	Output - Connections – Female sockets ø 4 mm	Output - Connections – BNC connector (coaxial)	Specific features – Transformation ratio (input/output)	Specific features – Output protected against overvoltages	Specific features – Automatic DC zero	Specific features – Power measurement (low phase shift)	Specific features – Bandwidth (frequency in Hz)	Specific features – Typical accuracy	Reference
	MA110 3-30-300-3000/3 (17 cm / Ø 4.5 cm)	0.08 A - 3 A 0.5 A .. 30 A 0.5 A .. 300 A 0.5 A .. 3,000 A				■			3 VAC	(2)			1 V/A 100 mV/A 10 mV/A 1 mV/A			■	10 Hz .. 10 kHz 10 Hz .. 20 kHz 10 Hz .. 20 kHz 10 Hz .. 20 kHz	≤ 1%	P01120660
	MA110 3-30-300-3000/3 (25 cm / Ø 7 cm)	0.08 A - 3 A 0.5 A .. 30 A 0.5 A .. 300 A 0.5 A .. 3,000 A				■			3 VAC	(2)			1 V/A 100 mV/A 10 mV/A 1 mV/A			■	10 Hz .. 10 kHz 10 Hz .. 20 kHz 10 Hz .. 20 kHz 10 Hz .. 20 kHz	≤ 1%	P01120661
	MA110 3-30-300-3000/3 (35 cm / Ø 10 cm)	0.08 A - 3 A 0.5 A .. 30 A 0.5 A .. 300 A 0.5 A .. 3,000 A				■			3 VAC	(2)			1 V/A 100 mV/A 10 mV/A 1 mV/A			■	10 Hz .. 10 kHz 10 Hz .. 20 kHz 10 Hz .. 20 kHz 10 Hz .. 20 kHz	≤ 1%	P01120662
	MA130 30-300-3000/3 (25 cm / Ø 7 cm)	0.5 A .. 30 A 0.5 A .. 300 A 0.5 A .. 3,000 A				■			3 VAC			■	100 mV/A 10 mV/A 1 mV/A			■	10 Hz .. 20 kHz 10 Hz .. 20 kHz 10 Hz .. 20 kHz	≤ 1%	P01120663
	MA200 30-300/3 (17 cm / Ø 4.5 cm)		0.5 A…45 APEAK 0.5 A…450 APEAK			■			4.5 VPEAK			■	100 mV/A 10 mV/A			■	5 Hz…1 MHz	≤ 1% + 0.3 A	P01120570
	MA200 30-300/3 (25 cm / Ø 7 cm)		0.5 A…45 APEAK 0.5 A…450 APEAK			■			4.5 VPEAK			■	100 mV/A 10 mV/A			■		≤ 1% + 0.3 A	P01120571
	MA200 3000 /3 (35 cm / Ø 10 cm)		0.5 A…4,500 APEAK			■			4.5 VPEAK			■	1 mV/A			■		≤ 1% + 0.3 A	P01120572

(1) The upper value corresponds to 120 % of the max. rated value. (2) Cable + electronic unit with Ø 4 mm safety plugs and 19 mm spacing.

AmpFlex® FLEXIBLE PROBES FOR AC CURRENT



A110 - A130

1000 V CAT IV | 80 mA | 30 kAAC | IP 67 | 4 calibres

STRENGTHS

- Flexible sensor comprising an active part (Rogowski coil) and a unit containing electronics
- For multimeters, loggers, oscilloscopes, etc.
- No magnetic saturation constraints: excellent linearity, low phase shift, wide dynamic range for measurement
- Flexibility of the sensors for easier clamping of the conductor to be measured
- Compact instruments which are easy to position in residential or industrial electrical cabinets
- Click system for opening and closing the core even when handling with safety gloves

CONTENTS

- A110 delivered with 2 x 1.5V LR6 alkaline batteries, 1 safety datasheet, 1 verification certificate
- A130 delivered with 2 x 1.5V LR6 batteries, 1 datasheet, 1 verification certificate, 1 set of coloured rings for cable foolproofing/ identification, 3 female BNC/Ø 4 mm male plug adapters

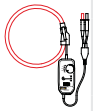
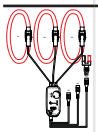
ADDITIONAL INFO

A110 model

- Measures from 80 mA
- Can be connected to the AC voltage input (mVAC / VAC) of any multimeter or measuring instrument equipped with Ø 4 mm female banana plugs
- Can be powered by batteries or via a standard external power supply
- Equipped with an automatic power-off system which can be deactivated at start-up to perform long-duration measurement campaigns
- Possesses 3 LEDs (green, yellow and orange) indicating, respectively, the power-supply status, status of the automatic power-off function and measurement capacity overruns

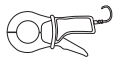
Three-phase A130 model

- Can be connected to the AC voltage inputs (mVAC / VAC) of any power analyser, logger or measuring instrument equipped with BNC plugs

		Input							Output - Connections					Specific features						
		Measurement range(1)																		
Series	Model	Very low current	Low current	Medium current	High current	Alternating current	Direct current		Current	Voltage	Lead + safety plugs ø 4 mm	Female sockets ø 4 mm	BNC connector (coaxial)	Transformation ratio (input/output)	Output protected against overvoltages	Automatic DC zero	Power measurement (low phase shift)	Bandwidth (frequency in Hz)	Typical accuracy	Reference
	A110 3-30-300-3,000/3 (45 cm / Ø 14 cm)	0.08 A - 3 A 0.5 A .. 30 A 0.5 A .. 300 A 0.5 A .. 3,000 A				■				3 VAC	(2)			1 V/A 100 mV/A 10 mV/A 1 mV/A			■	10 Hz .. 10 kHz 10 Hz .. 20 kHz 10 Hz .. 20 kHz 10 Hz .. 20 kHz	≤ 1%	P01120630
	A110 3-30-300-3,000/3 (80 cm / Ø 25 cm)	0.08 A - 3 A 0.5 A .. 30 A 0.5 A .. 300 A 0.5 A .. 3,000 A				■				3 VAC	(2)			1 V/A 100 mV/A 10 mV/A 1 mV/A			■	10 Hz .. 10 kHz 10 Hz .. 20 kHz 10 Hz .. 20 kHz 10 Hz .. 20 kHz	≤ 1%	P01120631
	A110 30-300-3000-30,000/3 (120 cm / Ø 38 cm)	0.5 A - 30 A 0.5 A .. 300 A 0.5 A .. 3,000 A 0.5 A .. 30,000 A				■				3 VAC	(2)			100 mV/A 10 mV/A 1 mV/A 0.1 mV/A			■	10 Hz .. 5 kHz 10 Hz .. 20 kHz 10 Hz .. 20 kHz 10 Hz .. 20 kHz	≤ 1%	P01120632
	A130 30-300-3,000/3 (80 cm / Ø 25 cm)	0.5 A .. 30 A 0.5 A .. 300 A 0.5 A .. 3,000 A				■				3 VAC			■	100 mV/A 10 mV/A 1 mV/A			■	10 Hz .. 20 kHz 10 Hz .. 20 kHz 10 Hz .. 20 kHz	≤ 1%	P01120633

(1) The upper value corresponds to 120 % of the max. rated value. (2) Cable + electronic unit with Ø 4 mm safety plugs and 19 mm spacing.

SPECIFIC SENSORS FOR DEDICATED APPLICATIONS

Series	Model	Input – Measurement range(1) – Very low current	Low current	Medium current	High current	Alternating current	Direct current	Output - Connections – Current	Voltage	Lead + safety plugs ø 4 mm	Female sockets ø 4 mm	Female sockets ø 4 mm	Specific features – Transformation ratio (input/output)	Output protected against overvoltages	Automatic DC zero	Power measurement (low phase shift)	Bandwidth (frequency in Hz)	Typical accuracy	Reference
LEAKAGE CURRENT MEASUREMENT																			
	MN73	10mA to 2.4 A 100 mA to 240 A				■			2 VAC 2 VAC	■			1 A / 1,000 mV 1 A / 10 mV				40 Hz to 10 kHz	≤ 1 % ≤ 2 %	P01120421
	C173	1 mA to 1.2 A 0.01 A to 12 A 0.1 A to 120 A 1 A to 1,200 A				■			1 VAC	■			1 A / 1 V 10 A / 1 V 100 A / 1 V 1,000 A / 1 V				10 Hz to 3 kHz	≤ 0.7 % ≤ 0.3 % ≤ 0.5 % ≤ 0.2 %	P01120309
	B102	500 µA to 4 A 0.5 A to 400 A				■			4 VAC 0.4 VAC	■			1 mA / 1 mV 1 A / 1 mV	■			10 Hz to 1 kHz	≤ 0.5 % ≤ 0.35 %	P01120083
PROCESS CURRENT MEASUREMENT																			
	K1	1 mA to 4.5 ADC 1 mA to 3 ARMS 1 mA to 4.5 APEAK				■	(2)		4.5 VDC 3 VRMS 4.5 VPEAK	■			1 mA / 1 mV				DC to 2 kHz	≤ 1 %	P01120067A
	K2	100 µA to 450 mADC 100 µA to 300 mARMS 100 µA to 450 mAPEAK				■	(2)		4.5 VDC 3 VRMS 4.5 VPEAK	■			1 mA / 10 mV				DC to 1.5 kHz	≤ 1 %	P01120074A
MEASUREMENT ON CURRENT TRANSFORMER SECONDARY																			
	MN71	10 mA to 12 A				■			1 VAC	■			1 A / 100 mV				40 Hz to 10 kHz	≤ 1 %	P01120420

(1) The upper value corresponds to 120 % of the max. rated value. (2) Cable + electronic unit with Ø 4 mm safety plugs and 19 mm spacing.

Please contact us for models with specific sensitivities (mV/A) and/or lengths. We can also supply bare sensors for integration into assemblies including the signal-processing electronics.

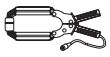
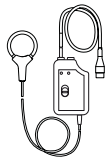
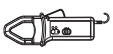
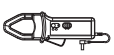
CURRENT PROBES FOR OSCILLOSCOPES

ADDITIONAL INFO

- View the currents in total safety without opening the circuit!
- Capture the signal simply by clamping the conductor

600 V CAT III

IEC 61010-2-32

Series	Model	Input – Measurement range(1): Very low current	Low current	Medium current	High current	Alternating current	Direct current	Output - Connections: Current	Voltage	Lead + safety plugs ø 4 mm	Female sockets ø 4 mm	BNC connector (coaxial)	Specific features: Transformation ratio (input/output)	Output protected against overvoltages	Automatic DC zero	Power measurement (low phase shift)	Bandwidth (frequency in Hz)	Typical accuracy	Reference
MEASUREMENT ON OSCILLOSCOPE																			
	MN60		0.1 A to 60 Apeak 0.5 A to 600 Apeak						6 Vpeak				1 A / 100 mV 1 A / 10 mV				40 Hz to 40 kHz	≤ 2 % ≤ 1.5 %	P01120409
	Y7N		1 A to 1,200 Apeak						1.2 Vpeak				1 mA / 1 mV				5 Hz to 10 kHz	≤ 2 %	P01120075
	C160		0.1 A to 300 Apeak 1 A to 300 Apeak 1 A to 2,000 Apeak						3 Vpeak 3 Vpeak 2 Vpeak				10 A / 1 V 100 A / 1 V 1,000 A / 1 V				10 Hz to 100 kHz	≤ 3 % ≤ 2 % ≤ 1 %	P01120308
	D38N		1 A to 90 Apeak 1 A to 900 Apeak 1 A to 9,000 Apeak						0.9 Vpeak				1 A / 10 V 1 A / 1 mV 1 A / 0.1 mV				30 Hz to 50 kHz	≤ 2 %	P01120057A
	MA200 30-300/3 (17 cm)		0.5 A…45 Apeak 0.5 A…450 Apeak						4.5 Vpeak				100 mV/A 10 mVA				5 Hz…1 MHz	≤ 1 % + 0.3 A	P01120570
	MA200 30-300/3 (25 cm)		0.5 A…45 Apeak						4.5 Vpeak				100 mV/A 10 mVA					≤ 1 % + 0.3 A	P01120571
	MA200 3000/3 (35 cm)		5 A…4,500 Apeak						4.5 Vpeak				1 mV/A					≤ 1 % + 0.3 A	P01120572
	E3N	0.05 A to 10 Apeak 1 A to 100 Apeak							1 Vpeak				1 A / 10 mV 1 A / 1 mV				DC to 10 kHz	≤ 3 % ≤ 4 %	P01120043A P01120047*
	PAC12		0.2 A to 60 Apeak 0.4 A to 60 Adc 0.5 A to 600 Apeak 0.5 A to 600 Adc						600 mVpeak ou DC				1 A / 10 mV 1 A / 1 mV				DC to 100 kHz	≤ 1.5 % ≤ 2 %	P01120072
	PAC22		0.2 A to 150 Apeak 0.4 A to 150 Adc 0.5 A to 1,400 Apeak 0.5 A to 1,400 Adc						1.5 Vpeak 1.4 Vpeak				1 A / 10 mV 1 A / 1 mV				DC to 10 kHz	≤ 1.5 % ≤ 2.5 %	P01120073

(1) The upper value corresponds to 120 % of the max. rated value.

*Reference for E3N + power supply > P01120047

ACCESSORIES / REPLACEMENT PARTS

FOR CURRENT SENSORS

MiniFlex® MA110/MA130 and AmpFlex® A110/A130

- Mains adapter / µUSB-B cable — P01651023
  - 110 V-240 V 50/60 Hz
  - Female USB type A 5 V 1A
  - Charging and connection cable
  - Male USB type A - male USB type Micro-B
  - 1.80 m

MH60

- Replacement rechargeable battery — P01296049Z

MN73 / C173 / B102

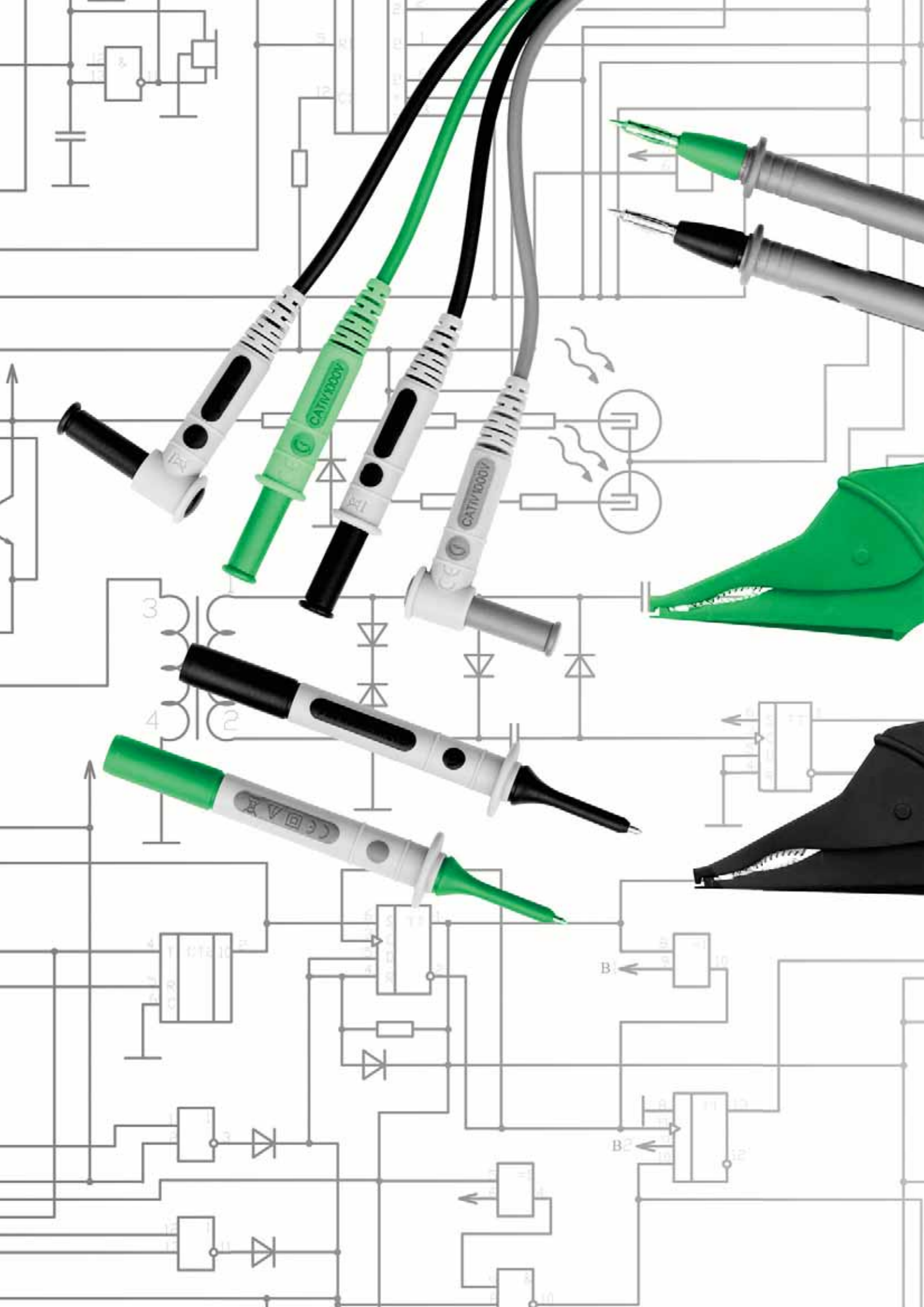
- AN1 artificial neutral box — P01197201

OTHER CURRENT SENSORS

- Mains adapter for E clamp — P01101965
- Mains adapter for K clamp — P01101966
- Mains adapter for PAC clamp — P01101967
- Mains adapter for AmpFlex® A100 — P01101968
- Mains adapter for MiniFlex® MA100 — P01102986
- Mains adapter for MiniFlex® MA200 — P01102987

FIND ALL OUR ACCESSORIES ON PAGE 230

AN1 artificial neutral box


CAT IV 600V
CAT IV 600V

ACCESSORIES

PROTECTION, STORAGE & TRANSPORT

SOFT CASES


E01


E02


E03


E04


E05


E06


E07


E08

BAGS


S01


S02


S03


S04


S05


S06


S07


S08


S09


S10

SHOULDER BAGS


S20


S21


S22


S23

HARD CASES


M01-M02-M03


M04-M05-M06


M07

MOUNTING SUPPORT


F01

WATERPROOF SITE CASES


B01


B02

PROTECTION, STORAGE AND TRANSPORT

Photo	L x H x W	Reference	Additional information
		SOFT CASE	
E01	110 x 220 x 45 mm	P01298065Z	
E02	125 x 210 x120 mm	P01298049	Specific to one instrument or product range. See pages 234
E03	125 x 265 x 60 mm	P01298043Z	
E04	180 x 75 x 45 mm	P01298012	
E05	185 x 135 x 85 mm	P01298046	Specific to one instrument or product range. See pages 234
E06	190 x 250 x 60 mm	P01298055	
E07	250 x 190 x 80 mm	P01298051	
E08	70 x 185 x 30 mm	P01298007	
		BAG	
S01	120 x 200 x 60 mm	P01298074	Compatible with MultiFix
S02	120 x 245 x 60 mm	P01298075	Compatible with MultiFix
S03	120 x 320 x 60 mm	P01298076	Compatible with MultiFix
S04	150 x 230 x (40+40) mm	P01298032	
S05	165 x 250 x 60 mm	P06239502	
S06	180 x 220 x 75 mm	P01298036	
S07	225 x 270 x 70 mm	P01298033	
S08	240 x 140 x 130 mm	P01298006	
S09	355 x 255 x 235 mm	P01298056	
S10	360 x 200 x 140 + 360 x 160 x 35 mm	P01298061A	
		SHOULDER BAG	
S20	330 x 240 x 240 mm	P01298078	
S21	380 x 280 x 200 mm	P01298066	All-terrain waterproof bottom. 2 compartments and space for documents. Supplied with shoulder strap
S22	575 x 320 x (200 + x +x) mm	P01298067	
S23		P01298031	
		HARD CASE	
M01	270 x 195 x 65 mm	P01298071	Equipped with foam inserts. Delivered with strap and keys
M02	285 x 210 x 80 mm	P01298037	Specific to one instrument or product range. See pages 234
M03	285 x 210 x 80 mm	P01298037A	Specific to one instrument or product range. See pages 234
M04	320 x 255 x 75 mm	P01298004	Equipped with foam inserts. Delivered with strap and keys
M05	320 x 255 x 75 mm	P01298011	Specific to one instrument or product range. See pages 234
M06	320 x 255 x 75 mm	P01298040	Specific to one instrument or product range. See pages 234
M07	440 x 310 x 135 mm	P01298072	Equipped with foam inserts. Delivered with strap and keys
		WATERPROOF CASE	
B01	272 x 248 x 130 mm	P01298068	Equipped with foam inserts
B02	272 x 248 x 182 mm	P01298069	Equipped with foam inserts

MULTIFIX MOUNTING ACCESSORY

P01102100Z

When used with the compatible soft cases and bags, this helps you to transport and mount the measuring instruments for greater user comfort.

REELING BOX

P01102149

To make sure that your cables are never tangled. Can be used to store up to 3 m of cable (1 x 3 m / 2 x 1.5 m). Built-in magnet for easy mounting on any metal surface.

CHOOSE THE RIGHT PROTECTION FOR YOUR INSTRUMENT

	Mounting acc.	Soft case								Bag					Bag			
Photo no.	F01	E01	E02	E03	E04	E05	E06	E07	E08	S01	S02	S03	S04	S05	S06	S07	S08	S09
Code	P01102100Z	P01298065Z	P01298049	P01298043Z	P01298012 P01298012Z	P01298046	P01298055	P01298051	P01298007	P01298074	P01298075	P01298076	P01298032	P06239502	P01298036	P01298033	P01298006	P01298056
AL834																		
AN1 artificial neutral box																	■	
C.A 1052																		
C.A 1621, C.A 1623, C.A 1631											■							
C.A 1725, C.A 1727																		
C.A 1864, C.A 1866																■		
C.A 1877, C.A 1878, C.A 1882											■							
C.A 40															■			
C.A 401, C.A 402, C.A 403, C.A 404, C.A 405, C.A 406, C.A 406 KIT																		
C.A 41, C.A 43															■			
C.A 5001, C.A 5003, C.A 5005														■	■	■		
C.A 5005																		
C.A 5011															■	■		
C.A 5030																■		
C.A 5110, C.A 5120																■		
C.A 5205G/10G/20G/30G/40G/60G		■													■	■		
C.A 5231, C.A 5233	■									■								
C.A 5271, C.A 5273, C.A 5275, C.A 5277	■											■						
C.A 5287, C.A 5289	■										■							
C.A 6030			■															
C.A 61, C.A 65																		
C.A 6113, C.A 6116, C.A 6116N, C.A 6117																		■
C.A 6115N													■					
C.A 6121																		
C.A 6160																		
C.A 6240, C.A 6250, C.A 6255																		
C.A 6410, C.A 6411, C.A 6412, C.A 6413, C.A 6415																		
C.A 6416, C.A 6417																		
C.A 6421, C.A 6423																		
C.A 6425																		
C.A 6454, C.A 6456			■															
C.A 6460, C.A 6462																		
C.A 6501, C.A 6503																	■	
C.A 6505																		
C.A 6511, C.A 6513																		
C.A 6521, C.A 6523, C.A 6525			■														■	
C.A 6522/24/26, C.A 6532/34/36			■															
C.A 6531, C.A 6533			■															
C.A 6541, C.A 6543								■										■
C.A 6545, C.A 6547																		

CHOOSE THE RIGHT PROTECTION FOR YOUR INSTRUMENT

Sheath	Shockproof sheath			Hard case							Bag				Strap		
				M02	M03	M04	M05	M06	M02	M07	S20	S21	S22	S23			Photo no.
P01298015	P01298009B	P01298016	P03298504	P01298037	P01298037A	P01298004	P01298011	P01298040	P01298080	P01298072	P01298078	P01298066	P01298067	P01298031	P01298057	P01298005	Code
																	AL834
																■	AN1 artificial neutral box
										■							C.A 1052
																	C.A 1621, C.A 1623, C.A 1631
						■											C.A 1725, C.A 1727
																	C.A 1864, C.A 1866
																	C.A 1877, C.A 1878, C.A 1882
																	C.A 40
		■															C.A 401, C.A 402, C.A 403, C.A 404, C.A 405, C.A 406, C.A 406 KIT
	■					■											C.A 41, C.A 43
																	C.A 5001, C.A 5003, C.A 5005
					■												C.A 5005
				■													C.A 5011
		■															C.A 5030
		■															C.A 5110, C.A 5120
■																	C.A 5205G/10G/20G/30G/40G/60G
																	C.A 5231, C.A 5233
																	C.A 5271, C.A 5273, C.A 5275, C.A 5277
																	C.A 5287, C.A 5289
												■					C.A 6030
	■																C.A 61, C.A 65
															■		C.A 6113, C.A 6116, C.A 6116N, C.A 6117
														■			C.A 6115N
														■			C.A 6121
												■					C.A 6160
												■					C.A 6240, C.A 6250, C.A 6255
							■										C.A 6410, C.A 6411, C.A 6412, C.A 6413, C.A 6415
									■								C.A 6416, C.A 6417
												■	■			■	C.A 6421, C.A 6423
																■	C.A 6425
												■	■				C.A 6454, C.A 6456
												■	■				C.A 6460, C.A 6462
																	C.A 6501, C.A 6503
												■					C.A 6505
		■															C.A 6511, C.A 6513
												■					C.A 6521, C.A 6523, C.A 6525
																	C.A 6522/24/26, C.A 6532/34/36
																	C.A 6531, C.A 6533
																	C.A 6541, C.A 6543
												■					C.A 6545, C.A 6547

CHOOSE THE RIGHT PROTECTION FOR YOUR INSTRUMENT

	Mounting acc.	Soft case								Bag					Bag			
Photo no.	F01	E01	E02	E03	E04	E05	E06	E07	E08	S01	S02	S03	S04	S05	S06	S07	S08	S09
Code	P01102100Z	P01298065Z	P01298049	P01298043Z	P01298012 P01298012Z	P01298046	P01298055	P01298051	P01298007	P01298074	P01298075	P01298076	P01298032	P06239502	P01298036	P01298033	P01298006	P01298056
C.A 6550, C.A 6555																		
C.A 702, C.A 703		■																
C.A 704					■													
C.A 730, C.A 735		■			■													
C.A 745		■			■				■									
C.A 740, C.A 760, C.A 740N, C.A 740N IP2X, C.A 760N, C.A 760N IP2X		■			■					■								
C.A 742, C.A 742 IP2X, C.A 762, C.A 762 IP2X		■			■					■								
C.A 745N, C.A 755, C.A 757										■								
C.A 771, C.A 771 IP2X, C.A 773, C.A 773 IP2X												■						
C.A 8220, C.A 8230			■															
C.A 8331, C.A 8332, C.A 8333, C.A 8334, C.A 8335, C.A 8336							■	■										■
C.A 8352																		■
C.A 8435																		■
C.A 871, C.A 879																■		
CADI 2																		
CDA 104					■													
DTR 8510																		
F01, F03, F05, F07, F09		■								■								
F11N, F13N, F15		■		■							■							
F201, F203, F205											■							
F21				■														
F3N				■					■									
F401, F403, F405, F407												■						
F601, F603, F605, F607												■						
F62, F65		■																
FTV200																		
L101, L102, L111, L261, L322, L481, L562, L642, ML912												■						
L452	■																	
MA400D, MA4000D	■									■								
MAN'X 015, MAN'X 02S																		
MAN'X TOP, MAN'X TOP PLUS																		
MAX 2000, MAX 3000															■	■		
PAC10, PAC11, PAC12																		
PAC20, PAC21, PAC22																		
PEL102, PEL103	■																	
PEL105																		
RW501, RW511, RW521, RW5012						■												
SIMPLE LOGGER ML914, AL834																		
TK 1000					■													
TP 850					■													

CHOOSE THE RIGHT PROTECTION FOR YOUR INSTRUMENT

Sheath	Shockproof sheath			Hard case							Bag				Strap		Photo no.
				M02	M03	M04	M05	M06	M02	M07	S20	S21	S22	S23			
P01298015	P01298009B	P01298016	P03298504	P01298037	P01298037A	P01298004	P01298011	P01298040	P01298080	P01298072	P01298078	P01298066	P01298067	P01298031	P01298057	P01298005	Code
												■					C.A 6550, C.A 6555
																	C.A 702, C.A 703
																	C.A 704
																	C.A 730, C.A 735
																	C.A 745
																	C.A 740, C.A 760, C.A 740N, C.A 740N IP2X, C.A 760N, C.A 760N IP2X
												■					C.A 742, C.A 742 IP2X, C.A 762, C.A 762 IP2X
																	C.A 745N, C.A 755, C.A 757
																	C.A 771, C.A 771 IP2X, C.A 773, C.A 773 IP2X
																	C.A 8220, C.A 8230
															■		C.A 8331, C.A 8332, C.A 8333, C.A 8334, C.A 8335, C.A 8336
																	C.A 8352
																	C.A 8435
																	C.A 871, C.A 879
			■														CADI 2
																	CDA 104
												■					DTR 8510
																	F01, F03, F05, F07, F09
																	F11N, F13N, F15
																	F201, F203, F205
																	F21
																	F3N
																	F401, F403, F405, F407
																	F601, F603, F605, F607
																	F62, F65
												■					FTV200
																	L101, L102, L111, L261, L322, L481, L562, L642, ML912
																	L452
																	MA400D, MA4000D
			■														MAN'X 015, MAN'X 02S
			■														MAN'X TOP, MAN'X TOP PLUS
			■														MAX 2000, MAX 3000
								■									PAC10, PAC11, PAC12
								■									PAC20, PAC21, PAC22
											■						PEL102, PEL103
																	PEL105
																	RW501, RW511, RW521, RW5012
											■						SIMPLE LOGGER ML914, AL834
						■											TK 1000
						■											TP 850

Ø 4 MM BANANA CONNECTION TECHNOLOGY

MEASUREMENT LEADS

Moulded

Model	Description
	**Set of 2 red/black moulded PVC leads** **P01295450Z** Insulated straight male plug Ø 4 mm Insulated straight male plug Ø 4 mm • 15 A • 1.5 m • 1000 V CAT IV
	**Set of 2 red/black moulded silicone leads** **P01295452Z** Insulated straight male plug Ø 4 mm Insulated straight male plug Ø 4 mm • 15 A • 1.5 m • 1000 V CAT IV

Model	Description
	**Set of 2 red/black moulded PVC leads** **P01295451Z** Insulated straight male plug Ø 4 mm Insulated elbowed male plug Ø 4 mm • 15 A • 1.5 m • 1000 V CAT IV
	**Set of 2 red/black moulded PVC leads** **P01295453Z** Insulated straight male plug Ø 4 mm Insulated elbowed male plug Ø 4 mm • 15 A • 1.5 m • 1000 V CAT IV

Standards

Model	Description
	**Set of 2 red/black PVC leads** **P01295288Z** Insulated straight male plug Ø 4 mm Insulated straight male plug Ø 4 mm • 15 A • 1.5 m • 600 V CAT IV / 1000 V CAT III
	**Set of 2 red/black PVC leads** **P01295290Z** Insulated straight male plug Ø 4 mm with rear connection. Insulated straight male plug Ø 4 mm with rear connection • 20 A • 2 m • 600 V CAT III

Model	Description
	**Set of 2 red/black PVC leads** **P01295289Z** Insulated straight male plug Ø 4 mm Insulated elbowed male plug Ø 4 mm • 15 A • 1.5 m • 600 V CAT IV / 1000 V CAT III

LEADS WITH TEST PROBES

For CAT IV & CAT III installations

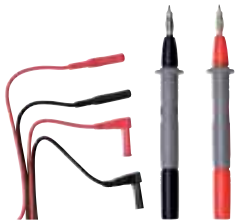
Model	Description
	**Set of 2 red/black PVC test-probe leads** **P01295455Z** Insulated straight male plug Ø 4 mm • 15 A • 1.5 m • 600 V CAT IV / 1000 V CAT III
	**Set of 2 IP2X PVC leads for multimeters** **P01295461Z** Complies with NF C 18-510 and IEC 61010-031+A1:2008 • IP2X test probe • Insulated elbowed male plug Ø 4 mm • 15 A • 1,5 m • 600 V CAT IV

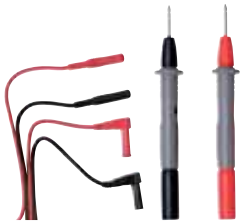
Model	Description
	**Set of 2 red/black PVC test-probe leads** **P01295456Z** Insulated elbowed male plug Ø 4 mm • 15 A • 1.5 m • 600 V CAT IV / 1000 V CAT III

Ø 4 MM BANANA CONNECTION TECHNOLOGY

LEADS WITH TEST PROBES

For CAT II & lower installations

Model	Description
	**Measurement leads + test probes kit** P01295475Z comprising: **Set of 2 red/black PVC leads** Insulated straight male plug Ø 4 mm Insulated elbowed male plug Ø 4 mm • 15 A • 1,5 m • 600 V CAT IV / 1000 V CAT III **+ Set of 2 moulded test probes Ø 4 mm** • Female plug Ø 4 mm • CAT II 300 V

Model	Description
	**Measurement leads + test probes kit** P01295474Z comprising: **Set of 2 red/black PVC leads** Insulated straight male plug Ø 4 mm Insulated elbowed male plug Ø 4 mm •15 A •1.5 m •600 V CAT IV / 1000 V CAT III **+ Set of 2 moulded test probes Ø 2 mm** •Female plug Ø 4 mm •CAT II 300 V

REMOVABLE TEST PROBES

For CAT IV & CAT III installations

Model	Description
	**Set of 2 red/black moulded test probes** P01295454Z • Female plug Ø 4 mm • 15 A • CAT IV / CAT III 1000 V

Model	Description
	**Set of 2 red / black moulded Ø 2 test probes** P01295491Z • Ø 4 mm female plug • 10 A • CAT IV 1000 V

For CAT II & lower installations

Model	Description
	**Set of 2 moulded test probes Ø 4 mm** P01295458Z • Female plug Ø 4 mm • 15 A • CAT II 300 V

Model	Description
	**Set of 2 moulded test probes Ø 2 mm** P01295460Z • Female plug Ø 4 mm • 15 A • CAT II 300 V

PRODUCT-SPECIFIC ACCESSORIES

FOR MULTIMETERS OR TESTERS WITH + TERMINAL ON TOP

Model	Description
	**Red test probe Ø 4 mm** **P01103060Z** removable for tester or DMM Use as "hands-free" test probe • Male plug Ø 4 mm • 600 V CAT IV

FOR C.A 745 TESTER OR REMOTE-CONTROL PROBE

Model	Description
	**Red test probe Ø 4 mm** **P01103061Z** removable with locking pin For tester or remote-control probe • Male plug Ø 4 mm • 600 V CAT IV

FOR C.A 704, C.A 740 & C.A 760 VOLTAGE ABSENCE TESTERS

Model	Description
	**Removable red test probe** **P01103059Z** • Female plug Ø 4 mm • 600 V CAT IV **Black test-probe lead** **P01295464Z** Insulated elbowed female plug Ø 4 mm Length 0.85 m • 600 V CAT IV

FOR C.A 745N, C.A 755 AND C.A 757

Model	Description
	**Set of red/black test probes** **P01102152Z** • CAT III/IV
	**Set of red/black test probes** **P01102153Z** • Ø 2 mm • CAT II
	**Set of red/black test probes** **P01102154Z** • Ø 4 mm • CAT II

FOR ALL VOLTAGE ABSENCE TESTERS, C.A 74X/XN SERIES / C.A 76X/XN SERIES

Model	Description
	**Set of 2 PVC IP2X leads** **P01295463Z** for C.A 760 and C.A 704 VATs Complies with NF C 18-510 and IEC 61010-031+A1:2008 • IP2X test probe Ø 2 mm • Elbowed female plug Ø 4 mm • 15 A • 1.5 m • 600 V CAT IV
	**Red removable test probe** **P01102008Z** • Female plug Ø 4 mm • IEC 61243-3 **Black test-probe lead** **P01102009Z** Insulated elbowed female plug Ø 4 mm • Length 0.85 m • IEC 61243-3

Model	Description
	**Set of 2 IP2X leads for C.A 740N and C.A 760N VATs** **P01295462Z** • IP2X test probe Ø 4 mm • Elbowed female plug Ø 4 mm • 15 A • NF C 18-510 / IEC 61243-3 1000 V • 1.5 m • 0.25 m & 0.85 m : **P01295285Z**
	**Set of IP2X accessories for VAT** **P01102121Z** • 2 x IP2X Ø 4 mm test probes • 1 point-point cable, L = 1.10 m
	**C.A 751 measurement adapter** **P01101997Z** • For 2P+E sockets

FOR C.A 771 & C.A 773 VOLTAGE ABSENCE TESTERS

Model	Description
	**Set of 2 red/black IP2X test probes Ø 4 mm** **P01102128Z** Female plug Ø 4 mm IEC 61423-3 1000 V
	**Set of 2 red/black IP2X test probes** **P01102127Z** Female plug Ø 4 mm 1000 V CAT IV
	**Set of 2 red/black test probes** **P01102123Z** Female plug Ø 4 mm 1000 V CAT IV

Model	Description
	**Set of 2 red/black test probes Ø 2 mm with crystal cap** **P01102124Z** Female plug Ø 4 mm IEC 61423-3 1000 V
	**Set of 2 red/black test probes Ø 4 mm** **P01102125Z** Female plug Ø 4 mm IEC 61423-3 1000 V
	**Crystal protective cap for test probe** **P01102126Z**

FOR CAT IV & CAT III INSTALLATIONS

Model	Description
	**Set of 2 red/black crocodile clips** P01295457Z • 15 A • 1000 V CAT IV
	**Set of leads and measuring accessories for electricians** P01295459Z • 2 x 1000 V CAT IV moulded test probes • 2 x 1.5 m 1000 V CAT IV red/black moulded leads with straight male plug – elbowed male plug • 2 x red/black 1000 V CAT IV crocodile clips • 2 x 300 V CAT II moulded test probes Ø 4 mm
	**Kit of 2 PVC leads + 2 test probes Ø4 mm** P01295475Z • Straight male plug Ø4 mm - Elbowed male plug Ø4 mm • Probe Ø4 mm - Female plug Ø 4mm • 300 V CAT II
	**Set of 2 red/black magnetized test probes** P01103058Z For voltage measurement only Ø test probe: 6.6 mm – Elbowed female plug Ø 4 mm • 1000 V CAT III / 600 V CAT IV

Model	Description
	**Set of 2 red/black crocodile wire grips** P01102053Z • 20 A • 1000 V CAT III
	**Set of 2 adapters** P01102101Z Insulated female BNC plug–Red/black insulated male plugs Ø 4 mm with 19 mm spacing • 600 V CAT III
	**Kit of 2 PVC leads + 2 test probes Ø2 mm** P01295474Z • Straight male plug Ø4 mm - Elbowed male plug Ø4 mm • Probe Ø2 mm - Female plug Ø 4mm • 300 V CAT II
	**PVC lead** AG-1066Z Insulated male BNC plug –Insulated straight male banana plugs Ø 4 mm (red/black) with rear connection • 1 m • 500 V CAT III

FOR CAT II & LOWER INSTALLATIONS

Model	Description
	**Set of 3 measurement adapters for housing** P01102114Z 2 red/black insulated straight male plugs Ø4 mm • E27 screw socket • B22 bayonet socket • 2-pole mains socket (P/N) • 250 V CAT II
	**Current lead equipped with a French 2P+E mains socket** P03295509 • For inserting an ammeter in series in total safety • For measuring the current with a current clamp without having to remove the outer sheath of the power supply cable
	**Set of 2 red/black insulation-piercing clips** P01102055Z • 30 V AC, 60 V DC
	**Set of 2 adapters** P01101846 Red/black insulated male BNC – female sockets Ø 4 mm with 19 mm spacing • 500 V CAT I, 150 V CAT III

Model	Description
	**C.A 753: Measurement adapter for 2P+E socket** P01191748Z • Suitable for European and Schuko sockets • Can be used for measurements on the P (Phase), N (Neutral) and PE (Earth) conductors in total safety • Guarantees mechanical and electrical contact with all test probes (Ø2, Ø4, IP2x, etc.) • Shows the presence of a P-N voltage (> 200 V) and indicates the phase position • IEC 61010 230 V CAT II
	**Measurement lead for French and German 2P+E mains sockets** P06239307 For direct measurement on a mains socket Quick implementation and reliable connections
	**CMS clamp** HX0064 Copper-gold-plated beryllium contacts Output via male plugs Ø 4 mm • 1.2 m • SELV
	**Set of 2 adapters** P01101847 Red/black insulated BNC male – male sockets Ø 4 mm with 19 mm spacing • 500 V CAT I, 150 V CAT III

OTHER ACCESSORIES

FOR CAT II & LOWER INSTALLATIONS

Modèle	Description
	**SHT40KV high-voltage probe for multimeters** P01102097 Maximum rated voltage: 40 kV_{DC}, 28 kV_{RMS} or 40 kV_{PEAK} (50/60 Hz) Division ratio (input/output : 1 kV / 1 V For multimeters with 10 MΩ input impedance

EXTERNAL POWER SUPPLY & MAINS POWER PACK

Model	Description
	**Set of 4 x 1.5 V LR06 rechargeable batteries with low self-discharge plus charger** HX0053
	**Set of 4 x 1.5 V LR06 rechargeable batteries with low self-discharge** HX0051B

Model	Description
	**230 V / µUSB mains adapter – B** P01651023 • 110 – 240 V 50/60 Hz • Female USB type A, 5 V 1 A Charging and connection cable • Male USB type A – Male USB type µ-B • 1.8 m

TEMPERATURE AND ROTATION SPEED MEASUREMENT PROBES

Model	Description
	**C.A 1711** P01102082 Tachometer probe - Pulse output 1,1 V / 0 / rev. - 2 insulated banana plugs Ø 4 mm - Measurement range: 6 to 120,000 RPM - IP 53
	**C.A 801** P01652401Z Temperature adapter for multimeters - -40 °C to +1,000 °C - 1 mVDC / °C (or /°F) Delivered with 1 K sensor and 1 battery

Model	Description
	**C.A 1871** P016516102 Infrared sensor Compatible with any multimeter equipped with an mV range - Measurement range: -30 °C to +550 °C - Output: 1 mV/1 °C - Distance/spot ratio: 8/1 - Accuracy: ± 2 %
	**C.A 803** P01652411Z Temperature adapter for multimeters - 2 measurement channels - -40 °C to +1,000 °C - 1 mVdc / °C (or /°F) - θ1 - θ2 differential measurement Delivered with 2 K sensors and 1 battery

ADAPTERS FOR TEMPERATURE MEASUREMENT SENSORS

Modèle	Description
	**Set of 2 safety thermocouple adapters for multimeters** P01102106Z Female thermocouple plug – insulated red/black male plugs Ø 4 mm with 19 mm spacing
	**Safety adapter and K-sensor temperature probe** P01102107Z For multimeters and multimeter clamps equipped with a temperature measurement calibre with 19 mm-spaced banana inputs - Measurement range from -50 °C to +350 °C - Sensor length: approx. 100 cm

Modèle	Description
	**Pt100/Pt1000 sensor adapter for multimeters** HX0091 Female Pt100/Pt1000 plug – Red/black insulated male plugs Ø 4 mm

FUSES

Product	Standardized dimensions (mm)	Amperage	Reference
C.A 10	6 x 32	8 A	P01297013
C.A 1621	5 x 20	125 mA	P01297099
C.A 1631	5 x 20	125 mA	P01297099
C.A 401	6 x 32	1 A	P03297507
C.A 401	6 x 32	10 A	P03297510
C.A 4010	6 x 32	0.315 A	P03297509
C.A 4010	6 x 32	16 A	P03297505
C.A 4020	6 x 32	0.315 A	P03297509
C.A 4020	6 x 32	16 A	P03297505
C.A 403	6 x 32	0.315 A	P03297509
C.A 404	6 x 32	1.25 A	P01297015
C.A 405	6 x 32	6.3 A	P01297016
C.A 406	5 x 20	0.16 A	P03297508
C.A 406	6 x 32	3.15 A	P01100726
C.A 4300	6 x 32	1 A	P03297507
C.A 4300	6 x 32	10 A	P03297510
C.A 47	5 x 20	1 A	P01297075
C.A 47	5 x 20	4 A	P01297076
C.A 47	5 x 20	0.315 A	P01297074
C.A 5000	6 x 32	5 A	P01297035
C.A 5000	6 x 32	0.5 A	P01297028
C.A 5003	6 x 32	1.6 A	P01297036
C.A 5003	10 x 38	16 A	P01297037
C.A 5005	6 x 32	1 A	P01297039
C.A 5005	6 x 32	10 A	P01297038
C.A 5011	6 x 32	1 A	P01297039
C.A 5011	6 x 32	10 A	P01297038
C.A 5110	6 x 32	1 A	P03297507
C.A 5120	6 x 32	1 A	P03297507
C.A 5120	6 x 32	10 A	P03297510
C.A 5210	10 x 38	12 A	P01297021
C.A 5210	6 x 32	0.4 A	P01297020
C.A 5210G	10 x 38	12 A	P01297021
C.A 5210G	6 x 32	0.4 A	P01297020
C.A 5220	10 x 38	12 A	P01297021
C.A 5220	6 x 32	0.4 A	P01297020
C.A 5220G	10 x 38	12 A	P01297021
C.A 5220G	6 x 32	0.4 A	P01297020
C.A 5230G	10 x 38	12 A	P01297021
C.A 5230G	6 x 32	0.5 A	P01297028
C.A 5240G	10 x 38	12 A	P01297021
C.A 5233	6 x 32	10 A	AT0070
C.A 5240G	6 x 32	0.5 A	P01297028
C.A 5260G	6 x 32	0.1 A	P01297012
C.A 5271	10 x 38	10 A	P01297096
C.A 5273	10 x 38	10 A	P01297096
C.A 5275	6 x 32	0.63 A	P01297098
C.A 5275	10 x 38	10 A	P01297096
C.A 5277	6 x 32	0.63 A	P01297098
C.A 5277	10 x 38	10 A	P01297096
C.A 5287	10 x 38	11 A	P01297092
C.A 5287	10 x 38	0.44 A	P01297094
C.A 5289	10 x 38	11 A	P01297092
C.A 5289	10 x 38	0.44 A	P01297094
C.A 6114 / 15N	6 x 32	3.15 A	P01297080

Product	Standardized dimensions (mm)	Amperage	Reference
C.A 6115N	5 x 20	2 A	P01297026
C.A 6115N	6 x 32	3.15 A	P01297080
C.A 6121	5 x 20	1 A	P01297031
C.A 6121	5 x 20	4 A	P01297032
C.A 6121	6 x 32	0.2 A	P01297033
C.A 6121	10 x 38	20 A	P01297030
C.A 6160	6 x 32	16 A	P01297086
C.A 6160	5 x 20	2.5 A	P01297085
C.A 6240	6 x 32	12.5 A	P01297091
C.A 6250	5 x 20	2 A	P01297090
C.A 6250	6 x 32	16 A	P01297089
C.A 6255	5 x 20	2 A	P01297090
C.A 6255	6 x 32	16 A	P01297089
C.A 6421	6 x 32	0.1 A	P01297012
C.A 6423	6 x 32	0.1 A	P01297012
C.A 6425	6 x 32	0.1 A	P01297012
C.A 6460	6 x 32	0.1 A	P01297012
C.A 6462	6 x 32	0.1 A	P01297012
C.A 6470	5 x 20	0.63 A	AT0094
C.A 6472	5 x 20	0.63 A	AT0094
C.A 6501	6 x 32	0.2 A	P01297095
C.A 6503	6 x 32	0.2 A	P01297095
C.A 6511	6 x 32	1.6 A	P01297022
C.A 6513	6 x 32	1.6 A	P01297022
C.A 6521	6 x 32	0.63 A	P01297078
C.A 6523	6 x 32	0.63 A	P01297078
C.A 6525	6 x 32	0.63 A	P01297078
C.A 6531	6 x 32	0.63 A	P01297078
C.A 6541	6 x 32	0.1 A	P01297072
C.A 6541	8 x 50	2.5 A	P01297071
C.A 6543	6 x 32	0.1 A	P01297072
C.A 6543	8 x 50	2.5 A	P01297071
C.A 6545	5 x 20	0.1 A	P03297514
C.A 6547	5 x 20	0.1 A	P03297514
C.A 6549	5 x 20	0.1 A	P03297514
CADI 2	5 x 20	12.5 A	P01297004
CADI 2	5 x 20	3.15 A	P01297002
CAMPUS	5 x 20	0.16 A	P03297508
CAMPUS	6 x 32	3.15 A	P01100726
CdA 651	6 x 32	3.15 A	P01100726
CdA 651M	6 x 32	3.15 A	P01100726
CdA 778N	6 x 32	2 A	P03297513
CdA 778N	6 x 32	10 A	P03297502
CdA 791	8 x 32	6 A	P03100801
CdA 800	5 x 20	0.1 A	P03100201
CdA LAB'X 9000	5 x 20	1.6 A	P03297501
CdA100-A	6 x 32	0.4 A	P01297020
CONPAMATIC 2	10 x 38	10 A	P01100731
CONPAMATIC 2	6 x 32	3.15 A	P01100726
DETEC 220	5 x 20	0.315 A	P01297014
DTR 8500	5 x 20	1 A	P01297031
DTR 8500	5 x 20	4 A	P01297041
DTR 8500	5 x 20	0.5 A	P01297042
IMEG 500	5 x 20	0.2 A	P02297302
IMEG 500N	5 x 20	0.2 A	P02297302

FUSES

Product	Standardized dimensions (mm)	Amperage	Reference
ISOL 1000N G4	6 x 32	0.315 A	P01101724
ISOL 5000N G4	6 x 32	0.315 A	P01101724
LOCAT 110	5 x 20	0.1 A	P03297514
LOCAT 220	5 x 20	0.1 A	P03297514
MANIP W1	6 x 32	1.25 A	P01297015
MANIP Z10	5 x 20	0.16 A	P03297508
MAN'X 015	6 x 32	1.6 A	P01297017
MAN'X 02S	6 x 32	2 A	P03297513
MAN'X 02S	10 x 38	10 A	P01100731
MAN'X 04B	8 x 32	10 A	P03100830
MAN'X 04B	5 x 20	1.6 A	P03297501
MAN'X 102	5 x 20	0.160 A	P03297508
MAN'X 102	6 x 32	3.15 A	P01100726
MAN'X 500	6 x 32	2 A	P03297513
MAN'X 500	6 x 32	16 A	P03297505
MAN'X 520A	6 x 32	0.315 A	P03297509
MAN'X 520A	6 x 32	16 A	P03297505
MAN'X TOP	6 x 32	0.315 A	P03297509
MAN'X TOP	6 x 32	16 A	P03297505
MAN'X TOP PLUS	6 x 32	0.315 A	P03297509
MAN'X TOP PLUS	6 x 32	16 A	P03297505
MAX 2000	6 x 32	1 A	P03297510
MAX 2000	6 x 32	10 A	P03297510
MAX 3000	6 x 32	1 A	P03297510
MAX 3000	6 x 32	10 A	P03297510
MH600	5 x 20	0.16 A	P01297043
MH600	5 x 20	0.310 A	P01297045
MH600	5 x 20	0.315 A	P01297074
RO600	5 x 20	2 A	P01297069
RO600	5 x 20	0.25 A	P01297070
Tellurohm C.A 2	6 x 32	0.1 A	P01297012
C.A 5001	6 x 32	0.5 A	P01297028
C.A 5001	6 x 32	5 A	P01297035
C.A 6522	6 x 32	0.63 A	P01297078
C.A 6524	6 x 32	0.63 A	P01297078
C.A 6526	6 x 32	0.63 A	P01297078
C.A 6532	6 x 32	0.63 A	P01297078
C.A 6534	6 x 32	0.63 A	P01297078
C.A 6536	6 x 32	0.63 A	P01297078
C.A 6471	5 x 20	0.63 A	AT0094

NOTES

BY FUNCTIONS

BY PRODUCT NAME

BY REFERENCE

BY REFERENCE

NOTES

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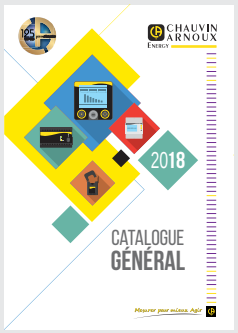

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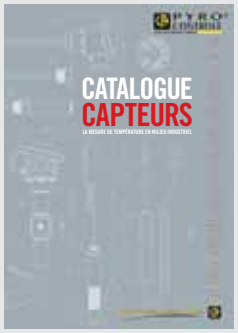

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