CHAUVIN® ARNOUX
CHAUVIN ARNOUX GROUP

Test & Measurement

Hand-held, field, and laboratory test and measurement instruments

2013
2014

Black and yellow

An amazing story!

1895 reflection galvanometer

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.

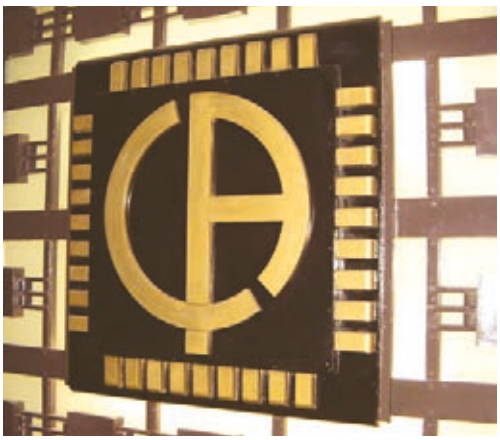
It is often said that at the root of knowledge is language, or that the origin of an innovation was an idea,... yet it is the individual, the person, who is really the source of knowledge and discoveries. This also applies to electricity, which was not invented in the 19th century, but discovered in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

The calibration potentiometer dating from 1900 was used with a standard battery and a galvanometer like the one shown above.

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 black, in its measurement instruments, Chauvin Arnoux reproduced these colours in its first corporate logo in 1927.



Logo on the company's former main gate

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.

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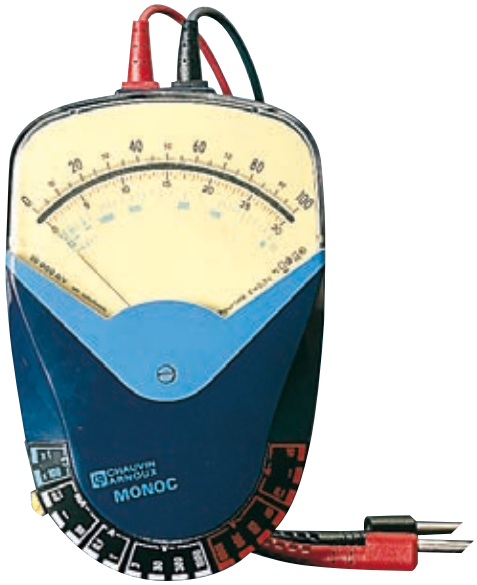

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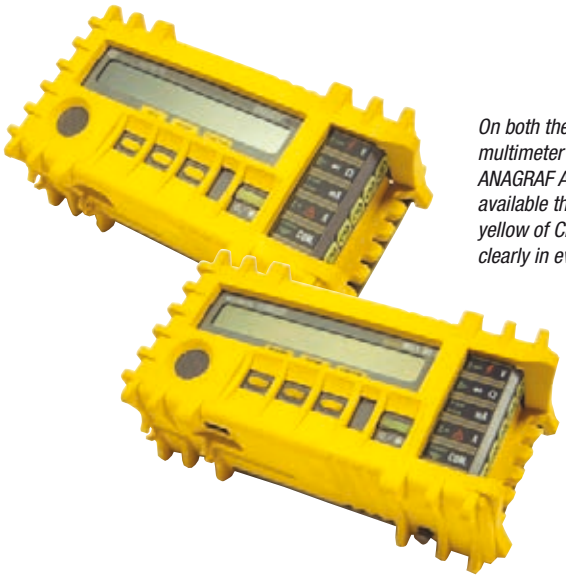


On both the French MICA multimeter in 1985 and the ANAGRAF American version available the same year, the yellow of Chauvin Arnoux is clearly in evidence.

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.

Polypince CdA 600 (1982)

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

MX 51

CHAUVIN® ARNOUX
CHAUVIN ARNOUX GROUP

Chauvin Arnoux is an industrial Group with a comprehensive product offering for the measurement sector

The Group's three areas of expertise (handheld, thermal process and electrical instruments) are marketed respectively by the three French companies **Chauvin Arnoux, Pyrocontrole and Enerdis.**

90 % of our products are entirely designed and manufactured in one of the Group's **six Research and development centres**. Chauvin Arnoux has 4 production sites in France, 1 in the USA and 1 in Italy. We offer a range of more than **5,000 product references** every year to meet the needs of self-employed electricians, local authorities and major accounts in industry.

Integrated service!

To accompany this comprehensive offering, the Group also has **12 agencies** under the Manumesure brand to provide top-quality all-round after-sales service (repair, metrological verification, calibration, pollution measurement, etc.) in France. This expertise is also provided internationally via our ten local subsidiaries.

Designed and produced in-house

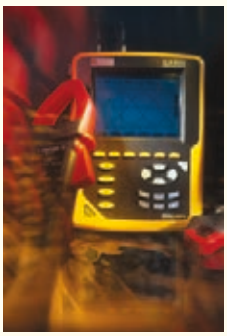
Every year, the Group invests **nearly 10% of its sales revenue in Research and Development** to maintain its technological leadership and its reputation for design and constant innovation. Designed in the R&D Centres in France, Austria and the USA, the Group's measurement instruments are **manufactured in Chauvin Arnoux's production plants.** The plastic and metal parts are manufactured at Vire, while the printed circuit boards are etched at Villedieu. Assembly, conditioning, storage and shipment worldwide are all handled on the site at Reux (Pont-l'Évêque) in Normandy

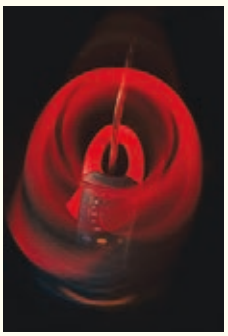
Eco Conception

Several years ago, the Group launched a civic-minded initiative with the purpose of reconciling protection of the environment with the economic imperatives. The Chauvin Arnoux Group's **Eco Conception label** (eco-design in English) highlights the company's commitment to recycling and recovery of product materials from the design phase onwards.n.

An international presence

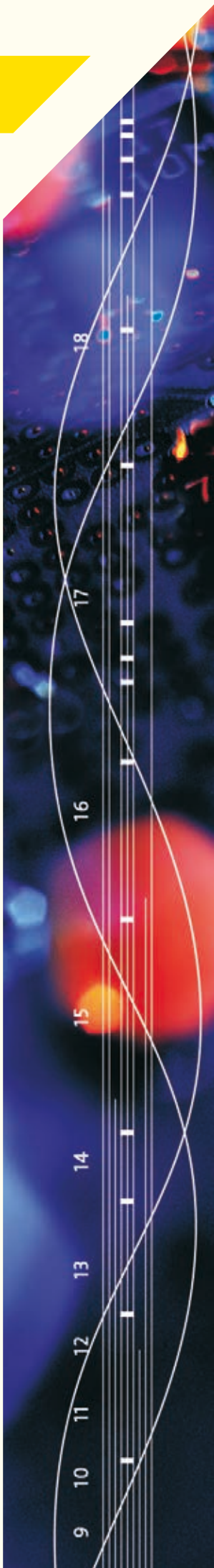
10 subsidiaries in Europe, the **United States**, China and the Middle East, backed by export sales teams, support the Chauvin Arnoux Group's international development, enabling it to market its Chauvin Arnoux, Metrix, Multimetrix, Enerdis, Pyro-Contrôle, **AEMC** and **AMRA** brands on all five continents.





All the Chauvin Arnoux Group's sites have received ISO 9001 and ISO 14001 certification.

Visit our web site at www.chauvin-arnoux.com



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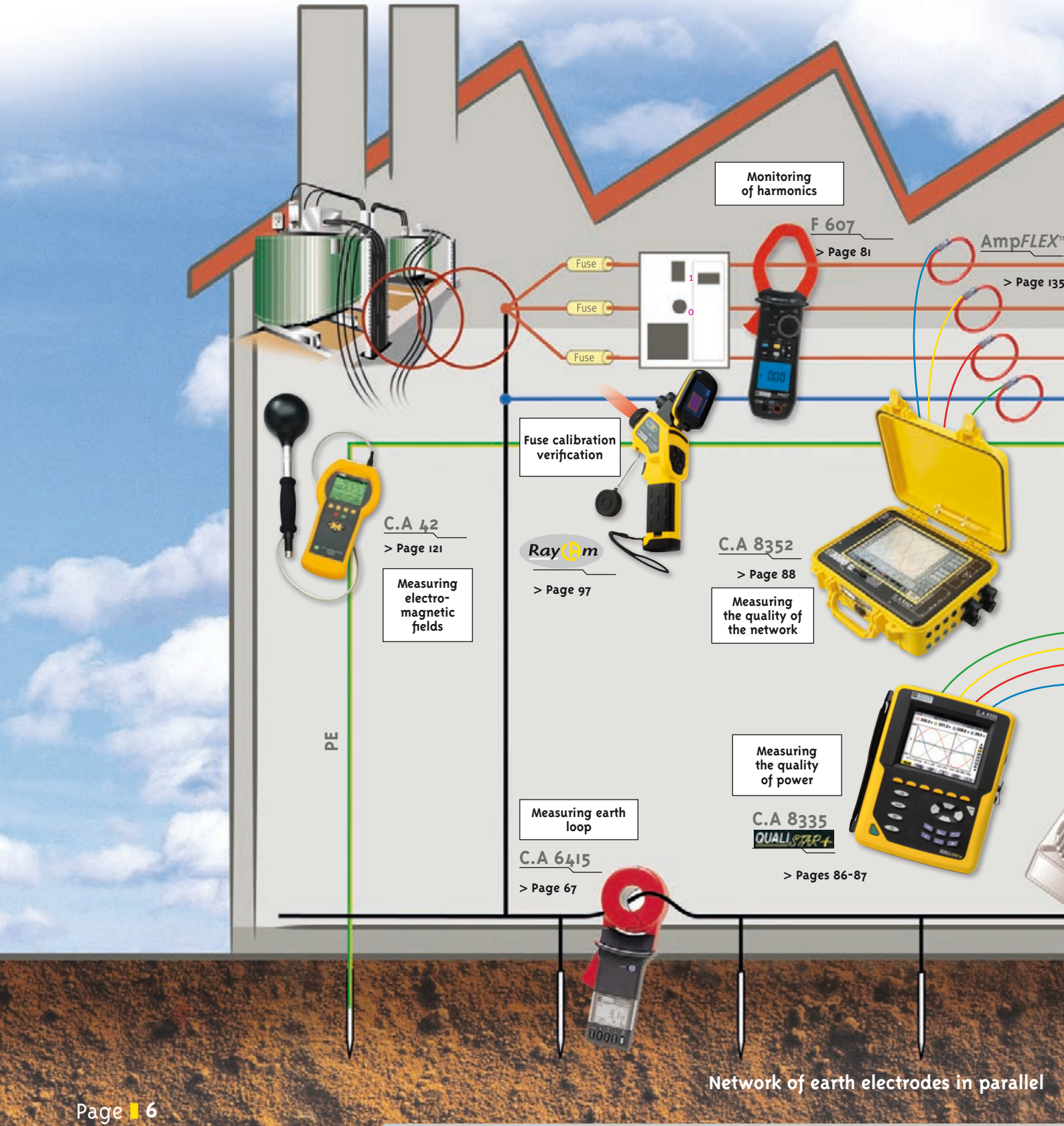
Industrial or tertiary applications

You use our products for certain applications.
Learn about some of their other applications here.

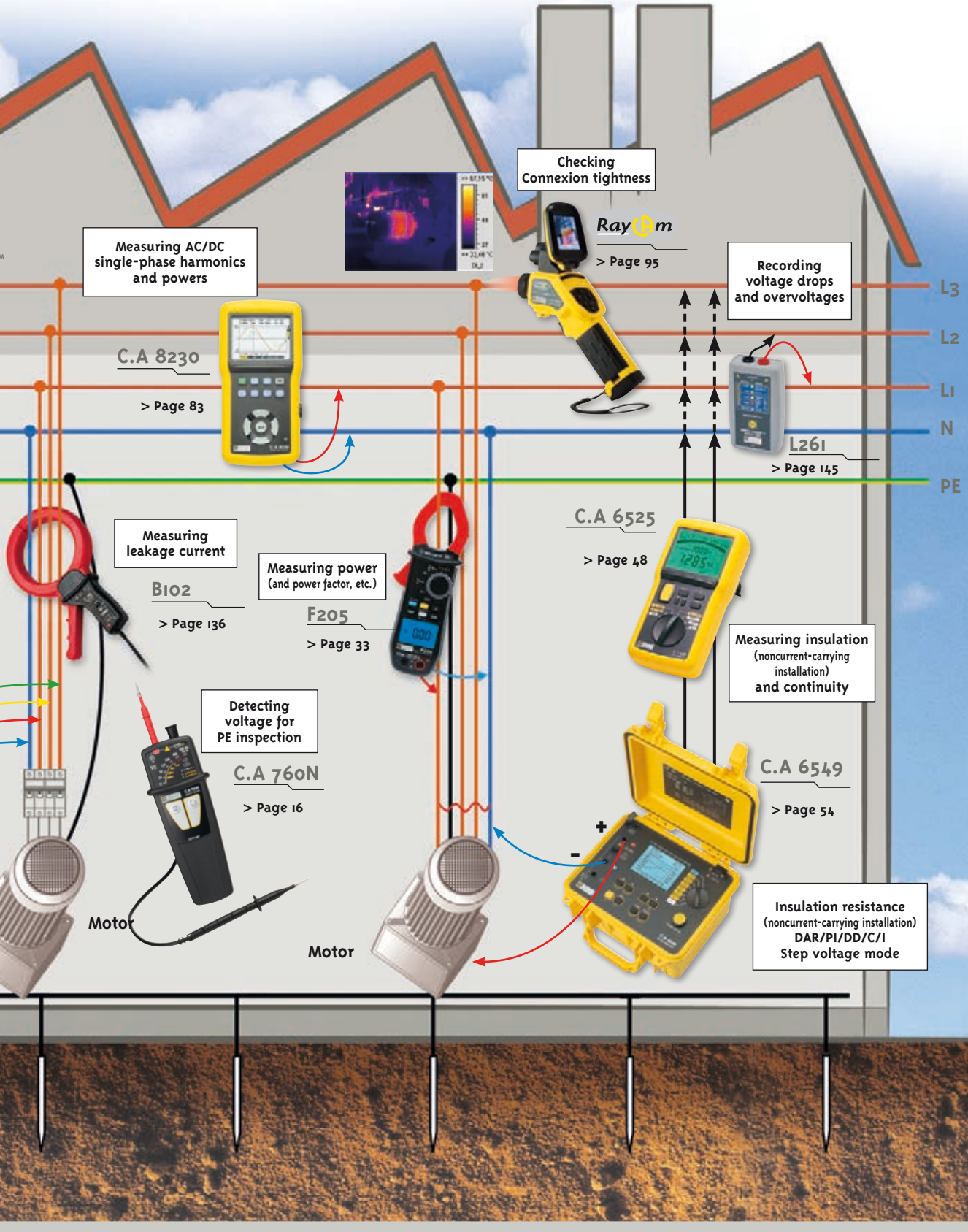


Network of earth electrodes in parallel

See the index of our products on page 166

New

In each chapter, the selection table will help you choose the instrument and accessories best suited to your needs

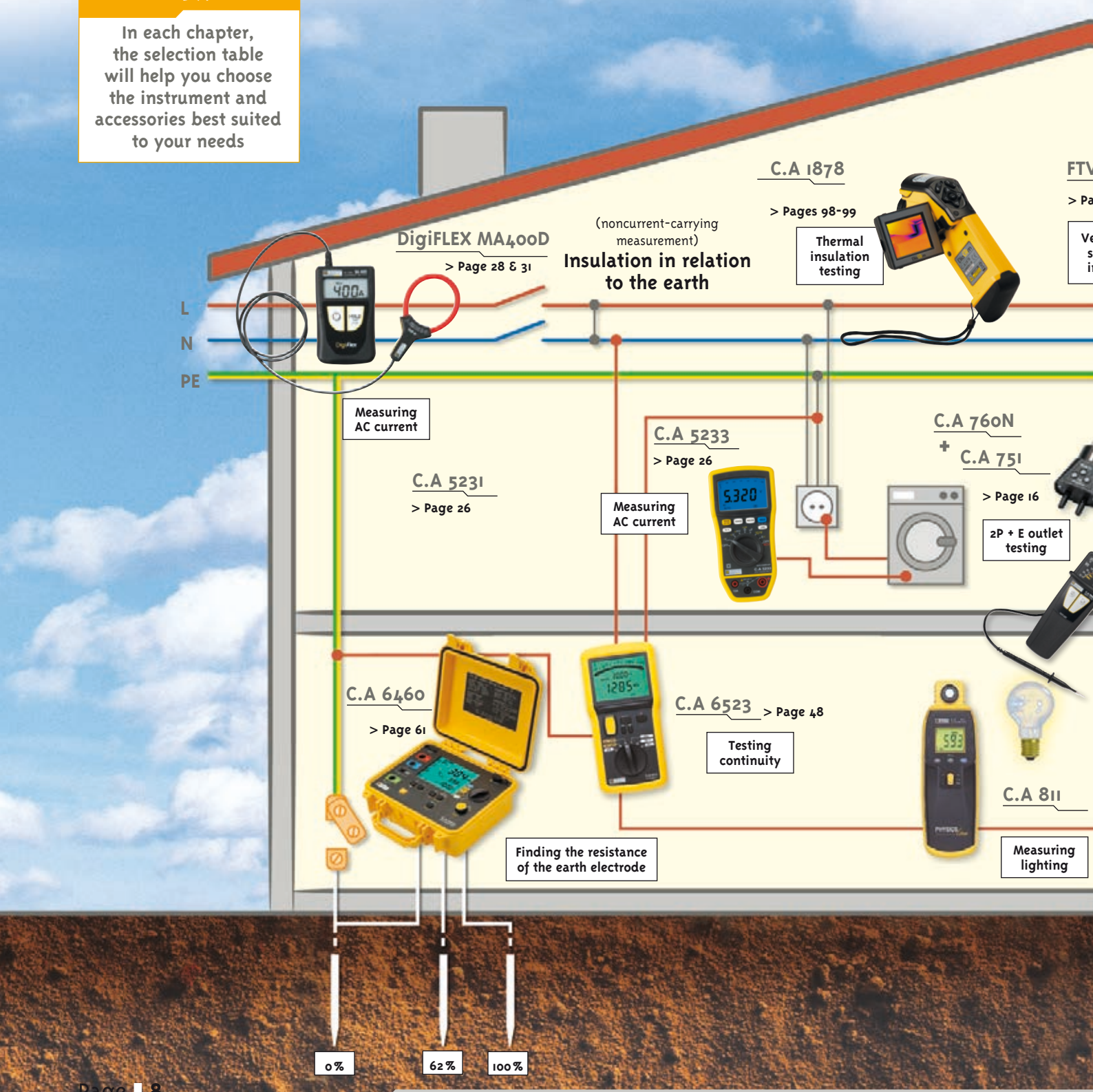


Domestic applications

You use our products for certain applications.
Learn about some of their other applications here.

New

In each chapter, the selection table will help you choose the instrument and accessories best suited to your needs



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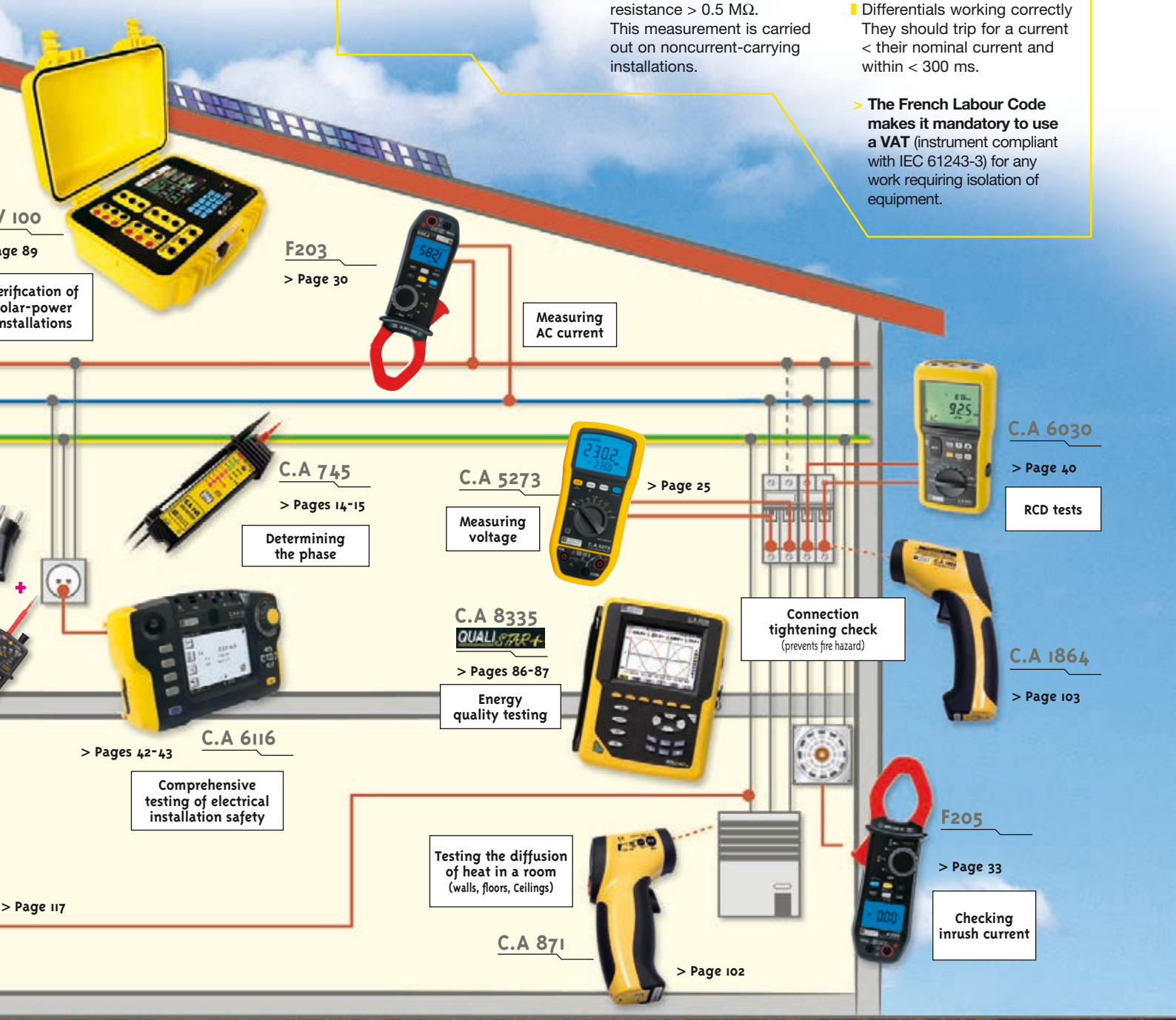
Reminders

> **The IEE 16th regulation imposes the following tests:**

- Earth Measurement
  The earth rod should have a resistance <100 Ω to allow current to flow to the earth.
- Insulation measurement between conductors and of the entire Installation in relation to the earth
  For an installation with a nominal voltage of 230 VAC, inject 500 VDC and find the resistance > 0.5 MΩ.
  This measurement is carried out on noncurrent-carrying installations.
- Continuity measurement (test at 200 mA)
  Check that the ground conductor is in good condition and connected well to the earth. Find R <2 Ω.
- Differentials working correctly
  They should trip for a current < their nominal current and within < 300 ms.

> **The French Labour Code makes it mandatory to use a VAT** (instrument compliant with IEC 61243-3) for any work requiring isolation of equipment.



Automotive

You use our products for certain applications.
Learn about some of their other applications here.

C.A 1866
> Page 97
Surface temperature measurement (laser sight)

F205
> Page 33
DC current measurement

C.A 5275
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Battery voltage measurement

F203
> Pages 33
DC current measurement

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Domestic

Control of comfort parameters

...for living in an healthy climate.

Standard

IP RATING

The IP (ingress protection) rating corresponds to the instrument's degree of protection against penetration by solid bodies (1st digit) and against penetration by water (2nd digit). The higher the rating, the greater the protection. A product without protection corresponds to a rating of IP00 (minimum rating), whereas a product totally protected against solid bodies and liquids is rated IP68 (maximum rating).

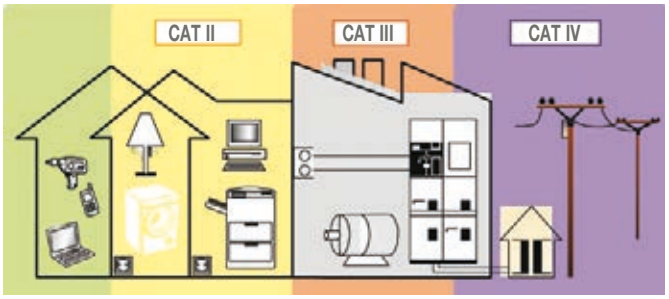
IIEC 61010

This international standard defines the safety rules for electrical measurement, control and laboratory instruments. It guarantees that the instruments' design and construction ensure protection of users and their environment against: electric shocks, burns, mechanical hazards, spread of fire from the instruments, excessive temperatures, etc.

For some types of instruments, this standard is completed by special prescriptions.

The development of industrial and household equipment is increasing the hazards encountered on electrical installations, and in particular ever-higher overvoltages.

On LV installations, where the voltages are limited to 1,000 Vac and 1,500 Vdc, the hazard levels depend on the type of installation and the voltage level.



CAT II Measurements on circuits directly connected to the low-voltage installation.
Examples: domestic distribution boards, portable or household equipment, mains power sockets.

CAT III Measurements on supply circuits in building installations
Examples: fixed installations involved in industrial distribution and building electrical maintenance circuits (lighting, lifts, 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 overcurrent protection equipment.

The IEC 61010 international standards provide safety rules for the use of electrical measuring, control and laboratory instruments.

More specifically, it is the IEC 61010-031 standard and its amendment A1 which define the safety rules for measuring instruments and their associated accessories.

In its latest edition applicable from 1st March 2011, this standard has been completed with a chapter (13) covering the prevention of hazards associated with short-circuits and electrical arcing:

For work on CAT. III and CAT. IV installations, this stipulates that:

- The conductive part of test probes must not be more than 4 mm long
- The outer surfaces of the jaws of crocodile clips must be non-conductive and the conductive parts must not be accessible when the clip is closed.

Example: *the IEC 61010-2-010 standard specifies the special requirements for laboratory equipment used for heating materials.*

IEC 61557

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

The parts of the IEC 61557 standard applicable to our test and measurement products include in particular:

Part 1: IEC 61557-1:	General requirements
Part 2: IEC 61557-2:	Insulation resistance
Part 3: IEC 61557-3:	Loop impedance
Part 4: IEC 61557-4:	Resistance of earth connection 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 systems
Part 7: IEC 61557-7:	Phase sequence

NF C 15-100

This is the official 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 counts and number of power outlets in each type of room (bathroom, kitchen...), etc.

Testers selection guide

	C.A 732	C.A 730	C.A 735	C.A 745	C.A 740N	C.A 760N
Voltage absence test					■	■
Compliant with IEC 61243-3					■	■
LED display	■	■	■	■	■	■
Phase detection	■	■		■	■	■
AC voltage test	■		■	■	■	■
DC voltage test			■	■	■	■
Resistance measurement				■		■
Audible continuity				■	■	■
Phase rotation						■
Integrated auto-test		■		■	■	■
Removable test-probe				■	■	■
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Testers

C.A 730, C.A 732, C.A 735 & C.A 745

> **C.A 730**
- No-contact phase detection
- Operates on closed power sockets

> **C.A 732**
- No-contact phase identification
- Moulded body for exceptional handling
- Built-in torch

> **C.A 735**
- Voltage test up to 690 VAC/DC
- No risk of tripping high-sensitivity RCDs during phase/earth tests

> **C.A 745**
- Phase test with a single test probe
- Continuity and resistance testing
- No risk of tripping high-sensitivity RCDs during phase/earth tests

State at delivery

> **C.A 732** delivered in blister pack with 2 x 1.5 V battery and 1 operating manual

> **C.A 730** delivered in blister pack with 1 x 9 V battery and 1 operating manual

> **C.A 735** delivered in blister pack with 1 x 9 V battery, 1 test probe and 1 operating manual

> **C.A 745** delivered in blister pack with 1 x 9 V battery, 1 removable test probe and 1 operating manual

References to order

> **C.A 732**	> P01191745Z
> **C.A 730**	> P01191733Z
> **C.A 735**	> P01191734Z
> **C.A 745**	> P01191736Z

Testers

C.A 730, C.A 732, C.A 735 and C.A 745

	C.A 730	C.A 732	C.A 735	C.A 745
Specifications				
Voltage test	No-contact phase detection 195 V~ < U < 265 V~	No-contact phase detection with built-in torch	12 V to 690 V~ (7 LEDs)	
Buzzer				U > 50 V~
Impedance			400 kΩ	
Phase/neutral identification				Flashing "Ph" LED and intermittent buzzer if U > 100 V~
Operating frequency	45 Hz to 400 Hz	50/60 Hz	DC and 50/60 Hz	
Polarity test			"+" and "–" LEDs	
Voltage protection			Up to 1,000 V for 30 seconds	
Audible continuity test				R < 2 kΩ
Resistance test				2 kΩ to 300 kΩ
Resistance protection				Up to 550 V
Standards	IEC 61010 600 V CAT III	IEC 61010 1,000 V CAT III	IEC 61010 600 V CAT III	
Power supply	Standard 9 V battery	2 x 1.5 V AAA	Standard 9 V battery	
Other features			Built-in 1.2 mm lead with test-probe. Safety test probe	Built-in 1.2 mm lead with test-probe. Lockable removable red safety test probe
Dimensions / weight	179 x 47 x 33 mm / 120 g	176 x 26 mm / 48 g	193 x 47 x 36 mm / 170 g	

Accessories / Replacement parts

> **For C.A 730 and C.A 735**
Wrist strap > P03100824

> **For C.A 730, C.A 735 and C.A 745**
9 V alkaline battery > P01100620
Carrying bag no. 10 > P01298012
Blister-pack carrying bag no. 10 blister > P01298012Z
200 x 100 x 40 mm case with belt attachment > P01298065Z

> **For C.A 732**
1.5 V alkaline battery > P01296032

> **For C.A 735 and C.A 745**
Case no. 5 > P03100850
Carrying bag > P01298007

> **For C.A 745**
Test probe with locking stud > P01103061Z

Other accessories:
test, transport and protection accessories

> See pages 157 to 163

Low-voltage Two-pole Voltage Absence Testers

- **C.A 740N & C.A 760N**
- Comply with Edition 2 of the IEC 61243-3 standard
- Full integrated autotest
- Voltage test up to 690 VAC (16 2/3-800 Hz) / 750 VDC
- Single-pole phase test
- Phase order up to 400 Hz
- Continuity test
- Removable test probe and lead
- Automatic standby and wake-up
- Fulfil the requirements of the standards: EN 50110-1, NF C 18-510 1, etc.

C.A 740N & C.A 760N

Specifications	C.A 740N	C.A 760N
Voltage detection		
Voltage	12 V_{AC} ≤ U ≤ 690 V_{AC} 12 V_{DC} ≤ U ≤ 750 V_{DC}	
Frequency	DC, 16 2/3 à 800 Hz	
Input impedance	> 300 kΩ	> 400 kΩ
Max peak current	3.5 mA RMS	
Polarity indication	Yes	
Indication of hazardous voltage	The red ELV (Extra Low Voltage) LED indicates that the voltage is higher than the ELV and flashes faster the higher the voltage present	
Phase / Neutral identification	above 50 V (45 - 65 Hz) above 150 V (16 2/3 - 65 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 1,000 V	
Phase rotation	No	2-wire method
Ph/Ph voltage	–	50 V ≤ U ≤ 690 V_{AC} (45 ~ 400 Hz)
Buzzer	Intermittent beep for voltage detection Continuous beep for continuity	
Standards and electrical safety	CEI 61010 600 V CAT IV IEC 61243-3 Ed. 2 concerning Voltage Detectors (VD/VAT)	
Envelope protection rating	Casing: IP65 Test probes (option): IP2X	
Climatic conditions	Use from -15 °C to +45 °C / 20 to 95% RH	
Battery life	7,500 x 10s measurements	7,000 x 10s measurements
Dimensions / Weight	163 x 64 x 40 mm / 210 g	

State at delivery

- 1 voltage absence tester delivered in blister pack with 1 black Ø 2 mm test-probe lead with crystal safety cover, 1 red Ø 2 mm test-probe with crystal safety cover, 1 wrist-strap, 2 x 1.5V LR03/AAA batteries & 1 operating manual in 5 languages.
- Version IP2X : Livrés avec 1 jeu de cordon à pointes IP2X Ø 4 mm de longueur 0,85 m (noir) et 0,25 m (rouge), 1 dragonne, 2 piles 1,5 V LR03/AAA et 1 notice de fonctionnement en 5 langues.

References to order

C.A 740N	> P01191741Z
C.A 760N	> P01191761Z
C.A 740N IP2X	> P01191741B
C.A 760N IP2X	> P01191761B

Accessories / Replacement parts

Adapter for 2P+E sockets	P01101997Z
Red test probe, replacement for VAT. Complies with IEC 61243-3	P01102008Z
Black test-probe lead, replacement for VAT. Complies with IEC 61243-3	P01102009Z
Adapter for safety rod	P01102034
Crystal safety cover for test probe D2 (x10)	P01102033
Set of 2 leads 0.25m and 0.85m long with Ø4 IP2X probes	P01295285Z
Set of 2 leads 1.5m long with Ø4 IP2X probes	P01295462Z
Soft case 200X100X40	P01298065Z
Wrist strap	P03100824
Soft case Multifix 120 x 20 x 60	P01298074

Technical reminders

NUMBER OF COUNTS

This is one of the fundamental specifications of instruments using analogue-digital conversion. In general, it allows you to define the measurement range and the resolution on the basis of the value chosen for the rated calibre.

MEASUREMENT RANGE

This represents the limits within which the digital instrument complies with all its specifications, without the readings being subject to a level of error greater than the maximum error tolerated. 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 the upper limit is 5 A, it is described as having a 5 A calibre.

RESOLUTION

This is the smallest difference of value that can be measured. It is also the value of a measurement count or unit of quantification usually called the "unit".

MINIMUM MEASURABLE VALUE (OR THRESHOLD)

This is the smallest value measurable. For an instrument offering sufficiently linear conversion, it may be equal to the resolution.

This is not always the case, however, and the manufacturer should indicate it clearly, as this minimum value also depends on the accuracy and, in particular, on the constant error.

If the constant error is too high, it becomes impossible to measure very low values accurately.

RMS: ROOT MEAN SQUARE VALUE

By definition, the effective or RMS value of a current is the DC current value which would cause the same heating when flowing through a resistor.

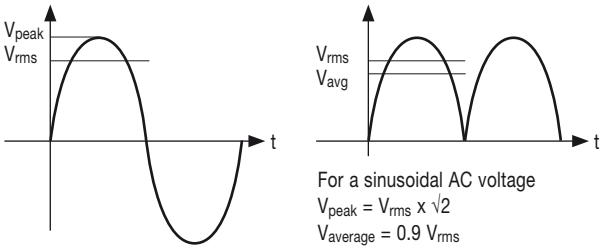
$$V_{rms} = \sqrt{\frac{1}{T}\int_0^T v(t)^2}$$

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

$$v = V_{pk} \cos \omega t$$

$$V_{rms} = \sqrt{\frac{1}{T} V_{pk}^2 \cos(\omega t)^2.dt} = \frac{V_{pk}}{\sqrt{2}}$$

The amplitude of a sinusoidal voltage (Vpk) or current is √2 times its RMS value (Vpk = √2 Vrms).
The RMS value is essential for industrial applications because it is used to define a current.



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

Thus, for a 230 V/50 Hz network:

Vrms = 230 V; Vpeak = 325 V; Vaverage = 207 V

An "average value" measurement instrument measures the average value of a sinusoidal current after rectification and filtering and then displays the effective value after applying a coefficient of 1/0.9 = 1.111.

This indirect measurement method is simple and accurate but it only gives a true value for undistorted sinusoidal currents as it only tolerates a distortion level of a few per cent.

This is why "RMS" measurement instruments are increasingly widely used. They are based on direct measurement principles: the thermal method (mainly used in metrology) and analogue or digital calculation methods requiring sophisticated electronic components.

PEAK VALUE – CREST FACTOR

The crest factor is defined as follows:

CF = Vpeak / Vrms

This information can be used with the RMS value to assess a signal's distortion in qualitative terms.

For a sinusoidal signal, CF = √2 = 1.414

Recommendation:

When we speak of a 230 V mains network, it is an "effective" or RMS value. For a long time, the linear loads (incandescent lamps, heating) connected to the network caused only slight distortion. The spread of non-linear loads (switching power supplies, light dimmers, variable speed drives or compact fluorescent lamps) calls this approach into question as "pure" sinusoidal mains supplies are increasingly rare.
Conventional measurement instruments (calculating the effective value on the basis of the average value) are by definition only accurate with sinusoidal currents. Otherwise, the measurement error may reach 50 %!
It is therefore advisable to opt for "RMS" measurement instruments which are capable of giving correct measurement results whatever the waveform of the current or voltage.

SAFETY RULES AND GOOD PRACTICE

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

Give preference to CAT IV instruments:

- This means that it can withstand up to 50 % higher overvoltages than a CAT III product.
- CAT IV 1,000 V offers protection against electric shocks up to 12,000 V, while CAT IV 600 V offers protection up to 8,000 V.
- If a lower-CATegory instrument is used, you must first check that the installation is equipped with protective systems (disconnecting switch, circuit breaker, etc.) that operate correctly and are in good condition. This is often the case... but not always!
- For external installations which may be temporary or upstream of the protective systems, CAT IV instruments are mandatory.

- It is the weakest element which defines your level of protection. If you use accessories whose category or voltage is lower than your measurement instrument's, you reduce the overall safety level offered by your measurement system.
- Use accessories that are in perfect condition. Any accessory with even the slightest defect must be replaced immediately, as it can no longer guarantee your safety.
- Fuses are protective devices. If they are replaced by cheaper models or, even worse, by a metal element (copper wire, aluminium foil, etc.), they will no longer protect you against possible voltage surges on the installation.

Analogue multimeter selection guide

	 C.A 5001	 C.A 5003	 C.A 5005	 C.A 5011
Analogue	■	■	■	■
Digital				■
Anti-parallax mirror	■	■	■	
4,000-count display				■
Backlighting				■
TRMS AC+DC measurement method				■
Max				■
AC and DC voltage up to 1,000 V	■	■	■	■
Low-impedance calibre (LowZ)	■	■	■	
AC and DC intensity	■	■	■	■
Intensity via clamp	■	■	■	
µA calibre	■	■	■	
5 A calibre	■			
10 A calibre			■	■
15 A calibre		■		
Resistance	■	■	■	■
Audible continuity	■	■	■	■
Frequency				■
dB	■	■	■	■
Fuse test LED	■	■	■	■
Voltage presence LED in ohmmeter mode				■
CAT III 600 V	■	■	■	
CAT IV 600 V / CAT III 1,000 V				■
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Analogue multimeters

C.A 5001, C.A 5003 & C.A 5005

> **"Fus" LED for checking HRC fuses**

> **"Voltest™" LED shows presence of voltage for resistance measurements***

- Automatic offset for resistance measurements*
- µA calibres
- Compact shockproof casing with "Multistand™" multi-purpose fold-away stand

** for C.A 5003 and C.A 5005*

State at delivery & references

> **C.A 5001** delivered with 1 set of silicone leads with straight banana plug/elbowed banana plug, 1 set of test-probe leads, 1.5 V LR6 battery and 1 operating manual > P01196521E

> **C.A 5001** complete **in hard case** > P01196521F

> **C.A 5003** delivered with 1 set of silicone leads with straight banana plug/elbowed banana plug, 1 set of test-probe leads, 9 V battery and 1 operating manual > P01196522E

> **C.A 5003** complete **in hard case** > P01196522F

> **C.A 5005** delivered with 1 MN89 AC clamp, 1 set of silicone leads with straight banana plug/elbowed banana plug, 1 set of test-probe leads, 9 V battery and 1 operating manual > P01196523E

> **C.A 5005** complete **in hard case** > P01196523F

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

(1) Additional Voltest™ function for checking possible presence of voltage during resistance measurement and audible continuity test – (2) Limited to 240 A maxi by the MN 89 miniclamp – (3) In % of full scale – (4) Pollution 2 – (5) Electronic protection and HRC fuses for the current calibres with fuse check LED.

Accessories / Replacement parts

Accessories kit for electricians	> P01295459Z
CMI214S current measurement lead	> P03295509
C.A 1871 Infrared probe for multimeter	> P01651610Z
C.A 801 1-channel temperature adapter	> P01652401Z
C.A 803 2-channel temperature adapter with differential measurement	> P01652411Z
Carrying bag no. 21 (250 x 165 x 60 mm) with strap	> P06239502
Carrying bag for multimeter and clamp	> P01298033
Carrying case no. 5	> P01298036
Hard case for CA 50XX analogue multimeter	> P01298037
MN89 CV 200/20 clamp	> P01120415

Accessories / Replacement parts

> For C.A 5001 & C.A 5003

MN11 LCA 200/0.2 clamp	> P01120404

> For C.A 5001

0.5 A HRC fuses (x 10)	> P01297028
5 A HRC fuses (x 10)	> P01297035
1.5 V LR6 battery	> P01296033

> For C.A 5003

1.6 A HRC fuses (x 10)	> P01297036
16 A HRC fuses (x 10)	> P01297037
alkaline 9 V	> P01100620

> For C.A 5005

10 A HRC fuses (x 10)	> P01297038
1 A HRC fuses (x 10)	> P01297039
alkaline 9 V	> P01100620
MINI 09 1 A/100 mVDC	> P01105109Z
Hard case with pre-cut foam insert for C.A 5005	> P01298037A

Analogue and digital multimeter

C.A 5011

- "Fus" for checking HRC fuses
- "Voltest™" for checking on voltage presence for resistance measurements

> **Two complementary read-outs:**

- Digital for accuracy, with backlighting
- Analogue for quick reading

> **Automatic recognition of AC/DC**

> **Compact, shockproof casing with multistand™ multi-purpose fold-away stand**

Specifications	C.A 5011
Voltage ⎓ and ~	2 x 5 calibres 400 mV... 1,000 V
Impedance	10 MΩ
Operating frequency (1)	20 Hz...10 kHz
⎓ and ~ current	2 x 6 calibres: 400 µA ... 10 A
Resistance (2)	6 calibres: 400 Ω ... 40 MΩ
Audible continuity test (2)	R < 400 Ω
Frequency	3 calibres: 4 kHz... 400 kHz
Scale in dB for V~	–20 dB... +16 dB
Max. value	Over 500 ms
Typical accuracy (3)	0.5 % for V – 1 % for A and Ω
Power supply	9 V battery
Battery life	300 hours
Electrical safety (4)	IEC 61010 1,000 V CAT III / 600 V CAT IV
Protection (5)	1 A and 10 A HRC fuses
Protection	IP 53
Climatic conditions	–10 °C... +55 °C and RH < 90 %
Dimensions / weight	160 x 105 x 56 mm / 500 g

(1) Crest factor ≤ 5 – (2) Additional Voltest™ function for checking possible presence of voltage – (3) In digital mode. In analogue mode: 2.5 % – (4) Pollution 2 – (5) Electronic protection and HRC fuses for the intensity calibres with fuse check LED.

State at delivery & references

> **C.A 5011** delivered with 1 set of silicone leads, straight banana male plug/elbowed banana male plug , 1 set of test-probe leads, 9 V battery and 1 operating manual > P01196311E

> **C.A 5011** complete **in hard case** > P01196311F

Accessories / Replacement parts

Accessories kit for electricians	> P01295459Z
2 PVC test-probe leads, isolated Ø 4 mm elbowed male plug (red/black)	> P01295456Z
2 PVC IP2X test-probe leads for multimeters	> P01295461Z
2 moulded PVC leads, isolated Ø 4 mm straight male plug / elbowed male plug (red/black)	> P01295451Z
2 moulded silicone leads, isolated Ø 4 mm straight male plug / elbowed male plug (red/black)	> P01295453Z
2 safety test probes (red/black)	> P01295454Z
2 crocodile clips (red/black)	> P01295457Z
2 crocodile wire grips (red/black)	> P01102053Z
2 insulation-piercing clips (red/black)	> P01102055Z
Ø 4 mm CAT II 300 V moulded test probe (x 2)	> P01295458Z
Ø 2 mm CAT II 300 V moulded test probe (x 2)	> P01295460Z
CMI214S current measurement lead	> P03295509
C.A 1871 Infrared probe for multimeter	> P01651610Z
C.A 801 1-channel temperature adapter	> P01652401Z

Accessories / Replacement parts

C.A 803 2-channel temperature adapter with differential measurement	> P01652411Z
9 V alkaline battery	> P01100620

Other accessories:
test and current measurement accessories, K thermocouples, transport and protection accessories, fuses, etc.

> See pages 157 to 163

Digital multimeters selection guide

	C.A 702	C.A 703	C.A 5205	C.A 5220	C.A 5260	C.A 5231	C.A 5233	C.A 5271	C.A 5273	C.A 5275	C.A 5277
2,000-count display	■	■	■								
4,000-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										■	■
Automatic calibres	■	■	■	■	■	■	■	■	■	■	■
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 intensity		■		■	■		■	■	■	■	■
Intensity via clamp			■			■					
µA calibre		■			■					■	■
10 A calibre				■			■	■	■	■	■
Resistance	■	■	■	■	■	■	■	■	■	■	■
Audible continuity	■	■	■	■	■	■	■	■	■	■	■
Semi-conductor testing	■	■	■	■	■	■	■	■	■	■	■
Frequency				■			■		■	■	■
Capacitance				■			■		■	■	■
Temperature					■		■		■		■
CAT III 600 V			■	■	■		■				
CAT III 1,000 V	■	■				■		■	■	■	■
CAT IV 600 V	■	■				■	■	■	■	■	■
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Pocket digital multimeters

C.A 702 & C.A 703

> **Easy handling and safety**
- Their compact size and built-in test probes mean you can take them with you anywhere
- Compliant with IEC 61010 600 V CAT IV / 1,000 V CAT III for safety in all conditions with a tool that is always available

600 V CAT IV

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 signals • Protection	1.999 V • V Test ≤ 1.5 V I Test ≤ 1.5 A • 600 V_{RMS}	
Audible continuity • Buzzer • Protection	199.9 Ω • R < approx. 60 Ω • 600 V_{RMS}	
Built-in torch	Yes	Yes
Standards	IEC 61010 1,000 V CAT III / 600 V CAT IV	
Power supply	2 x 1.5 V AAA batteries	
Other features	Built-in test-probe leads connected to the instrument	
Dimensions / weight	104 x 55 x 32.5 mm / 145 g	

State at delivery

> **C.A 702 & C.A 703** delivered in blister pack with 2 x 1.5 V AAA batteries, 1 operating manual

Accessories / Replacement parts

1.5 V LR03 battery	> P01296032
Case 200 x 100 x 40 mm	> P01298065Z

References to order

> **C.A 702**	> P01191739Z
> **C.A 703**	> P01191740Z

Digital multimeters

C.A 5205G, C.A 5220G & C.A 5260G

> **C.A 5205G:**
Economical, automatic AC/DC selection, large display

> **C.A 5220G:**
A comprehensive instrument which is the reference for work on sinusoidal electrical installations

> **C.A 5260G:**
The HVAC model for heating and air-conditioning

Specifications	C.A 5205G	C.A 5220G	C.A 5260G
Display	2,000 counts	4,000 counts	
Bargraph	No	Yes	No
Backlighting		Yes	
Voltage ~	5 cal.: 200 mV... 600 V	5 calibres: 400 mV... 600 V	
Typical accuracy		1 %	
Impedance	3 MΩ	10 MΩ	
Current ~	No	3 cal.: 40 mA / ... / 10 A	2 cal.: 400 µA & 4,000 µA
Resistance	6 cal.: 200 Ω / ... / 20 MΩ	6 cal.: 400 Ω / ... / 40 MΩ	
Audible continuity test	R < 700 Ω	R < 40 Ω	R < 35 Ω
Diode test	Voltage measurement in forward direction (resolution 1 mV)		
Capacitance	No	5 cal.: 4 nF / ... / 40 µF	3 cal.: 40 µF / ... / 4,000 µF
Frequency	No	5 cal.: 10 Hz / ... / 200 kHz	No
Temperature °C / °F	No	No	–40 °C to +1,000 °C With K thermocouple
Min/Max value	No	500 ms	
Calibre selection	Automatic (autorange)	Automatic and manual (RANGE key)	Automatic (autorange)
Shutdown	Manual	Automatic (30 min.) or manual	
Power supply	2 x 1.5 V batteries (LR6)	2 x 1.5 V batteries (LR6)	9 V battery (6LF22)
Battery life	500 hours	600 hours	40 hours
Electrical safety		IEC 61010 600 V CAT III-2	
Protection	Fuseless electronic protection	Electronic protection 0.4 A and 12 A HRC fuses	Electronic protection + 0.1 A HRC fuses
Protection		IP 40	
Climatic conditions		0... +50 °C and RH < 70 %	
Dimensions / weight		177 x 64 x 42 mm / 350 g	

State at delivery

Delivered with 1 Multistand™ shockproof sheath, 1 set of test-probe leads and 1 operating manual

> **C.A 5205G** delivered in blister pack with 2 x 1.5 V AA batteries

> **C.A 5205G + MN89** delivered in blister pack with 2 x 1.5 V AA batteries, and 1 MN89 AC clamp-on ammeter

> **C.A 5220G** delivered with 2 x 1.5 V AA batteries

> **C.A 5260G** delivered in blister pack with 1 crocodile clip, 9 V battery, 1 K thermocouple adapter and 1 wire K thermocouple

Accessories / Replacement parts

Accessories kit for electricians	> P01295459Z
2 PVC test-probe leads, isolated Ø 4 mm elbowed male plug (red/black)	> P01295456Z
2 PVC IP2X test-probe leads for multimeters	> P01295461Z
2 moulded PVC leads, isolated Ø 4 mm straight male plug / elbowed male plug (red/black)	> P01295451Z
2 moulded silicone leads, isolated Ø 4 mm straight male plug / elbowed male plug (red/black)	> P01295453Z
2 safety test probes (red/black)	> P01295454Z
2 crocodile clips (red/black)	> P01295457Z
2 crocodile wire grips (red/black)	> P01102053Z
2 insulation-piercing clips (red/black)	> P01102055Z
Ø 4 mm CAT II 300 V moulded test probe (x 2)	> P01295458Z
Ø 2 mm CAT II 300 V moulded test probe (x 2)	> P01295460Z
Infrared probe for multimeter	> P01651610Z
C.A 801 single-channel adapter for multimeter	> P01652401Z
C.A 803 two-channel adapter with diff. measurement for multimeter	> P01652411Z
> For C.A 5205G and C.A 5220G	
CMI214S current measurement lead	> P03295509
1.5 V LR6 alkaline battery	> P01296033

Accessories / Replacement parts

> For C.A 5220G and C.A 5260G	
40 kVDC/28 kVAC high-voltage probe	> P01102097
> For C.A 5260G	
9 V alkaline battery	> P01100620
Safety adapter and K-sensor wire temperature probe -50 °C to +450 °C	> P01102107Z
Safety thermocouple adapter for multimeters (x 2)	> P01102106Z

Other accessories: test and current measurement accessories, K thermocouples, transport and protection accessories, etc. > See pages 157 to 163

References

> C.A 5205G	> P01196707Z
> C.A 5205G + MN89	> P01196708Z
> C.A 5220G	> P01196712B
> C.A 5260G	> P01196732Z

Digital TRMS multimeters

C.A 5231 & C.A 5233

> **Compact and ergonomic**

- TRMS measurements
- 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	
Measurement	TRMS 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 AC or DC clamp (1 mV/A): 1 calibre / 600 A / resolution: 0.1 A	2 calibres / 10 A / resolution 0.01 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 function	Yes	Yes
Relative mode		Yes
Min-Max		Yes
Power supply	9 V alkaline battery	
Protection	IP 54	
Standards	IEC 61010 CAT IV 600 V / CAT III 1,000 V	IEC 61010 CAT IV 600 V / CAT III 600 V
Dimensions / weight	155 x 75 x 55 mm / 320 g	

State at delivery & references

> **C.A 5231** delivered with 1 set of red/black test-probe leads, 9 V battery and 1 operating manual > P01196731

> **C.A 5231 kit** C.A 5231 + MINI 03 100 AAC current clamp > P01196734

> **C.A 5233** delivered with 1 set of red/black test-probe leads, 1 K thermocouple adapter for DMM, 1 wire K thermocouple, 9 V battery and 1 operating manual > P01196733

Accessories / Replacement parts

Accessories kit for electricians	> P01295459Z
2 PVC test-probe leads, isolated Ø 4 mm elbowed male plug (red/black)	> P01295456Z
2 PVC IP2X test-probe leads for multimeters	> P01295461Z
2 moulded PVC leads, isolated Ø 4 mm straight male plug / elbowed male plug (red/black)	> P01295451Z
2 moulded silicone leads, isolated Ø 4 mm straight male plug / elbowed male plug (red/black)	> P01295453Z
2 safety test probes (red/black)	> P01295454Z
2 crocodile clips (red/black)	> P01295457Z
2 crocodile wire grips (red/black)	> P01102053Z
2 insulation-piercing clips (red/black)	> P01102055Z
Ø 4 mm CAT II 300 V moulded test probe (x 2)	> P01295458Z
Ø 2 mm CAT II 300 V moulded test probe (x 2)	> P01295460Z
Infrared probe for multimeter	> P01651610Z
C.A 801 single-channel temperature adapter	> P01652401Z
C.A 803 two-channel temperature adapter with diff. measurement	> P01652411Z

Accessories / Replacement parts

40 kVDC/28 kVAC high-voltage probe	> P01102097
Multi-position mounting accessory for DMM	> P01102100Z
9 V alkaline battery	> P01100620
> For C.A 5231	
100 AAC MINI 03 current clamp	> P01105103Z
400 AAC / 600 ADC PAC10 current clamp	> P01120070
> For C.A 5233	
CMI214S current measurement lead	> P03295509
Safety adapter and K-sensor wire temperature probe -50 °C to +450 °C	> P01102107Z
Safety thermocouple adapter for multimeters (x 2)	> P01102106Z

Other accessories: test and current measurement accessories, K thermocouples, transport and protection accessories, fuses, etc.

> See pages 157 to 163

TRMS AC, DC and AC+DC digital multimeters

C.A 5271, C.A 5273, C.A 5275 & C.A 5277

600 V CAT IV
1,000 V CAT III

> **Category IV safety, versatility for use in the field**

- Double backlit 6,000-count display with dual-mode remanent bargraph
- VLowZ low-impedance voltage measurement with low-pass filter (electronic power supply)
- Resolution from 10 µV and 1 µA
- Ionization current measurement
- Quick response, 5 measurements/s and high crest factor
- Resistance, continuity, frequency, temperature, capacitance, etc.
- Min-Max-Peak functions, relative and differential measurements

Specifications		C.A 5271	C.A 5273	C.A 5275	C.A 5277
Display		6,000 counts	2 x 6,000 counts, backlighting		
Bargraph		61+2 elements	61+2 elements, dual mode (full scale / central zero)		
Acquisition		TRMS AC / DC		TRMS AC / DC / AC+DC	
Measurement rate		5 measurements / second			
Autoranging / Deactivatable		Yes / No	Yes / Yes		
Automatic AC /DC detection		Yes		No	
VDC	Calibres	600 mV / 6 V / 60 V / 600 V / 1,000 V		60 mV / 600 mV / 6 V / 60 V / 600 V / 1,000 V	
	Typical accuracy	0.2% + 2 cts		0.09% + 2 cts	
	Resolution	0,1 mV to 1 V		0,01 mV to 1 V	
VAC	Calibres	600mV / 6V / 60V / 600 V / 1,000 V		60 mV / 600 mV / 6 V / 60 V / 600 V / 1,000 V	
	Resolution	0.1 mV à 1 V		0.01 mV à 1 V	
	Bandwidth	40 Hz à 3 kHz		40 Hz à 10 kHz	
VLowZ AC (low impedance + low-pass filter)	Calibres	600 mV / 6 V / 60 V / 600 V / 1,000 V			
	Resolution	0.1 mV à 1 V		0.01 mV à 1 V	
VAC+DC	Calibres	–		60 mV / 600 mV / 6 V / 60 V / 600 V / 1,000 V	
	Resolution	–		0.01 mV to 1 V	
A DC	Calibres	6 A / 10 A (20 A/30 s)		6000 µA / 60 mA / 600 mA / 6 A / 10 A (20 A / 30 s)	
	Resolution	0.001 A à 0.01 A		1 µA to 0.01 A Ionization current: 0.2 µA à 20.0 µA	
A AC	Calibres	6 A / 10 A		6000 µA / 60 mA / 600 mA / 6 A / 10 A (20 A / 30 s)	
	Resolution	0.001A to 0.01 A		1 µA to 0.01 A	
A AC+DC	Calibres			6000µA / 60mA / 600 mA / 6 A / 10 A (20 A / 30 s)	
	Resolution			1 µA to 0.01 A	
Resistance	Calibres	600 Ω / 6,000 Ω / 60 kΩ / 600 kΩ / 6 MΩ / 60 MΩ			
	Resolution	0,1 Ω to 0.1 MΩ			
Audible continuity		Yes			
Test Diode		Yes			
Hz	Calibres	–	600 Hz / 6 kHz / 50 kHz		
	Resolution	–	0.1Hz to 10 Hz		
Capacitance	Calibres	–	6 nF / 60 nF / 600 nF / 6 µF / 60 µF / 600 µF / 6 mF / 60 mF		
	Resolution	–	0.001 nF (1pF) to 10 µF		
T°	Calibres	–	-59.6 °C à +1,200°C -4°F to 2,192 °F	–	-59.6 °C to +1,200°C -4°F to 2,192 °F
	Resolution	–	0.1° to 1 °	–	0.1° to 1 °
Hold		Yes	Yes	Yes	Yes
Min / MAX (100 ms)		No	Yes	Yes	Yes
Peak+ / Peak- (1 ms)		No	No	No	Yes
Differential (ΔX) / RELative (ΔX/X%) measurement		No	No	Yes	Yes
Automatic shutdown		Yes (deactivatable)			
Power supply		1 x 9V			
Normes		IEC 61010 CAT IV 600 V / CAT III 1,000 V			
Dimensions / Weight		90 x 190 x 45 / 400 g			

IP 54

State at delivery

> **1 x C.A 5270 multimeter delivered with set of banana leads, set of test probes, 9 V battery and CD containing the operating manual and start-up guide.**

> **C.A 5271** standard state at delivery

> **C.A 5273** includes an additional K thermocouple temperature sensor

> **C.A 5275** includes a bag and a Multifix adapter

> **C.A 5277** includes a K thermocouple temperature sensor, bag and Multifix adapter

References to order

> **C.A 5271 TRMS AC/DC multimeter** > P01196771

> **C.A 5273 TRMS AC/DC multimeter** > P01196773

> **C.A 5275 TRMS AC+DC multimeter** > P01196775

> **C.A 5277 TRMS AC+DC multimeter** > P01196777

Multimeter clamp selection guide

	F01	F03	F05	F07	F09	F11N	F13N	F21	F3N	MA400D-170	MA400D-250	MA4000D-350
26 mm clamping diameter	■	■	■	■	■							
34 mm clamping diameter												
42 mm clamping diameter						■	■	■	■			
48 mm clamping diameter										■		
60 mm clamping diameter											■	
AC current												■
DC current	■	■	■	■	■	■	■	■	■	■	■	■
Automatic zero DC		■	■	■	■							
Zéro DC automatique		■	■	■	■							
TRMS measurement	■	■	■	■	■		■	■	■	■	■	■
Measurement with DC component (AC+DC)				■	■							
Measurement on non-linear loads	■	■	■	■	■			■	■			
4,000-count display	■	■	■	■	■	■	■			■	■	■
6,000-count display												
10,000-count display								■	■			
Backlighting		■	■	■	■				■			
Bargraph								■	■			
AC and DC voltage measurement	■	■	■	■	■	■	■	■				
Resistance	■	■	■	■	■	■	■					
Audible continuity	■	■	■	■	■	■	■					
Semi-conductor testing	■	■	■	■	■	■	■					
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			■	■	■							
Load overcurrents (TrueInrush)												
Min	■	■	■	■	■			■	■			
Max	■	■	■	■	■	■	■	■	■	■	■	■
Peak		■	■	■	■			■	■			
Smooth								■	■			
Differential measurement ΔX / Relative measurement ΔX/X												
Presence of dangerous voltage (Vlive)	■	■	■	■	■							
Compensation of measurement-lead resistance		■	■	■	■							
Adapter input (external probe)				■								
Analogue output								■				
Data-logging												
PC interface / Bluetooth interface												
CAT III 600 V	■	■	■	■	■	■	■	■	■			
CAT IV 600 V										■	■	■
CAT IV 1,000 V												
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Multimeter clamp selection guide

	F201	F203	F205	F401	F403	F405	F407	F601	F603	F605	F607
26 mm clamping diameter											
34 mm clamping diameter	■	■	■								
42 mm clamping diameter											
48 mm clamping diameter				■	■	■	■				
60 mm clamping diameter								■	■	■	■
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	■	■	■								
Backlighting				■	■	■	■ (x 3)	■	■	■	■ (x 3)
Bargraph Bargraphe		■	■	■	■	■	■	■	■	■	■
Resistance	■	■	■	■	■	■	■	■	■	■	■
Audible continuity	■	■	■	■	■	■	■	■	■	■	■
Semi-conductor testing	■	■	■	■	■	■	■	■	■	■	■
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) Facteur de crête (CF)							■ ■				■ ■
Automatic deactivatable AC/DC	■	■	■	■	■	■	■	■	■	■	■
Motor InRush	■	■	■	■	■	■	■	■	■	■	■
Load overcurrents (TrueInrush)	■	■	■	■	■	■	■	■	■	■	■
Min	■	■	■	■	■	■	■	■	■	■	■
Max	■	■	■	■	■	■	■	■	■	■	■
Peak			■			■	■			■	■
Smooth											
Differential measurement ΔX / Relative measurement ΔX/X		■ / ■	■ / ■		■ / ■	■ / ■			■ / ■	■ / ■	
Presence of dangerous voltage (Vlive)											
Compensation of measurement-lead resistance											
Adapter input (external probe)		■			■				■		
Analogue output											
Data-logging							■				■
PC interface / Bluetooth interface							■				■
CAT III 600 V											
CAT IV 600 V	■	■	■								
CAT IV 1,000 V				■	■	■	■	■	■	■	■
Page	33	33	33	34	34	34	34/80	35	35	35	35/81

Pocket TRMS multimeter clamps

Specifications	F01	F03	F05	F07	F09
Clamping diameter	26 mm				
Display	4,000 counts				
Backlighting	No	Yes			
Acquisition	True Root Mean Square (TRMS)				
Range selection	Automatic (AUTORANGE)				
Bandwidth	40 Hz to 2 kHz / 5 kHz	40 Hz to 1 kHz / 2 kHz			40 Hz to 1 kHz
TRMS AC current	40 A / 400 A				
DC current	No	40 A / 400 A			
TRMS AC+DC current	No	No	No	40 A / 400 A	
Accuracy	1.5 % R				
Automatic zero DC	-	Yes			
TRMS AC voltage	40 V / 400 V / 600 V				
DC voltage	40 V / 400 V / 600 V				
TRMS AC+DC voltage	-	-	-	40 V / 400 V / 600 V	
Accuracy	1% R				
Resistance	400 Ω	400 Ω / 4 kΩ	400 Ω / 4 kΩ / 40 kΩ		
Continuity / Buzzer	Yes (< 40 Ω)				
Compensation of measurement lead resistance	-	Yes			
Diode	-	Yes			
Power values	-	-	4 / 40 / 240 W	-	4 / 40 / 240 W 4 / 40 / 240 kvar 4 / 40 / 240 kVA
PF	-	-	Yes	-	Yes
Temperature (int., ext., °C, °F) K couple	-	Yes	-	Yes	-
Frequency	-	-	400 Hz / 4 kHz / 20 kHz		
Adapter (AC/DC)	-	-	-	400 mV / 4 V	-
Phase rotation	-	-	Yes (2 wires)	-	Yes (2 wires)
Auto AC/DC	Yes (V)	Yes (V & A)			
V-Live	Yes (V)				
Inrush	No	No	Yes		
Automatic shutdown	Yes				
Hold function	Yes				
Min/Max/Peak functions	-	Yes (100 ms) / Yes (100 ms) / Yes (500 µs)			
Electrical safety	IEC 61010 600 V CAT III / 300 V CAT IV				
Power supply	9 V battery				
Dimensions / weight	193 x 70 x 37 mm / 260 g				

> F01 TRMS
The low-price RMS clamp

> F03 TRMS
- The benchmark for RMS testing with temperature measurement

> F05 AC/DC TRMS
- Single-phase power measurement
- Inrush function

> F07 AC+DC TRMS
- emperature measurement
- Adapter function

> F09 AC+DC TRMS
- Single-phase and balanced three-phase power measurement

State at delivery and references

Delivered with 1 set of straight banana plug/elbowed banana plug leads, 1 set of test-probe leads, 9 V battery and 1 operating manual.

- **> F01** delivered in blister pack > P01120901Z
- **> F03** delivered in blister pack plus 1 adapter for K thermocouple > P01120903Z
- **> F05** delivered in blister pack with 1 carrying case and 1 crocodile clip > P01120905Z
- **> F07** delivered in blister pack plus 1 carrying case, 1 crocodile clip and 1 K thermocouple adapter > P01120907Z
- **> F09** plus 1 carrying case and 1 crocodile clip > P01120909

Accessories / Replacement parts

Accessories kit for electricians	> P01295459Z
2 PVC test-probe leads, isolated Ø 4 mm elbowed male plug (red/black)	> P01295456Z
2 PVC IP2X test-probe leads for multimeters	> P01295461Z
2 moulded PVC leads, isolated Ø 4 mm straight male plug / elbowed male plug (red/black)	> P01295451Z

Accessories / Replacement parts

2 moulded silicone leads, isolated Ø 4 mm straight male plug / elbowed male plug (red/black)	> P01295453Z
2 moulded test probes (red/black)	> P01295454Z
2 crocodile clips (red/black)	> P01295457Z
2 crocodile wire grips (red/black)	> P01102053Z
2 insulation-piercing clips (red/black)	> P01102055Z
Ø 4 mm CAT II 300 V moulded test probe (x 2)	> P01295458Z
Ø 2 mm CAT II 300 V moulded test probe (x 2)	> P01295460Z
CMI214S current measurement lead	> P03295509
9 V alkaline battery	> P01100620

> For F07

C.A 801 single-channel temperature adapter	> P01652401Z
C.A 803 two-channel adapter with differential measurement for multimeter	> P01652411Z
Infrared probe for multimeter	> P01651610Z

> For F03 & F07

Safety adapter and K-sensor wire temperature probe -50 °C to +450 °C	> P01102107Z
Safety thermocouple adapter for multimeters (x 2)	> P01102106Z

TRMS digital ammeters with flexible sensors

MA400D & MA4000D

DigiFlex

- Compact, stand-alone and simple to use
- Direct current readings
- Measurement from a few tens of mA
- Storage of the maximum value

Specifications	MA400D			MA4000D		
Display range	4 A AC	40 A AC	400 A AC	40 A AC	400 A AC	4,000 A AC
Measurement range	0.020 A ... 3.999 A	4.00 A ... 39.99 A	40.0 A ... 399.9 A	0.01 A ... 39.99 A	40.0 A ... 399.9 A	400 A ... 3,999 A
Resolution	1 mA	10 mA	100 mA	10 mA	100 mA	1 A
Accuracy	± (2% + 10 cts)	± (1.5% + 2 cts)	± (1.5% + 2 cts)	± (2% + 10 cts)	± (1.5% + 2 cts)	± (1.5% + 2 cts)
Clamping diam. / Sensor length	MA400D-170 : Ø 45 mm / 170 mm MA400D-250 : Ø 70 mm / 250 mm			MA4000D-350 : Ø 100 mm / 350 mm		
Bandwidth	10 Hz ... 3 kHz					
Power supply	2 x 1.5V AAA/LR3 batteries					
Safety	IEC 61010 CAT IV 600 V					
Operating temperature	0°C to +50°C					
Weight	130 g approx.					
Casing dimensions	100 x 60 x 20 mm					
Length of built-in connection cable	0.8 m					

Accessories / Replacement parts

Bag 120x200x60	> P01298074
MULTIFIX accessories	> P01102100Z
Velcro strap (set of 5)	> P01102113

State at delivery

> **1 DigiFLEX sensor** delivered in a blister pack with 2 x 1.5V AAA batteries, 1 Velcro mounting strap and an operating manual in 5 languages

References to order

> **MA400D-170**	> P01120575Z
> **MA400D-250**	> P01120576Z
> **MA4000D-350**	> P01120577Z

Clamp multimeters

F11N & F13N

> **F11N**
Everything you need up to 700 A

> **F13N**
RMS measurement

Specifications	F11N	F13N
Clamping diameter	Ø 42 mm	
Display	4000 points	
Acquisition	AVG	RMS
Range selection	Automatic *(AUTORANGE)*	
Iac *(trms)*	2 calibres: 0.5 .. 700 A	2 calibres: 0.5 .. 700 A
Idc	-	-
Accuracy	2,5 % R	
AC voltage *(trms)*	2 calibres : 400/600 V	
Accuracy	1,5 % R	
DC voltage	2 calibres : 400/600 V	
Accuracy	1 % L	
Resistance	2 calibres : 400 Ω / 4 kΩ	2 calibres : 400 / 4 kΩ
Continuity/buzzer	Yesi *(< 40 Ω)*	Yes *(< 40 Ω)*
Diode test	Yes	Yes
Frequency	-	1 calibre : 4 kHz
Shutdown	Manual	Manual
"Hold" function	Yes	
Min function	Yes (100 ms)	Yes (100 ms)
Max function	-	-
Electrical safety	IEC 61010 600 V CAT III / 300 V CAT IV	
Protection	IP30	
Power supply	9 V battery	
Dimensions / weight	254 x 97 x 46 mm / 600 g	

États de livraison et Références

Delivered with 1 carrying bag, 1 set of leads with straight banana plug/elbowed banana plug, set of leads with test probes, 9 V battery and 1 operating manual

> **F11N** > P01120751C

> **F13N** > P01120753C

Accessoires / Rechanges

Accessories kit for electricians	> P01295459Z
2 PVC test-probe leads, isolated Ø 4 mm elbowed male plug (red/black)	> P01295456Z
2 PVC IP2X test-probe leads for multimeters	> P01295461Z
2 moulded PVC leads, isolated Ø 4 mm straight male plug / elbowed male plug (red/black)	> P01295451Z
2 moulded silicone leads, isolated Ø 4 mm straight male plug / elbowed male plug (red/black)	> P01295453Z
2 moulded test probes (red/black)	> P01295454Z
2 crocodile clips (red/black)	> P01295457Z
2 crocodile wire grips (red/black)	> P01102053Z
2 insulation-piercing clips (red/black)	> P01102055Z
Ø 4 mm CAT II 300 V moulded test probe (x 2)	> P01295458Z
Ø 2 mm CAT II 300 V moulded test probe (x 2)	> P01295460Z
CMI214S current measurement lead	> P03295509
9 V alkaline battery	> P01100620

Compact TRMS digital multimeter clamps

Serie F200

> **The clamp specially designed for the needs of self-employed electricians and SMEs/SMIs in the electrical sector**

> **Low and medium-power LV applications**

- 600 AAC (or AAC+DC) / 900 ADC
- Clamping diameter 34 mm
- TRMS acquisition
- TrueInRush function

	F201	F203	F205
Specifications			
Clamping diameter	34 mm		
Display	LCD	Backlit LCD screen	
No of counts	6,000 counts		
No. of values displayed	1		
Acquisition	TRMS AC	TRMS AC/DC	TRMS AC, DC, AC+DC
Automatic calibres (Autorange)	Yes		
Automatic AC/DC detection	Yes		
AAC	600 A		
ADC		900 A peak	
AAC+DC			600 A (900 A peak)
Best accuracy	1%R + 3 cts		
VAC	1,000 V		
VDC	1,000 V		
VAC+DC			1,000 V (1,400 V peak)
Best accuracy	1%R + 3 cts		
Frequency of V / I	Yes / Yes		
Resistance	60 kΩ		
Audible continuity	Adjustable from 1 Ω to 599 Ω		
Diode test (semi-conductor junction)	Yes		
Temperature (K type)	°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 power (W)			Yes
Reactive power (var)			Yes
Apparent power (VA)			Yes
PF			Yes
Harmonic analyses THD_f / THD_r			Yes / Yes
Phase rotation *(2-wire method)*			Yes
Functions			
Overcurrent measurement	Yes		
Motor InRush	Yes		
Load variation (TrueInrush)	Yes		
Hold	Yes		
Min / MAX	Yes		
Peak+ / Peak-			Yes
RELative ΔX / Differential ΔX/X(%)		Yes / Yes	Yes / Yes
Auto Power Off	Yes		
Electrical safety as per IEC 61010	600 V CAT IV - 1,000 V CAT III		
Power supply	1 x 9 V LF22		
Dimensions / weight	78 x 222 x 42 mm / 340 g		

State at delivery & References

> **F201** delivered with 1 PVC lead with built-in test-probe/insulated elbowed Ø 4 mm male banana plug, 9 V alkaline battery, 1 bag pre-equipped for MultiFix, 1 start-up guide on paper and 1 mini-CD with operating manual > P01120921

> **F203** same as F201 plus 1 wire thermocouple with built-in insulated Ø 4 mm banana connections, spacing 19 mm > P01120923

> **F205** delivered with 2 PVC leads with insulated elbowed Ø 4 mm male banana plug / straight banana plug, 2 safety test-probes, 1 crocodile clip, 9 V alkaline battery, 1 bag pre-equipped for MultiFix, 1 start-up guide on paper and 1 mini-cd with operating manual > P01120925

1,000 / 1,500 A TRMS digital multimeter clamps

F400 series

> **Low and medium-power LV applications**

- 1,000 AAC (or AC+DC) / 1,500 ADC
- Clamping diameter 48 mm
- TRMS acquisition
- TrueInRush function

State at delivery & References

Delivered in bag pre-equipped for MultiFix with 2 PVC leads with elbowed insulated Ø 4 mm male banana plug / straight insulated Ø 4 mm male banana plug, 2 test probes/insulated Ø 4 mm female plug, 4 x 1.5 V AA alkaline batteries, 1 start-up guide on paper and 1 mini-CD with operating manual

> **F401** delivered with 1 wire thermocouple with built-in insulated Ø 4 mm banana connections, spacing 19 mm > P01120941

> **F403** same as F401 > P01120943

> **F405** delivered with 1 black CAT IV 1,000 V crocodile clip > P01120945

> **F407** delivered with 1 set of red/black crocodile clips and the PAT (Power Analyser Transfer) PC software > P01120947

Specifications	F401	F403	F405	F407
Clamping diameter	48 mm			
Display	Backlit LCD screen			
No of counts	10,000 counts			
No. of values displayed	1			3
Acquisition	TRMS AC	TRMS AC/DC	TRMS AC, DC, AC+DC	
Automatic calibres (Autorange)	Yes			
Automatic AC/DC detection	Yes			
AAC	1,000 A			
ADC	1,500 A peak			
AAC+DC	1,000 A (1,500 A peak)			
Best accuracy	1% R + 3 cts			
VAC	1,000 V			
VDC	1,000 V			
VAC+DC	1,000 V (1,400 V peak)			
Best accuracy	1% R + 3 cts			
Frequency of V / I	Yes / Yes			
Resistance	100 kΩ			
Audible continuity	Adjustable from 1 Ω to 999 Ω			
Diode test (semi-conductor junction)	Yes			
Temperature (K type)	°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 power (W)			Yes	
Reactive power (VAR)			Yes	
Apparent power (VA)			Yes	
PF / DPF			Yes / –	Yes / Yes
Harmonic analyses THDf / THDr			Yes / Yes	
Frequency analysis			No	25th order
Phase rotation *(2-wire method)*			Yes	
Functions				
Overcurrent measurement	Yes			
Motor Inrush	Yes			
Load variation (TrueInrush)	Yes			
Hold	Yes			
Min / MAX	Yes			
Peak+ / Peak-				Yes
RELative ΔX		Yes	Yes	
Differential ΔX/X(%)		Yes	Yes	
Auto Power Off	Yes			
Data recording				Yes
Communication interface				Bluetooth
Electrical safety as per IEC 61010	1,000 V CAT IV - 1,000 V CAT III			
Power supply	4 x 1.5 V AA batteries			
Dimensions / weight	92 x 272 x 41 mm / 600 g			

2,000/3,000 A TRMS digital multimeter clamps

F600 series

> **High-power LV applications**

- 2,000 AAC (or AC+DC) / 3,000 ADC
- Clamping diameter 60 mm
- TRMS acquisition
- TrueInRush function

TrueInRush

1,000 V CAT IV

IP 54

	F601	F603	F605	F607
Specifications				
Clamping diameter	60 mm			
Display	Backlit LCD screen			
No of counts	10,000 counts			
No. of values displayed	1			3
Acquisition	TRMS AC	TRMS AC/DC	TRMS AC, DC, AC+DC	
Automatic calibres (Autorange)	Yes			
Automatic AC/DC detection	Yes			
AAC	2,000 A			
ADC	3,000 A peak			
AAC+DC	2,000 A (3,000 A peak)			
Best accuracy	1% R + 3 cts			
VAC	1,000 V			
VDC	1,000 V			
VAC+DC	1,000 V (1,400 V peak)			
Best accuracy	1% R + 3 cts			
Frequency of V / I	Yes / Yes			
Resistance	100 kΩ			
Audible continuity	Adjustable from 1 Ω to 999 Ω			
Diode test (semi-conductor junction)	Yes			
Temperature (K type)	°C: -60.0 to +1,000 °C °F: -76 to +1832 °F			
Adapter		Yes		
Single-phase and total three-phase power values			Yes	
Active power (W)			Yes	
Reactive power (VAR)			Yes	
Apparent power (VA)			Yes	
PF / DPF			Yes / –	Yes / Yes
Harmonic analyses THDf / THDr			Yes / Yes	
Frequency analysis				25th order
Phase rotation *(2-wire method)*			Yes	
Functions				
Overcurrent measurement	Yes			
Motor Inrush	Yes			
Load variation (TrueInrush)	Yes			
Hold	Yes			
Min / MAX	Yes			
Peak+ / Peak-				Yes
RELative ΔX		Yes	Yes	
Differential ΔX/X(%)		Yes	Yes	
Auto Power Off	Yes			
Data recording				Yes
Communication interface				Bluetooth
Electrical safety as per IEC 61010	1,000 V CAT IV - 1,000 V CAT III			
Power supply	4 x 1.5 V AA batteries			
Dimensions / weight	111 x 296 x 41 mm / 640 g			

State at delivery & References

Delivered in bag pre-equipped for MultiFix with 1 PVC lead with elbowed insulated Ø 4 mm male banana plug/ straight insulated Ø 4 mm male banana plug, 1 test probe/insulated Ø 4 mm female plug, 4 x 1.5 V AA alkaline batteries, 1 start-up guide on paper and 1 mini-CD with operating manual

> **F601** delivered with 1 wire thermocouple with with built-in insulated Ø 4 mm banana connections, 19 mm spacing > P01120961

> **F603** same as F601 > P01120963

> **F605** delivered with a CAT IV 1,000 V crocodile clip > P01120965

> **F607** delivered with 1 set of red/black crocodile clips and the PAT (Power Analyser Transfer) PC software > P01120967

Digital current clamp

F3N

> **TRMS measurement of any sinusoidal or distorted AC current**
> **Bandwidth from 0.5 Hz to 10 kHz**
> **Memorization of Min/Max/Avg**

Specifications		F3N
Clamping diameter		42 mm
Display		10,000 counts and 40-segment bargraph
Intensity		2 calibres: 0.3 to 400 A / 700 A TRMS to 1,000 Apeak
Accuracy		2 % R
Frequency	Stable	2 calibres: 0.5 Hz to 1 kHz – 10 kHz
	Variable	2 calibres: 5 Hz to 1 kHz – 2 kHz
Crest factor		2.5 to 400 A
Memorization		Min / Max / Avg
Peak		1 ms for intensity
Smooth		3 s smoothing for intensity and frequency
Hold		Yes
Electrical safety		IEC 61010 - 600 V CAT III-2
Dimensions / weight		232 x 98 x 44 mm / 500 g

State at delivery

> **F3N** delivered with carrying case, 9 V battery and 1 operating manual

Reference to order

> **F3N**	> P01120703A

Accessories / Replacement parts

9 V alkaline battery	> P01100620
Carrying bag	> P01298007
Blister-pack bag no. 15	> P01298043Z

AC harmonics clamp

F21

> **Quick diagnosis for qualifying and quantifying "harmonic pollution"**
> **Total harmonic distortion of a current or voltage**

Specifications	F21
Clamping capacity	Ø 42 mm or 50 x 5 mm bars
Display	10,000 counts and 30-segment bargraph
Intensity *(True RMS)*	30 mA to 700 A (1,000 A_{peak})(1)
Voltage *(True RMS)*	50 mV to 600 V (1,200 V_{peak})(1)
Peak	Peak
Frequency	0.5 Hz to 10 kHz
Total Harmonic Distortion *(THD)*	0.5 to 600 %
Harmonic distortion factor *(DF)*	0.5 to 10 %
Analogue output (2)	2 calibres: 1 – 10 mV / A
Power supply / Battery life	9 V battery / 50 hours
Electrical safety	IEC 61010 600 V CAT III
Protection	IP 40
Dimensions / weight	254 x 97 x 44 mm / 600 g

(1) Automatic zero adjustment for DC intensity
(2) To view the current on an oscilloscope

Accessories / Replacement parts

9 V alkaline battery	> P01100620
9 V alkaline battery (x 12)	> P01100620A
9 V alkaline battery (x 24)	> P01100620B
BNC/safety plug lead	> P01295032
2 PVC test-probe leads, isolated Ø 4 mm elbowed male plug (red/black)	> P01295456Z
Blister-pack bag no. 15	> P01298043Z

State at delivery

> **F21** delivered in carrying bag with 1 set of leads, 1 banana/BNC oscilloscope cable, 1 battery and 1 operating manual

Reference to order

> **F21**	> P01120752

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, there must be an earth electrode.

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

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

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

2. CONTINUITY

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

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

3. INSULATION

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

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

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

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

4. TESTS OF PROTECTIVE DEVICES

- *Fuses / Circuit-breakers*

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

- *Residual current devices (RCDs)*

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

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

Installation testers selection guide

	 C.A 6030	 C.A 6454	 C.A 6456	 C.A 6116
Insulation				
Bipolar				■
50 / 100 / 250 / 500 / 1,000 V				■
RCD tests				
Non-trip test	■			■
Trip time	■			■
Trip current	■			■
Earth				
2P / 3P method without voltage			■	■
1P live-line method	■	■	■	■
1-clamp selective method		■	■	■
Loop impedance & resistance				
L-PE	■	■	■	■
L-L		■	■	■
L-N		■	■	■
Isc calculation	■	■	■	■
Continuity				
Manual & automatic measurement				■
Phase rotation	■			■
Current / Leakage current	■	■	■	■
Active power				■
Harmonics				■
Voltage	■	■	■	■
Frequency	■	■	■	■
Wiring polarity: Test + Reversal	■	■	■	■
Alarms	■	■	■	■
Memory	■	■	■	■
Communication output	■	■	■	■
Display	■	■	■	■
LCD screen	■	■	■	
Graphic screen				■
Power supply				
Batteries	■	■	■	
Rechargeable batteries				■
Software				
DataView®				■
Other	■	■	■	
Page	40	41	41	42

Installation tester

> **C.A 6030**
- Comprehensive, accurate testing of RCD status
- Earth loop measurement

600 V CAT III

C.A 6030

Specifications	C.A 6030
Voltage measurement	2 to 550 V *(DC or RMS)* as soon as the instrument is connected
Frequency	15.3 Hz to 450 Hz as soon as the instrument is connected
Wiring polarity: testing + reversal	Yes
RCD tests	
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 to 650 mA
No-trip test	½ IΔn
Trip time	IΔn, 2 IΔn, 5 IΔn, 150 mA, 250 mA
Trip current	Step mode
L-PE loops *(without RCD trip > 30 mA)*	Z and R measurement
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 % R +15 cts
Current measurement	0.1 to 0.5 IΔn
Calculation of short-circuit current *(Isc)*	Up to 40 kA
Earth measurement with power on *(1P)* *(without RCD trip > 30 mA)*	
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 % R + 15 cts
Current measurement	0.1 to 0.5 IΔn
Phase rotation	90 < voltage present < 550 V
Current / Leakage current *(using a current clamp option)*	
MN20 clamp	5 mA to 20 A
C172 clamp	5 mA to 20 A
C176 clamp	50 mA to 200 A
Compensation of cables	Yes
Alarms	In each function
Memory	1,000 measurements
Communication output	Optical interface
Power supply / electrical safety	6 x 1.5 V batteries / IEC 61010-1 - CAT III 600 V
Display	4,000-count backlit LCD screen
Dimensions / weight	211 x 108 x 60 mm / 0.9 kg

State at delivery

> **C.A 6030** delivered in "neckstrap" bag with a carrying bag for accessories containing 1 measurement lead with Euro mains plug, 1 measurement lead with 3 separate cables, 3 crocodile clips, 3 test probes, data transfer software + 1 optical communication cable and 1 operating manual in 5 languages

References to order

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

Accessories / Replacement parts

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

Installation testers

C.A 6454 & C.A 6456

> **C.A 6454**
Installation testing by loop measurement

> **C.A 6456**
Universal earth tester for any installation

Specifications		C.A 6454	C.A 6456
Voltage measurement		2 to 550 V *(DC or RMS)* as soon as the instrument is connected	
Frequency		15.3 Hz to 450 Hz as soon as the instrument is connected	
Wiring polarity: testing + reversal		Yes	
Loops	Voltage	90 to 550 V	
	Frequency of the installation	15.3 to 65 Hz	
L-PE loops		Z and R measurement	
(without RCD trip > 30 mA)	Measurement range	0.2 Ω to 4,000 Ω	
	Accuracy	15 % R +5 cts	
	Current measurement	6 mA – 9 mA – 12 mA	
L-L / L-N / L-PE loops measurements		Z and R measurement	
(high current)	Measurement range	0.2 Ω to 4,000 Ω	
	Accuracy	10 % R +7 cts	
	Current measurement	5 A	
Calculation of short-circuit current *(Isc)*		Up to 40 kA	
Earth measurement with power on	Voltage	90 to 550 V	
	Frequency of the installation	15.3 to 65 Hz	
Earth measurement with power on *(1P)*	Measurement range	0.5Ω to 4,000 Ω	
(without RCD trip > 30 mA)	Accuracy	15 % R + 5 cts	
	Current measurement	6 mA – 9 mA – 12 mA	
Earth measurement with power on *(1P)*	Measurement range	0.2Ω to 4,000 Ω	
(high current)	Accuracy	10 % R + 7 cts	
	Current measurement	5 A	
Selective earth measurement	Measurement range	0.5Ω to 4,000 Ω	
	Accuracy	15 % R + 10 cts	
	Current measurement	5 A	
Earth with power off with stakes	Measurement range	-	0.5Ω to 4,000 Ω
(2P/3P method)	Accuracy	-	2 % R + 5 cts
Current / Leakage current	MN20 clamp	5 mA to 20 A	
(using a current clamp option)	C172 clamp	5 mA to 20 A	
	C176 clamp	50 mA to 200 A	
Compensation of cables		Yes	
Alarms / Memory		In each function / 100 measurements	
Communication output		Optical interface	
Power supply / electrical safety		6 x 1.5 V batteries / IEC 61010-1 - CAT III 600 V	
Display		4,000-count backlit LCD screen	
Dimensions / weight		211 x 108 x 60 mm / 0.9 kg	

600 V CAT III

Accessories / Replacement parts

C172 current clamp	> P01120310
C176 current clamp	> P01120330
MN20 current clamp	> P01120440
Serial printer no. 5	> P01102903
1P loop kit	> P01102020
3 crocodile clips (red/white/yellow)	> P01101905
3 test probes (red/white/yellow)	> P01101906A
Optical / RS232 connection cable	> P01295252
10 m H green cable winder	> P01102026
Earth T-rod	> P01102031
100 m reel of green cable	> P01295266
33 m reel of green cable	> P01295268
Standard carrying bag	> P01298066
> For C.A 6456	
3P 50 m earth kit	> P01102021
3P 100 m earth kit	> P01102022
15 m earth kit (red/green/blue)	> P01102017
1P 30 m earth kit (black)	> P01102018

State at delivery

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

References to order

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

Installation tester

C.A 6116

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

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

> **Software**

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

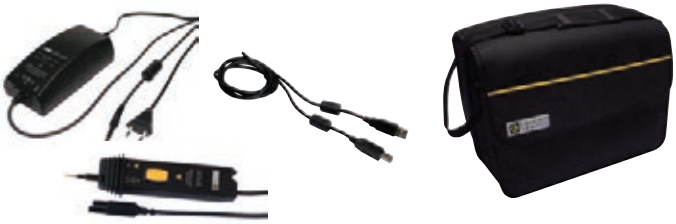
Compatible with the DataView® software which is capable of producing reports in compliance with the applicable standards (IEC 60364-6, VDE 100, etc.)

Accessories

EARTH KITS	
50 m 3P earth kit	> P01102021
100 m 3P earth kit	> P01102022
15 m earth kit (red/green/blue)	> P01102017
1P 30 m earth kit (black)	> P01102018
CURRENTS CLAMPS	
MN77 current clamp (5 mA... 20 A)	> P01120460
C177 current clamp (5 mA... 20 A)	> P01120335
C177A current clamp (0.020 A... 200 A)	> P01120336
Others	
Continuity rod	> P01102084A
DataView® software	> P01102095

Spares

Carrying bag	> P01298056
PA 30 W mains power pack	> P01102057
NiMh 35 Wh battery pack	> P01296024
USB-A USB-B lead	> P01295293
Screen-protection film (x 3)	> P01102094
4-point "hands-free" strap	> P01298073
Remote-control probe	> P01102092
Red test probe for remote control unit	> P01101943
Kit with 3 test probes (red, blue and green)	> P01101921
Kit with 3 crocodile clips (red, blue and green)	> P01101922



Installation tester

C.A 6116

			C.A 6116
Specifications			
Voltage			0.2 to 550 VAC - 2.0 to 399.9 VDC
Frequency			15.8 to 500 Hz
Insulation		Rated voltage	Utest: 50 / 100 / 250 / 500 / 1,000 VDC
		Range	0.01 MΩ to 2 GΩ
		Intrinsic accuracy	± (5 % of measurement + 2 counts)
RCDs		Installation voltage	90 V to 500 V
		Installation frequency	15.8 Hz to 17.5 Hz / 45 Hz to 65 Hz
		IΔn	10 / 30 / 100 / 300 / 500 / 650 / 1,000 mA or variable (4 – 999 mA)
		No-trip test	At ½ IΔn – Duration: 1,000 ms or 2,000 ms
		Measurement of tripping time	At IΔn / 2 IΔn *(selective)* / 5 IΔn
		Step mode	0.3 IΔn to 1.06 IΔn in steps of 3.3 % IΔn
Earth		Measurement range	0.50 Ω to 4 kΩ
3P earth		Accuracy	± (2 % of measurement + 5 counts)
		Others	Auxiliary stake resistance measurement (up to 40 kΩ)
Earth measurement with power on			
		Installation voltage	90 to 500 V
		Installation frequency	15.8...17.5 Hz / 45...65 Hz
1P earth		*High-current mode with tripping (TRIP)*	
		Measurement range	0.08 Ω to 3999 Ω
		Accuracy (> 4Ω)	± (5 % of measurement + 2 counts)
		Test current	Up to 4.5 A
		Mode without tripping (NO TRIP)	
		Measurement range	0.20 Ω to 3999 Ω
		Accuracy(> 2Ω)	± (5 % of measurement + 3 counts)
		Test current	6 mA *(by default)* – 9 mA – 12 mA
1P selective earth		Measurement range	0.50 Ω to 399.9 Ω
		Accuracy	± (10 % of measurement + 10 counts)
Loops		Installation rated voltage	90 to 500 V
		Installation rated frequency	15.8 to 17.5 Hz and 45 to 65 Hz
L-PE loops *(Zs)*			Z and R measurement
(without RCD trip > 30 mA)		Measurement range	0.2 Ω to 4,000 Ω
		Accuracy 2 to 4,000 Ω (> 2 Ω)	±5 % / ±10 % R ± 3 cts
		Current measurement	6 mA – 9 mA – 12 mA
L-L / L-N / L-PE loop measurements *(Zi)*			Z and R measurement
(high current)		Measurement range	0.08 Ω to 4,000 Ω
		Accuracy (> 4 Ω)	±5 % R ± 2 cts
		Current measurement	Up to 4.5 A
Calculation of short-circuit current (Isc)			0.1 A to 6 kA
Continuity		Current measurement	I > 200 mA up to 39.99 Ω I approx. 13 mA, range from 0 to 400 Ω
		Measurement range	0 to 40 Ω - 0 to 400 Ω
		Accuracy	± 1 % + 2 cts
Resistance		Measurement range	0 to 400 kΩ
		Accuracy	± 1 % + 2 cts
Phase rotations		Voltage	20 to 500 VAC
		Frequency	15.8 to 17.5 Hz and 45 to 65 Hz
Current / leakage current		MN77 clamp	5 mA to 19.99 A
		C177 clamp	5 mA to 19.99 A
		C177A clamp	0.02 to 199.9 A
Active power *(with optional C177A clamp)*			0 to 110 kW single-phase, 0 to 330 kW three-phase Simultaneous display of of voltage and current waveforms
Harmonics *(with optional C177A clamp)*			Voltage and current harmonics / orders 1 to 50 / THD
Alarms			In each function
Memory			1,000 memory locations
Display			Large 5.7" backlit graphic screen 320 x 240 counts
Communication output			Via USB for data transfer and report creation (with PC software)
Power supply			Rechargeable battery
Protection			IP 53
Electrical safety			IEC 61010-1 – 600 V CAT III – IEC 61557
Dimensions / weight			280 x 190 x 128 mm / 2.4 kg

State at delivery

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

References to order

> **C.A 6116**

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

Technical overview

INSULATION

To ensure that electrical equipment and installation operate correctly in total safety, all the conductors are insulated: sheathing for cables, varnish for windings. When the quality of these insulating materials diminishes, leakage currents may flow from one conductor to the other and, depending on the extent of the insulation faults (the worst being a short-circuit), may cause serious damage.
Equipment with faulty insulation may break down, burn or cause a fault on the installation itself, thus triggering protective devices and shutting down the whole installation...
Furthermore, some particularly sensitive installations (operating theatres in hospitals, chemical industries, etc.) are built using an IT-type neutral system (cf. IEC 60364-6), which tolerates an initial line-earth insulation fault and only shuts down the installation if a second fault occurs.
Measurements are needed to prevent and prepare for the hazards linked to insufficient or damaged insulation. These measurements concern both the electrical equipment and the installations to which it is connected.
These measurements are carried out during commissioning on new or reconditioned items, and then repeated regularly to monitor their evolution over time.

I - INSULATION RESISTANCE MEASUREMENT AND DIELECTRIC TESTING

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

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

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

II- MEASURING LEVELS OF INSULATION

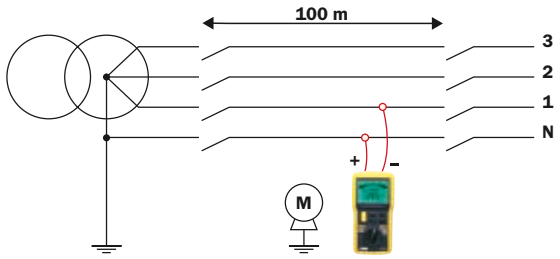
In concrete terms, first of all the installation or equipment is checked to ensure that no voltage is present in it. Then a DC test voltage is applied and the insulation resistance value is read. When measuring an insulation in relation to the earth, you are advised to place the positive pole of the test voltage on the earth to prevent earth polarization problems when carrying out multiple tests.
All the standards concerning electrical installations or equipment specify the measurement conditions and minimum thresholds to be respected for insulation measurements.

III- INSULATION MEASUREMENT APPLICATIONS

A) Insulation measurement on electrical installations

■ *Insulation test before powering up*

Before powering up a new installation, its insulation must be tested.
Two types of measurements are required:
- Verification of the conductors: this checks that none of the conductors, cut-off devices or connection equipment has suffered damage liable to cause an insulation fault. This is done before commissioning the installation, with all the receivers disconnected.
- Verification of the whole installation in relation to the earth.



■ *Verification of insulation after powering up*

After powering up the installation, the insulation should be checked regularly to make sure there is no substantial drift away from the initial values.
Because the method used is the same as for testing before powering up, the installations must be switched off.
In both cases, the insulation will be considered acceptable if the insulation resistance measured is greater than the threshold specified by the applicable standard for the installation tested (NF C 15-100 in France, VDE 100 in Germany, European standard IEC 60364, IEEE 43-2000, etc.).

B) Insulation measurement on motors, transformers, etc.

Whether on electrical installations or on machines, the quality of the insulating materials deteriorates as time passes due to the stresses affecting the equipment. This deterioration reduces the electrical resistivity of the insulants, leading in turn to an increase in the leakage currents and causing incidents which may be serious in terms of the safety of people and property, but also in terms of production stoppage costs in industry.
So, in addition to the measurements during commissioning of new or renovated equipment, regular insulation testing of installations and equipment helps to prevent such incidents by organizing preventive maintenance designed to detect ageing and therefore prevent premature deterioration of the insulation properties before they reach a level liable to cause the incidents described above.
Deterioration of the equipment may occur naturally, but it is often also accelerated by external contaminants such as dust, oil, etc. It is therefore strongly recommended to monitor their insulation over time.
To carry out this preventive maintenance effectively, the Chauvin Arnoux range of megohmmeters proposes the following functions:
- PI, DAR and DD quality ratios for a quick assessment of insulation quality, with the added advantage that they are not particularly influenced by temperature, making them easy to use without requiring correction of the results
- Automatic calculation of the insulation resistance at a reference temperature (C.A 6549)
- Method based on the influence of test voltage variation (step voltage measurement)

CRITERIA FOR CHOOSING AN INSULATION TESTER

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

■ **The application**

What type of equipment will you be testing: electrical installations, switchgear, telephony, etc.?
Rated operating voltage, manufacturer recommendations, dedicated standards?
Test voltage: 50 – 100 – 250 – 500 – 1,000 – 2,500 – 5,000 – 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?

Insulation testers selection guide

	C.A 6501	C.A 6503	C.A 6511	C.A 6513	C.A 6521	C.A 6523	C.A 6525	C.A 6531	C.A 6533	C.A 6541	C.A 6543	C.A 6505	C.A 6545	C.A 6547	C.A 6549	C.A 6550	C.A 6555
Test voltage (VDC)																	
50								■	■	■	■	■	■	■	■	■	■
100								■	■	■	■	■	■	■	■	■	■
250		■			■		■		■	■	■	■	■	■	■	■	■
500	■	■	■	■	■	■	■		■	■	■	■	■	■	■	■	■
1,000		■		■		■	■			■	■	■	■	■	■	■	■
2,500												■	■	■	■	■	■
5,000												■	■	■	■	■	■
variable 50 to 5,100												■	■	■	■	■	■
10,000																■	■
variable 40 to 10,000																■	■
15,000																	■
variable 40 to 15,000																	■
Max. measurement value																	
200 MΩ	■																
400 MΩ								■									
1 GΩ			■	■													
2 GΩ					■	■	■										
5 GΩ		■															
20 GΩ									■								
4 TΩ										■	■						
10 TΩ												■	■	■	■		
25 TΩ																■	
30 TΩ																	■
Continuity	■		■	■	■	■	■			■	■						
Resistance	■			■		■	■	■	■	■	■		■	■	■	■	■
Capacitance								■		■	■	■	■	■	■	■	■
AC/DC current								■									
Chronometer													■	■	■	■	■
Test duration programming							■			■	■		■	■	■	■	■
Quality ratios										■	■	■	■	■	■	■	■
Ratios de qualité																	
PI										■	■	■	■	■	■	■	■
DAR										■	■	■	■	■	■	■	■
DD													■	■	■	■	■
Graphics																	
R(t)										■	■		■	■	■	■	■
u(t) + i(t)																■	■
i(u)																■	■
Ramp																■	■
Ramp by voltage steps															■	■	■
R. calculation (Tref)															■	■	■
I limit																■	■
Early break / Burn-in																■	■
Memorization										■	■			■	■	■	■
RS232											■			■	■		
USB																■	■
Display																	
Analogue	■	■	■	■													
LCD + bargraph					■	■	■	■	■	■	■	■	■	■			
Graphic															■	■	■
Power supply																	
Magneto	■	■															
Batteries			■	■	■	■	■	■	■	■							
Rechargeable battery											■	■	■	■	■	■	■
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Magneto analogue insulation testers

C.A 6501 & C.A 6503

> **C.A 6501 & C.A 6503: on-site version**
Rugged plastic casing suitable for use in all conditions

Specifications		C.A 6501	C.A 6503
Insulation	*(calibre MΩ)*		
	Test voltage *(DC)*	500 V	250 V / 500 V / 1,000 V
	Range	0.5 to 200 MΩ	1 to 5,000 MΩ
	Accuracy	2.5 % of end-of-scale	2.5 % of end-of-scale
Resistance	Range	45 to 500 kΩ	-
	Accuracy	2.5 % of end-of-scale	
Continuity	Range	0 to 100 Ω	-
	Accuracy	2 % of end-of-scale	
Voltage	Range	0 ... 600 VAC	
	Frequency	45 to 450 Hz	
	Accuracy	3 % of end-of-scale	
Display		Analogue	
Dimensions / weight		120 x 120 x 130 mm / 1.06 kg	
Power supply		Magneto allowing a stable test voltage	
Protection		IP 54 with cover IP 52 without cover	
Electrical safety		IEC 61010 - 600 V CAT II / 300 V CAT III	

State at delivery

> **C.A 6501** delivered in carrying bag with 1 operating manual, 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 carrying bag with 1 operating manual, 3 elbowed/straight PVC leads 1.5 m long (black/red/blue), 3 crocodile clips (black/red/blue), 1 black test probe

References to order

> **C.A 6501**	> P01132503
> **C.A 6503**	> P01132504

Accessories / Replacement parts

C.A 846 thermo-hygrometer	> P01156301Z
C.A 861 thermometer + K thermocouple	> P01650101Z
0.2 A fuse / HPC for C.A 6501	> P01297095
2 crocodile clips (red/black)	> P01102052Z
Ø 4 mm CAT II 300 V moulded test probe (x 2)	> P01295458Z
2 PVC leads (red/black)	> P01295289Z
5 crocodile clips (red, black, blue, yellow, green/yellow)	> P01101849
3 safety leads 1.5 m long (red, blue, black)	> P01295171

Analogue insulation testers

C.A 6511 & C.A 6513

> **C.A 6511**
- Simple to use
- Rugged shockproof sheath
- Insulation 500 V, continuity 200 mA

> **C.A 6513**
- Simple to use
- Rugged shockproof sheath
- Insulation 1,000 V, continuity 200 mA & resistance

600 V CAT III

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

Accessories / Replacement parts

C.A 861 thermometer + K thermocouple	> P01650101Z
C.A 846 thermo-hygrometer	> P01156301Z
2 crocodile clips (red/black))	> P01102052Z
Ø 4 mm CAT II 300 V moulded test probe (x 2)	> P01295458Z
2 PVC leads (red/black)	> P01295289Z
1.5 V LR6 alkaline battery	> P01296033
1.5 V LR6 alkaline battery (x 12)	> P01296033A
1.5 V LR6 alkaline battery (x 24)	> P01296033B
1.6 A fuse	> P01297022
Shockproof sheath no. 13	> P01298016

State at delivery

> **C.A 6511 and C.A 6513** delivered in shockproof sheath with 2 elbowed/straight PVC leads 1.5 m long (red/black), 1 black test probe, 1 red crocodile clip, 1 operating manual, 4 x LR6 1.5 V batteries

References to order

> **C.A 6511**	> P01140201
> **C.A 6513**	> P01140301

Digital insulation testers

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

> **C.A 6521, 2 in 1**
- Dual analogue and digital display

> **C.A 6523, 3 in 1**
- Dual analogue and digital display
- Programmable alarm thresholds

> **C.A 6525, 3 in 1**
- Programmable alarm thresholds
- Chronometer to test insulation quality

Specifications		C.A 6521	C.A 6523	C.A 6525
Insulation	Test voltage			
	250 V	50 kΩ to 2 GΩ	-	50 kΩ to 2 GΩ
	500 V	100 kΩ to 2 GΩ	100 kΩ to 2 GΩ	100 kΩ to 2 GΩ
	1,000 V	-	200 kΩ to 2 GΩ	200 kΩ to 2 GΩ
Accuracy	200 kΩ to 2 GΩ	±3 % R ±2 cts		
Voltage test / Safety		0 to 600 VAC/DC		
Voltage alert indicator		Yes > 25 V		
Test inhibition		Yes > 25 V		
Continuity	Range	0.0 to 19.99 Ω		
	Current measurement	≥ 200 mA up to 20 Ω		
	Current reversal	Yes	Yes	Yes
	Cable compensation	-	Yes	Yes
	Buzzer	Yes	Yes	Yes
Resistance	Range	-	0 to 400 kΩ	0 to 400 kΩ
Alarms		-	Yes	Yes
Chronometer		-	-	0 to 15 min.
Display		LCD + Bargraph		
Backlighting		-	Yes	Yes
Power supply		6 x LR6 batteries		
Dimensions / weight		211 x 108 x 60 mm / 830 g		
Electrical safety		IEC 61010 300 V CAT II – IEC 61557		

State at delivery

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

Accessories / Replacement parts

Remote-control probe	> P01101935
C.A 861 thermometer + K thermocouple	> P01650101Z
C.A 846 thermo-hygrometer	> P01156301Z
Carrying bag for "hands-free" use	> P01298049
0.63 A fuse (x 5)	> P01297078
1.5 V LR6 alkaline battery	> P01296033
Ø 4 mm CAT II 300 V moulded test probe (x 2)	> P01295458Z
2 crocodile clips (red/black)	> P01102052Z
2 PVC leads (red/black)	> P01295289Z

References to order

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

Digital insulation testers

C.A 6531 & C.A 6533

> **C.A 6531 & C.A 6533**
- Specially designed for Telecoms & Electronics
- Dedicated to equipment or installations using low currents

600 V CAT III

Specifications		C.A 6531	C.A 6533
Insulation	Test voltage		
	50 V	10 kΩ to 400 MΩ	10 kΩ to 2 GΩ
	100 V	20 kΩ to 400 MΩ	20 kΩ to 2 GΩ
	250 V	-	50 kΩ to 20 GΩ
	500 V	-	100 kΩ to 20 GΩ
Accuracy	200 kΩ to 2 GΩ	±3 % R ±2 cts	
Voltage test / Safety		0 to 600 VAC/DC	
Voltage alert indicator		Yes > 25 V	
Test inhibition		Yes > 25 V	
Capacitance		0 to 4,000 nF*	-
AC/DC current measurement		0 to 400 mA	-
Resistance	Range	0 to 40 kΩ	0 to 400 kΩ
Alarms		Yes	Yes
Display		LCD + Bargraph	
Backlighting		Yes	
Power supply		6 x LR6 batteries	
Dimensions / weight		211 x 108 x 60 mm / 835 g	
Electrical safety		IEC 61010 600 V CAT III – IEC 61557	

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

Accessories / Replacement parts

Remote-control probe	> P01101935
C.A 861 thermometer + K thermocouple	> P01650101Z
C.A 846 thermo-hygrometer	> P01156301Z
Carrying bag for "hands-free" use	> P01298049
0.63 A fuse (x 5)	> P01297078
1.5 V LR6 alkaline battery	> P01296033
Ø 4 mm CAT II 300 V moulded test probe (x 2)	> P01295458Z
2 crocodile clips (red/black)	> P01102052Z
2 PVC leads (red/black)	> P01295289Z

State at delivery

> **C.A 6531** delivered with a carrying bag for "hands-free" use containing a set of 2 leads 1.5 m long, 1 crocodile clip, 1 black test probe, 2 wire grips, 6 x 1.5 V LR6 batteries and 1 operating manual

> **C.A 6533** delivered with a carrying bag for "hands-free" use containing a set of 2 leads 1.5 m long, 1 guarded safety lead 1.5 m long, 1 crocodile clip, 1 blue crocodile clip, 1 black test probe, 2 wire grips, 6 x 1.5 V LR6 batteries and 1 operating manual

References to order

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

Digital insulation tester

C.A 6541 & C.A 6543

> **Special on-site 1,000 V insulation tester**
- Extensive measurement range, up to 4 TΩ
- Automatic calculation of DAR / PI quality ratios
- Ultra-rugged site-proof case

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 % R ± 3 cts	
	40 GΩ to 4 TΩ	±15 % R ± 10 cts	
Programmable test duration		1 to 59 min.	
DAR *(1 min. / 30 sec.)*		0.000 to 9.999	
PI *(10 min. / 1 min.)*		0.000 to 9.999	
Customizable PI		Times programmable 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	
Smooth function		Yes	
Continuity	Range	0.01 to 39.99 Ω	
	Current measurement	≥ 200 mA up to 20 Ω	
Resistance	Range	0.01 to 400 kΩ	
Capacitance	Range	0.005 to 4.999 µF	
Memory – Communication			
	R*(time)*	20 kB	128 kB
	Measurement storage	20 measurement values	Until 1,500 measurement values
	Direct report printing	-	On local printer, fixed format
	Communication output	No	RS-232
	PC software	No	DataView® *(option)*
Display		Giant LCD + bargraph	Giant LCD + bargraph
Power supply		8 x LR14 batteries	NiMH 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

Accessories / Replacement parts

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

C.A 6543

INo. 5 series printer	> P01102903
Serial-parallel adapter	> P01101941
MegohmView software	> P01101938A
DataView® software	> P01102058
Safety leads 1.5 m long (red, blue, black)	> P01295171
RS232 PC cable DB 9F - DB 25F x 2	> P01295172

State at delivery and reference

> **C.A 6541** delivered with a carrying bag for accessories containing: a set of 2 leads 1.5 m long (red/black), 1 black guarded lead 1.5 m long, 3 crocodile clips (red/blue/black), 1 test probe (black), 1 simplified operating manual, 1 operating manual in 5 languages, 8 LR14 batteries > P01138901

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

Accessories / Replacement parts

RS232 printer cable DB 9F - DB 9M no. 01	> P01295173
2P EUR mains lead	> P01295174
GB mains power cable	> P01295253
Battery pack	> P01296021

Digital insulation tester

C.A 6505

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

1,000 V CAT III

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
Programmable voltage		40 V to 1,000 V: 10 V increments
		1,000 V to 5100 V: 100 V increments
Accuracy	1 kΩ to 400 GΩ	±5 % R ± 3 cts
	400 GΩ to 10 TΩ	±15 % R ± 10 cts
Programmable 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		Times programmable 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 battery
Dimensions / weight		270 x 250 x 180 mm / 4.3 kg
Electrical safety		IEC 61010 1,000 V CAT III – IEC 61557

State at delivery

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

Reference to order

- **C.A 6505 Megohmmeter** > P01139704

Digital insulation testers

> The insulation experts at 5 kV: measurement, testing and diagnosis

- Extensive measurement range
- Fixed and programmable test voltages
- Quantitative and qualitative insulation analysis: automatic calculation of the DAR / PI / DD quality ratios
- Storage and communication (C.A 6547)

C.A 6545 & 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	
Programmable voltage		40 V to 1,000 V: 10 V increments	
		1,000 V to 5100 V: 100 V increments	
Accuracy	30 kΩ to 40 GΩ	±5 % R ± 3 cts	
	40 GΩ to 10 TΩ	±15 % R ± 10 cts	
Programmable 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		Times programmable 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	
Smooth function		Configurable – Digital filtering to stabilize the measurements	
Capacitance		0.005 to 49.99 µF	
Leakage current measurement		0.001 nA to 3 mA	
Memory – Communication			
	R*(time)*	4 kb	128 kb
	Measurement storage	20 measurement values	Up to 1,500 measurement values
	Direct report printing	No	On local printer, fixed format
	Communication output	No	RS232
	PC software	No	DataView® *(option)*
Display		Giant LCD + bargraph	
Power supply		NiMH battery	
Dimensions / weight		270 x 250 x 180 mm / 4.3 kg	
Electrical safety		IEC 61010 1,000 V CAT III – IEC 61557	

Accessories / Replacement parts

C.A 861 thermometer, K thermocouple K	> P01650101Z
AN1 artificial neutral box	> P01197201
Red/black HV lead for simplified measurement (x 2)	> P01295231
Simplified protective HV lead + 1 crocodile clip (blue)	> P01295232
HV lead 8 m long, blue crocodile clip	> P01295214
HV lead 8 m long, red crocodile clip	> P01295215
HV lead 8 m long, black crocodile clip / earth ident.	> P01295216
HV lead 15 m long, blue crocodile clip	> P01295217
HV lead 15 m long, red crocodile clip	> P01295218
HV lead 15 m long, black crocodile clip / earth ident.	> P01295219
Standard carrying bag for accessories	> P01298066
FF fuse 0.1 A - 380 V - 5 x 20 mm - 10 kA (set of 10)	> P03297514
2P EUR mains lead	> P01295174

> For C.A 6547:

No. 5 series printer	> P01102903
Serial-parallel adapter	> P01101941
MEGOHMVIEW software	> P01101938A
DataView® report generation software	> P01102095
RS232 PC cable DB 9F - DB 25F x 2	> P01295172
RS232 printer cable DB 9F - DB 9M no. 01	> P01295173

State at delivery

> C.A 6545 delivered with a carrying bag containing 2 safety leads 3 m long with HV plug and HV crocodile clip (red/blue), 1 guarded safety lead 3 m long with HV plug with rear connector and HV crocodile clip (black), 1 rear-connector lead (blue) 0.35 m long, 1 mains power cable 2 m long, 1 simplified operating manual, 1 operating manual in 5 languages

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

References to order

> C.A 6545	> P011139701
> C.A 6547	> P011139702

Digital insulation tester

C.A 6549

Specifications		C.A 6549
Insulation	Test voltage	
	500 V	30 kΩ to 2 TΩ
	1,000 V	100 kΩ to 4 TΩ
	2500 V	100 kΩ to 10 TΩ
	5,000 V	300 kΩ to 10 TΩ
Programmable voltage		40 V to 1,000 V: 10 V increments
		1,000 V to 5,100 V: 100 V increments
Automatic voltage steps		Value and duration programmable for up to 5 steps, three profiles stored
Accuracy	30 kΩ to 40 GΩ	±5% R ± 3 cts
	40 GΩ to 10 TΩ	±15% R ± 10 cts
Programmable 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		Times programmable 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
Smooth function		Configurable – Digital filtering to stabilize the measurements
Capacitance		0.005 to 49.99 µF
Leakage current measurement		0.001 nA to 3 mA
Memory – Communication		
	R*(time)*	Viewing on the display + storage of samples
	Measurement storage	Up to 1,500 measurements
	Direct report printing	On local printer, fixed format
	Communication output	RS232
	PC software	DataView® *(option)*
Display		Large LCD screen
Power supply		NiMH battery
Dimensions / weight		270 x 250 x 180 mm / 4.3 kg
Electrical safety		IEC 61010 1,000 V CAT III – IEC 61557

> **C.A 6549, The "Pro" for preventive maintenance**
- Storage
- Wide graphic screen
- Calculation of the resistance at a reference temperature
- Step voltage testing

1,000 V CAT III

State at delivery

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

Reference to order

> **C.A 6549**	> P011139703

Accessories / Replacement parts

C.A 861 thermometer, K thermocouple	> P01650101Z
AN1 artificial neutral box	> P01197201
2 HV leads for simplified measurement (red/black)	> P01295231
Simplified protective HV lead + 1 crocodile clip (blue)	> P01295232
HV lead 8 m long, blue crocodile clip	> P01295214
HV lead 8 m long, red crocodile clip	> P01295215
HV lead 8 m long, black crocodile clip / earth ident.	> P01295216
HV lead 15 m long, blue crocodile clip	> P01295217
HV lead 15 m long, red crocodile clip	> P01295218
HV lead 15 m long, black crocodile clip / earth ident.	> P01295219
Standard carrying bag for accessories	> P01298066
FF fuse 0.1 A - 380 V - 5 x 20 mm - 10 kA (set of 10)	> P03297514
2P EUR mains lead	> P01295174
No. 5 series printer	> P01102903
Serial-parallel adapter	> P01101941
MegohmView software	> P01101938A
DataView® report generation software	> P01102095
RS232 PC cable DB 9F - DB 25F x 2	> P01295172
RS232 printer cable DB 9F - DB 9M no. 01	> P01295173

Digital insulation testers

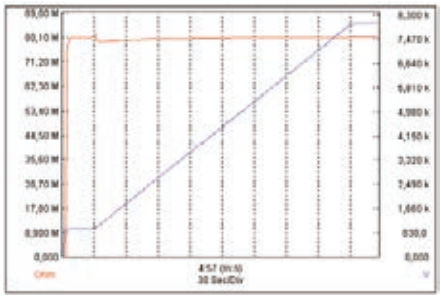
C.A 6550 & C.A 6555

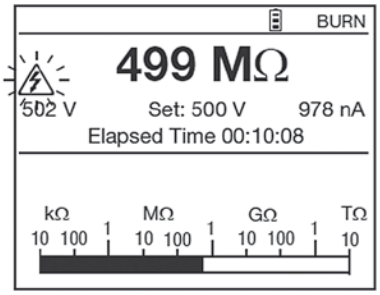
1,000 V CAT IV

- Wide measurement range from 10 kΩ to 30 TΩ
- Fixed or programmable test voltage from 40 V to 10/15 kV
- 5 mA charging current
- Large backlit LCD screen with digital display, bargraph and R(t)+u(t), i(t), i(u) graphs
- Automatic calculation of DAR / PI / DD / ΔR (ppm/V) ratios
- Multiple voltage ramp and step test modes with:
  - Burn mode: test without programmed current limit
  - Early break" mode: non-destructive test
  - "_I-limit_" mode: test with predefined current
- 3 filters to optimize measurement stability
- Calculation of the resistance at a temperature of reference
- 80,000-measurement storage capacity and real-time clock
- Optically-isolated USB communication for transferring the recorded data onto a PC and generating reports with the DataView® software

> **Effective, with 2 levels of diagnostics available:**
- "Go/No Go" test
- Qualitative measurement for preventive maintenance

Example of results displayed on the large 320 x 240-pixel screen, and example of graphic mode





États de livraison

> **C.A 6550 and C.A 6555** delivered with a carrying bag containing 2 safety leads 3 m long with HV plugs (red/blue), 1 guarded safety cable 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 CAT IV 1,000 V test probes (red/black) for voltage measurements, 1 rear-connector lead (blue), 1 mains power cable 2 m long, DataView® software, 1 optical / USB communication lead, 1 operating manual in 5 languages on CD-ROM

Références pour commander

> **C.A 6550**	> P01139705
> **C.A 6555**	> P01139706

Digital insulation testers

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	
		2500 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 presettable voltage values	40 V - 15,000 V 3 presettable voltage values
	Variable voltage settings	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 presettable 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 steps (value and duration configurable for each step)	
Voltage measurement 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 minutes 59 seconds	
Burning mode	Burning	Continuous testing	
Ratio calculation		PI, DAR, DD, SV, ΔR (ppm/V)	
Calculation of R at ref. T°		Yes	
Measurement display filter		3 filters with 3 time constants	
Graphs on display		R(t)+u(t); i(t); i(u)	
Storage		256 recordings, 80,000 points R, U, I and date	
Communication		Optically-isolated port for USB and RS232 links	
PC software		DataView®	
Power supply		NiMH rechargeable batteries, 8 x 1.2 V / 4,000 mAh charging by external voltage: 90-260 V 50/60 Hz	
Electrical safety		1,000 V CAT IV - IEC 61010-1 and IEC 61557	
Dimensions / weight		L x P x H: 406 x 330 x 174 mm, 6 kg approx.	

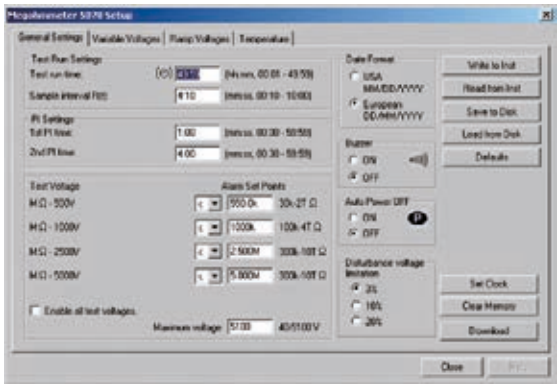
INSULATION at 10 kV / 15 kV

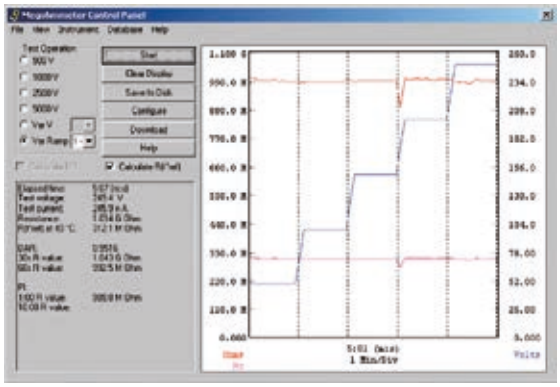
Accessories / Replacement parts

3 x 3 m HV leads for 10/15 kV	> P01295465
Blue 8 m HV lead with crocodile clip	> P01295468
Red 8 m HV lead with crocodile clip	> P01295469
Black 8 m HV lead with crocodile clip	> P01295470
Blue 15 m HV lead with crocodile clip	> P01295471
Red 15 m HV lead with crocodile clip	> P01295472
Black 15 m HV lead with crocodile clip	> P01295473
3 x 3 m HV leads for 10/15 kV, black/blue/red crocodile clips	> P01295466
50 cm HV lead with rear connection	> P01295467
2 moulded test probes (red/black)	> P01295454Z
3 crocodile clips (red/blue/black)	> P01103062
USB optical cable	> HX0056-Z
Carrying bag	> P01298066
C.A 861 thermometer, K thermocouple	> P01650101Z
C.A 846 thermo-hygrometer	> P01156301Z
2P mains lead	> P01295174

Software for digital insulation testers

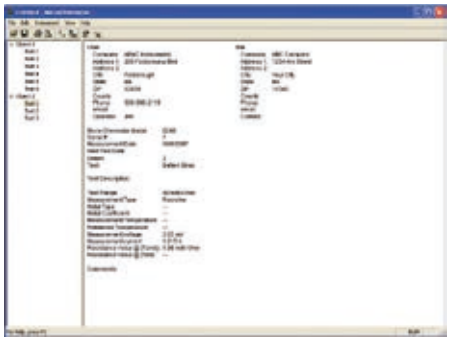
DataView® for the C.A 6543, C.A 6547, C.A 6549, C.A 6550 & C.A 6555

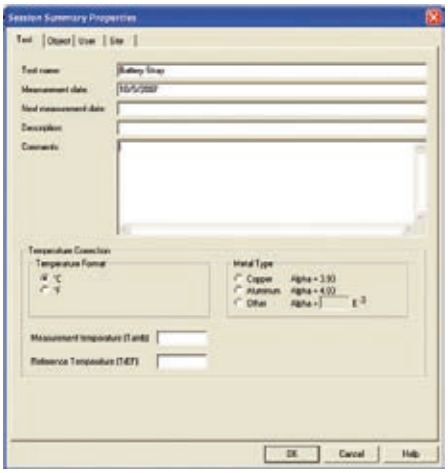


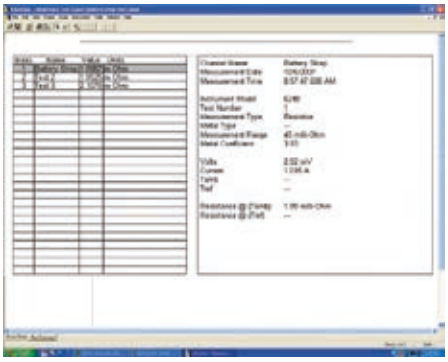


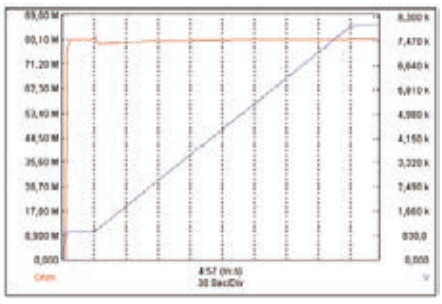
> The essential tool for configuring the instruments, triggering the measurements, viewing the data in real time, recovering the recorded data and creating standard or customized measurement reports

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









Insulation testing

Reference to order

> DataView® > P01102095

Clamp multimeters for leakage current

F62 & F65

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

Specifications				F62		F65	
Display				10,000 counts - 2 measurements / s			
Acquisition				AVG		TRMS	
Function		Calibre	Resolution	Accuracy			
				with filter 50-60 Hz		with filter 50-60 Hz	
Current	mA AC	60 mA	10 µA	1.2 % ± 5 counts	2.5 % ± 5 counts 60 - 500 Hz	1.2 % ± 5 counts	2.5 % ± 5 counts (60-500 Hz)
		600 mA	100 µA				3.5 % ± 10 counts (500-3 kHz)
	A AC	10 A	1 mA	1.2 % ± 5 counts	2.5 % ±5 counts 60 - 500 Hz	1.2 % ± 5 counts	2.5 % ± 5 counts (60-500 Hz)
		80 A	10 mA				3.5 % ± 10 counts (500-3 kHz)
		100 A		5 % ± 5 counts	5 % ± 5 counts (50-60 Hz)	5 % ± 5 counts	5 % ± 5 counts (50-60 Hz)
Voltage	V AC	600 V	0.1 V	1.0 % ± 5 counts (50-60 Hz) 1.2 % ± 5 counts (60-500 Hz)		1.0 % ± 5 counts (50-60 Hz) 1.2 % ± 5 counts (60-500 Hz) 2.5 % ± 5 counts (500-3 kHz)	
	V DC	600 V	0.1 V	1 % ± 2 counts			
Resistance	Ω	1 kΩ	0.1 Ω	1 % + 3 counts (max measurement voltage 3.3 VDC)			
Audible continuity	Buzzer < 35 Ω						
Frequency	A	100 Hz 1 kHz	0.1 Hz 1 Hz	0.5 % ± 2 counts (I > 10 mA)			
	V	100 Hz 1 kHz	0.1 Hz 1 Hz	0.5 % ± 2 counts (V > 5 VAC)			
Max. value				100 ms			
Backlighting				Yes			
Deactivatable automatic shutdown				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			
Installation category				CAT III 600 V			
Enclosure protection				IP 30 as per NF EN 60529			

Accessories / Replacement parts

2 crocodile clips (red/black)	> P01295457Z
2 PVC test-probe leads, isolated Ø 4 mm elbowed male plug (red/black)	> P01295456Z
Case 200 x 100 x 40 mm with belt attachment	> P01298065Z
CMI214S current measurement lead	> P03295509
C.A 1871 infrared probe for multimeter	> P01651610Z
C.A 801 single-channel adapter for multimeter	> P01652401Z
C.A 803 two-channel adapter with diff. measurement for multimeter	> P01652411Z
Carrying bag no.21 (250 x 165 x 60 mm) with strap	> P06239502

Other accessories: test, transport and protection accessories... > See pages 157 to 165

State at delivery

> **F62 & F65** delivered with 1 carrying bag, 1 set of straight/elbowed banana leads, 1 set of safety test probes, 2 x 1.5 V AAA batteries and 1 operating manual

References to order

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

Technical overview

EARTH MEASUREMENT

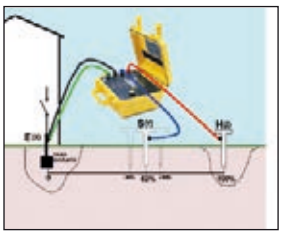
For residential or industrial installations, the presence of an earth connection is one of the basic rules to ensure that the electrical installation is safe.
The absence of an earth connection may endanger people's lives and damage electrical installations and property.
However, the presence of an earth connection does not guarantee safety and, even if the earth is correctly sized, only regular testing can ensure that it functions correctly.
The standards for electrical installations, such as IEC 60364, NF C 15-100, etc., stipulate the general installation conditions to be applied in order to guarantee the safety of people, pets, farm animals and property by protecting them against the hazards and damage which may result from use of the electrical installations.
When there is a large enough area available to set up stakes, earth measurement should be carried out with the traditional 3-pole method, also known as the 62 % method.
There are a large number of different methods for earth measurements, however, and the right choice depends on the type of neutral system, the type of installation (residential, industrial, urban, rural, etc.), the possibility of switching off the power supply, the area available for setting up stakes, etc.

LIST OF THE DIFFERENT EARTH MEASUREMENT METHODS

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

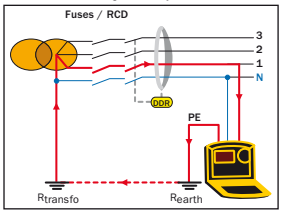
Here is an overview of the most frequently-used measurement methods:

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



This method requires the use of two auxiliary electrodes (or "stakes") to allow current injection and provide the 0V reference potential. The positioning of the two auxiliary electrodes in relation to the earth connection to be tested E(X), is crucial. For correct measurements, the "auxiliary connection" providing the reference potential (S) must not be positioned in the areas influenced by earths E & H due to the flow of the current (i).
Statistics from the field have shown that the ideal method for guaranteeing the highest possible measurement accuracy involves placing the stake S at a point 62 % of the distance from E on the line EH.
You must then make sure that the measurement does not vary significantly when moving the stake S by ± 10 % (S' and S") on either side of its initial position, while remaining on the line EH.
If the measurement varies, it means that (S) is in an influence area, so the procedure should be repeated after increasing the distances.
For a correct measurement, the stake H should be at least 25 metres away from the earth to be tested.
For more accurate measurement, it is possible to use a 4-pole measurement method (adding a connection between the earth to be tested and the ES terminal of the measurement instruments) to minimize the resistance of the measurement leads, thus improving accuracy. This method is strongly recommended for low resistance values as the influence of measurement-lead resistance will then be considerable.

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



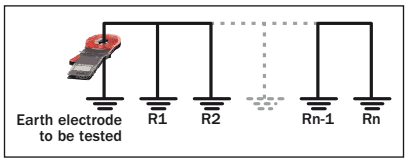
In urban environments, it often proves difficult to measure earth resistances using auxiliary stakes because it is not possible to set up the stakes for reasons of space, concreting, etc. Loop measurement can then be used to test earths in urban environments without using stakes simply by hooking up to the mains power supply (mains socket). In addition to the earth to be measured, the loop resistance measured in this way includes the earth and internal resistance of the transformer and the resistance of the cables. As all these resistances are very low, the value measured is an overall earth resistance value.
The actual earth resistance is therefore lower: 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.

3) Selective earth measurements

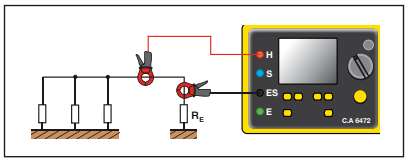
For interconnected earths, selective earth measurement can be used for quick, safe testing. In this case, it is not necessary to isolate the installation (no need to open the earth bar) and, for loop measurements with 2 clamps or with an earth clamp, it is not necessary to set up stakes.

For the earth clamp and for the 2-clamp method, all you have to do to find out the earth value and the value of the currents flowing in it is clamp the cable connected to the earth.
An earth clamp comprises two windings: a generator winding and a receiver winding:
- The clamp's "generator" winding develops an AC voltage at the constant level E around the clamped conductor; a current I = E / 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.

Earth and resistivity testers selection guide

	 C.A 6421	 C.A 6423	 C.A 6460	 C.A 6462	 C.A 6470N TERCA 3	 C.A 6471	 C.A 6472	 C.A 6410	 C.A 6412	 C.A 6415
Earth										
3P method	■	■	■	■	■	■	■			
4P method			■	■	■	■	■			
Automatic coupling					■	■	■			
Selective earth										
4P + clamp method						■	■			
2-clamp method						■	■			
Earth clamp								■	■	■
Pylon earth measurement							■			
Resistivity										
Manual			■	■						
Automatic					■	■	■			
Potential measurement			■	■						
Continuity					■	■	■			
Earth potential							■			
Measurement frequency										
Single frequency: 128 Hz	■	■	■	■						
Single frequency: 2,400 Hz								■	■	■
41 to 512 Hz					■	■				
41 to 5,078 Hz							■			
Rs, Rh measurement					■	■	■			
Udisturbance measurement					■	■	■			
Display										
Analogue	■									
LCD		■	■	■				■	■	■
3-display LCD					■	■	■			
Storage			■	■	■	■	■			■
Power supply										
Batteries	■	■	■					■	■	■
Rechargeable batteries				■	■	■	■			
Page	60	60	61	61	62	63	64	67	67	67

Earth testers

C.A 6421 & C.A 6423

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

Specifications	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 *(3 automatic calibres)*
Resolution	-	10 mΩ / 100 mΩ / 1 Ω *(depending on calibre)*
Accuracy	± (5 % + 0.1 % to full scale)	± (2 % + 1 ct)
No-load voltage	≤ 24 V	≤ 48 V
Frequency	128 Hz	
Alarms	3 fault-indicator LEDs to validate the measurement	
Power supply	8 x 1.5 V batteries	
Display	Analogue	2,000-count digital LCD screen
Electrical safety	IEC 61010 & IEC 61557	
Dimensions / weight	238 x 136 x 150 mm / 1.3 kg	

State at delivery

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

Accessories / Replacement parts

> **For C.A 6421 and C.A 6423**

Carrying strap	> P01298005
0.1 A -250 V HRC fuse (x 10)	> P01297012
1.5 V LR6 alkaline battery	> P01296033
1.5 V LR6 alkaline battery (x 12)	> P01296033A
1.5 V LR6 alkaline battery (x 24)	> P01296033B
Earth and resistivity kits	> see page 66

References to order

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

Earth and resistivity testers

C.A 6460 & C.A 6462

> **3 in 1: earth, coupling and resistivity**
- Confirmation of the measurement by self-diagnosis: 3 LEDs indicating the presence of faults liable to invalidate the measurement result
- Highly resistant site-proof casing with cover for use in severe conditions
- Large LCD screen with backlighting

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

Accessories / Replacement parts

> **For C.A 6460 and C.A 6462:**

2P EUR mains lead	> P01295174
0.1 A -250 V HRC fuse (x 10)	> P01297012
Battery pack	> P01296021
1.5 V LR6 alkaline battery	> P01296033
1.5 V LR6 alkaline battery (x 12)	> P01296033A
1.5 V LR6 alkaline battery (x 24)	> P01296033B
Earth and resistivity kits	> see page 66

State at delivery

> **C.A 6460** delivered with 8 x LR6 1.5 V batteries and 1 operating manual in 5 languages

> **C.A 6462** delivered with 1 mains lead for recharging and 1 operating manual in 5 languages

References to order

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

Earth and resistivity tester

C.A 6470N - TERCA 3

> **4 in 1: Earth / Resistivity / Coupling and Continuity**

> **Suitable for industrial and residential environments**

C.A 6470N

		C.A 6470N
Specifications		
3P measurements	Range *(automatic selection)*	0.01 Ω to 99.99 kΩ
	Resolution	0.01 to 100 Ω
	Test voltage	16 or 32 V, selectable
	Measurement frequency	40 to 512 Hz, automatic or manual
	Test current	Up to 250 mA
	Accuracy	± 2 % R ± 1 ct
4P measurements	Range	0.001 Ω to 99.99 kΩ
	Resolution	0.001 to 100 Ω
	Test voltage	16 V or 32 V
	Measurement frequency	40 to 512 Hz, automatic or manual
	Test current	Up to 250 mA
	Accuracy	± 2 % R ± 1 ct
Soil resistivity measurement 4P measurements		
	Measurement method	Wenner or Schlumberger method with automatic calculation of results and display in Ω-meter or Ω-feet
	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 to 450 Hz
	Accuracy	± 2 % R + 1 ct
Resistance measurement / Continuity *(connection test)*		
	Type of measurement	2P or 4P selectable by user
	Range *(automatic selection)*	2P: 0.01 Ω to 99.9 kΩ; 4P: 0.001 Ω to 99.99 kΩ
	Accuracy	± 2 % R + 3 cts
	Test voltage	16 VDC *(polarity +, – or auto)*
	Test current	> 200 mA for R < 20 Ω
Data storage	Storage capacity	512 test results
	Communication	Optically-isolated USB
Power supply		Rechargeable battery
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 kg
Electrical safety		50 V CAT IV

State at delivery

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

Accessoires / Rechanges

DataView® report generation software	> P01102095
Adapter for recharging on vehicle cigarette lighter	> P01102036
Optical/RS communication cable	> P01295252
GB mains power cable	> P01295253
F 0.63 A – 250 V – 5 x 20 mm – 1.5 kA fuse (x 10)	> AT0094
Adapter for charging battery from the mains	> P01102035
Battery pack	> P01296021
Optical/USB communication cable	> HX0056-Z
Earth and resistivity kits	> see page 66

Référence pour commander

> **C.A 6470N**	> P01126506

Earth and resistivity tester

C.A 6471

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

> **Ideal for industry**

		C.A 6471
Specifications		
Measurements with 2 clamps	Range	0.01 to 500 Ω 0.01 to 1 Ω
	Resolution	Auto: 1367 Hz
	Measurement frequency	Manual: 128 Hz – 1,367 Hz - 1,611 Hz – 1,758 Hz
3P measurements	Range *(automatic selection)*	0.01 Ω to 99.99 kΩ
	Resolution	0.01 Ω to 100 Ω
	Test voltage	16 V or 32 V_{RMS} rated voltage, selectable
	Measurement frequency	41 to 513 Hz, automatic or manual
	Test current	Up to 250 mA
	Accuracy	± 2 % R + 1 ct at 128 Hz
4P measurements / 4P measurements with clamps	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
	Accuracy	± 2 % R ± 1 ct
Soil resistivity measurement	Measurement method	Wenner or Schlumberger method with automatic calculation of results and display in Ω-meter
	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 $V_{AC/DC}$ - DC to 440 Hz
	Accuracy	± 2 % R + 1 ct
Resistance measurement / Continuity *(connection test)*	Type of measurement	2P or 4P selectable by user
	Range *(automatic selection)*	2P: 0.01 Ω to 99.9 kΩ; 4P: 0.001 Ω to 99.99 kΩ
	Accuracy	± 2 % R + 2 cts
	Test voltage	16 V_{DC} *(polarity +, – or auto)*
	Test current	> 200 mA for R < 20 Ω
Data storage	Storage capacity	512 test results
	Communication	Optically-isolated USB
Power supply		Rechargeable battery
Battery-charger power supply		External power supply with 18 V_{DC} / 1.9 A output or 12 V_{DC} vehicle power supply
Dimensions / weight		272 x 250 x 128 mm / 3.2 kg
Electrical safety		50 V CAT IV

Accessories / Replacement parts

DataView® report generation software	> P01102095
Adapter for recharging on vehicle cigarette lighter	> P01102036
Optical/RS communication cable	> P01295252
GB mains power cable	> P01295253
F 0.63 A – 250 V – 5 x 20 mm – 1.5 kA fuse (x 10)	> AT0094
Adapter for charging battery from the mains	> P01102035
Battery pack	> P01296021
Optical/USB communication cable	> HX0056-Z
MN62 clamp (diam. 20 mm) delivered with 2 m cable for ES terminal connection	> P01120452
C182 clamp (diam. 20 mm) delivered with 2 m cable for ES terminal connection	> P01120333
Earth and resistivity kits	> see page 66

State at delivery

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

Reference to order

> **C.A 6471**	> P01126505

Earth and resistivity tester

C.A 6472

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

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: 1367 Hz Manual: 128 Hz – 1,367 Hz - 1,611 Hz – 1,758 Hz
4P measurements / 4P measurements with clamps	
Range	0.001 Ω to 99.99 kΩ
Resolution	0.001 to 100 Ω
Test voltage	16 V or 32 V selectable
Measurement frequency	40 to 512 Hz, automatic or manual
Test current	Up to 250 mA
Accuracy	± 2 % R ± 1 ct
Soil resistivity measurement 4P measurements	
Measurement method	Wenner or Schlumberger method with automatic calculation of results and display in Ω-meter
Range *(automatic selection)*	0.01 to 99.99 kΩ; ρ max. 999 kΩm
Resolution	0.01 Ω to 100 Ω
Test voltage	16 or 32 V, selectable
Measurement frequency	41 to 512 Hz, selectable
External voltage measurement	
Range *(automatic selection)*	0.1 to 65.0 VAC/DC - DC to 450 Hz
Accuracy	± 2 % R + 1 ct
Resistance measurement / Continuity	
Type of measurement	2P or 4P selectable by user
Range *(automatic selection)*	2P: 0.01 Ω to 99.9 kΩ; 4P: 0.001 Ω to 99.99 kΩ
Accuracy	± 2 % R + 2 cts
Test voltage	16 VDC *(polarity +, – or auto)*
Test current	> 200 mA for R < 20 Ω
Memorization Storage capacity	512 test results
Communication	Optically-isolated USB
Power supply	Rechargeable battery
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

State at delivery

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

Accessories / Replacement parts

Connection cable	> P01295271
15 m BNC/BNC cable	> P01295272
AmpFLEX™ identification ring (x 12)	> P01102045
Adjustable clamp (x 3)	> P01102046
Spade lug/banana plug adapters	> P01102028
Calibration loop	> P01295294
AmpFLEX™ flexible current sensors: other lengths are available on request	
Earth and resistivity kits	> see page 66

Reference to order

> C.A 6472	> P01126504

Earth and resistivity tester

C.A 6474

> **The essential accessory for measurements on pylons**
- Measurement of the overall line impedance
- Measurement of the pylon's overall earth resistance
- Measurement of the earth resistance of each pylon footing
- Quality of overhead earth wire connection

Specifications	C.A 6474 / PYLON BOX
Measurement	
Type of measurement	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 disturbance currents)*
Measurement 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

DataView®

For C.A 6470N, C.A 6471, C.A 6472 & C.A 6474

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

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

Accessories / Replacement parts

Connection cable	> P01295271
15 m BNC/BNC cable	> P01295272
5 m AmpFLEX™ flexible current sensor	> P01120550
AmpFLEX™ identification ring (x 12)	> P01102045
Adjustable clamp (x 3)	> P01102046
5 m green cable (E terminal connection)	> P01295291
5 m black cable (ES terminal connection)	> P01295292
Spade lug/banana plug adapters	> P01102028
Calibration loop	> P01295294
AmpFLEX™ flexible current sensors: other lengths are available on request	

State at delivery

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

Reference to order

> **C.A 6474**	> P01126510

Earth and resistivity kits

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

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

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

> **Ergonomic**
- Simple, error-free connections thanks to colour coding
- Easy to handle

> **Universal**
- Ø 4 mm banana plug / spade lug adapters

> **Compact, with all the accessories in a single carrying bag divided into compartments**

	Composition
1P loop kit	1 x 30 m green cable reel, 1 T-rod
3P earth kit *50 m*	2 T-rods, 2 cable reels *(50 m red, 50 m blue)*, 1 cable winder *(10 m green)*, 1 mallet, 5 spade lug / Ø 4 mm banana plug adapters, 1 carrying bag
3P earth kit *100 m*	2 T-rods, 2 cable reels *(100 m red, 100 m blue)*, 1 cable winder *(10 m green)*, 1 mallet, 5 spade lug / Ø 4 mm banana plug adapters, 1 carrying bag
3P earth kit *150 m*	2 T-rods, 2 cable reels *(150 m red, 150 m blue)*, 1 cable winder *(10 m green)*, 1 mallet, 5 spade lug / Ø 4 mm banana plug adapters, 1 carrying bag
Earth & resistivity kit *100 m*	4 T-rods, 4 cable reels *(100 m red, 100 m blue, 100 m green, 30 m black)*, 1 cable winder *(10 m green)*, 1 mallet, 5 spade lug / Ø 4 mm banana plug adapters, 1 prestige carrying bag
Earth & resistivity kit *150 m*	4 T-rods, 4 cable reels *(150 m red, 150 m blue, 100 m green, 30 m black)*, 1 cable winder *(10 m green)*, 1 mallet, 5 spade lug / Ø 4 mm banana plug adapters, 1 prestige carrying bag
Resistivity add-on kit *100 m*	2 cable reels *(100 m green and 30 m black)*, 1 standard carrying case, 2 T-rods
C.A 647X continuity kit *(μΩ position)*	4 x 1.5 m cables terminated by Ø 4 mm banana plugs, 4 crocodile clips, 2 test probes

References to order

> **1P loop kit**	> P01102020
> **50 m 3P earth kit**	> P01102021
> **100 m 3P earth kit**	> P01102022
> **150 m 3P earth kit**	> P01102023
> **100 m 3P earth and resistivity kit**	> P01102024
> **150 m 3P earth and resistivity kit**	> P01102025
> **Resistivity add-on kit (100 m)**	> P01102030
> **C.A 647X continuity kit** (μΩ position)	> P01102037

Accessories / Replacement parts

> **For earth and resistivity kit:**	
10 m H green cable winder	> P01102026
Adapter for terminals (x 5)	> P01102028
Reel handles (x 4)	> P01102029
Earth T-rod	> P01102031
C172 current clamp	> P01120310
166 m cable reel red	> P01295260
100 m cable reel red	> P01295261
50 m cable reel red	> P01295262
166 m cable reel blue	> P01295263
100 m cable reel blue	> P01295264

Earth clamps

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

- **Quick earth-loop testing**
- **Testing in total safety because the test is performed without disconnecting the earth bar**
- **C.A 6410**
  - Earth loop
- **C.A 6412**
  - Earth loop
  - Leakage current
- **C.A 6415**
  - Earth loop
  - Leakage current
  - Storage of results

Specifications	C.A 6410	C.A 6412	C.A 6415
Earth resistance Measurement range	0 to 1.0 Ω 1.0 to 50.00 Ω 50.00 to 100.0 Ω 100 to 200 Ω 200 to 400 Ω 400 to 600 Ω 600 to 1,200 Ω		
Resolution per range	0.01 Ω 0.1 Ω 0.5 Ω 1 Ω 5 Ω 10 Ω 50 Ω		
Accuracy per range	±2 % ± 2 cts ±1.5 % ± 1 ct ±2 % ± 1 ct ±3 % ± 1 ct ±6 % ± 1 ct ±10 % ± 1 ct ±25 % ± 1 ct		
Current / Leakage current Measurement range	-	1 to 299 mA 0.300 to 2.999 A 3.00 to 29.99 A	
Resolution per range	-	1 mA 0.001 A 0.01 A	
Accuracy per range	-	±2.5 % ± 2 cts ±2.5 % ± 2 cts ±2.5 % ± 2 cts	
Clamping diameter	32 mm		
Measurement frequency	2,400 Hz		
Indication of disturbance currents and incorrect closure	By symbol		
Alarm	-	-	Configurable
Memorization	-	-	99 measurements
Power supply	9 V battery		
Electrical safety	IEC 61010 - CAT III 150 V		
Display	3,000-count LCD		
Dimensions / weight	55 x 100 x 240 mm / 1 kg		

Accessories / Replacement parts

For C.A 6472 & C.A 6474

Calibration loop	> P01122301
MLT 100 carrying case	> P01298011
9 V alkaline battery	> P01100620
9 V alkaline battery (x 12)	> P01100620A
9 V alkaline battery (x 24)	> P01100620B

State at delivery

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

References to order

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

Micro-ohmmeter

C.A 6240

> **Rugged, leakproof on-site instrument**

> **Suitable for use in the field, the workshop or the laboratory**

> **Wide measurement range and excellent accuracy due to:**

- The 4-wire measurement method
- Automatic current reversal
- Test current up to 10 A
- Resolution of 1 µΩ
- Automatic "on-the-fly" or manual measurement modes

DataView® compatible

C.A 6240

Specifications						
Measurement method	4-wire method					
Range	400 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
Current measurement	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 180 mm / 5 kg					
Electrical safety	IEC 61010 - CAT III 50 V					

Accessories / Replacement parts

Double test probe (x 2)	> P01102056
Mini Kelvin clamp (x 2)	> P01101783
GB mains power cable	> P01295253
C.A 846 thermo-hygrometer	> P01156301Z
2P EUR mains lead	> P01295174
6.3 x 32 / 12.5 A / 500 V fuse (x 10)	> P01297091
Standard carrying bag	> P01298066
Optical/USB communication cable	> HX0056-Z
10 A-P clamp (x 2)	> P01101794
DataView®	> P01102095
Straight probe with 10 A double pivoting retractable test probe (x 2)	> P01103063
Pistol with 10 A double retractable test probe (x 2)	> P01103065

Pointes de touche KEL

> **"Pistol" test probes**

- Handle dimensions 108 x 40 mm, test probe 154 x 30 mm, thickness 28 mm
- Test probes Ø 2 mm
- Test probe spacing 3.5 mm
- Cable length 3.15 m
- Spade lugs for Ø 4 to 6 mm
- Safety connectors Ø 4 mm
- Approx. weight 2 x 420 g
- Resistance 2 x 50 mW max.

Reference > P01103065

Pistol with retractable double 10 A test probe

State at delivery and reference

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

> P01143200

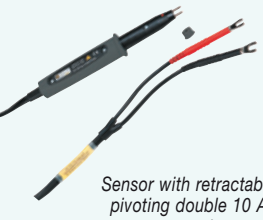
Micro-ohmmeter

C.A 6250

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

Specifications	C.A 6250						
Measurement method	4-wire method						
Range	5.0000 mΩ	25.000 mΩ	250.00 mΩ	2,500.0 mΩ	25.000 Ω	250.00 Ω	2,500.0 Ω
Accuracy	0.015 % +1.0 µΩ	0.05 % +3 µΩ	0.05 % +30 µΩ	0.05 % +0.3 mΩ	0.05 % +3 mΩ	0.05 % +30 mΩ	0.05 % +300 mΩ
Resolution	0.1 µΩ	1 µΩ	10 µΩ	0.1 mΩ	1 mΩ	10 mΩ	100 mΩ
Current measurement	10 A	10 A	10 A	1 A	100 mA	10 mA	1 mA
Measurement modes	Inductive, non-inductive with automatic triggering						
Temperature compensation	By temperature probe or manual						
Memory	1,500 measurements						
Communication output	RS232						
Power supply	Rechargeable NiMH battery						
Dimensions / weight	270 x 250 x 180 mm / 4 kg						
Electrical safety	IEC 61010 - CAT III 50 V						

VIN rétractables 10 A



Sensor with retractable pivoting double 10 A test probe

> **Kelvin probe with rotation**
- Dimensions (L x W x H) 207 x 34 x 30 mm
- Test probes Ø 3 mm
- Test probe spacing 8 mm
- Test probe extension/retraction 10 mm
- Cable length 3.15 m
- Spade lugs for Ø 4 to 6 mm
- Safety connectors Ø 4 mm
- Approx. weight 2 x 400 g
- Resistance 2 x 50 mW max.

Reference > P01103063

State at delivery and reference

> **C.A 6250** delivered in carrying bag with 1 power supply cable 2 m long, 2 x 3 m cables terminated by 10 A Kelvin clamps, 1 operating manual in 5 languages, 5 simplified operating manuals, data transfer software and RS232 communication cable
> P01143201

Accessoires / Rechanges

Double test probe (x 2)	> P01102056
Mini Kelvin clamp (x 2)	> P01101783
C.A 846 thermo-hygrometer	> P01156301Z
2P EUR mains lead	> P01295174
Standard carrying bag	> P01298066
10 A-P clamp (x 2)	> P01101794
GB mains power cable	> P01295253
Pt 100 temperature probe	> P01102013
2 m cable for remote Pt 100	> P01102014
Serial printer no. 5	> P01102903
DataView®	> P01102095
RS232 PC cable DB 9F – DB 25F x 2	> P01295172
6.3 x 32 / 16 A / 250 V fuse (x 10)	> P01297089
5.0 x 20 / 2 A / 250 V fuse (x 10)	> P01297090
Straight probe with 10 A double pivoting retractable test probe (x 2)	> P01103063
Pistol with 10 A double retractable test probe (x 2)	> P0110306

Electrical equipment tester

> **Digital ratiometer for transformers**
- A powerful ratio tester that stores up to 10,000 test results in internal memory
- Measures turns ratios on power transformers, VT/PTs and current transformers (CTs)
- Direct Turns Ratio readings from 0.8000:1 to 8000.0:1
- Tests performed by exciting the primary and reading the secondary for greater operator safety
- Displays turns ratio, excitation current, winding polarity and % deviation from the nameplate values
- Internal NiMH battery packs provide up to 10 hours of continuous operation

DTR 8510

Specifications	DTR 8510	
Ratio range (VT/PT)	Auto-ranging: 0.8000 to 8000:1	
Accuracy (VT/PT)	Ratio	Accuracy (% R)
	0.8000 to 9.9999	± 0.2 %
	10.000 to 999.99	± 0.1 %
	1,000.0 to 4999.9	± 0.2 %
	5,000.0 to 8000.0	± 0.25 %
Ratio range (CT)	Auto-ranging: 0.8000 to 1.000.0	
Accuracy (CT)	± 0.5 % R	
Excitation signal	PT/VT mode: 32 Vrms max CT mode: automatic level 0 to 1 A, 0.1 to 4.5 Vrms	
Excitation current display	Range: 0 to 1,000 mA; Accuracy: ± (2 % R + 2 mA)	
Excitation frequency	70 Hz	
Display	Dual-line alphanumeric LCD, 16 x 2 characters with contrast adjustment and backlight control. Day/night visible.	
Languages supported	English, Spanish, French, Italian, German, Portuguese	
Measurement method	In accordance with IEEE Std C57, 12.90™ -2006	
Power supply	Two 12 V, 1,650 mAH NiMH rechargeable battery packs	
Battery life	Up to 10 hrs of continuous operation. Low battery indication.	
Battery charger	Universal input (90 to 264 Vrms input) smart recharger	
Charging time	< 4 hours to full charge	
Data storage	10,000 tests	
Date / time	Battery-backed, real-time clock	
Communication	USB. 2.0 compliant, optically isolated, 115.2 kB	
Software	DataView® analysis software included	
Dimensions / weight	272 x 248 x 130 mm / 3.7 kg	
Connection	XLR connectors	
Leads	15 ft (4.6m) H & X shielded with colour-coded crocodile clips	
Casing	Heavy-duty Polypropylene case, UL 94 V0 rated	
Vibrations	IEC 68-2-6 (1.5 mm to 55 Hz)	
Shocks	IEC 68-2-27 (30 G)	
Falls	IEC 68-2-32 (1 m)	
Protection	IP 40 (Instrument lid open) per EN 60529 IP 53 ((Instrument lid closed)per EN 60529	
Safety ratings	EN 61010-1, 50 V CAT IV; pollution degree 2	

State at delivery

> **DTR 8510** delivered with 1 carrying bag containing 1 set of leads 4.6 m long with crocodile clips, 1 external battery charger with mains lead, 1 USB cable, 1 NiMH battery sheet, 1 operating manual and DataView® software on CD-ROM

Accessories / Replacement parts

Spare lead, length 4.6 m (x 2)	> P01295143A

Reference to order

> DTR 8510	> P01157702

Electrical equipment tester

C.A 6121

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

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 testing	Test voltage	1,000 / 1,250 / 1,500 VAC (50 Hz) for Umains = 230 V 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
	Current measurement	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 counts) or internal (4 counts)
	Range	0 - 10 s
	Accuracy	± (2 % R + 0.2 s)
Memorization		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 - CAT III - 600 V

Accessories / Replacement parts

C.A 6121 TRANSFER Windows processing software (supplied with communication cable)	> P01101915
Serial printer no. 5	> P01102903
DB9F-DB25M adapter	> P01101841
Remote-control pedal	> P01101916
Indicator lamps (green/red)	> P01101917
Roll of paper for serial printer (x 5)	> P01101842
2 crocodile clips (red/black)	> P01102052Z
Ø 4 mm CAT II 300 V moulded test probe (x 2)	> P01295458Z
2 HV test guns with 6 m cable	> P01101918
2 HV test guns with 2 m cable	> P01101919
Key (x 2)	> P01101932
2 safety leads, 3 m (red/black)	> P01295097
Black continuity test lead, 2.5 m	> P01295137
Red continuity test lead, 2.5 m	> P01295140
Discharge time cable (EURO)	> P01295141

State at delivery and reference

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

> P01145601

Accessories / Replacement parts

DB9F-25F cable (x 2)	> P01295172
DB9F-DB9M cable no. 01	> P01295173
20 A-600 V 10,3 x 38F fuse (x 10)	> P01297030
Rigid bag no.3	> P01298031

Electrical equipment tester

- A single instrument for all the tests required
- AUTOTEST function for automatic execution of a measurement sequence
- Large memory capacity: 600 measurements
- Testing and certification according to the European standards

C.A 6160

Specifications		C.A 6160
Insulation		
	Test voltage	250 / 500 / 1,000 VDC
	Measurement range	0.000 MΩ to 999 MΩ
	Accuracy	0.000 to 1,999 MΩ: ±(5 % R + 10 cts) 2,000 to 199,9 MΩ: ±(3 % R + 3 cts) 200 to 999 MΩ: ±(10 % R+ 10 cts)
Dielectric testing		
	Test voltage	100 to 5,000 VAC - 50 Hz/60 Hz for U_{mains} = 230 V at 500 VA
	Trigger current	0.5 to 500 mA up to 500 VA
Continuity		
	Test current	0.1 / 0.2 / 10 / 25 A
	Measurement range	0.000 to 9,999 Ω for I = 10 A or 25 A 0.00 to 100.0 Ω for I = 0.1 A
	Accuracy at 10 / 25 A	(3 % R + 3 cts)
Voltage drop		0.00 to 99.99 V at 10 A
Discharge time		External (mains socket) Internal (components)
Leakage current		
	Measurement range	0.00 to 20.0 mA
	Accuracy	±(5 % R + 3 cts)
Residual leakage current		
	Measurement range	0.00 to 20.0 mA
	Accuracy	±(5 % R + 3 cts)
Contact leakage current		
	Measurement range	0.00 to 2.00 mA
	Accuracy	±(5 % R + 3 cts)
Functional testing		Active and apparent power, current, voltage, frequency, cos φ
Memorization		1,600 measurements
Communication output		RS232
Power supply		230 V / 50-60 Hz mains supply
Dimensions / weight		410 x 175 x 370 mm / 13.5 kg
Electrical safety		IEC 61010-1 – 600 V CAT II

State at delivery & reference

> **C.A 6160** delivered with 2 HV test guns with cable 2 m long, 2 insulation test leads 3 m long, 4 crocodile clips, 2 test probes, 4 continuity test leads 2.5 m long, 1 discharge-time cable, 1 power supply lead and 1 operating manual in 5 languages

> P01145801

CE Link software (option) **for C.A 6160**

Used for:

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

Accessories / Replacement parts

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

Multi-function machine tester

Specifications		C.A 6155
Dielectric testing	Test voltage	1,000 V / 1,890 V / 2,500 V
	I limit	0.1 to 100 mA (1,890 V / 2,500 V) 0.1 to 200 mA (1,000 V)
	Timer	2, 3, 5, 10, 30 s
Insulation resistance measurement		
	U test	250 / 500 VDC
	Range	Up to 200 MΩ
	Timer	5, 10, 30, 60, 120 s
Continuity testing	Range	0.01 to 1.99 Ω Indication range: 2.00 Ω to 19.9 Ω
	I test	0.20 / 10 A
	U test	< 9 V
	Timer	5, 10, 30, 60, 120, 180 s
Leakage current measurement		
	Substitution method	0.00 to 20.0 mA
	Differential method	0.00 to 9.99 mA
	Accuracy	± (5 % R + 5 cts)
Contact leakage current measurement		
	Measurement range	0.00 to 2.50 mA
	Accuracy	± (10 % R + 5 cts)
60 V discharge time measurement		10 % R
	Voltage range (peak value)	0 to 550 V
	Time range	0 to 10 s
Functional test		
	Apparent power	0.00 to 4.00 kVA
Power-lead polarity test		Yes
Current measurement with clamp		0.00 mA to 24.9 A
PRCD testing	Calibre	10, 15, 30 mA
	Test current	0.5 x IΔn, IΔn, 5 x IΔn
	Other	Automatic PRCD test
RCD testing	Calibre	10, 30, 100, 300, 500, 1,000 mA
	Test current	0.5 x IΔn, IΔn, 2 x IΔn, 5 x IΔn
	Current type	AC / AC (pulse)
	RCD type	General / Selective
	Test type	Step / Pulse
	Uc contact voltage measurement	Yes
	Other	Automatic RCD test
High-current Zs loop measurement		
	Test current	6.5 A
	Range	0.00 to 1,999 Ω
	Accuracy	±(5 % R + 5 cts)
	Ik calculation	0.00 to 23.0 kA
Zs loop measurement *(without RCD tripping)*		
	Range	0.00 to 1,999 Ω
	Accuracy	±(5 % R + 10 cts)
	Ik calculation	0.00 to 23.0 kA
Zi loop measurement	Test current	6.5 A
	Range	0.00 to 1,999 Ω
	Accuracy	±(5 % R + 5 cts)
	Ik calculation	0.00 to 199 kA
Voltage, frequency		0 to 550 V / 14.0 to 499.9 Hz
Phase rotations	Voltage	100 to 550 V AC
	Frequency	14 to 500 Hz
Communication	*RS232*	1 connection for barcode / RFID reader + 1 connection for printer / PC
	USB	1 printer / PC connection
Alarms		Yes for all functions
Storage		6,000 memory locations
Software		Yes, delivered as standard, Pro version as option
Power supply		230 V / 50-60 Hz
Dimensions / weight		33.5 cm x 16.0 cm x 33.5 cm / 8.4 kg
Functional standards		VDE 701 702 / IEC 60204 Ed. 5 / IEC 60439 / IEC 61439
Electrical safety		IEC 61010-1 / IEC 61557 (parts 1, 2, 3, 4, 6, 7, 10) CAT II / 300 V

C.A 6155

Check the safety of all your electrical instruments and equipment:

> **Measurements in compliance with the IEC 60204 (edition 5), VDE701/702 and IEC 61439 (IEC 60439) standards**

- Electrical safety testing on portable electrical equipment, machines and switchgear
- Preprogrammed test sequences adapted to the standards or personal needs
- Extensive storage capacity allowing you to store up to 6,000 measurements
- Delivered with data processing and report generation software as standard
- Large backlit graphic screen with an intuitive user interface and contextual help for each function
- Built-in keyboard for quick and easy customization of the measurements recorded

State at delivery and reference

> **C.A 6155** delivered with an accessories bag containing 1 high-voltage test probe, 1 mains-socket test cable, 1 test cable with separate wires, 1 red lead 1.5 m long, 1 black lead 1.5 m long, 1 green lead 1.5 m long, 1 red lead 4 m long, 4 test probes, 3 crocodile clips, 1 operating manual in 5 languages, 1 USB communication cable, 1 RS232 communication cable and data transfer software > P01146001

Phase rotation and/or motor testers

C.A 6608 & C.A 6609

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

Specifications	C.A 6608	C.A 6609
Operating voltage for phase rotation function	40 to 850 VAC between phases	With connections: 40 to 600 VAC between phases Without connections: 120 to 400 Vac between phases
Frequency range	15 to 400 Hz	
Power supply	Self-powered via the 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	

State at delivery

- **C.A 6608 Phase rotation tester**
  Delivered in a carrying bag containing 3 test leads, 3 crocodile clips, 1 operating manual in 5 languages
- **C.A 6609 Phase rotation and motor tester**
  Delivered in a carrying bag containing 3 test leads, 3 crocodile clips, 1 operating manual in 5 languages

References to order

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

Cable and metal pipe locator

C.A 6681 E & C.A 6681 R

- Ideal for all configurations (current-carrying or non-current-carrying)
- Digital technology for reliable detection and maximum immunity to disturbances
- Transmitter and Receiver with large LCD screens displaying the transmission power, the numeric identification code and the voltage present on the circuit tested.
- Digital, visual and audible indication for intuitive monitoring of the trace.
- Automatic or manual adjustment (more accurate detection) of the reception sensitivity
- Deactivatable audible indication
- Indication of transmitter and receiver battery status on the receiver screen
- Automatic shutdown of receiver
- Transmitter and receiver equipped with an additional lighting system (torch) for use in dark conditions.

C.A 6681 E

Caractéristiques	
Transmitted signal frequency	125 kHz
External voltage measurement	12~600 V DC/AC(50~60 Hz)
Dimensions	190 x 89 x 42.5 mm
Weigh	Approx. 420 g with battery

C.A 6681 R

Caractéristiques	
Detection depth	Single-pole application: 0 to 2 m approx. Two-pole application: 0 to 0.5 m approx. Simple loop line: up to 2.5 m
Identification of network voltage	0~0.4 m approx.
Dimensions	241.5 x 78 x 38.5 mm
Weigh	Approx. 360 g with battery

State at delivery

> Delivered in a hard case containing 1 x **C.A 6681E** transmitter, 1 x **C.A 6681R** receiver, set of 2 red/black isolated banana leads 1.5 m long (Ø4mm straight male / Ø4mm elbowed male), set of 2 red/black crocodile clips, 1 earthing stake, 1 adapter for mains socket, male plug adapter for B22 bayonet socket, 1 male plug adapter for E27 screw socket, 9V 6LR61 alkaline battery, 6 x 1.5 V LR03 (or AAA) batteries, operating manual in 5 languages

References to order

> **C.A 6681 LOCAT-N** > P01141626

Battery capacity tester

C.A 6630

> **Test batteries simply, quickly and safely**

- Zero adjustment function for compensation of the voltage circuit displayed
- 2-display LCD screen with numerous symbols
- Power supply by 6 x 1.5 V batteries.
  Battery life in continuous use: 7 hours
- Max. power consumption: 1 VA
- Dimensions: 250 x 100 x 45 mm
- Weight: 500 g including batteries
- Resistance measurement:
  temperature coeff.: ± (0.1 % R + 0.5 digit) / °C
  measurement voltage: 1.5 mV_{AC}
  measurement frequency: 1 kHz ± 10 %

Specifications	C.A 6630			
Range	40 mΩ	400 mΩ	4 Ω	40 Ω
Resolution	10 µΩ	100 µΩ	1 mΩ	10 mΩ
Current measurement	37.5 mA	3.75 mA	375 µA	37.5 µA
Accuracy	± (1 % R + 8 cts)			
Voltage measurement	Temp. coeff.: ± (0.1 % R + 0.5 digit) / °C			
Range	4 V		40 V	
Resolution	1 mV		10 mV	
Accuracy	± (1 % R + 6 cts)			

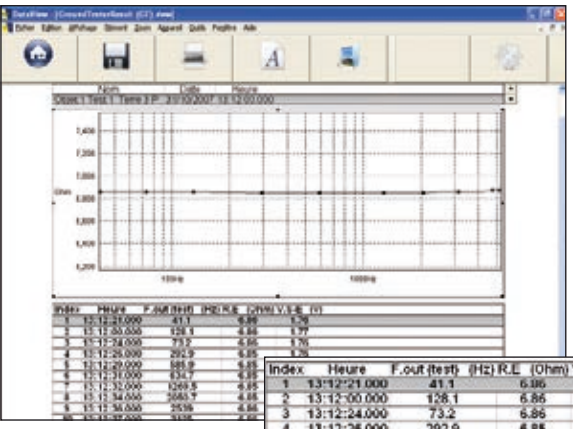
State at delivery

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

Reference to order

> **C.A 6630** > P01191303

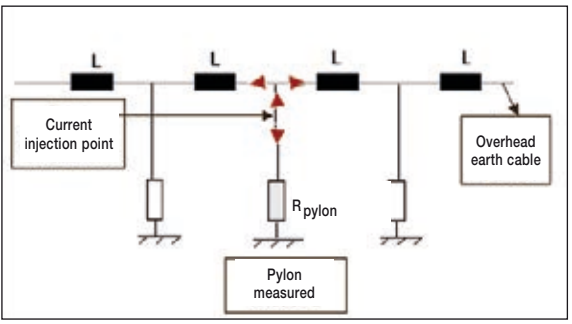
Multi-product PC processing software

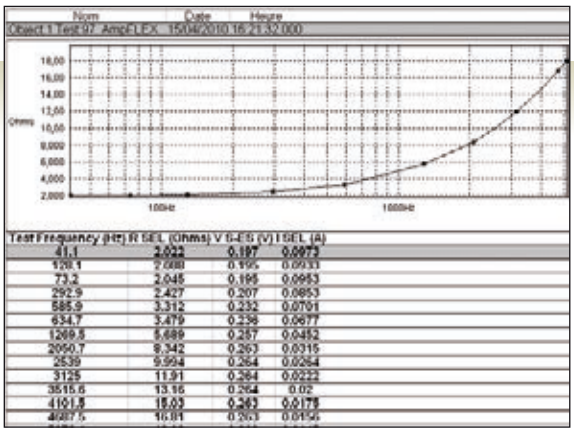


3P earth measurement with GT (Ground Tester) module

Index	Heure	F.out (test) (Hz)	R.E (Ohm)	V.S-E (V)
1	13:12:21.000	41.1	6.86	1.76
2	13:12:00.000	128.1	6.86	1.77
3	13:12:24.000	73.2	6.86	1.76
4	13:12:28.000	292.9	6.86	1.76
5	13:12:29.000	585.9	6.85	1.76
6	13:12:31.000	634.7	6.85	1.76
7	13:12:32.000	1269.5	6.85	1.76
8	13:12:34.000	2050.7	6.85	1.76
9	13:12:36.000	2539	6.86	1.76
10	13:12:37.000	3125	6.86	1.75
11	13:12:39.000	3515.6	6.86	1.75
12	13:12:41.000	4101.5	6.86	1.74
13	13:12:42.000	4687.5	6.87	1.74
14	13:12:44.000	5078.1	6.87	1.73

GT Module – Pylon Earth Measurement – "Sweep" Mode





DataView®

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

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

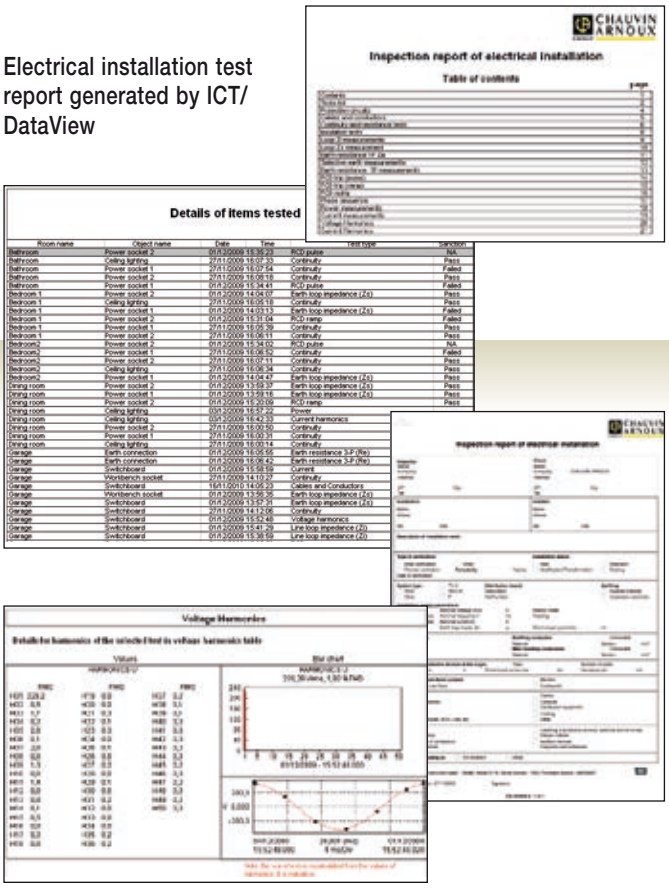
> **DataView® is compatible with multiple products, including:**

- QualiSTAR® energy analysers
- C.A 8220 & C.A 8230 power analysers
- C.A 6470N earth tester
- C.A 6543, C.A 6547 & C.A 6549 megohmmeters
- F400 and F600 multimeter clamps
- As well as other measurement instruments

> **These instruments are connected to the PC via a USB link, an RS232 interface or Bluetooth connection. Minimum operating system required:**

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

Electrical installation test report generated by ICT/ DataView

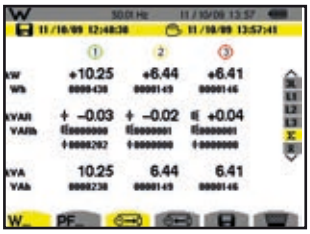


Reference to order

> **DataView®** software > P01102095

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 longterm effects of an energy optimization programme. Reducing electricity consumption is also a simple, painless way of saving money. Electricity is a clean energy source and is less harmful for the environment, but it does affect it nevertheless.

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

For private customers, reactive power is neither measured nor billed separately. Instead 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..

DETECTION OF DISTURBANCES

With the spread of systems incorporating electronics using switching power supplies, the electrical network is becoming increasingly polluted.

A further complication is the fact that electricity market deregulation could lead to an increase in the frequency of general network blackouts.

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

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

Electrical network analysers capable of recording disturbances for industrial companies and professionals in the electricity sector (producers, transmission companies, electricity users) are essential tools for satisfactory supervision and timely maintenance of installations.
They have to provide direct measurements, allow as much parameterization as possible for recording and facilitate subsequent analysis.

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

1/ Slow and transient voltage variations.
The voltage amplitude is a crucial parameter for electricity quality.
The voltage amplitude varies abnormally and may even drop to a level close to zero.
The causes mainly lie in the installation itself. The connection of heavy loads may lead to voltage variations if the short-circuit power at a point of supply is undersized.
Several types of faults are then defined: overvoltage, voltage dip, outage, etc. The rated network voltage variation range is set by the power distributor.

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

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

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

3/ Harmonics and interharmonics.
The waveform of the current consumed by loads connected to the electrical network is often no longer purely sinusoidal. This current distortion implies distortion of the voltage also depending on the impedance of the source. The disturbances called harmonics are caused by connecting non-linear loads, such as equipment incorporating power electronics, to the network. This may have instant consequences on certain electronic equipment: operating problems (synchronization, switching), untimely tripping, measurement errors on energy meters, etc. In the medium term, the extra heating caused by this may reduce the life span of rotating machines, capacitors, power transformers and neutral conductors.
Today's measurement instruments have to be capable of performing this harmonic analysis order by order, as well as measuring the Total Harmonic Distortion (THD) for more detailed diagnosis of the installation.

Selection guide for power and/or energy analysers

	C.A 404	C.A 405	F21	F205	F405	F605	F407	F607	C.A 8220	C.A 8230	C.A 8332B	C.A 8334B	C.A 8335	C.A 8352
Number of U/I input channels														
	1	1	1	1	1	1	1	1	1	1	3	3	4	4
Current														
(A)	1	5	700	600	1,000	2,000	1,000	2,000	□	□	□	□	□	□
Display														
Analogue	■	■												
Digital			■	■	■	■	■	■	■	■	■	■	■	■
Scope mode										■	■	■	■	■
Electrical network														
Single-phase	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Balanced 3-phase		■	■	■	■	■	■	■	■	■	■	■	■	■
3-phase											■	■	■	■
Measurements														
DC voltage			■	■	■	■	■	■	■	■	■	■	■	■
AC voltage			■	■	■	■	■	■	■	■	■	■	■	■
DC current			■	■	■	■	■	■	■	■	■	■	■	■
AC current			■	■	■	■	■	■	■	■	■	■	■	■
Frequency			■	■	■	■	■	■	■	■	■	■	■	■
Power														
VA			■	■	■	■	■	■	■	■	■	■	■	■
W	■	■	■	■	■	■	■	■	■	■	■	■	■	■
var			■	■	■	■	■	■	■	■	■	■	■	■
Cos φ / DPF							■	■	■	■	■	■	■	■
PF				■	■	■	■	■	■	■	■	■	■	■
Tan φ										■	■	■	■	
Energy														
VAh, Wh, varh							■	■	■	■	■	■	■	■
Harmonics														
THD				■	■	■	■	■	■	■	■	■	■	■
FD							■	■	■	■	■	■	■	■
Decomposition							■	■	■	■	■	■	■	■
Interharmonics														■
Other														
PST flicker										■	■	■	■	■
PLT flicker														■
Sliding PLT flicker														
Unbalance												■	■	■
Temperature									■					■
Resistance				■	■	■	■	■	■					
Rotation speed									■					
Monitoring														
Recording							■	■		■	■	■	■	■
Transient												■	■	■
Alarms										■	■	■	■	■
PC software														
							■	■	■	■	■	■	■	■
Page	129	129	37	33	34	35	34/80	35/81	82	83	84	85	86	88

□ *Depending on sensors*

Power and harmonics multimeter clamp

F407

- Measurements up to 1,000 Aac or 1,500 Adc or Aac+dc
- Clamping diameter: 48 mm
- Analysis of harmonic orders
- TrueInrush function
- Bluetooth communication

Specifications		F407
Current *(RMS)*	AC	100 mA to 1,000 A
	DC and AC+DC	100 mA to 1,500 A
	Best accuracy	1% R + 3 cts
Voltage *(RMS)*	AC	100 mV to 1,000 V
	DC and AC+DC	100 mV to 1,000 V
	Best accuracy	1% R + 3 cts
Auto AC/DC		Yes (V and A)
Resistance		100 kΩ
Continuity/buzzer		Yes (< 40 Ω)
Power W, var, VA		Yes, single-phase and total three-phase
Crest factor (CF)		Yes
PF and DPF (cos φ)		Yes / Yes
Automatic power Off		Yes
Hold function		Yes
Display backlighting		Yes
Min Max button		Yes
100 ms Peak +/- function		Yes / Yes
True-Inrush function		Yes
THD-f / THD-r harmonics function		Yes / Yes
Decomposition into harmonic orders		25th
REC recording function		Yes
Recordings (with Min, Max)		Up to 3,000 measurements
Bluetooth communication function		Yes
Frequency		15 Hz to 20 kHz
Clamping diameter		48 mm
Protection		IP 54
Electrical safety		IEC 61010 – 1,000 V CAT IV
Warranty		3 years

State at delivery

> **F407** delivered in bag pre-equipped for MultiFix with 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 AA alkaline batteries, 1 safety plug and 1 CD-Rom containing 1 operating manual and the PC data recovery software (Power Analyser Transfer)

Accessories / Replacement parts

2 banana/banana leads (red/black)	> P01637301
2 crocodile clips (red/black)	> P01295457Z
MultiFix magnetic mounting kit	> P01102100Z
Bluetooth kit	> P01637301
Carrying bag	> P01298076
DataVIEW® software	> P01102095

Reference to order

> **F407** Power and harmonics multimeter clamp > P01120947

Power and harmonics multimeter clamp

F607

- Measurements up to 2,000 Aac or 3,000 Adc or Aac+dc
- Clamping diameter: 60 mm
- Analysis of harmonic orders
- TrueInrush function
- Bluetooth communication

Specifications		F607
Current *(RMS)*	AC	100 mA to 2,000 A
	DC and AC+DC	100 mA to 3,000 A
	Best accuracy	1% R + 3 cts
Voltage *(RMS)*	AC	100 mV to 1,000 V
	DC and AC+DC	100 mV to 1,000 V
	Best accuracy	1% R + 3 cts
Auto AC/DC		Yes (V and A)
Resistance		100 kΩ
Continuity/buzzer		Yes (< 40 Ω)
Power W, var, VA		Yes, single-phase and total three-phase
Crest factor (CF)		Yes
PF and DPF (cos φ)		Yes / Yes
Automatic power Off		Yes
Hold function		Yes
Display backlighting		Yes
Min Max button		Yes
100 ms Peak +/- function		Yes / Yes
True-Inrush function		Yes
THD-f / THD-r harmonics function		Yes / Yes
Decomposition into harmonic orders		25th
REC recording function		Yes
Recordings (with Min, Max)		Up to 3,000 measurements
Bluetooth communication function		Yes
Frequency		15 Hz to 20 kHz
Clamping diameter		60 mm
Protection		IP 54
Electrical safety		IEC 61010 – 1,000 V CAT IV
Warranty		3 years

Accessories / Replacement parts

2 banana/banana leads (red/black)	> P01637301
2 crocodile clips (red/black)	> P01295457Z
MultiFix magnetic mounting kit	> P01102100Z
Bluetooth kit	> P01637301
Carrying bag	> P01298076
DataVIEW® software	> P01102095

State at delivery

> **F607** delivered in bag pre-equipped for MultiFix with 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 AA alkaline batteries, 1 safety plug and 1 CD-Rom containing 1 operating manual and the PC data recovery software (Power Analyser Transfer)

Reference to order

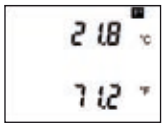
> **F607** Power and harmonics multimeter clamp > P01120967

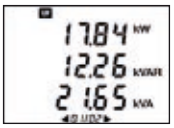
Power and energy quality analyser

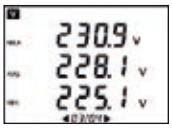
C.A 8220

> Ideal for motor maintenance

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







Specifications		C.A 8220
Voltage *(TRMS)*		Phase/Phase: 660 VAC+DC Phase/Neutral: 600 VAC+DC
Current *(TRMS)*	MN clamp	MN93: 2 to 240 AAC; MN93A: 0.005 AAC to 5 AAC / 0.1 AAC to 120 AAC
	C clamp	3 A to 1,200 AAC
	AmpFLEX™ or MiniFLEX clamp	30 A to 6,500 AAC
	PAC clamp	10 A to 1,000 AAC / 10 A to 1,400 ADC
	E3N clamp	50 mA to 10 AAC+DC, 100 mA to 100 AAC+DC
Frequency		40 Hz to 70 Hz
Other measurements		W, var, PF, DPF, VA, temperature, phase rotation, RPM, resistance, continuity, diode test, wh, VAh, varh
Harmonics		1st to 50th
Sampling frequency		256 samples/cycle
Data storage		≥ 99 complete sets of voltage, current, power and harmonics measurement data
Power supply		6 1.5 V AA batteries, optional mains adapter
Battery life		≥ 8 hours with display on
Communication		Optically isolated USB
Display		3-line backlit digital display with custom icons
Dimensions / weight		211 x 108 x 60 mm / 0.88 kg
Electrical safety		IEC 61010 600 V CAT III, IP 54, pollution degree 2

State at delivery

> The **C.A 8220** analyser is always delivered complete with 2 banana leads, 2 x 4 mm test probes, 2 crocodile clips, 6 x 1.2 V AA batteries, 1 USB optical cable, Power Analyser Transfer processing software, 1 operating manual on CD in 5 languages

References to order

> C.A 8220

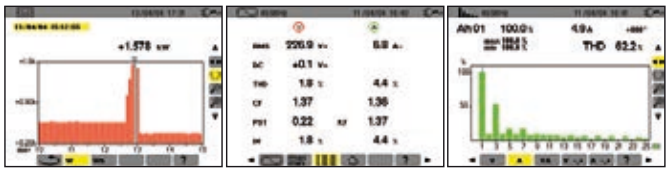
C.A 8220 analyser (without clamp)	> P01160620
C.A 8220 MN93A analyser	> P01160621
C.A 8220 AmpFLEX™ analyser	> P01160622

Accessories / Replacement parts

C.A 1711 tachometer sensor	> P01102082
Pt100 adapter, 2 wires	> HX0091
> Pour C.A 8220 / C.A 8230	
E3N clamp	> P01120043A
E3N clamp adapter	> P01120081
E3N clamp + mains power pack	> P01120047

Power and energy quality analyser

C.A 8230



> Ideal for electrical network maintenance

- All measurements accessible simultaneously
- INRUSH function up to 18 s
- Excellent quality/price ratio
- Recording and alarms

Specifications		C.A 8230
Voltage *(TRMS)*		Phase/Phase: 660 V Phase/Neutral: 600 V
Current *(TRMS)*	MN clamp	MN93: 2 to 240 Aac; MN93A: 0.005 Aac to 5 Aac / 0.1 Aac to 120 Aac
	C clamp	3 A to 1,200 Aac
	AmpFLEX™ or MiniFLEX clamp	30 A to 6,500 Aac
	PAC clamp	10 A to 1,000 Aac / 10 A to 1,400 Adc
Frequency		40 to 70 Hz
Other measurements		VA, W, var, PF, DPF, Wh, varh, VAh, K-factor, flicker, harmonics phase shift, phase rotation
Harmonics		THD-R, THD-F, V, A, VA 1st to 50th, direction, sequence
Sampling frequency		256 samples/cycle
Data storage		1.5 MB partitioned for waveforms, alarms and trend recording
Power supply		6 NiMH rechargeable batteries (included) AC power supply: 120/230 VAC (50/60 Hz)
Battery life		≥ 8 hours with display on ≥ 40 hours with display off (recording mode)
Communication		Optically isolated USB
Display		¼ VGA (320 x 240) color LCD
Dimensions / weight		211 x 108 x 60 mm *(8.3 x 4.3 x 2.4")* 0.88 kg *(1.9 lbs)*
Electrical safety		EN 61010 - 600 V - CAT III, pollution degree 2

Accessories / Replacement parts

> For C.A 8220 / C.A 8230

MN93A BK clamp	> P01120434B
MN93 BK clamp	> P01120425B
AmpFLEX™ A193 450 mm BK	> P01120526B
AmpFLEX™ A193 800 mm BK	> P01120531B
PAC93 BK clamp	> P01120079B
C193 BK clamp	> P01120323B
5 A adapter box	> P01101959
Optical cable	> P01295252
Carrying bag no. 5	> P01298049
2 crocodile clips (red/black)	> P01102057Z
2 PVC leads with 4 mm straight male plugs (red/black)	> P01295288Z
2 moulded test probes (red/black)	> P01295454Z
Pack 6 NiMH rechargeable batteries	> P01296037
C.A 82X0 EUR mains power supply	> P01160640
MA193 Mini-AmpFLEX™	> P01120580
Optical/USB cable	> HX0056Z
DataView® software	> P01102095
Current lead	> P03295509

State at delivery

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

References to order

> C.A 8230

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

Three-phase network and energy analyser

C.A 8332B

> **Measures all the voltage, current and power parameters necessary for full diagnosis of an electrical installation**

- All the specifications required at a very attractive price
- Proven simplicity of use
- 3-year warranty

		C.A 8332B
Specifications		
Sampling frequency		256 samples/period
Voltage *(RMS AC+DC)*		6 V to 960 V (Phase-Phase); 6 V to 480 V (Phase-Neutral)
Current *(RMS AC+DC)*		
	MN clamp	MN93: 2 to 240 Aac; MN93A: 0.005 Aac to 5 Aac / 0.1 Aac to 120 Aac
	C clamp	3 A to 1,200 Aac
	AmpFLEX™ or MiniFLEX clamp	30 A to 6,500 Aac
	PAC clamp	10 A to 1,000 Aac / 10 A to 1,400 Adc
Frequency		40 Hz to 69 Hz
Other measurements		kW, kvar, kVA, PF, DPF, kWh, kvarh, kVAh, flicker, Unbalance, K-Factor
Harmonics		THD up to the 50th order, phase
Power supply		Rechargeable 9.6 V NiMH battery or 90 to 260 V mains power pack
Battery life		≥ 8 hours; ≥ 35 hours in standby mode
Storage	Screen and curve	8
	Recording	From 21 minutes to several weeks
	Alarm	4,000 of 10 different type
Communication		Optical RS232
Display		1/4 VGA colour screen, Diagonal 148 mm
Dimensions / weight		24 x 18 x 5.5 cm / 2.1 kg
Electrical safety		IEC 61010, 600 V CAT IV / 1,000 V CAT III

State at delivery

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

References to order

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

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

Accessories / Replacement parts

> **For C.A 8332B and C.A 8334B**

CA833X-F 5 A adapter box	> P01101959
PAC93 BK clamp	> P01120079B
C193 BK clamp	> P01120323B
MN93 BK clamp	> P01120425B
MN93A BK clamp	> P01120434B

Three-phase network and energy analyser

QualiSTAR C.A 8334B

> **Intuitive operation making it very easy to use**

> **Simultaneous operation of all the instrument's modes (recording, alarm, measurement, power, harmonics)**

- Wide graphic screen, very easy to read
- Suitable for single and three-phase networks
- 3-year warranty
- Direct access to all the measurement modes for full diagnosis: Energy, W, VA, Var, PF, cos φ, tan φ, THD up to 50th harmonic order, etc.

1,000 V CAT III
600 V CAT IV

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

Accessories / Replacement parts

AmpFLEX™ A193 450 mm BK	> P01120526B
AmpFLEX™ A193 800 mm BK	> P01120531B
Mini-AmpFLEX™ MA193 200 mm BK	> P01120580
Waist bag no. 21	> P01298055
Qualistar bag no. 22	> P01298056
Qualistar screen film	> P01102059
Site-proof case	> P01298062
Qualistar bag no. 06	> P01298051
DataView® software	> P01102095
Optical RS232 lead	> P01295190A
USB adapter	> HX0055
In-vehicle charger	> HX0061

State at delivery

> With the Qualistar **C.A 8334B**: bag no. 22, RS232 optical lead, mains power lead, 4 x Ø 4 mm banana voltage leads 3 m long, 4 crocodile clips, 1 safety plug, 1 operating manual, 1 PC data recovery software and the set of current sensors chosen.

References to order

> CA 8334B-F MN93	> P01160551
> CA 8334B-F MN93A	> P01160552
> CA 8334B-F AmpFLEX™	> P01160553
> CA 8334B-INT MN	> P01160554
> CA 8334B-INT MN93A	> P01160555
> CA 8334B-INT AmpFLEX™	> P01160556

Other configurations are available: please contact us for details

Three-phase network and energy analyser

QualiSTAR+ C.A 8335

> **Measures all the voltage, current and power parameters necessary for full diagnosis of an electrical installation**

- Captures and records all the parameters, transients, alarms and waveforms simultaneously.
- Proven simplicity of use
- 3-year warranty

	C.A 8335
Specifications	
Sampling frequency	256 samples/period
Voltage *(TRMS AC+DC)*	10 V to 1,200 V
Current *(TRMS AC+DC)* MN clamp	MN93: 2 to 240 AAC; MN93A: 0.005 AAC to 5 AAC / 0.1 AAC to 120 AAC
C clamp	3 A to 1,200 AAC
Amp*FLEX*™ or Mini*FLEX* clamps	30 A to 6,500 AAC
PAC clamp	10 A to 1,000 AAC / 10 A to 1,400 ADC
E3N clamp	50 mA to 10 AAC/DC, 100 mA to 100 AAC/DC
Frequency	40 Hz to 69 Hz
Other measurements	kW, kvar, kVA, PF, DPF, kWh, kvarh, kVAh, Flicker, Unbalance, K factor
Harmonics	THD, 0 to 50th order, phase
Power supply	9.6 V NiMH rechargeable battery or 90 to 260 V mains power supply
Battery life	≥ 10 hours; ≥ 30 hours in standby mode
Storage	
Memory depth	≥ 2 GB
Screens and curves	50
Recordings	From 29 days to several years
Alarms	10,000, 40 different types
Transients	210
Inrush	10 min. on all 3 phases
Mechanical specification	
Communication port	USB
Display	1/4 VGA colour screen, diagonal 148 mm
Dimensions / weight	240 x 180 x 55 mm / 1.9 kg
Electrical safety	IEC 61010, 600 V CAT IV /1,000 V CAT III, pollution degree 2

State at delivery

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

Reference to order

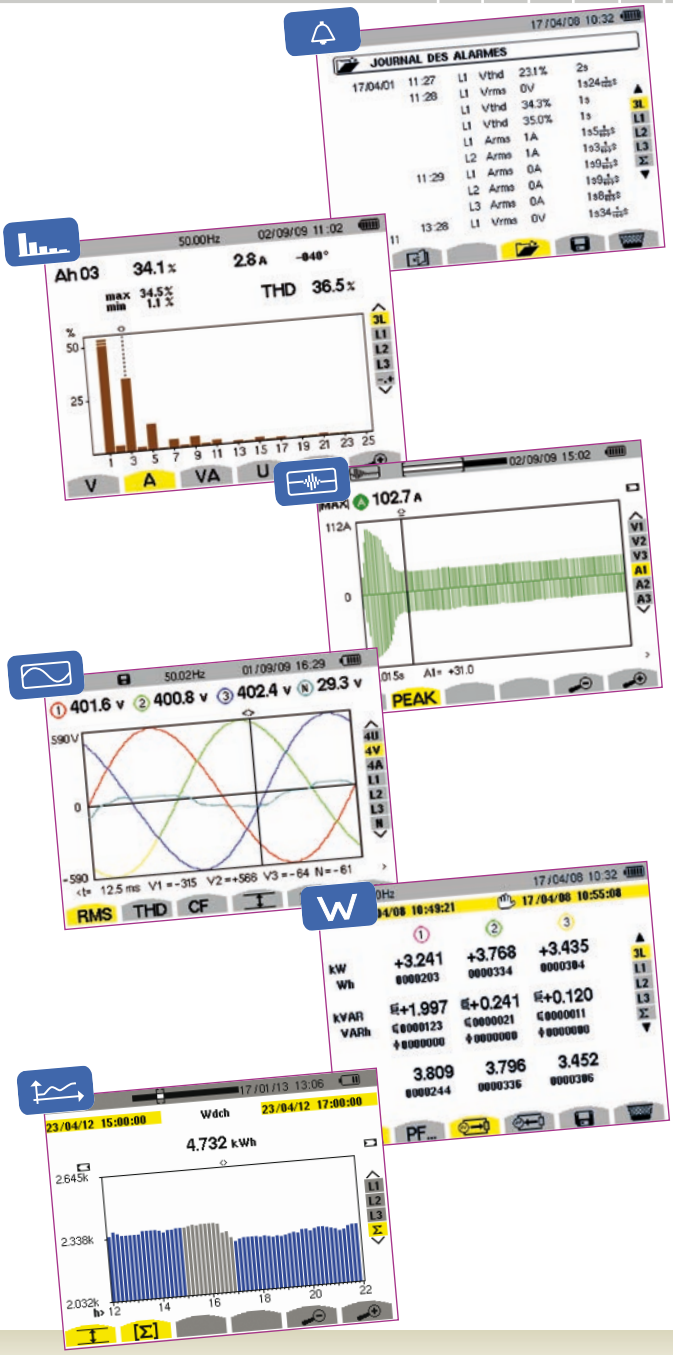
> **C.A 8335**
Power analyser > P01160577

Accessories / Replacement parts

CA833X-F 5 A adapter box	> P01101959
PAC93 clamp	> P01120079B
C193 clamp	> P01120323B
MN93 clamp	> P01120425B
MN93A clamp	> P01120434B
Amp*FLEX*™ A193 450 mm	> P01120526B
Amp*FLEX*™ A193 800 mm	> P01120531B
Mini-Amp*FLEX*™ MA193 200 mm	> P01120580
Soft case with neck strap no. 21	> P01298055
Qualistar soft case no. 22	> P01298056
Screen protection film	> P01102059
Set of inserts/rings	> P01102080
DataView® Software	> P01102095
Mains power supply AP 30 W	> P01102057
Lead USB-A USB-B	> P01129593
E3N clamp	> P01120043A
E3N adapter	> P01120081
E3N clamp + mains power pack	> P01120047
Boîtier ESSAILEC	> P01102131

Functions

- Real-time display of waveforms (5 voltages and 4 currents)
- RMS voltage and current measurements per half-period
- Intuitive use
- Automatic recognition of the different types of current sensors
- Includes measurement of all the DC components
- Voltage and current ratios
- Mixing of current sensors
- Measurement, calculation and display of harmonics up to the 50th order with their phase details
- Calculation of total harmonic distortion (THD)
- Capture of transients per sample (1/256th of a period)
- Display of phasor diagram
- Measurement of VA, W, VAD, total var and var per phase power values
- Measurement of VAh, Wh, VADh, total varh and varh per phase energy values
- Calculation of K factor
- Calculation of cos φ displacement power factor (DPF) and power factor (PF)
- Capture of up to 210 transients
- Flicker calculation
- Unbalance calculation (current and voltage)
- Monitoring of the electrical network with alarm parameterization
- Creation and recording of screenshots (image and data)
- Back-up and export on PC
- Software for data retrieval and real-time communication with a PC




Voltage leads


Crocodile clips


Set of inserts/rings


5 A adapter


Mains power supply


Mini AmpFLEX™ MA 193


Qualistar Carrying bag


Software


USB cable


A 193/450 mm


C193
3 to 1,200 Aac


A 193/800 mm


PAC93


E3N clamp


MN 93
MN 93A

Power and energy analyser

1,000 V CAT III
600 V CAT IV

IP 67

C.A 8435

> **For all conditions and all seasons!**

- ndoor and outdoor use, even in the rain
- 5 voltage inputs, 4 current inputs
- Continuous recording of all the parameters simultaneously
- Monitoring with alarms
- All types of installations
- Inrush over more than 10 minutes

	C.A 8435
Specifications	
Sampling frequency	256 samples/period
Voltage *(TRMS AC+DC)*	10 V to 1,000 V
Current (TRMS AC+DC) MN clamp	MN93: 2 to 240 AAC ; MN93A: 0.005 AAC to 5 AAC / 0.1 AAC to 120 AAC
C clamp	3 A to 1,200 AAC
Pinces Amp*FLEX*™ or Mini*FLEX*	30 A to 6,500 AAC
PAC clamp	10 A to 1,000 AAC / 10 A to 1,400 ADC
E3N clamp	50 mA to 10 AAC/DC, 100 mA to 100 AAC/DC
Frequency	40 Hz to 69 Hz
Other measurements	kW, kvar, kVA, kVAD, PF, DPF, kWh, kvarh, kVAh, Flicker, Unbalance, K factor
Harmonics	THD, orders 0 to 50, phase
Power supply	9.6 V NiMH rechargeable battery or 90 to 260 V mains power pack
Battery life	≥ 10 hours; ≥ 30 hours in standby mode
Storage	
Memory depth	≥ 2 Go
Screen and curve	50
Recording *(quantity)*	From 29 days to several years
Alarms	10,000 alarms of 40 different types
Transients	210
Inrush	≥ 10 minutes on all 3 phases
Mechanical specifications	
Communication	USB
Display	¼ VGA colour screen, diagonal 148 mm
Dimensions / weight	270 x 250 x 180 mm / 3.7 kg
Electrical safety	IEC 61010, 600 V CAT IV / 1,000 V CAT III, pollution 2

Standard state at delivery

> **C.A 8435** delivered with 1 USB cable, IP65 mains power cable, 5 x 4 mm banana voltage leads 3 m long, 5 crocodile clips, 1 x 12-colour identification kit for the leads and inputs, 1 screen-protection film (mounted), 1 safety datasheet, 1 bag for accessories, 1 CD containing a multilingual operating manual and 1 CD containing the PC data recovery software (Power Analyser Transfer)

References to order

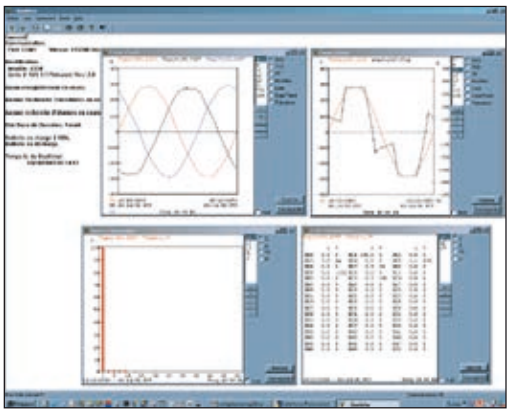
> **C.A 8435 analyser** > P01160585

> **C.A 8435 analyser with 4 x IP65 Amp*FLEX*™ 450 A196 current sensors, 5 x IP65 BB196 black banana leads 3 m long and 5 lockable crocodile clips** > P01160587

Accessories / Replacement parts

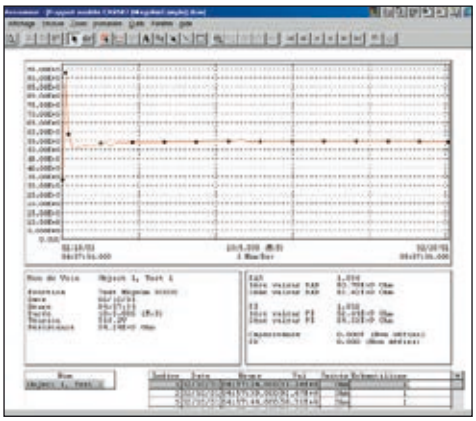
IP65 Amp*FLEX*™ A196 450	> P01120552
Mini*FLEX*™ MA193	> P01120580
Set of 5 IP65 banana leads 3m long	> P01295476
Set of 5 lockable crocodile clips	> P01102099
IP65 mains power cable	> P01295477
Set of rubber plugs	> P01102117
ESSAILEC casing	> P01102131
CA833X-F 5 A adapter unit	> P01101959
Qualistar bag no. 22	> P01298056
MN93 clamp	> P01120425B
MN93A clamp	> P01120434B
Amp*FLEX*™ A193 450 mm	> P01120526B
Amp*FLEX*™ A193 800 mm	> P01120531B
PAC93 clamp	> P01120079B
C193 clamp	> P01120323B
DataView® software	> P01102095
Screen protection film	> P01102059
Set of rings/inserts	> P01102080
USB-A USB-B cable	> P01129593
E3N clamp	> P01120043A
E3N clamp adapter	> P01102081
E3N clamp + mains adapter	> P01120047

Logiciel d'exploitation multi-produit sur PC

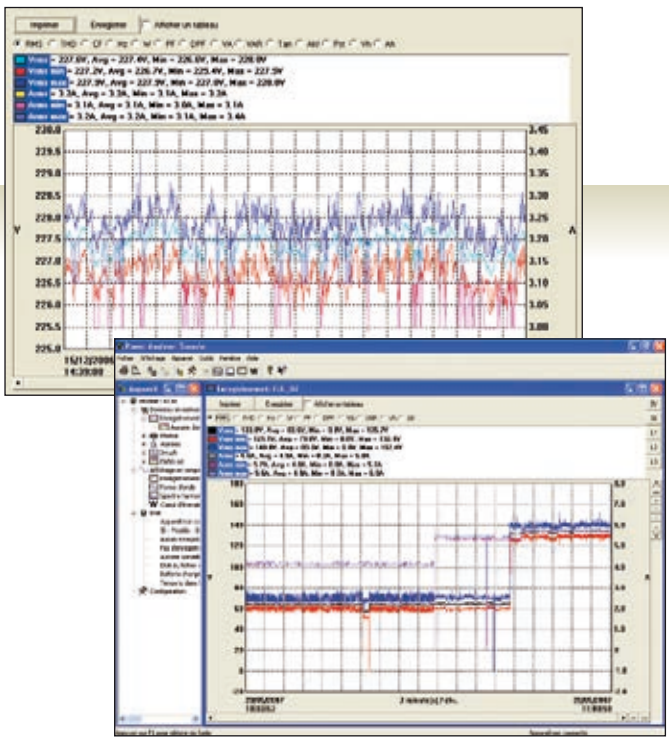


Configuration de l'appareil

Mesures en temps réel



Enregistrements



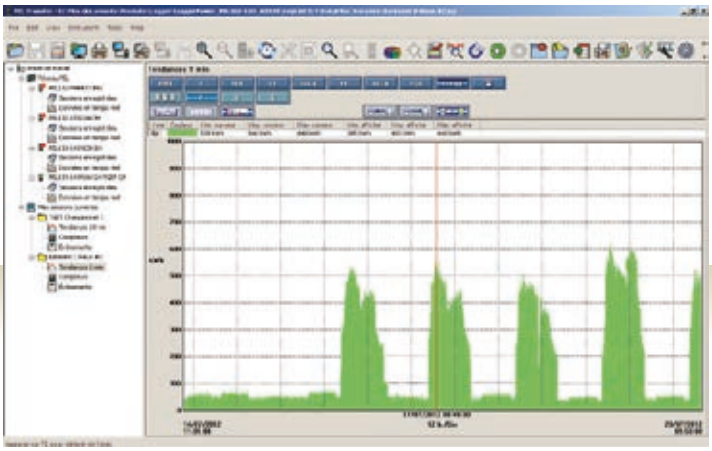
DataView®

> **Communication multiples : RS232, USB, Bluetooth**
> **Fonctions supplémentaires pour le confort de l'utilisateur ou pour des analyses plus pointues :**
- Zoom sur les graphes afin d'analyser certaines parties affichées
- Affichage à la demande de différents paramètres enregistrés
- Exportation sous Excel des données mémorisées
- Intégration d'objets (OLE)...

> **Multi-produit, DataView® est compatible avec :**
- Analyseurs d'energie Qualistar & Qualistar+
- Analyseurs de puissance C.A 8220 & C.A 8230
- Pinces multimetres F400 et F600
- Et autres appareils de mesure

> **Ces appareils se connectent au PC via liaison USB, interface RS232 ou connexion Bluetooth. Système d'exploitation minimum requis :**
- Windows® 2000
- Windows® XP
- Window® Vista
- Windows® 7
- Windows® 8

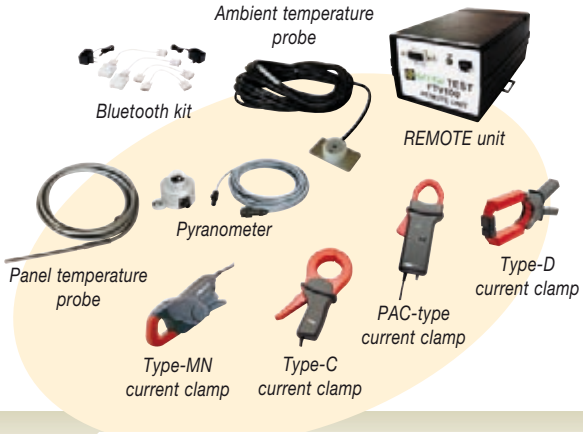
Edition de rapports



Référence pour commander

> Logiciel **DataView®** > P01102095

Solar power installation analyser



FTV 100

> **Verification of energy efficiency on solar power installations:**

- Electrical power survey
- Calculation of solar panel efficiency
- Calculation of DC/AC converter efficiency

> **Easy to read even in direct sunlight thanks to anti-reflective treatment!**

> **Simultaneous measurements on 1, 2 or 3 rows of panels installed in parallel**

	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 %
Ambient temperature	Measurement with Pt 100 probe	-30 °C to +80 °C	± 1 % ± 1 °C
Solar panel temperature	Measurement with Pt 100 probe	-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		
	AC/DC converter efficiency		
Data logger	Up to 10 instrument configurations can be pre-recorded *(measurements and results)*		
Specifications			
Communication	RS232 (remote unit) + USB (PC)		
Internal power supply	Built-in Li-Ion rechargeable battery (4.5 Ah) / Battery life 8 hours		
External power supply	Via 220 VAC – 50 Hz external power supply		
Protection	IP67 closed / IP 54 open		
Dimensions / weight	360 x 304 x 194 mm / 3 kg (with battery)		
Electrical safety	IEC 61010-1 - 600 V CAT IV / 1,000 V CAT III		

Accessories / Replacement parts

Installation measurement kit with 3 DC inputs:
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 x RS232 M/M connectors for soldering,
1 fastening strap > P01160736
"Wired" communication kit: 1 serial cable 15 m long,
9-pin RS232 M/M connectors > P01160737
"Bluetooth" communication kit:
2 Bluetooth adapters (transmitter/receiver),
2 x RS232 M/F and M/M cables 20 cm long,
software for programming the adapters > P01160738
PAC10-FTV DC PAC clamp (200 ADC) > P01160734
PAC20-FTV DC PAC clamp (1,400 ADC) > P01120092
MN13-FTV AC MN clamp (200 AAC) > P01160733
C107-FTV AC type-C clamp (1,000 AAC) > P01120337
D43-FTV AC type-D clamp (3,000 AAC) > P01120100
2 crocodile clips Ø 4 mm (red/black) > P01102052Z
FTV100 battery > P01160735

State at delivery and references

> **FTV100 with 1 DC input and PAC10-FTV DC current clamp + 3 MN-FTV AC clamps:** delivered with 1 IP67 site-proof case, 1 pyranometer for irradiance measurement with 5 m cable, 1 Pt100 probe for ambient temperature with 3 m cable, 1 Pt100 probe 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 carrying bag, 1 certificate of conformity, 1 SIT calibration certificate for the pyranometer
> P01160700

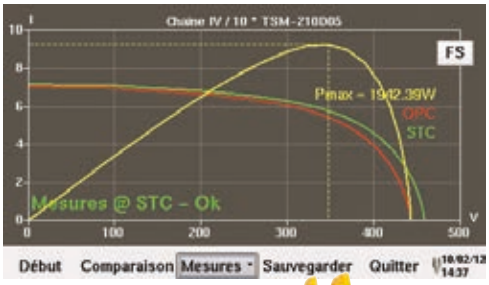
> **GREENTEST FTV100 with 3 DC inputs and 3 PAC10-FTV DC current clamps + 3 MN-FTV AC current clamps:** same as for 1-DC-input version plus the 3-DC-input installation measurement kit > P01160720

Solar panel testers

FTV200

- Specifications of thousands of panels referenced in an integrated library
- Excellent display resolution with 500 measurement points per curve
- Temperature and solar radiation measurements
- All types of solar panels
- Complies with the IEC /EN 60891 standard

	FTV 200
Specifications	
Display	4.3" colour graphic LCD touch screen
Casing	Site-proof case
Library	10,000 curves (with reference values of panels / manufacturer)
Functions	
DC voltage	10 to 1,000 V
DC current	0.1 to 10 A
Power	10 W to 10 kW
Radiation	By pyranometer / 0 to 2,000 W/m²
Temperature	By Pt 100 probe, -20 °C to +100 °C
I-V graph	Display of voltage/current measurement graph per panel or string
MPP graph	Display of Maximum Power Point (MPP) graph
General Specifications	
Communication	USB 2.0
Power supply / battery life	Mains or Li-ion rechargeable battery pack / 2-hour battery life
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



State at delivery and references

> Carrying bag, set of 3 m cables, set of MC4 adapters (red/black), MC4/ Ø 4 mm banana adapter, magnetic stylus for touch screen, USB key, 1 mains adapter, set of flexible test probes, operating manual, PC software and certificate of conformity

Accessories / Replacement parts

Pyranometre	> P01160730
Pt100 ambient temperature probe	> P01160731
Pt100 contact temperature probe	> P01160732
FTV remote unit	> P01160736
FTV200 Bluetooth communication kit	> P01160739
Carrying bag	> P01298066
USB/RS232 adapter	> HX0055
Inclinometer	> P01102115
Flexible test probes	> P01102116

References to order

> **FTV200 I-V TRACER**	> P01160745
> **FTV200 I-V TRACER** With pyranometer and Pt100 probe0	> P01160740

Calibrators

> C.A 1621, thermocouple temperature calibrator

The C.A 1621 is 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 probes temperature calibrator

The C.A1623 is capable of measuring and simulating:
- up to 7 different types probes: Pt 10, Pt 50, Pt 100, Pt 200, Pt 500, Pt 1000, Pt 100 (JIS)
- a resistor

C.A 1621, C.A 1623 & C.A 1631

> Instrument calibration without dismantling the sensors

> Simulation and generation of all low-level signals encountered in industry

> Measurement of signal during calibration

> Comfortable handling for use in the field

> Powered by battery or mains

C.A 1621

Specifications for measurement (input) /simulation (output)

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

Function	Range	Resolution	Accuracy	Reference 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

Specifications for measurement (input) /simulation (output)

Range	4-wire measurement accuracy ± Ω	Simulation accuracy ± Ω	Acceptable excitation in mA
0 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			Acceptable excitation in mA
		4-wire input	2-wire / 3-wire input	Output	
Pt10 385	-200 ... +800 °C				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 +250 ... +630 °C	0.2 0,8	0.3 1,6	0.2 0.8	0.1 ... 3,0
Pt500 385	-200 ... +500 °C +500 ... +630 °C	0.3 0,4	0.6 0.9	0.3 0.4	0.05 ... 3.0
Pt1000 385	-200 ... +100 °C +100 ... +630 °C	0.2 0.2	0.4 0.5	0.2 0.2	0.1 ... 3.0
Pt100 JIS	+200 ... +630 °C	0.2	0.5	0.3	0.1 ... 3,0

Calibrators

C.A 1621, C.A 1623 & C.A 1631

C.A 1631

Specifications for measurement (input) / simulation (output)

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 delivered by rated voltage: 1 mA

Calibre	Resolution	Accuracy ± (% of reading + counts)
24 mA	0.001 mA	0.015 % + 3

Protection against overvoltages: 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 %

> **C.A 1631, voltage/current process signal calibrator**

The C.A 1631 can be used for measurements or to deliver a DC current loop between 0 and 24 mA and a DC voltage between 0 and 20 V

C.A 1621 C.A 1623 C.A 1631

Specifications	
Unit	C.A 1621 and C.A 1623: °C or °F
Power supply	6 x 1.5 V
Dimension / Weight	205 x 97 X 45 mm / 472 g
Mains power supply	Input: 100 V – 240 VAC, 50–60 Hz 1.8 A Output: 12 VDC, 2 A MAX

Mains power supply

Accessories / Replacement parts

Mains power supply	> P01103057
MF carrying bag 120 x 245 x 60 mm	> P01298075
2 crocodile clips (red/black)	> P01295457Z
2 moulded leads, isolated Ø 4 mm straight male plug/elbowed male plug (red/black)	> P01295451Z
2 moulded test probes, Ø 4 mm	> P01295458Z

State at delivery

> **C.A 1621** delivered with 1 carrying bag, 2 thermocouple adapters, 6 x 1.5 V AAA batteries and 1 operating manual in 5 languages

> **C.A 1623** delivered with 1 carrying bag, 2 test leads, 2 crocodile clips, 6 x 1.5 V AAA batteries and 1 operating manual in 5 languages

> **C.A 1631** delivered with 1 carrying bag, 2 test leads, 2 crocodile clips, 2 test probes, 6 x 1.5 V AAA batteries and 1 operating manual in 5 languages

References to order

> **C.A 1621**	> P01654621
> **C.A 1623**	> P01654623
> **C.A 1631**	> P01654402

Introduction

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.

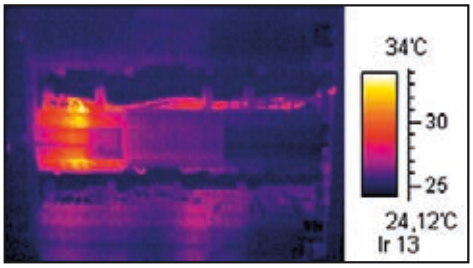
For this detection method, there is no need to cut off the current, shut down the machines or stop production. It can be used to troubleshoot in advance any latent malfunctions and thus prevent failures and avoid production incidents. Thermal imaging is an innovative technique for safe, reliable and 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 which is called a thermogram: each temperature is represented by a different colour..

APPLICATIONS

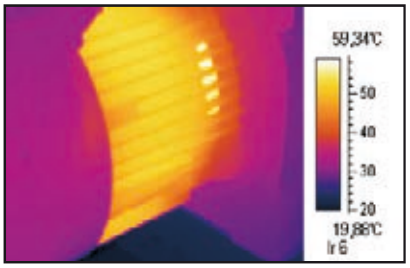
1) Electrical maintenance

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).



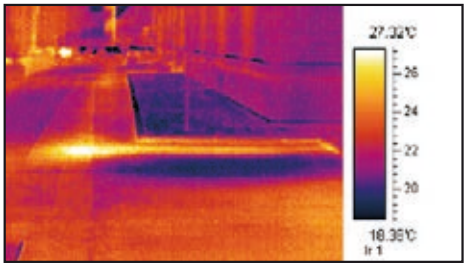
2) Mechanical maintenance

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.



3) 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.



Thermography

C.A 1875 training bench

- **Highlighting of the various types of error possible in thermography: problems involving emissivity, spatial resolution, measurement angle, transmission or reflection**
- **Simple use and simple measurements**
- **Delivered with a guide presenting experiments and the corresponding theoretical framework**

	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

State at delivery

- **C.A 1875** delivered in carrying bag with 1 power supply lead, test sheets, 1 operating manual with booklet presenting the theoretical principles and practical exercises.

Reference to order

- **C.A 1875** training bench > P01651620

Thermography

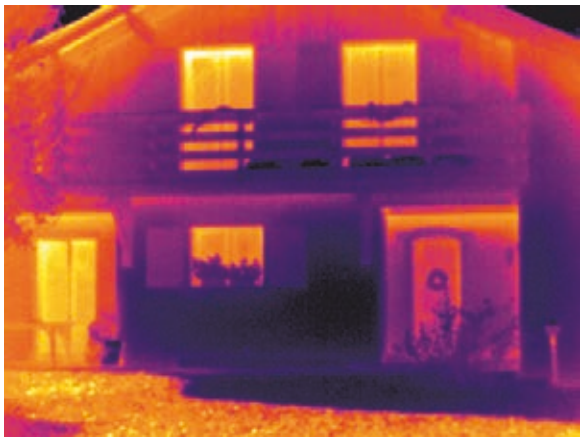
The RayCAm cameras

DiaCAm

IP 54

DiaCAm, les caméras thermiques simples, efficaces et économiques

- Appareils compacts et simples d'utilisation
- Sensibilité thermique de 0,08°C
- Large dynamique de mesure de -20°C à +250°C
- Recharge externe sans immobilisation de l'instrument
- Logiciel d'analyse intuitif et complet fourni standard



Logiciel DiaCAm Preview

> **Les enregistrements :**

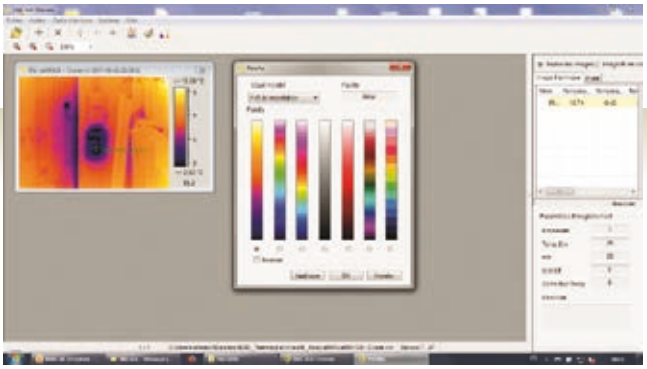
Jusqu'à 1 000 images thermiques peuvent être sauvegardées sur les cartes SD fournies en standard.

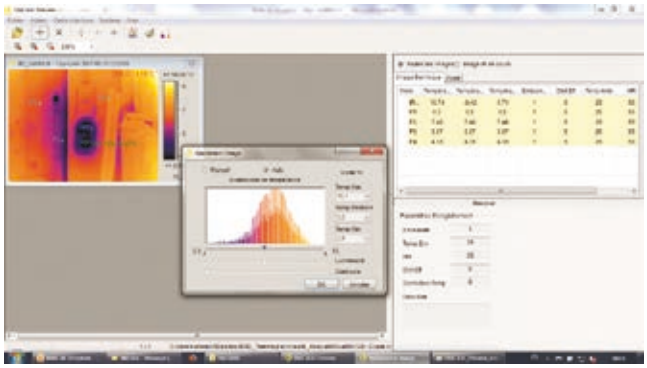
> **DiaCAm Preview, le logiciel de prévisualisation et d'analyse :**

La simplicité d'utilisation de son interface assure une accessibilité rapide à tous.

D'ailleurs, toutes les fonctions d'analyse sont déjà intégrées dans la barre d'outil :

- lCurseurs (affichage automatique de la température au point choisi)
- Profil thermique (affichage automatique des températures Min / Max / Moy de la ligne)
- Un carré ou un cercle pour une analyse par zone (idéal pour des comparaisons des températures Min / Max / Moy, entre bornes par exemple)
- Des tableaux de résultats affichent automatiquement et rapidement l'ensemble des informations / outils d'analyse du thermogramme
- La fonction « Max » donne automatiquement le point chaud du thermogramme complet ou sur une zone d'analyse prédéfinie
- Des polygones et polylignes pour analyser plus précisément certaines zones du thermogramme





Thermography

EduCAm C.A 1882 camera

> **Maintenance & thermal troubleshooting**

> **Comprehensive analysis and parameterization**

> **Ergonomic design**

- IP 54 leakproofing
- excellent legibility thanks to its multidirectional screen,
- comfortable handling due to its pistol shape

> **Performance**

- automatic detection of hottest/coldest point
- parameter settings affecting measurement:
  - adjustable emissivity
  - adjustment of measurement distance
  - parameters for defining relative humidity and environment temperature
- parameterizable alarms
- isotherm function
- storage capacity of 1,000 radiometric images organized in 250 folders and back-up on SD card

Certification granted on the basis of a single test
Available at www.cnpp.com
N°2010-0020 - N°2010-0021

IP 54

With the **C.A 1886 & C.A 1888**, users can choose the mode for viewing the target: infrared, real or a mix of both with the "MixVision" function. This allows you to adjust the transparency (from 0 to 100 %) of the infrared image in relation to the real image, thus helping to identify problem areas immediately.

RayCAm Report software

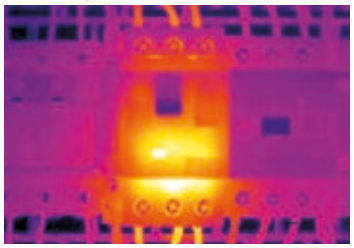
Delivered as standard

RayCAm Report is the ideal tool for analysing the results and creating customized reports. Its interface is so simple that anyone can learn to use it very quickly:

- Cursors (automatic display of the temperature at the point selected)
- Thermal profile (automatic display of the Min/Max/Average temperatures of the line)
- A square or circle for area analysis (ideal for Min/Max/Average temperature comparisons between terminals, for example)
- Result tables quickly display all the data/analytical tools on the thermogram automatically
- The "Max" function automatically indicates the hottest point in the whole thermogram or in a predefined area of analysis
- There are now also new functions available:
  - Polygons and polylines for more precise analysis of certain areas in the thermogram
  - A barchart for studying the temperature distribution according to several intervals

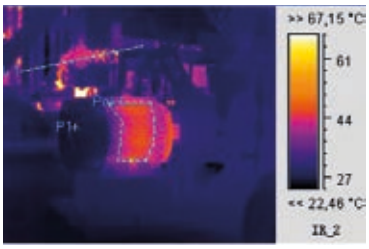
ELECTRICAL APPLICATIONS
Circuit-breaker / Generator

- detection of damaged fuses and bad connections
- verification of correct heat diffusion in the generator



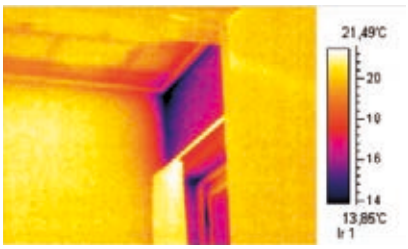
MECHANICAL APPLICATIONS
Electric motors

- detection of internal component anomalies or malfunctions to prevent motor overheating



THERMAL APPLICATIONS
Water leaks / energy losses

- energy consumption monitoring / building inspections
- location of losses (heating, insulation, etc.)



Thermography

C.A 1877, C.A 1878, C.A 1882

DiaCAm thermal cameras for affordable thermographic diagnostics

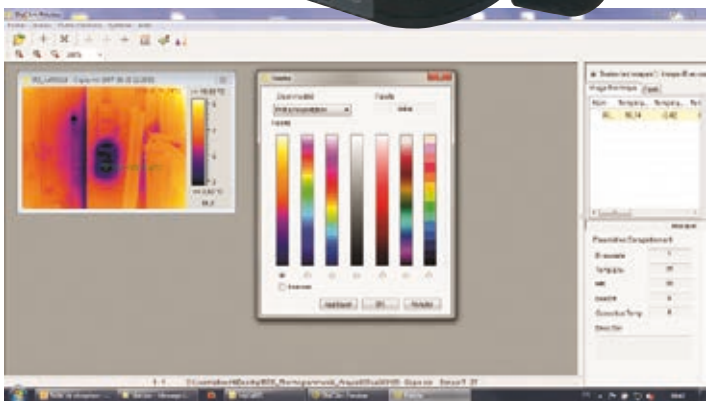
- Ergonomics designed for effortless handling
- Manual cursor and automatic search for hot/cold point
- Alarms
- Thermal sensitivity of 0.08 °C
- Wide dynamic range for measurement from -20°C to +250°C
- Recording of up to 1,000 thermograms on SD card

> **C.A 1882**
- Wide-angle lens
- MixVision function
- Docking station delivered as standard wih video output

> **Applications**
- Building diagnostics (insulation faults, thermal bridges, air infiltration)
- Electrical maintenance (abnormal heating, faulty contacts, overloads, etc.)
- Mechanical maintenance (motor wear, incorrect alignment, etc.)
- Suitable for educational purposes in combination with the C.A 1875 Training Bench

DiaCAm Preview

> Delivered as standard, the **DiaCAm Preview** software is ideal for analysing thermal images. Its interface is simple to use, providing quick access for all users. Furthermore, all the analysis functions are already integrated in the tool bar.



Thermography

	C.A 1877	C.A 1878	C.A 1882
Detector specifications			
Detector	80 x 60	100 x 80	160 x 120
Type	UFPA microbolometer, 8-14 µm		
Frequency	9 Hz		50 Hz*
Sensitivity (N.E.T.D)	0,08 °C @ 30 °C		
Temperature measurement			
Temperature range	-20 °C to +250 °C		
Accuracy	±2°C or ±2% of reading		
Image performance			
Thermal image			
Field of view	10° x 8°	12° x 10°	38° x 28°
Spatial resolution	2,2 mrad		4,4 mrad
Min. focal distance	10 cm		
Focusing	Manual		
Real image	No		Yes
"MixVision" mode	-		Merge function with adjustment of percentage of thermal image in real image from 0 to 100%
Image size	-		640 x 480 pixels
Functions			
Emissivity correction	Yes		
Parameter settings	Emissivity, environmental temperature, distance, relative humidity		
Measurement tools	1 manual cursor + automatic Min/Max detection on adjustable area + adjustable alarm (C.A 1877 & C.A 1878)		
Laser pointer	Yes		
Storage	1,000 thermal images as standard		
Storage type	2-GB removable SD card (as standard), up to 16 GB possible		
Screen	2.5 inches, multi-directional		
Generalites			
Battery	Rechargeable Lithium-Ion battery / Battery life: 3 hours		
Battery recharging	Recharging with external charger		
Protection	IP54		

** 9 Hz en dehors de l'Union Européenne*

State at delivery

> **C.A 1877 or C.A 1878:** Idelivered in blank cardboard box for transport, 1 battery charger, 1 battery, 2-GB SD card, SD card reader, DiaCAm Preview software on CD-ROM, operating manuals.

> **C.A 1882:** delivered in blank cardboard box for transport, 1 battery charger, 1 docking station, 1 battery, 2-GB mini-SD card, SD card reader, video cable, RayCam Preview software on CD-ROM, operating manuals.

References to order

> **C.A 1877 IR thermographic camera**	> P01651277
> **C.A 1878 IR thermographic camera**	> P01651278
> **C.A 1882 IR thermographic camera**	> P01651215
> **C.A 1882_9 Hz IR thermographic camera**	> P01651215E

Accessories / Replacement parts

Battery	> P01296045
Battery charger	> P01296046
Bag	> P01298075
Docking station	> P01651528
Mains power supply	> P01651527
Sun-shade	> P01651532
In-vehicle charger adapter	> HX0061
Initiation Thermographie	> Nous consulter

Thermography

CNPP APPROVAL

Certification granted on the basis of a single test
Available at www.cnpp.com
N° 2010-0020

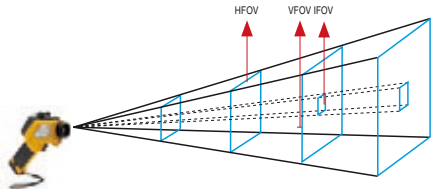
C.A 1886 infrared camera

- Large 3.5'' multidirectional screen for easier reading
- Temperature up to 600 °C as standard
- Voice comments (option)
- MixVision mode
- RayCAm Report software for zone analysis (polygons or polylines) and temperature distribution studies on histograms.

Specifications	C.A 1886
Detector	160 x 120, refresh rate: 50 Hz
Type	UFPA microbolometer, 8-14 microns
Sensitivity (NETD)	0.1 °C to 30 °C
Temperature	-20 °C to +600 °C (standard) up to 1,500 °C (option)
Accuracy	±2 °C or ±2 %
Optics	Field of view: 20° x 15°, IFOV: 2.2 mrad Min. focusing distance: 10 cm
MixVision function	Complete IR-Merge functions IR image in real image from 0 to 100 %
Image size	640 x 480 pixels
Adjustment	Emissivity, environment temperature, distance, humidity
Measurement tools	3 manual cursors + 1 Max/Min detection on adjustable area, isotherm, High/low alarm
Storage	1,000 radiometric images in 250 folders + 2 GB on mini-SD card
Power supply	Battery life: 3 hours (continuous use) External battery charger

Lens for RayCAm C.A 1886

Lens	IFOV spatial resolution		0.1 m	0.3 m	0.5 m	1 m	2 m	10 m	30 m	100 m
6.4°x 4.8° 3 x Telephoto lens	0.7 mrad	HFOV	0.01	0.03	0.05	0.11	0.22	1.11	3.35	11.18
		VFOV	0.008	0.024	0.04	0.08	0.16	0.83	2.51	8.38
		IFOV	0.07	0.21	0.34	0.69	1.39	6.98	20.96	69.88
20°x 15° Standard lens	2.2 mrad	HFOV	0.03	0.10	0.17	0.35	0.70	3.52	10.57	35.26
		VFOV	0.02	0.07	0.13	0.26	0.52	2.63	7.89	26.33
		IFOV	0.22	0.66	1.10	2.20	4.40	22.04	66.12	220.40
38°x 28.5° 0.5 x Wide-angle lens	4.4 mrad	HFOV	0.06	0.20	0.34	0.68	1.37	6.88	20.65	68.86
		VFOV	0.05	0.15	0.25	0.50	1.01	5.07	15.23	50.79
		IFOV	0.43	1.29	2.15	4.30	8.60	43.04	129.12	430.40



HFOV: horizontal field of view (metres)
VFOV: vertical field of view (metres)
IFOV: spatial resolution (millimetres)

State at delivery

> Delivered in a case with 1 battery charger, 2 batteries, a 2 GB mini-SD card, 1 SD card reader, 1 video cable, RayCAm Report software and 1 measurement report

Accessories / Replacement parts

Sun shade	> P01651531
Photo tripod adapter	> P01651526
Lens cap	> P01651522
USB cable	> P01295274
Battery	> P01296041
Battery charger	> P01296043
Mains power supply	> P01651527
In-vehicle adapter	> HX0061
Thermography training	> Contact us

References to order

> **C.A 1886**	> P01651260
> **C.A 1886** high-temperature option 1,000 °C	> P01651261
> **C.A 1886** high-temperature option 1,500 °C	> P01651262
> **C.A 1886** Bluetooth	> P01651263
Others configurations	> Contact us

Thermography

C.A 1888 infrared camera

- 3.5" multidirectional screen for easier reading
- Temperature up to 600 °C as standard
- Matrix up to 384 x 288
- Voice comments (option)

CNPP APPROVAL
Certification granted on the basis of a single test
Available at www.cnpp.com
N° 2010-0021

Specifications	C.A 1888
Detector	384 x 288, refresh rate: 50 Hz
Type	UFPA microbolometer, 8-14 microns
Sensitivity (NETD)	0.08 °C to 30 °C
Temperature	-20 °C to +600 °C (standard) up to 1,500 °C (option)
Accuracy	±2 °C or ±2 %
Optics	Field of view: 24° x 18°, IFOV: 1.3 mrad Min. focusing distance: 10 cm
MixVision function	Merge function with adjustment of IR image percentage on real image from 0 to 100 %
Image size	640 x 480 pixels
Adjustment	Emissivity, environment temperature, distance, humidity
Measurement tools	3 manual cursors + 1 Max/Min detection on adjustable area, isotherm, High/low alarm
Storage	1,000 radiometric images in 250 folders + 2 GB on mini-SD card
Power supply	Battery life: 3 hours (continuous use) External battery charger

Lens 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	1.3 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

HFOV: horizontal field of view (metres)
VFOV: vertical field of view (metres)
IFOV: spatial resolution (millimetres)

State at delivery

> Delivered in a case with 1 battery charger, 2 batteries, a 2 GB mini-SD card, 1 SD card reader, 1 video cable, RayCAm Report software and a measurement report

Accessories / Replacement parts

Sun shade	> P01651531
Photo tripod adapter	> P01651526
Lens cap	> P01651522
USB cable	> P01295274
Battery	> P01296041
Battery charger	> P01296043
Mains power supply	> P01651527
In-vehicle adapter	> HX0061
Thermography training	> Contact us

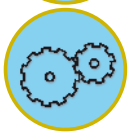
References to order

> **C.A 1888**	> P01651270
> **C.A 1888** high-temperature option 1,000 °C	> P01651271
> **C.A 1888** high-temperature option 1,500 °C	> P01651272
> **C.A 1888** Bluetooth	> P01651273
Others configurations	> Contact us

Air-conditioning, ventilation, noise and lighting, humidity and pollution are all features of our environment nowadays.
In order to limit the nuisance caused by them, these fields are covered by regularly-updated regulations.
To comply with these rules, environmental measurements need to be performed on the corresponding systems.
Just like manipulation of measuring instruments or interpretation of the results (curves, diagrams, etc.), environmental measurements are now an integral part of the job for electricians, heating technicians, environmental engineers, etc.
These professionals come into contact with these systems because they require complex installations to operate properly.
When constructing buildings, maintaining installations or checking environmental parameters, all the necessary measurements can be performed simply and quickly with our comprehensive range of Chauvin Arnoux measuring instruments, whatever the applications concerned.

Immediate, compulsory temperature testing at each stage of the cold chain

Checking proper functioning of your air conditioning and ventilation system



Preventive maintenance of all types of installations (Industries, hospitals, etc.)

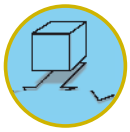
For industry, all measurements enabling work environment testing (noise pollution, carbon dioxide detection, lighting, etc)

Testing of air quality and atmospheric humidity, which are regulated for improved conservation of exhibits in museums

Testing the preservation of food products (superstores, etc.)

Testing all parameters to optimize storage (temperature, hygrometry, etc.)

Optimizing the quality of transport (vehicles, loads, etc.)



Testing comfort parameters in a restaurant

Thermometers selection guide

	 C.A 1871	 C.A 871	 C.A 876	 C.A 879	 C.A 1864	 C.A 1866	 C.A 861	 C.A 863	 C.A 865	 TK 2,000	 TK 2002
Infrared measurement											
	■	■	■	■	■	■					
Field of view											
8/1	■	■									
10/1			■								
12/1				■							
30/1					■						
50/1						■					
Emissivity											
Fixed: 0.95	■	■		■							
Variable: 0.1 to 1			■		■	■					
Laser sight	■	■	■	■	■	■					
Contact measurement											
1-input K sensor			■				■	■		■	■
2-input K sensor							■	■			■
Pt100 sensor									■		
General functions											
Hold	■	■	■	■	■	■	■	■	■	■	■
Max			■		■	■	■	■	■		
Min			■		■	■					
Avg					■	■					
Alarm			■		■	■					
Choice of units	■	■	■	■	■	■	■	■	■		
Backlighting	■	■	■	■	■	■	■	■	■		
Page	104	102	104	102	103	103	105	105	105	106	106

Non-contact thermometers

C.A 871

> **Small and easy to handle**
> **Simple to use**
> **Ideal for all users**

C.A 879

> **Specially designed for comfortable handling**
> **Laser sight for precise targeting of the measurement area**

	C.A 871	C.A 879
Specifications		
D/S targeting ratio	8/1	12/1
Emissivity	Fixed: 0.95	
Measurement range	−40 °C to +538 °C	−50 °C to +550 °C
Resolution	0.1 °C to 100 °C 1 °C for other temperature	
Accuracy*	±2.5 % ±2 °C	±1.5 % ±2 °C
Functions		
Laser sight	Yes	
Continuous measurement	Yes *(continuous press on trigger)*	
Hold	Yes	
Measurement unit	°C / °F	
Display	LCD 2,000 counts with backlighting	
Dimensions / weight	160 x 82 x 41.5 mm / 180 g	230 x 100 x 56 mm / 290 g

** Depending on measurement range. See operating manual for details.*

State at delivery

> **C.A 871** delivered with carrying bag and 9 V battery
> **C.A 879** delivered with carrying bag and 9 V battery

Accessories / Replacement parts

9 V battery	> P01100620
Carrying case	> P01298033

References to order

> **C.A 871**	> P01651302Z
> **C.A 879**	> P01651805Z

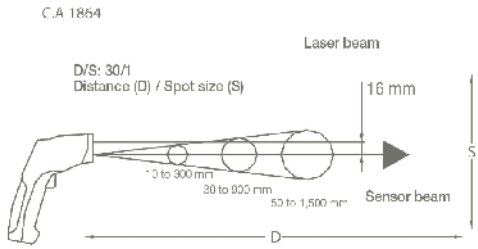
Non-contact thermometers

C.A 1864 & C.A 1866

- **Extensive temperature range: measure up to 1,000 °C**
- **Variable emissivity ensuring inspections in line with reality**
- **High distance/spot-size targeting ratio for greater accuracy**
- **Set your alarm thresholds**

	C.A 1864	C.A 1866
Specifications		
D/S targeting 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 sight	Yes, class II laser	
Display	20,000 counts, backlighting	
Dimensions / weight	230 x 100 x 56 mm / 290 g	

Diagram illustrating the D/S targeting ratio



Accessories / Replacement parts

9 V battery	> P01100620
Carrying case	> P01298033

State at delivery

- **C.A 1864** delivered in carrying case with operating manual and 9 V battery
- **C.A 1866** delivered in carrying case with operating manual and 9 V battery

References to order

C.A 1864	> P01651813
C.A 1866	> P01651814

Non-contact thermometers

C.A 1871 & C.A 876

> **C.A 1871**
- Infrared probe adaptable to all multimeters
- When the probe is pointed at the surface of an object, the sensor delivers a voltage proportional to the temperature measured (1 mV / °C)

> **C.A 876**
- Measure temperatures from a distance or by contact
- Accurate analysis due to its variable emissivity
- Surface measurement, measurement of medium, measurement of liquids

Specifications	C.A 1871	C.A 876	
		IR measurements	Contact measurements
D/S targeting ratio	8/1	10/1	
Emissivity	Fixed 0.95	0.1 to 1	
Measurement range	–30 °C to +550 °C	–20 °C to +550 °C	–40 °C to +1350 °C
Accuracy	±2% R	±2% R or ±3 °C	±0.1 % R +1 °C
Functions	-	Max, Min, Avg, Hold, Alarms	
Dimensions / weight	164 x 50 x 40 mm / 182 g	173 x 60.5 x 38 mm / 255 g	

State at delivery

> **C.A 876** delivered with 1 flexible K thermocouple sensor, 1 operating manual and 1 shockproof sheath

> **C.A 1871** delivered with 1 operating manual and 9 V battery

References to order

> **C.A 876**	> P01651403Z
> **C.A 1871**	> P01651610Z

Accessories / Replacement parts

> **For C.A 876**

Large choice of K thermocouple sensors > See page 107

Contact thermometers

C.A 861 & C.A 863

> **Rugged instruments due to their shockproof sheaths**
> **Particularly simple measurement of temperatures up to 1,300 °C**
> **Temperature differential included on the C.A 863**

C.A 865

> **Accurate measurements**
> **Stability of the sensor over time**
> **Rugged due to its protective sheath**

Specifications	C.A 861	C.A 863	C.A 865
Sensor	K couple	K couple	Pt 100
No. of inputs	1	2	1
Range	–40 °C to +1,350 °C	–50 °C to +1,300 °C	–50 °C to +200 °C
Accuracy	±0.1 % +1 °C	±0.3 % +1 °C	±0.5 °C
Functions	Max, Hold, °C or °F		
Dimensions	173 x 60.5 x 38 mm		
Weight	185 g		175 g

Accessories / Replacement parts

> **For C.A 861, C.A 863 and C.A 865**
Pt 100 probes
K thermocouples
CK extensions

> See page 107

State at delivery

> **C.A 861** delivered with 1 flexible K thermocouple sensor, 1 shockproof sheath, 1 operating manual and 1 battery
> **C.A 863** delivered with 2 flexible K thermocouple sensors, 1 shockproof sheath, 1 operating manual and 1 battery
> **C.A 865** delivered with 1 Pt 100 sensor, 1 shockproof sheath, 1 operating manual and 1 battery

References to order

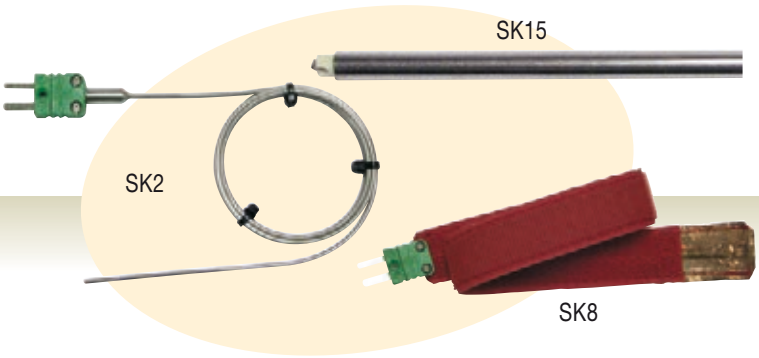
> **C.A 861**	> P01650101Z
> **C.A 863**	> P01650201Z
> **C.A 865**	> P01650301Z

Contact thermometers

TK 2000 & TK 2002

- **Compact, accurate thermometers which are easy to use: simply connect up the probe and start measuring!**
- **IP 65 protection means they can be used in any type of environment**
- **Measure the temperature difference with the TK 2002's two thermocouple inputs**

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 / weight	163 x 63 x 37.5 mm / 200 g	



State at delivery

- **TK 2000** delivered with 1 flexible K thermocouple sensor, 1 operating manual and 1 battery
- **TK 2002** delivered with 2 flexible K thermocouple sensors, 1 operating manual and 1 battery

Accessories / Replacement parts

- **TK 2000 and TK 2002**

K thermocouple assembly	> See page 107
CK extension	> See page 108

References to order

TK 2000	> P01653100
TK 2002	> P01653110

Sensors and probes

K thermocouple sensors

SK 1 SK 2 SK 3 SK 4 SK 5 SK 6 SK 7 SK 8 SK 11 SK 13 SK 14 SK 15 SK 17 SK 19

Series	Type	Description	Measurement range	Response time	Ø	Length
SK 1	Needle sensor	Penetration (20 mm minimum) in pasty, viscous or liquid media	–50 °C to +800 °C	1 s	3 mm	15 cm
SK 2	Bendable sensor	Bendable as required. Curve radius > 4 mm	–50 °C to +1,000 °C	2 s	2 mm	1 m
SK 3	Semi-rigid sensor	Slightly bendable	–50 °C to +1,000 °C	6 s	4 mm	50 cm
SK 4	Surface sensor	For small flat surfaces Use of silicone grease improves contact quality	0 to 250 °C	1 s	5 mm	15 cm
SK 5	Surface sensor with spring	For flat surfaces The spring ensures optimum contact, even if the sensor is not set up perpendicularly Use of silicone grease improves contact quality	–50 °C to +500 °C	1 s	5 mm	15 cm
SK 6	Flexible sensor	Sensor specially designed for measurements in places where access is difficult. Not to be used in liquids (tip not leakproof).	–50 °C to +285 °C	1 s in contact use 3 s in ambient-air use	1 mm	1 m
SK 7	Air sensor	Suitable for all ambient air measurements (moving air) If the air is stationary, agitate the sensor	–50 °C to +250 °C	5 s	5 mm	15 cm
SK 8	Pipe sensor	For measurements on pipes The pipe is cleaned and dried before applying the copper sheet The Velcro ribbon is then wound round it to ensure contact	–50 °C to +140 °C	10 stainless-steel tube	90 mm	32 cm
SK 11	Needle sensor (stainless steel)	For penetration in pasty or viscous products	–50 °C to +600 °C	12 s	3 mm	13 cm
SK 13	General purpose sensor	Spiral lead: 45 cm to 1 m	–50 °C to +1100 °C	12 s	3 mm	30 cm
SK 14	Elbowed surface	For measuring surface temperatures when access is difficult	–50 °C to +450 °C	8 s	6 mm	13 cm
SK 15	sensor	For flat surfaces The spring ensures optimum contact, even if the sensor is not set up perpendicularly	–50 °C to +900 °C	2 s	8 mm	13 cm
SK 17	Air sensor	Suitable for all ambient air measurements (moving air) If the air is stationary, agitate the sensor	–50 °C to +600 °C	3 s	6 mm	13 cm
SK 19	Magnetic sensor	Sensor with magnet for flat metal surfaces	–50 °C to +200 °C	7 s	4 mm	1 m
	Class-II thermocouple accuracy: -40 °C to +333 °C: ±2.5 °C / +333 °C to +1,200 °C: ±0.0075 x t °C x t °C					

References to order

> **SK 1**	> P03652901
> **SK 2**	> P03652902
> **SK 3**	> P03652903
> **SK 4**	> P03652904
> **SK 5**	> P03652905
> **SK 6**	> P03652906
> **SK 7**	> P03652907
> **SK 8**	> P03652908
> **SK 11**	> P03652917
> **SK 13**	> P03652918
> **SK 14**	> P03652919
> **SK 15**	> P03652920
> **SK 17**	> P03652921
> **SK 19**	> P03652922

Sensors and probes

CK 3 CK 2 CK 1 CK 4

Extensions for thermocouple

Series	Description	Ø	Length
CK 1	Terminated by male connector / female connector	4 mm	1 m
CK 2	Terminated by male connector / 2 bare wires	4 mm	1 m
CK 3	Terminated by 5-pin DIN 5 connector / 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		

Pt 100 Ω sensors and probes

> **Pt 100Ω temperature sensors with spiral lead 45 cm to 1 m long**

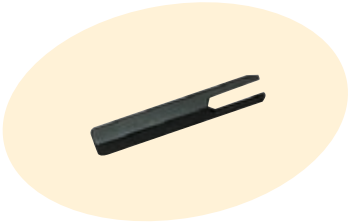
Series	Type	Description	Measurement range	Response time	Ø	Length
SP 10	Surface sensor with spring	For flat surfaces. The spring ensures optimum contact, even if the sensor is not set up perpendicularly	−50 °C to +200 °C	6 s	5 mm	Needle 13 cm
SP 11	Needle sensor	For penetration (20 mm minimum) in pasty and viscous products	−100 °C to +600 °C	7 s	3 mm	Needle 13 cm
SP 12	Air sensor	Suitable for all ambient air measurements (moving air). If the air is "stationary", agitate the sensor	−100 °C to +600 °C	5 s	5 mm	Needle 13 cm
SP 13	Liquid sensor	Specially designed for liquids	−100 °C to +600 °C	7 s	3 mm	Needle 13 cm
	Class B Pt100 probe accuracy ± 0.3 °C					

References to order

> **SP 10**	> P03652712
> **SP 11**	> P03652713
> **SP 12**	> P03652714
> **SP 13**	> P03652715
> **CK 1**	> P03652909
> **CK 2**	> P03652910
> **CK 3**	> P03652913
> **CK 4**	> P03652914

Accessories / Replacement parts

> **PP1** handle for CK extensions > P03652912



Selection guide for environmental measurement

	C.A 846	C.A 847	C.A 1244	C.A 822	C.A 1224	C.A 1226	C.A 850	C.A 852	C.A 1052
Temperature measurement									
Probe Pt 100	■		■	■	■	■			■
Probe K 2 inputs									■
Relative humidity measurement									
RH of air	■		■						■
Dew-point measurement			■						■
RH of materials		■							
Air speed measurement									
Rotating-vane sensor				■	■				■
Hot-wire sensor						■			■
Flow measurement					■	■			■
Air pressure measurement									
Differential pressure							■	■	■
High pressure (=> 10 bar)							■		
Low pressure (=> 100 mbar)								■	■
General functions									
Hold	■		■	■	■	■	■	■	■
Max	■		■	■	■	■	■	■	■
Min			■		■	■	■	■	■
Avg					■	■			■
Choice of units	■		■	■	■	■	■	■	■
Backlighting	■			■			■	■	■
Recording									■
Page	110	110	110	110	111	111	114	114	112

	C.A 811	C.A 813	C.A 832	C.A 834	C.A 895	C.A 1725	C.A 1727
Lighting measurement							
< 20,000 lux	■						
< 200,000 lux		■					
Spectral correction	■	■					
Incidence correction	■	■					
Noise measurement							
A and C frequency weighting			■	■			
Slow / fast time weighting			■	■			
Analogue output			■	■			
Detection gaz							
CO detection					■		
Speed measurement							
With and without contact						■	■
Rotating-vane speed						■	■
Linear speed						■	■
Frequency, period						■	■
Duty cycle						■	■
Counting							■
General functions							
Hold	■	■		■	■	■	■
Max	■	■	■	■	■	■	■
Min				■		■	■
Choice of units	■	■				■	■
Backlighting	■	■	■	■	■		
Buzzer					■		■
Recording				■			■
Software				■			■
Page	115	115	116	116	117	118	118

Thermo-hygrometers

C.A 846

> **2 in 1: hygrometry and ambient temperature measurement**
> **Easy to use**

C.A 1244

> **3 in 1: hygrometry, ambient temperature and dew point measurement**
> **Remote probe for greater accessibility**
> **Particularly easy to read with its dual backlit display**

C.A 847

> **Measure the humidity of your materials quickly and simply: prick the material and note the value corresponding to the LED lit**

Specifications	C.A 846	C.A 1244	C.A 847
RH range	0 to 100 % RH	5 to 95 % RH	6 to 100 % RH
RH accuracy	±2.5 % at 25 °C from 10 % to 90 % ±5 % at 25 °C from 0 % to 10 % HR and from 90 % to 100 %	+1.8 % RH	±1 LED
Temperature range	–20 °C to +60 °C	-20 °C to +70 °C	-
Temperature accuracy	±0.5 °C	±0.4 % R +0.3 °C	-
Dew point	-	Yes	-
Functions	Max, Hold		-
	-	Min, Avg	-
Dimensions / weight	173 x 60.5 x 38 mm / 185 g	147.7 x 70.6 x 34.7 mm / 190 g	173 x 60.5 x 38 mm / 160 g

State at delivery

> The **C.A 846**, **C.A 1244** and **C.A 847** delivered with 1 battery and 1 user guide in 5 languages

Accessories / Replacement parts

> **For C.A 846 and C.A 1244**

33 % salt cartridge	> P01156402
75 % salt cartridge	> P01156401

> **For C.A 1244**

Telescopic extension	> P01102012

References to order

> **C.A 846**	> P01156301Z
> **C.A 847**	> P01156302Z
> **C.A 1244**	> P01156310

Thermo-anemometers

C.A 822, C.A 1224 & C.A 1226

- **Simple to use**
- **Dual display**
- **Rotating-vane or hot-wire sensor depending on your application**

Specifications	C.A 822	C.A 1224	C.A 1226
Air-speed sensor	Rotating vane	Rotating vane	Hot wire
Air-speed range	0.4 to 30 m/s	0.25 to 35 m/s	0.15 to 30 m/s
Air-speed accuracy	± 3 % P.E.	± 3 % R + 0.1 m/s or ± 1 % R + 0.2 m/s*	± 3 % R + 0.05 m/s or ± 1 % R + 0.2 m/s*
Temperature range	-20 °C to + 60 °C	-20 °C to +80 °C	
Temperature accuracy	±0.5 °C	± 0.3 % R + 0.25 °C	
Flow rate	-	0 to 99,999 m³/h	
Functions		Max, Hold, Min, Avg	
Dimensions / weight	173 x 60.5 x 38 mm / 330 g	147.7 x 70.6 x 34.7 mm / 190 g	

** from 3.1 m/s*

Accessories / Replacement parts

- **For C.A 1224**

C.A 825 flow measurement cones	> P01173105
Telescopic extension	> P01102012

- **For C.A 1226**

C.A 828 flow measurement cones	> P01173107
Straight extension	> P01102010
Elbowed extension	> P01102011

State at delivery

- **C.A 822** delivered with 1 shockproof sheath, 1 rotating-vane sensor, 1 operating manual in 5 languages and 1 battery
- **C.A 1224** delivered with 1 remote probe, 1 operating manual in 5 languages and 9 V battery
- **C.A 1226** delivered with 1 remote probe, 1 operating manual in 5 languages and 9 V battery

References to order

C.A 822	> P01173102
C.A 1224	> P01173113
C.A 1226	> P01173114

Multi-function instrument

C.A 1052

- **Can be used for comprehensive analysis of your air-conditioning, heating and ventilation installations.**
- **Accurate 5-in-1 instrument: air-speed measurement, flow rate, relative humidity, pressure and temperature**
- **Complete: the instrument is delivered as standard with its probes in a hard case**
- **Very easy to use: simply connect the probe (recognized automatically) and start measuring!**
- **Data storage**

	C.A 1052	
Specifications	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
Ambient 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	–20 °C to +70 °C	± 0.8 % R + 0.6 °C
Pressure	0 to 1,000 mm H²O	± 0.2 % R + 1
Temperature (two K thermocouple inputs))	–200 °C to +1300 °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 / weight	161.9 x 80.8 x 57.4 mm / 380 g	

State at delivery & reference

- **C.A 1052** delivered in case with all its probes, 1 operating manual in 5 languages, 4 x 1.5 V batteries and PhysicsLog software

> P01175020

Accessories / Replacement parts

Straight extension	> P01102010
Elbowed extension	> P01102011
Telescopic extension	> P01102012
C.A 825 rotating-vane flow cone	> P01173105
C.A 828 hot-wire flow cone	> P01173107
Pitot tube	> P01102048
Hard case	> P01298072

Physics-Log software

- **Recovery of the data from the C.A 1052: rotating-vane and hot-wire speed, flow rate, relative humidity, temperature, pressure**
- **Downloaded campaigns labelled with operator and customer details**
- **Customized report printing**

Physics-Log software

Choice of campaigns for download
Campaigns labelled with operator and customer details
C.A 1052 memory dump
Display of curves corresponding to the data downloaded
Customization of graphs
Saving in PDF format for customer distribution

Manometers

C.A 850 & C.A 852

- **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	
Units	psi, bar, mbar, mmH_2O, inH_2O	
	kbar, cmH_2O, FtH_2O, mmHg, $OZin^2$, kg/cm^2	-
Functions	Differential measurements, Min, Max, Hold	
Dimensions / weight	182 x 72 x 30 mm / 220 g	

State at delivery

- **C.A 850** delivered in carrying case with 2 connection pipes, 1 operating manual in 5 languages and battery
- **C.A 852** delivered in carrying case with 2 connection pipes, 1 operating manual in 5 languages and battery

References to order

C.A 850	> P01184101
C.A 852	> P01184102

Lightmeters

C.A 811 & C.A 813

- **Check your lighting in compliance with the standards and in all directions**
- **Measurement up to 20,000 or 200,000 lux depending on your requirements**

Specifications	C.A 811	C.A 813
Measurement range	20 to 20,000 lux	20 to 200,000 lux
Accuracy		
Incandescent lamp:	± 3 % + 10 counts	
Other sources:	± 18 % + 2 counts	± 11 % + 2 counts
Correction	Spectral and incidence	
Functions	Max, Hold	
Dimensions	173 x 60.5 x 38 mm	
Weight	214 g	223 g

State at delivery

- **C.A 811** delivered with 1 shockproof protective sheath, 1 battery and 1 operating manual in 5 languages
- **C.A 813** delivered with 1 shockproof protective sheath, 1 battery and 1 operating manual in 5 languages

References to order

C.A 811	> P01172201Z
C.A 813	> P01172401Z

Sound-level meters

C.A 832

> **Testing of sound levels**
> **Simple to use**

C.A 834

> **Monitoring of noise exposure levels: recording of up to 32,000 values!**
> **Process the data on a PC using the standard software supplied**

Specifications	C.A 832	C.A 834
Measurement range	35 to 130 dB	30 to 130 dB
Calibres	3 calibres: 35 to 80 dB 50 to 100 dB 80 to 130 dB	4 calibres: 30 to 80 dB 50 to 100 dB 80 to 130 dB Auto 30 to 130 dB
Accuracy	±2 dB	±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, Hold
Analogue output	10 mV/dB or 1 Vrms	
Memory	-	32,000 values
Software	-	Yes
Dimensions / weight	237 x 60.5 x 38 mm / 230 g	275 x 64 x 30 mm / 285 g

State at delivery

> **C.A 832** delivered with 1 shockproof sheath, 1 jack socket for analogue output and 1 universal adapter for fixing on tripod, 1 operating manual and 9 V battery
> **C.A 834** delivered in hard case with data processing software, 1 RS232 cable and 1 jack socket for analogue output, 1 operating manual and 9 V battery

References to order

> **C.A 832**	> P01185501Z
> **C.A 834**	> P01185502

Accessories / Replacement parts

> **For 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	> P01102085
Wind shield	> P01102083

CO detector

C.A 895

> **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 832
Measurement range	0 to 1,000 ppm
Accuracy	± 5 % + 5 ppm
Measurement mode	Normal or Avg
Functions	Alarm, Max, Hold
Dimensions / weight	237 x 60.5 x 38 mm / 190 g

Accessories / Replacement parts

Aspiration kit with pump and extension > P01651101

State at delivery

> **C.A 895** delivered with 1 shockproof protective sheath, 1 operating manual in 5 languages and 9 V battery

Reference to order

> **C.A 895** > P01651001Z

Tachometers

IP 51

C.A 1725 & C.A 1727

- **Measurements up to 100,000 RPM**
- **Measurement with or without contact**
- **Large number of functions available: rotation speed, linear speed, counting, frequency, period**
- **Possibility of programming and storage capacity on the C.A 1727**
- **USB link for processing the recorded data on a PC with the C.A 1727**

Specifications		C.A 1725	C.A 1727
RPM function	Range	6 to 100,000 RPM	
	Accuracy	10^{-4} R ± 6 counts	
m/min function	Range	0.6 to 60,000 m/min.	
	Accuracy	10^{-4} R ± 1 pas	
Hz function	Range	0.1 to 10,000 Hz	
	Accuracy	4×10^{-5} R ± 4 counts	
ms function	Range	0.1 to 10,000 ms	
	Accuracy	10^{-4} R ±5 counts	
Duty cycle function	Range	10 to 10,000 %	
	Accuracy	0.1 % to 1 %	
Counting function	Range		0 to 99,999 events
	Accuracy		± 1 event
Functions		Min, Max, Hold, Smooth	
			High and low alarm
Memory			4,000 counts
Dimensions / weight		21 x 72 x 47 mm / 250 g	

State at delivery

- **C.A 1725 tachometer** delivered in a hard case with FRB F connector, a 9 V battery ,1 set of 15 reflective strips (length 0.1 m), 1 operating manual on CD and 1 quick start-up guide on paper.
- **C.A 1727 tachometer** delivered in a hard case with FRB F connector, a 9 V battery, 1 set of 15 reflective strips (length 0.1 m), 1 operating manual and the TACHOGRAPH software on CD and 1 quick start-up guide on paper.

Accessories / Replacement parts

Mechanical accessories kit	> P01174902
End-fittings (set of 3)	> P01174903
Reflective tape (15 strips of 0.1 m)	> P01101797
FRB F socket	> P01101785
TACHOGRAPH software on CD	> P01174835
USB-A <–> USB-B lead	> P01295293

References to order

C.A 1725 tachometer	> P01174810
C.A 1727 tachometer	> P01174830

LAN tester

C.A 7028

> **Detects, identifies and locates faults from up to 150 m away**
> **Alphanumeric and graphical screen**
> **Large number of standards supported (TIA 568, ISO, EN, USOC, ISDN)**

Specifications	C.A 7028
Type of cable	RJ 45
Tests	Cut wires, short-circuit, crossed, separated, split or reversed pairs, shielding faults
Remote modules	Identifiers nos 1 to 9
Dimensions / weight	165 x 90 x 37 mm / 350 g

Accessories / Replacement parts

> **For C.A 7028**

Set of 4 identifiers nos. 2 to 5	> P01101994
Set of 4 identifiers nos. 6 to 9	> P01101995
Carrying bag	> P01298532

State at delivery

> **C.A 7028** delivered with 2 x RJ45 leads, 1 identifier No. 1 and carrying case, 1 operating manual in 5 languages and 1 battery

Reference to order

> **C.A 7028**	> P01129501

Fieldmeters

C.A 40

> **Measurement of low-frequency magnetic fields**
> **Quick evaluation of the radiation from instruments and installations**
> **Easy-to-handle unidirectional probe**

C.A 41 & C.A 43

> **Electrical field measurement and detection of radiation sources across a wide frequency band**
> **Isotropic probe: measures the field in all directions**
> **Storage of measurement points with the C.A 43**

Specifications	C.A 40	C.A 41	C.A 43
Magnetic field measurement	20 µT 200 µT 2,000 µT	-	-
Electrical field measurement	-	0.1 to 1 1 to 10	10 to 100 100 to 200
Accuracy	± (4 %+3 cts) ± (5 %+3 cts) ± (10 %+5 cts)	0.7 V/m 0.5 V/m	1 dB 2 dB
Frequency range	30 to 300 Hz	100 kHz to 2.5 GHz	
Field intensity	-	-	0.1 to 2 mW/cm²
Output	-	Analogue	Digital on optical fibre
Probe	Unidirectional	Isotropic	
Alarm	-	Configurable high and low thresholds	
Memory	-	-	1,920 points
Dimensions / weight	163 x 68 x 24 mm / 285 g	216 x 72 x 37 mm / 350 g	

State at delivery

> **C.A 40** delivered in hard case with 1 probe, 1 battery and 1 operating manual in 5 languages
> **C.A 41** delivered in hard case with 1 probe EF2A, 1 battery and 1 operating manual in 5 languages
> **C.A 43** delivered in hard case with 1 probe EF2A, optical fibre, 1 PAC adapter, software,1 battery and 1 operating manual in 5 languages

References to order

> **C.A 40**	> P01167501
> **C.A 41**	> P01167001B
> **C.A 43**	> P01167002A

Accessories / Replacement parts

> **For C.A 41 and C.A 43**

EF2A isotropic probe	> P01167202B
Shockproof sheath	> P01298009B

> **For C.A 40**

Carrying case for the C.A 40	> P01298036

LF fieldmeters

C.A 42

> **Measurement of the fields and comparison with the international standards**

- Measurement of Low-Frequency magnetic and electrical fields
- Oscilloscope and frequency analysis functions
- Isotropic probes

Specifications	C.A 42
Magnetic field measurement	MF 400 – MF 400H – MF 05 isotropic probes: 10 nT to 1 T*
Electrical field measurement	EF 400 isotropic probe: 1 V/m to 30 kV/m
Frequency range	DC at 400 kHz*
Evaluation standards stored	6 as standard including ICNIRP
Probes	1 internal isotropic probe and 4 external isotropic probes as an option
Output	RS232 and analogue output
Function	Option: oscilloscope, frequency analysis
Dimensions / weight	266 x 144 x 60 mm / 950 g

** depending on the isotropic probe used*

Accessories / Replacement parts

MF 400 probe	> P01167302
MF 400H probe	> P01167303
MF 05 probe	> P01167304
EF 400 probe	> P01167305
Aluminium tripod for MFxxx probe	> P01167310
Voltage output lead	> P01167314
Large-size storage case	> P01167308
Small-size storage case	> P01167307
Carrying bag	> P01167309
Options:	
- Oscilloscope function	> Contact us
- Frequency analysis	> Contact us

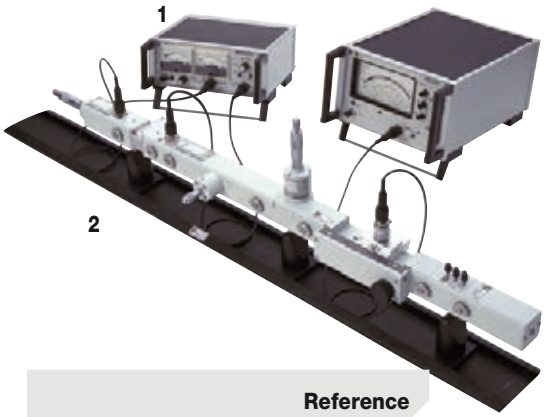
State at delivery

> **C.A 42** delivered in a carrying bag with a protective sheath, RS232 and Trigger leads, mains charger and 1 operating manual in 5 languages

Reference to order

> **C.A 42**	> Contact us

Training benches: guided propagation



Education

Made up of a set of components which are sturdy and very easy to implement, the ORITEL BDH 100 bench enables a great many basic microwave experiments to be conducted.

> **Microwave teaching aids – 8.5 to 9.6 GHz**

> **WR90/R100 waveguide fitted with "EASYFIX" quick fastening system**

> **1:** GUNN ORITEL CF 204 power supply

> **2:** ORITEL BDH R100 training bench

Can be used for a number of different experiments:

- Study of the GUNN oscillator
- Wavelength measurement
- Standing wave ratio measurement
- Impedance measurement
- Frequency measurement
- Reading the quadratic law of a detector, etc.

Detailed course, teaching and lab work material and aids come with this educational microwave bench.

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 %	> 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: < 1.25 Max. power: +19 dBm	> P01275315
ORITEL ISO 100 ferrite isolator	Isolation: > 20 dB	> P01275308
ORITEL ATM 100 micrometer - adjustable attenuator	Attenuation: > 20 dB Max. power: 1 W avg	> P01275310
ORITEL ADZ 100/3 impedance adaptor	Number of screws: 3	> P01275313
ORITEL TGN 100 waveguide-to-coax 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 CGX 100)	Coupling: 20 and 30 dB	> P01275306
ORITEL ANC 100/15 dB horn antenna	Coupling: 20 dB Gain: 15 dB	> P01275304
ORITEL AFR 100 fastening adaptor	Compatible with UBR 100/UG 39 standard 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*

State at delivery

> This is made up of the 11 components listed below along with 3 guide supports and a user's manual grouped together in a carrying case:

- 1 ORITEL OSG 100 GUNN diode oscillator
- 1 ORITEL ISO 100 ferrite isolator
- 1 ORITEL MOD 100 PIN diode modulator
- 1 ORITEL ATM variable attenuator
- 1 ORITEL OND 100 cavity wavemeter with curve
- 1 ORITEL LAF 100 measuring line
- 1 ORITEL ADZ 100/3 impedance adaptor
- 1 ORITEL TGN 100 waveguide-to-coax transition element
- 1 ORITEL DEN 100 coaxial detector
- 1 ORITEL CHG 100 adapted load
- 1 ORITEL CC 100 short circuit platelet
- 3 ORITEL SUP 100 guide support

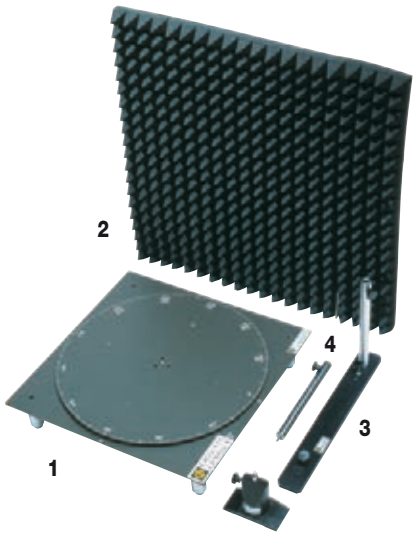
Reference to order

> **ORITEL BDH 100 bench** > P01275101

Training benches

	Additional components	Reference
1	ORITEL RD 100 displacement reproduction (for ORITEL LAF 100 measurement line)	> P01275302
2	Micrometer phase shifter – DPH100	> P01275340
3	Rotating joint – JTG100	> P01275338
4	Ferrite circulator – CIR100	> P01275344
5	Parallel detector on guide –DEG100	> P01275345
6	E-H positioner – PEH100	> P01275358
7	180 mm straight waveguide – GD100/180	> P01275350
8	High plane E bend – COE100/H	> P01275346
	Low plane E bend – COE100/B	> P01275347
	Plane H bend– COH100	> P01275348
9	Micrometer short-circuit – CCM100	> P01275351
10	Calibrated attenuator	> P01275339
11	Movable impedance adapter – LAZ100	> P01275352
12	Dielectrics kit – KED100	> P01275353
13	Multi-hole directional coupler – CDT100	> P01275341
	30 dB iris for multi-hole coupler	> P01275343
14	1 m coaxial cable – CAB100	> P01275357

	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	20 dB ANC 100/10 horn antenna	> P01275325
4	Passive radar responder – RRL100	> P01275333
5	Reflector disk – DR100	> P01275334
6	Dielectric antenna - AND100	> P01275329
7	Patch antenna - ASP100	> P01275328
8	Adjustable slot antenna – ANF100	> P01275332
	Fixed slot antenna – ANF100F	> P01275331
	Iris for adjustable slot antenna – IANF100	> P01275330
	Adjustable parabolic reflector – ANP100	> P01275327
9	Fixed parabolic reflector – ANP100F	> P01275335



	Accessories	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

Wattmeters / reflectometers

RW 511, RW 5012, RW 501 & RW 521

> **Wattmeters developed for military and civilian applications:**
- Simple installation testing
- Testing of the assembly comprising the transmitter, cable and antenna / audio circuit
- 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 511	RW 5012	RW 501	RW 521
Frequency	2 to 30 MHz	25 to 500 MHz	25 to 1,300 MHz	1.3 to 2.7 GHz
Incident power	30 to 1,000 W	1 to 300 W	1 to 300 W	+10 to +40 dBm
Reflected power	10 to 300 W	0.3 to 100 W	0.3 to 100 W	+5 to +35 dBm
Accuracy	± 7.5 %	± 6 %	± 6 %	± 6 %

State at delivery

> **RW 511 -** delivered with 9 V battery and 1 operating manual in 5 languages

> **RW 5012, RW 501** and **RW 521 -** delivered with 2 x 1.5 V batteries and 1 operating manual in 5 languages

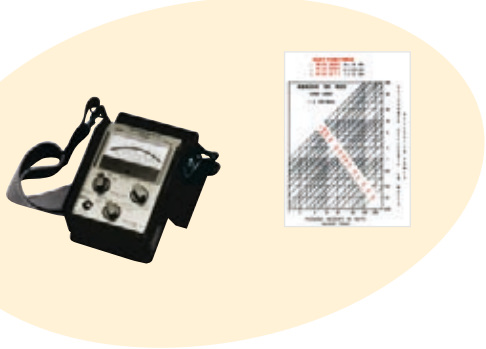
References to order

> **RW 511**	> P01255102
> **RW 5012**	> P01255104
> **RW 501**	> P01255101
> **RW 521**	> P01255103

Accessories / Replacement parts

> **For RW 511, RW 5012, RW 501 and RW 521**

Carrying bag	> P01298046
SWR chart for RW 501, 511 & 5012	> P01255901
SWR chart for RW 521	> P01255902



Training case

C.A 6710

> **C.A 6710 electrical installations case**
> **Simulation of measurements on electrical installations**
- Ideal for learning about electrical safety measurements
- 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, etc.
SLT simulations	T, TN and IT
Measurement simulations	Earth, resistivity, earth and phase/neutral loops, 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 / weight	490 x 395 x 195 mm / 10 kg

Accessories / Replacement parts

> Choice of current sensors: Amp*FLEX*™, MN clamps.: > Contact us

State at delivery

> **C.A 6710** electrical installations training case.
Delivered with a 2P+E FRA/GER Schuko-type mains power cable 6 black safety leads 25 cm long with rear connector, universal adapter for mains socket, FRA/GER adapter for mains socket and 1 operating manual in 2 languages

Reference to order

> **C.A 6710** > P01145901
Electrical installations case

Training case

Power and harmonics case

> **Power and Harmonics case**

> **Risk-free simulation of a network and a three-phase load**

- Variable currents and voltages
- Variable phase shift
- Variable harmonic distortion

Specifications	Power and harmonics case
Network simulations	*SINGLE or THREE-phase (230 V mains power supply)*
Measurement simulations	U, I, W, W/h, var, φ, THD,...
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 for current and voltage*	Network level, 15 %, 25 % and variable
Phase output	Yes
Power supply	230 V mains - 2 P + E socket
Electrical safety	IEC 61010 300 V Cat II pollution 2
Dimensions / weight	490 x 395 x 195 mm / 10 kg

** on phase 1*

State at delivery

> Delivered with mains lead

Reference to order

> **Power and harmonics case** > P01NC5003

Accessories / Replacement parts

> Choice of current sensors:
AmpFLEX™, MN clamps, etc.: > Contact us

Analogue testers

C.A 400 series

> **Economical and rugged for training applications**

> **Electrical safety compliant with IEC 61010-1**

- Resistant casing with fold-away stand
- Single switch
- Safety sockets
- Dual insulation

	C.A 401	C.A 402	C.A 403	C.A 404	C.A 405	C.A 406
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-phase AC/DC wattmeter	Multimeter with 6 black, green and red scales
Switchgear	Magneto-electric rectifying		Magneto-electric	Ferrodynamic		Magneto-electric
Calibres – Voltage	1 cal. DC: 100 mV for shunts	8 cal. DC: 100 mV to 1,000 V 6 cal. AC: 3 V to 1,000 V	1 cal. DC: 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	8 cal. DC: 100 mV to 1,000 V 6 cal. AC: 3 V to 1,000 V
Calibres – Intensity	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	4 DC cal.: 1 mA to 1 A + 1 cal. 50 µA 5 AC cal.: 0.3 mA to 3 A + 1 cal. 150 µA
Calibres – Resistance						3 cal.: 0.5 Ω - 1 kΩ to 1 MΩ
Basic accuracy	2 % DC 2.5 % AC		1.5 % DC	1 % AC	2.5 % DC, 1 % single-phase AC and 2 % tree-phase AC	1.5 % DC
Operating frequency	45 to 400 Hz	20 to 400 Hz		0 to 500 Hz	15 to 500 Hz	20 to 400 Hz
Fuses	1 A HPC and 10 A HPC	Internal resistance: 20 kW/DC; 6.32 kW/AC	315 mA HPC	1.25 A HPC	6.3 A HPC	3.15 A HPC and 160 mA HPC int. res: 20 kW/VDC; 6.32 kW/VAC
Dimensions / weight	165 x 105 x 50 mm / 450 g					

State at delivery and references

> **C.A 401** delivered with a 1.5 V battery (LR6) > P01170301

> **C.A 402** delivered with a 1.5 V battery (LR6) > P01170302

> **C.A 403** delivered with a 1.5 V battery (LR6) > P01170303

> **C.A 404** delivered with a 1.5 V battery (LR6) > P01170304

> **C.A 405** delivered with a 1.5 V battery (LR6) > P01170305

> **C.A 406** delivered with test-probe leads and a 1.5 V battery (LR6) > P01170501

> **C.A 406** kit version > P01170701

Decade boxes and shunts

Resistance boxes

Specifications	References to order
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

Wheatstone bridge assemblies

Specifications	References to order
7-ratio K box	P03197531A
Zero galvanometer	P03197611A
Dual switch box	P03197529A
Simple changeover-switch box	P03197530A

Decade boxes and shunts

Capacitance boxes

Specifications	References to order
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

Inductance boxes

Specifications	References to order
BL 07: 7 decades, 1 µH to 10 H	P01197451

Safety shunts for 100 mV outputs

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

Current sensors

Choose

Choosing your ammeter clamp

There is a wide range of criteria for choosing an ammeter 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 or AC clamps tables)
- 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 "Input / 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)

IEC 61010-2-032 clamps

The widest range of IEC 1010 clamps

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

On the next pages, you will find a table presenting the clamps for measuring AC/DC current, followed by a diagram giving 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.

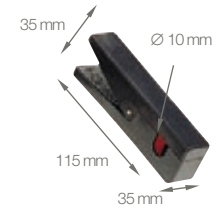
- Clamps for oscilloscopes (BNC connectors): E3N, PAC12, PAC22, MN60, Y7N, C160, and D38N
- Clamps for leakage currents: MN73 and C173 and B102
- Process current clamps: K1 and K2
- Clamp for measurement on the secondary winding of current transformers: MN71

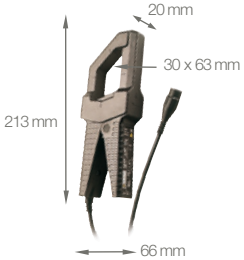
As well as these standard specialized and unspecialized models, "specific" versions can also be produced on request: please ask for details.

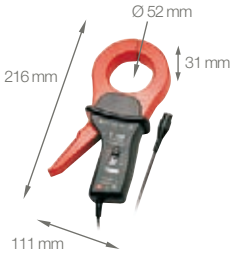
Current clamps selection guide

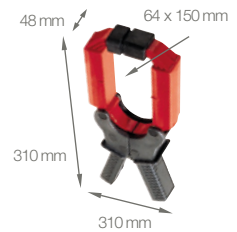
	MINI	MN	YN	C1XX	DN	BXX	MiniFLEX MA100 series	MiniFLEX MA200 series	AmpFLEX™	K	EN	PAC 1X	PAC 2X
For intensities													
Clamping diameter (mm)	10	20	30	52	64	115	45 70 100	45 70 100	140 250 380	3,9	8	30	42
AC	■	■	■	■	■	■	■	■	■	■	■	■	■
DC										■	■	■	■
Min	5 mA	10 mA	1 A	1 mA	100 mA	500 µA	500 mA	500 mA	500 mA	100 µA	5 mA	200 mA	200 mA
MAX	150 A	240 A	600 A	1,200 A	3,600 A	400 A	3,000 A	3,000 A	10,000 A	4.5 A	150 A	600 A	1,000 A
Output													
in mA AC	■	■	■	■	■								
in mV AC	■	■	■	■	■	■	■	■	■				
in mV DC	■	■	■										
in mV AC+DC										■	■	■	■
Connection													
Insulated Ø 4 mm sockets		■		■	■								
Lead with insulated elbowed Ø 4 mm plugs	■	■	■	■	■	■					■	■	■
Insulated Ø 4 mm plug box with standard 19 mm spacing							■		■	■			
Coaxial cable with insulated male BNC		■	■	■	■		■	■			■	■	■
Single-calibre	■	■	■	■	■			■	■			■	■
Multi-calibre	■	■		■	■	■	■	■	■	■	■	■	■
For multimeter	■	■	■	■	■	■	■		■	■	■	■	■
For oscilloscope		■	■	■	■			■	■		■	■	■
For seeking leaks and insulation faults		■		■		■							
For measuring power values, harmonics, etc.	■	■		■	■		■		■		■	■	■
For the process and the 4-20/0-20 mA measurement loop										■			
Power supply													
Stand-alone	■	■	■	■	■	■							
9 V battery							■	■	■	■	■	■	■
Mains adapter							■	■	■	■	■	■	■
Page	132	132	132	132	132	132	134	134	135	133	133	133	133

AC current measurement





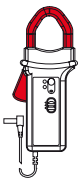


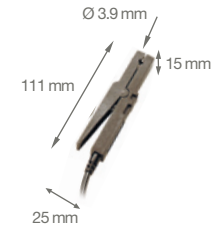


Series	Model	Input: Measurement range (1) Very low current	Low current	Medium current	High current	AC	DC	Output / Connections: Current	Voltage	Lead + safety plugs ø 4 mm	Female sockets ø 4 mm	BNC connectors (coaxial)	Transformation ratio (input/output)	Specific features: Output protected against overvoltages	Automatic zero DC	Power measurement (low phase shift)	Bandwidth (frequency in Hz)	Typical accuracy	To order
	MINI 01	2 to 150 A				●		0.15 A AC		●			1,000/1	●			48 Hz... 500 Hz	≤ 2.5 %	P01105101Z
	MINI 02	50 mA to 100 A				●		0.15 A AC		●			1,000/1	●		●	48 Hz... 10 kHz	≤ 1 %	P01105102Z
	MINI 03		1 to 100 A			●			0.1 V AC	●			1 A / 1 mV					≤ 2 %	P01105103Z
	MINI 05	5 mA to 10 A	1 to 100 A			●			10 V AC 0.1 V AC	●			1 mA / 1 mV 1 A / 1 mV				48 Hz... 500 Hz	≤ 3 % ≤ 2 %	P01105105Z
	MINI 09		1 to 150 A			●			15 V DC	●			1 A / 100 mV					≤ 4 %	P01105109Z
	MN08		0.5 to 240 A			●		0.2 A AC			●		1,000/1				40 Hz...10 kHz	≤ 1 %	P01120401
	MN09		0.5 to 240 A			●		0.2 A AC		●			1,000/1					≤ 1 %	P01120402
	MN010		0.5 to 240 A			●		0.2 A AC			●		1,000/1	●				≤ 2 %	P01120403
	MN011		0.5 to 240 A			●		0.2 A AC		●			1,000/1	●				≤ 2 %	P01120404
	MN012		0.5 to 240 A			●			2 V AC		●		1 A / 10 mV					≤ 1 %	P01120405
	MN013		0.5 A to 240 A			●			2 V AC	●			1 A / 10 mV					≤ 1 %	P01120406
	MN014		0.5 A to 240 A			●			0.2 V AC		●		1 A / 1 mV					≤ 1 %	P01120416
	MN015		0.5 A to 240 A			●			0.2 V AC	●			1 A / 1 mV					≤ 1 %	P01120417
	MN021		0.1 A to 240 A			●		0.2 A AC		●			1,000/1	●				≤ 2 %	P01120418
	MN023		0.1 A to 240 A			●			2 V AC	●			1 A / 10 mV					≤ 1.5 %	P01120419
	MN038		0.1 A to 24 A 0.5 A to 240 A			●			2 V AC 2 V AC		●		1 A / 100 mV 1 A / 10 mV					≤ 1 %	P01120407
	MN039		0.1 A to 24 A 0.5 A to 240 A			●			2 V AC 2 V AC	●			1 A / 100 mV 1 A / 10 mV					≤ 1 %	P01120408
	MN060		0.1 A to 60 A peak 0.5 A to 600 A peak			●			6 V peak 6 V peak			●	1 A / 100 mV 1 A / 10 mV				40 Hz...40 kHz	≤ 2 % ≤ 1.5 %	P01120409
	MN071	10 mA to 12 A				●			1 V AC	●			1 A / 100 mV					≤ 1 %	P01120420
	MN073		10 mA to 2.4 A 100 mA to 240 A			●			2 V AC 2 V AC	●			1 mA / 1 mV 1 A / 10 mV				40 Hz...10 kHz	≤ 1 % ≤ 2 %	P01120421
	MN088		0.5 A to 240 A			●			20 V DC (2)		●		1 A / 100 mV					≤ 2 %	P01120410
	MN089		0.5 A to 240 A			●			20 V DC (2)	●			1 A / 100 mV					≤ 2 %	P01120415
	Y1N		4 A to 600 A			●		0.5 A AC		●			1,000/1	●			48 Hz...1 kHz	≤ 3 %	P0112,0001A
	Y2N		4 A to 600 A			●		0.5 A AC		●			1,000/1	●				≤ 1 %	P01120028A
	Y3N		4 A to 600 A			●		5 A AC		●			100/1					≤ 3 %	P01120029A
	Y4N		4 A to 600 A			●			0.5 V DC (2)	●			500 A / 0.5 V					≤ 1 %	P0112,0005A
	Y7N		1 A to 1,200 A peak			●			1.2 V peak			●	1 A / 1 mV				5 Hz...10 kHz	≤ 2 %	P01120075
	C100		0.1 A to 1,200 A			●		1 A AC			●		1,000/1				30 Hz...10 kHz	≤ 0.5 %	P01120301
	C102		0.1 A to 1,200 A			●		1 A AC			●		1,000/1	●				≤ 0.5 %	P01120302
	C103		0.1 A to 1,200 A			●		1 A AC		●			1,000/1	●				≤ 0.5 %	P01120303
	C106		0.1 A to 1,200 A			●			1 V AC		●		1 A / 1 mV					≤ 0.5 %	P01120304
	C107		0.1 A to 1,200 A			●			1 V AC	●			1 A / 1 mV					≤ 0.5 %	P01120305
	C112		1 mA to 1,200 A			●		1 A AC			●		1,000/1	●		●		≤ 0.3 %	P01120314
	C113		1 mA to 1,200 A			●		1 A AC		●			1,000/1	●		●		≤ 0.3 %	P01120315
	C116		1 mA to 1,200 A			●			1 V AC		●		1 A / 1 mV			●		≤ 0.3 %	P01120316
	C117		1 mA to 1,200 A			●			1 V AC	●			1 A / 1 mV			●		≤ 0.3 %	P01120317
	C122		1 A to 1,200 A			●		5 A AC			●		1,000/5	●				≤ 1 %	P01120306
	C148		1 A to 300 A 1 A to 600 A 1 A to 1,200 A			●		5 A AC			●		250/5 500/5 1,000/5	●			48 Hz...1 kHz	≤ 2 % ≤ 1 % ≤ 1 %	P01120307
	C160		0.1 A to 30 A peak 0.1 A to 300 A peak 1 A to 2,000 A peak			●			3 V peak 3 V peak 2 V peak			●	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 V AC	●			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 V AC 0.4 V AC	●			1 mA / 1 mV 1 A / 1 mV				10 Hz...1 kHz	≤ 0.5 % ≤ 0.35 %	P01120083
	D30N			1 A to 3600 A		●		1 A AC			●		3,000/1	●		●	30 Hz...5 kHz	≤ 0.5 %	P01120049A
	D30CN			1 A to 3600 A		●		1 A AC		●			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 A AC			●		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 A AC			●		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 A AC			●		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 A AC			●		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 A AC			●		1,000/5 2,000/5 3,000/5			●		≤ 1 % ≤ 0.5 % ≤ 0.5 %	P01120054A
	D36N			1 A to 3,600 A		●		3 A AC			●		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 V AC		●		30 A/3 V 300 A/3 V 3,000 A/3 V				30 Hz...5 kHz	≤ 2 %	P01120056A
	D38N		1 A to 90 A peak 1 A to 900 A peak 1 A to 9,000 A peak			●			0.9 V peak			●	1 A / 10 mV 1 A / 1 mV 1 A / 0.1 mV				30 Hz...50 kHz	≤ 2 %	P01120057A

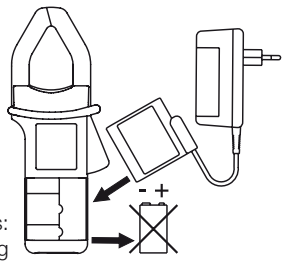
(1) The upper value corresponds to 120 % of the maximum rated value (2) Reshaping of AC signal by diodes.

AC current measurement

Series	Model	Input — Measurement range (1) — Very low current	Low current	Medium current	High current	AC	DC	Current	Output / Connections — Voltage	Lead + safety plugs ø 4 mm (3)	Female sockets ø 4 mm	BNC connectors (coaxial)	Specific features — Transformation ratio (input/output)	Output protected against overvoltages	Automatic zero DC	Power measurement (low phase shift)	Bandwidth (frequency in Hz)	Typical accuracy	To order
	**K1**	1 mA to 4.5 A DC 1 mA to 3 A RMS 1 mA to 4.5 A peak				●	●		4.5 V AC 3 V RMS 4.5 V peak	●			1 mA / 1 mV				DC...2 kHz	≤ 1 %	P01120067A
	K2	100 µA to 450 mA DC 100 µA to 300 mA RMS 100 µA to 450 mA peak				●	●		4.5 V AC 3 V RMS 4.5 V peak	●			1 mA / 10 mV				DC...1.5 kHz	≤ 1 %	P01120074A
	**E1N**	0.05 A to 2 A DC 0.05 A to 1.5 A AC 0.5 A to 150 A AC/DC				●	●		2 V DC 1.5 V AC 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 A peak 0.05 A to 10 A DC 1 A to 100 A peak 1 A to 100 A DC				●	●		1 V peak or DC			●	1 A / 100 mV 1 A / 10 mV				DC...100 kHz	≤ 3 % ≤ 4 %	P01120043A
	E6N	5 mA to 2 A DC 5 mA to 1.5 A AC 20 mA to 80 A AC/DC				●	●		2 V DC 1.5 V AC 0.8 V AC/ DC	●			1 A / 1 V 1 A / 10 mV				DC... 2 kHz DC... 8 kHz	≤ 2 % ≤ 4 %	P01120040A
	**PAC10**	0.5 A to 400 A AC 0.5 A to 600 A DC				●	●		600 mV AC/DC	●			1 A / 1 mV				DC...5 kHz	≤ 2 %	P01120070
	PAC11	0.2 A to 40 A AC 0.4 A to 60 A DC 0.5 A to 400 A AC 0.5 A to 600 A DC				●	●		600 mV AC/DC	●			1 A / 10 mV 1 A / 1 mV		●		DC...10 kHz	≤ 1.5 % ≤ 2 %	P01120068
	PAC12	0.2 A to 60 A peak 0.4 A to 60 A DC 0.5 A to 600 A peak 0.5 A to 600 A DC				●	●		600 mV peak or DC			●	1 A / 10 mV 1 A / 1 mV		●		DC...10 kHz	≤ 1.5 % ≤ 2 %	P01120072
	**PAC20**	0.5 A to 1.000 A AC 0.5 A to 1,400 A DC				●	●		1.4 V AC/DC	●			1 A / 1 mV				DC...5 kHz	≤ 2 %	P01120071
	PAC21	0.2 A to 100 A AC 0.4 A to 150 A DC 0.5 A to 1,000 A AC 0.5 A to 1,400 A DC				●	●		1.4 V AC/DC	●			1 A / 10 mV 1 A / 1 mV		●		DC...10 kHz	≤ 1.5 % ≤ 2.5 %	P01120069
	PAC22	0.2 A to 150 A peak 0.4 A to 150 A DC 0.5 A to 1,400 A peak 0.5 A to 1,400 A DC				●	●		1.5 V peak or DC 1.4 V peak 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 maximum rated value
(3) Lead + electronic unit with Ø 4 mm safety connectors, centre distance 19 mm, for K and AmpFLEX™ series



For unlimited use of your current clamps:
replace the battery with the mains adapter plug

Adapter for...

> E clamp	> P01101965
> K clamp	> P01101966
> PAC clamp	> P01101967
> AmpFLEX™ clamp	> P01101968
> MA100 clamp	> P01102086
> MA200 clamp	> P01102087

Mini*FLEX*

Flexible current sensors and probes

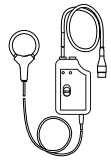
> **Models for multimeters, loggers or oscilloscopes**
> **600 V CAT IV – 1,000 V CAT III**

Mini*FLEX* MA100 series

The **MA100** sensors are fitted with two types of outputs: insulated Ø 4 mm banana plugs with 19 mm spacing or BNC output. These compact sensors are easy to set up in domestic or industrial electrical cabinets.

Mini*FLEX* MA200 series

The **MA200** insulated current probes are equipped with a BNC output and can be connected to all types of oscilloscopes. They offer high bandwidth and are particularly suitable for viewing transient signals. The **MA200** models can notably be used to display the control signals, the thyristor trigger current or the output signal of a power electronics power supply.

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 – AC	Input – DC	Input – Current	Output / Connections – Voltage	Output / Connections – Lead + safety plugs ø 4 mm	Output / Connections – Female sockets ø 4 mm	Output / Connections – BNC connectors (coaxial)	Output / Connections – Transformation ratio (input/output)	Specific features – Output protected against overvoltages	Specific features – Automatic zero DC	Specific features – Power measurement (low phase shift)	Specific features – Bandwidth (frequency in Hz)	Specific features – Typical accuracy	To order
	**MA100 30-300/3 (17 cm / Ø 4.5 cm)**		0.5 A...30 A 0.5 A...300 A			●			3 V AC	●			100 mV/A 10 mV/A			●	5 kHz ...20 kHz	≤ 1 %	P01120560
	MA100 30-300 /3 (17 cm / Ø 4.5 cm)		0.5 A...30 A 0.5 A...300 A			●			3 V AC			●	100 mV/A 10 mV/A			●		≤ 1 %	P01120563
	MA100 300-3,000/3 (25 cm / Ø 7 cm)		0.5 A...300 A 0.5 A...3,000 A			●			3 V AC	●			10 mV/A 1 mV/A			●		≤ 1 %	P01120561
	MA100 300-3,000/3 (25 cm / Ø 7 cm)		0.5 A...300 A 0.5 A...3,000 A			●			3 V AC			●	10 mV/A 1 mV/A			●		≤ 1 %	P01120564
	MA100 300-3,000 /3 (35 cm / Ø 10 cm)		0.5 A...300 A 0.5 A...3,000 A			●			3 V AC	●			10 mV/A 1 mV/A			●		≤ 1 %	P01120562
	MA100 300-3,000/3 (35 cm / Ø 10 cm)		0.5 A...300 A 0.5 A...3,000 A			●			3 V AC			●	10 mV/A 1 mV/A			●		≤ 1 %	P01120565
	**MA200 30-300/3 (17 cm / Ø 4.5 cm)**		0.5 A...45 Apeak 0.5 A...450 Apeak			●			4.5 V peak			●	100 mV/A 10 mV/A				5 Hz...1 MHz	≤ 1 % + 0.3 A	P01120570
	MA200 30-300/3 (25 cm / 7 cm)		0.5 A...45 Apeak 0.5 A...450 Apeak			●			4.5 V peak			●	100 mV/A 10 mV/A					≤ 1 % + 0.3 A	P01120571
	MA200 3,000 /3 (35 cm / Ø 10 cm)		5 A...4,500 Apeak			●			4.5 V peak			●	1 mV/A					≤ 1 % + 0.3 A	P01120572

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

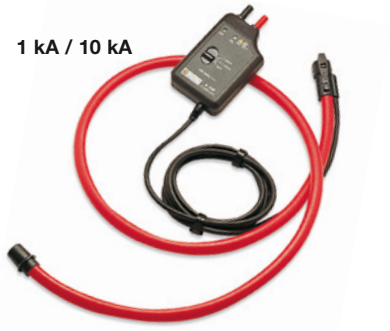
AmpFLEX™

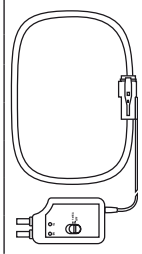
Flexible current sensors

AmpFLEX™ A100

Flexibility and easy handling for clamping any conductor

The range is composed of 9 standard models* dedicated to the measurement of AC currents from 0.5 A to 10 kA, at industrial frequencies. Each flexible core (48, 80 or 120 cm long depending on the model) is connected by a shielded cable to a small box containing the processing electronics and a standard 9 V battery.
The distance between the sockets (19 mm) facilitates direct connection to any type of multimeter, tester or recorder equipped with an AC voltage input (impedance Z > 1 MΩ).
The quick and simple system for opening/closing the core makes it easy to handle even with safety gloves. Other advantages: very lightweight (no magnetic circuit), no saturation effect, highly accurate and very little phase shift (for wattmeter measurements).



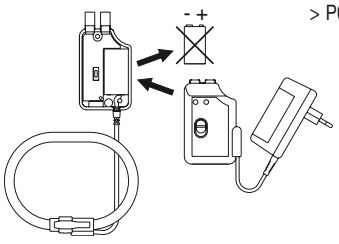
Series	Model		Input: Measurement range (1) Very low current	Input: Measurement range (1) Low current	Input: Measurement range (1) Medium current	Input: Measurement range (1) High current	Input: AC	Input: DC	Input: Current	Output / Connections: Voltage	Output / Connections: Lead + safety plugs ø 4 mm (3)	Output / Connections: Female sockets ø 4 mm	Output / Connections: BNC connectors (coaxial)	Output / Connections: Transformation ratio (input/output)	Specific features: Output protected against overvoltages	Specific features: Automatic zero DC	Specific features: Power measurement (low phase shift)	Specific features: Bandwidth (frequency in Hz)	Specific features: Typical accuracy	To order
	**A100 20-200/2**	**(45 cm)**		0.5 A...20 A 0.5 A...200 A			●			2 V AC	●			1 A / 100 mV 1 A / 10 mV			●	10 kHz...20 kHz	≤ 1 %	P01120503
	A100 2,000/2	**(45 cm)**		0.5 A...2,000 A			●			2 V AC	●			1 A / 1 mV			●		≤ 1 %	P01120501
	A100 2,000/2	**(80 cm)**		0.5 A...2,000 A			●			2 V AC	●			1 A / 1 mV			●		≤ 1 %	P01120502
	A100 0.2-2 k/2	**(45 cm)**		0.5 A...200 A 0.5 A...2,000 A			●			2 V AC	●			1 A / 10 mV 1 A / 1 mV			●		≤ 1 %	P01120504
	A100 0.2-2 k/2	**(80 cm)**		0.5 A...200 A 0.5 A...2,000 A			●			2 V AC	●			1 A / 10 mV 1 A / 1 mV			●		≤ 1 %	P01120505
	A100 0.3-3 k/3	**(45 cm)**		0.5 A...300 A 0.5 A...3,000 A			●			3 V AC	●			1 A / 10 mV 1 A / 1 mV			●		≤ 1 %	P01120506
	A100 0.3-3 k/3	**(80 cm)**		0.5 A...300 A 0.5 A...3,000 A			●			3 V AC	●			1 A / 10 mV 1 A / 1 mV			●		≤ 1 %	P01120507
	A100 0.3-3 k/3	**(120 cm)**		0.5 A...300 A 0.5 A...3,000 A			●			3 V AC	●			1 A / 10 mV 1 A / 1 mV			●		≤ 1 %	P01120508
	A100 1-10 k/1	**(120 cm)**		0.5 A...1,000 A 0.5 A...10,000 A			●			1 V AC	●			1 A / 1 mV 1 A / 0.1 mV			●		≤ 1 %	P01120509

(1) The upper value corresponds to 120 % of the maximum rated value
(3) Lead + electronic unit with Ø 4 mm safety connectors, centre distance 19 mm, for K and AmpFLEX™ series

Accessories / Replacement parts

> For unlimited use of your AmpFLEX™: replace the battery with the mains adapter plug

Adapter for AmpFLEX™ > P01101968
Adapter for MA100 > P01102086
Adapter for MA200 > P01102087



References to order

* Specific models on request: consult us concerning the possible sensitivities (mV/A) and lengths. We can also supply bare sensors for incorporation in assemblies including the signal processing electronics.

Specific sensors for dedicated applications

Leakage current measurement

	Series / Model	Input – Measurement range (1)	Current	Output / Connections – Voltage	Lead + safety plugs ø 4 mm (3)	Female sockets ø 4 mm	BNC connectors (coaxial)	Specific features – Transformation ratio (input/output)	Output protected against overvoltages	Automatic zero DC	Power measurement (low phase shift)	Bandwidth (frequency in Hz)	Typical accuracy	To order
	**MN73**	10 mA to 2.4 A 100 mA to 240 A	●	2 V AC 2 V AC	●			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 V AC	●			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 V AC 0.4 V AC	●			1 mA / 1 mV 1 A / 1 mV	●			10 Hz to 1 kHz	≤ 0.5 % ≤ 0.35 %	P01120083

Measurement of process current

	Series / Model	Input – Measurement range (1)	Current	Output / Connections – Voltage	Lead + safety plugs ø 4 mm (3)	Female sockets ø 4 mm	BNC connectors (coaxial)	Specific features – Transformation ratio (input/output)	Output protected against overvoltages	Automatic zero DC	Power measurement (low phase shift)	Bandwidth (frequency in Hz)	Typical accuracy	To order
	**K1**	1 mA to 4.5 A DC 1 mA to 3 A RMS 1 mA to 4.5 A peak	●	4.5 V DC 3 V RMS 4.5 V peak	●			1 mA / 1 mV				DC to 2 kHz	≤ 1 %	P01120067A
	K2	100 µA to 450 mA DC 100 µA to 300 mA RMS 100 µA to 450 mA peak	●	4.5 V DC 3 V RMS 4.5 V peak	●			1 mA / 10 mV				DC to 1.5 kHz	≤ 1 %	P01120074A

Measurement on secondary winding of current transformers

	Series / Model	Input – Measurement range (1)	Current	Output / Connections – Voltage	Lead + safety plugs ø 4 mm (3)	Female sockets ø 4 mm	BNC connectors (coaxial)	Specific features – Transformation ratio (input/output)	Output protected against overvoltages	Automatic zero DC	Power measurement (low phase shift)	Bandwidth (frequency in Hz)	Typical accuracy	To order
	**MN71**	10 mA to 12 A	●	1 V AC	●			1 A / 100 mV				40 Hz to 10 kHz	≤ 1 %	P01120420

(1) The upper value corresponds to 120 % of the maximum rated value
*(3) Lead + electronic unit with Ø 4 mm safety connectors, centre distance 19 mm, for K and Amp**FLEX**™ series*


C173


B102


K1

Current sensors for oscilloscopes

> View the currents in total safety without opening the circuit!

- Voltage output via BNC connector
- Safety: IEC 61010-2-32 Cat. III, 600 V
- Acquisition of the signal simply by clamping the conductor

MN 60

Measurement on oscilloscope

Series	Model	Input: Measurement range (1) — Very low current	Low current	Medium current	High current	AC	DC	Current	Output / Connections: Voltage	Lead + safety plugs ø 4 mm	Female sockets ø 4 mm	BNC connectors (coaxial)	Transformation ratio (input/output)	Specific features: Output protected against overvoltages	Automatic zero DC	Power measurement (low phase shift)	Bandwidth (frequency in Hz)	Typical accuracy	To order
	MN60	0.1 A to 60 Apeak 0.5 A to 600 Apeak				●			6 V peak			●	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 V peak			●	1 mA / 1 mV				5 Hz to 10 kHz	≤ 2 %	P01120075
	C160	0.1 A to 30 Apeak 1 A to 300 Apeak 1 A to 2,000 Apeak				●			3 V peak 3 V peak 2 V peak			●	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 V peak			●	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 V peak			●	100 mV/A 10 mV/A				5 Hz...1 MHz	≤ 1 % + 0.3 A	P01120570
	MA200 30-300/3 (25 cm)	0.5 A...45 Apeak 0.5 A...450 Apeak				●			4.5 V peak			●	100 mV/A 10 mV/A					≤ 1 % + 0.3 A	P01120571
	MA200 3,000 /3 (35 cm)	5 A...4,500 Apeak				●			4.5 V peak			●	1 mV/A					≤ 1 % + 0.3 A	P01120572
	E3N	0.05 A to 10 Apeak 1 A to 100 Apeak				●	●		1 V peak			●	1 A / 10 mV 1 A / 1 mV				DC to 100 kHz	≤ 3 % ≤ 4 %	P01120043A*
	PAC12	0.2 A to 60 Apeak 0.4 A to 60 A DC 0.5 A to 600 Apeak 0.5 A to 600 A DC				●	●		600 mV peak or DC			●	1 A / 10 mV 1 A / 1 mV		●		DC to 10 kHz	≤ 1.5 % ≤ 2 %	P01120072
	PAC22	0.2 A to 150 Apeak 0.4 A to 150 A DC 0.5 A to 1,400 Apeak 0.5 A to 1,400 A DC				●	●		1.5 V peak 1.4 V peak			●	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 maximum rated value

**Reference for E3N + mains power pack > P01120047*

Y7N

C160

D38N

MA200

E3N

PAC12

PAC22

Power and Energy Loggers

PEL 102 & PEL 103

> Management of energy spending & control of consumption

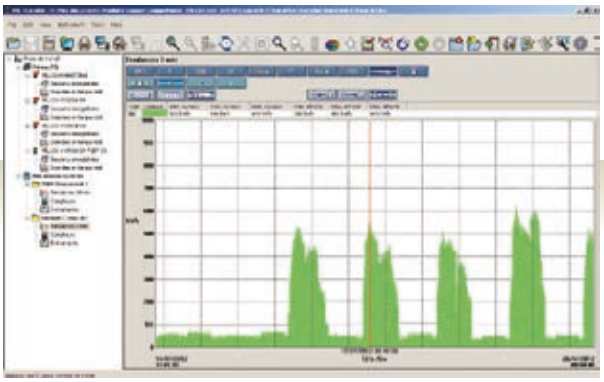
- Transportable electricity meters
- Meters compatible with all electrical networks
- Installation without switching off the electrical network
- Data recording on integrated SDcard
- Remote viewing of measurements
- Compact and magnetized for installation in closed cabinets
- Data viewable remotely via Bluetooth and Ethernet

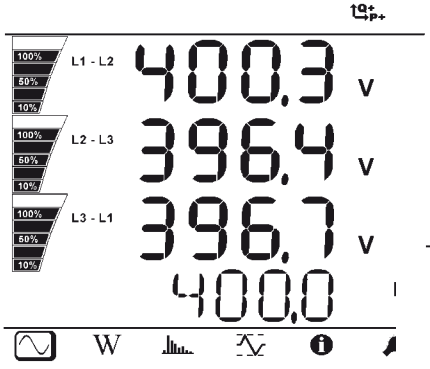
1,000 V CAT III

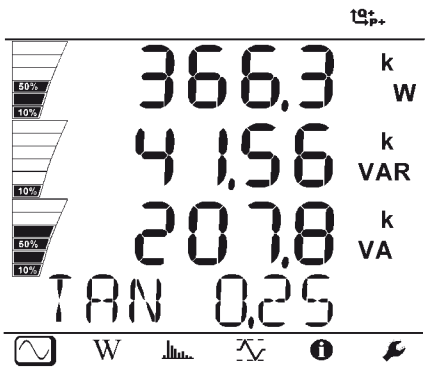
> PEL102 , logger without display

> PEL103, logger with triple digital display

IP 54







> PEL Transfer software, the PEL100 application software

- Configuration of PEL100 loggers
- Verification of the connections before starting to record
- Downloading of the measurements recorded in the PEL100 loggers
- Display of the various measurement and analysis results

Recording

		PEL 102	PEL 103
Specifications			
Display		Without	With 3 digital display
Installation types		Single-phase, split-phase, three-phase with or without neutral and many other specific configurations	
Number of channels		3 voltage inputs / 3 current inputs calculation of neutral current	
Electrical Specifications			
Network frequency		DC, 50 Hz, 60 Hz & 400 Hz	
Voltage range		10.00 to 1,000 $V_{AC/DC}$ / ± 0.2% + 0.5 V	
Current sensors supported	MN93	2.000 to 240.0 A_{AC} / ± 1.2% + 1 A	
	MN93A	0.005 A_{AC} to 5.000 A_{AC} / ± 1.2% + 2 mA 0.100 A_{AC} to 120.0 A_{AC} / ± 1.2% + 2 mA	
	C193	3.000 A to 1,200 A_{AC} / ± 0.5%	
	A193 & MA193	200.0 mA to 10.00 kA_{AC} / ± 1.2% + 70 mA	
	PAC93	10.00 A to 1,000 A_{AC} / ± 1.7% + 1 A 10.00 A to 1,400 A_{DC} / ± 1.7% + 1 A	
	E3N	50.00 mA to 10.00 $A_{AC/DC}$ / ± 3.2% + 70mA 100.0 mA à 100.0 $A_{AC/DC}$ / ± 3.2% + 70mA	
Calculated measurements			
Voltage ratio / Current ratio		Up to 650,000 V / up to 25,000 A	
Power		from 10 W to 10 GW / from 10 var to 10 Gvar / from 10 VA to 10 GVA	
Energy		Up to 4 EWh / 4 Evarh / 4 EVAh ($E = 10^{18}$)	
Phase		cos φ, tan Φ, PF	
Harmonics		Up to the 50th order	
Complementary functions			
Phase order		Yes	
Min / Max		Yes	
Mounting		Magnet, hook	
Recording			
Sampling / Acquisition rate / Aggregation		128 s/period - 1 measurement per second - from 1 min to 60 min	
Memory		SD card (SD-HC up to 32 Gb)	
Communication		Bluetooth (Class 2), Ethernet, USB	
Power supply		110 V - 250 V (+ 10%, - 15 %) @ 50-60 Hz & 400Hz	
Safety		IEC 61010 600 V CAT IV – 1,000 V CAT III	
Mechanical Specifications			
Dimensions		256 x 125 x 37 mm without sensor	
Weight		900 g	950 g
Casing		IP54, UL (pending)	

Accessories

DataVIEW® software	> P01102095
Bag No 23	> P01298078
Leads/clamps kit	> P01295476
Set of id. rings/inserts	> P01102080
5 A box	> P01101959
MN93 clamp	> P01120425B
MN93A clamp	> P01120434B
C193 clamp	> P01120323B
PAC93 clamp	> P01120079B
Amp*FLEX*™ A193-450 mm clamp	> P01120526B
Amp*FLEX*™ A193-800 mm clamp	> P01120531B
Mini*FLEX*™ MA193, 200 mm	> P01120580
E3N clamp	> P01120043A
E3N adapter	> P01102081
MultiFIX	> P01102100Z
Mains power cable	> P01295174

State at Delivery

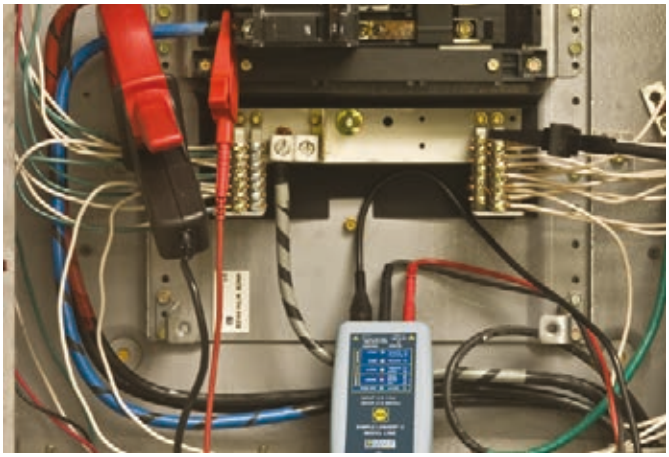
> One **PEL 102 or PEL 103** power and energy logger delivered with 4 measurement leads, 4 crocodile clips (black), 1 SD card (2 GB), 1 set of rings and inserts (for ends of leads and current sensors), 1 mains cable, 1 USB cable (Type A / Type B), 1 Multifix mounting systems, 1 operating manual (on CD), 1 bag, 1 safety datasheet, PEL Transfer PC software, 1 quick start-up guide and 1 SD MN adapter (depending on model)

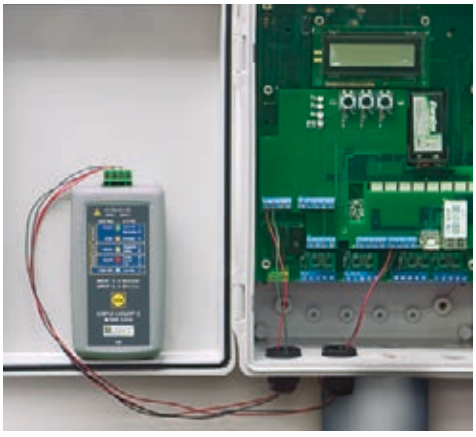
Reference to order

> **PEL102 Logger without current sensors**	> P01157152
> **PEL103 Logger without current sensors**	> P01157153

Data Logging made simple...

The Simple Logger® II 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 AC measurement loggers are True RMS (TRMS) and all 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 tight locations without the need for external power. A series of front-panel LEDs provides a quick overview of the logger's state and memory usage.
DataView® application software is included, 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®.
Nine models are available to record various AC, DC or temperature measurements. The pages that follow provide more specific information on each model, the available accessories and the DataView® software.





Features

- 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 application needs
- 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 in fault/intermittent current detection
- Neutral current monitoring to detect unwanted leakage currents
- Harmonic real-time current 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 - finds troubled sensors and controls
- HVAC and general temperature profiling (refrigeration and air-conditioning systems)

CL601 TRMS clamp-on current logger

CL601

> **The CL601 is particularly suitable for monitoring machine loads, electrical maintenance, etc.**

- Self-contained, no exposed connections
- Alarm function
- Overload indication

	CL601
Electrical specifications	
Channels	1
Input connection	Split CT – AC Current
Current range	0 to 600 AAC
Resolution	0.1 A
Accuracy (50/60 Hz)	0 to 5 A: unspecified 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/cycle
Storage interval	Programmable from 125 ms to 1 day
Recording modes	Start/Stop, FIFO and Extended Recording Mode (XRM™)
Recording duration	15 minutes to 8 weeks, programmable with DataView®
Storage	240,000 measurements (512 kB). The recorded data are stored in non-volatile memory and are kept even if the battery is low or removed
Communication	Optically-isolated USB 2.0
Power supply	2 x 1.5 V AA alkaline batteries
Battery life	100 hours to > 45 days (depends on storage interval/recording duration)
Mechanical specifications	
Dimensions	235 x 102 x 41 mm (9.25 x 4.0 x 1.63")
Max conductor size	1 conductor Ø 42 mm (1.65"), 2 conductors Ø 25.4 mm (1.00") each
Weight (with battery)	485 g (17.1 oz)
Electrical safety	IEC 61010, 300 V CAT IV / 600 V CAT III
Casing	UL94-V0
Vibrations	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)
Environmental specifications	
Operating temperature	-10 to +50 °C (14 to 122 °F)
Storage temperature	-20 to +60 °C (-4 to +140 °F)

State at delivery

> **CL601** delivered with 1 type A to 5-pin mini-B USB 2 m, PC software, two 1.5 V AA alkaline batteries and 1 operating manual in 5 languages

Reference to order

> **Simple Logger® II CL601** > P01157010

L101 and L102 TRMS current loggers

> The lightweight, compact Simple Logger® II L101 and L102 detect fault currents and intermittent problems.

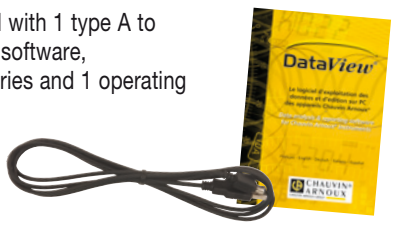
- 64 samples/cycle
- Programmable storage rates from 8 per second to 1 per day
- 4 user-selectable storage modes
- Store up to 240,000 measurements in non-volatile memory
- **L101:** records on demand and can be used to monitor the neutral current
- **L102:** can be used to monitor the neutral current in relation to the earth, as well as split-phase loads

L101 and L102

	L101	L102
Electrical specifications		
Channels	1	2
Input connection	BNC	One BNC connector per channel
Current-probe output-voltage range	0 to 1 VAC (depending on probe)	
Resolution	0.1 mV	
Accuracy (50/60 Hz)	0 to 10 mV: unspecified 10 to 50 mV: ± (0.5 % R + 1 mV) 50 to 1,000 mV: ± (0.5 % R + 0.5 mV)	
Sampling rate	64 samples/cycle	
Storage interval	Programmable from 125 ms to 1 day	
Recording modes	Start/Stop, FIFO and Extended Recording Mode (XRM™) and recording according to alarms	
Recording duration	15 minutes to 8 weeks, programmable with DataView®	
Storage	240,000 measurements (512 kB). The recorded data are stored in non-volatile memory and are kept even if the battery is low or removed	
Communication	Optically-isolated USB 2.0	
Power supply	2 x 1.5 V AA alkaline batteries	
Battery life	100 hours to > 45 days *(depends on storage interval/recording duration)*	
Mechanical specifications		
Dimensions	136 x 70 x 32 mm *(5.38 x 2.75 x 1.28")*	
Max conductor size	Depends on current probe	
Weight (with battery)	180 g *(6.4 oz)*	
Electrical safety	IEC 61010, 50 V CAT III	
Casing	UL94-V0	
Vibrations	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)*	
Environmental specifications		
Operating temperature	-10 to +50 °C (14 to 122 °F)	
Storage temperature	-20 to +60 °C (-4 to +140 °F)	

State at delivery

> L101 and L102, delivered with 1 type A to 5-pin mini-B USB 2 m, PC software, two 1.5 V AA alkaline batteries and 1 operating manual in 5 languages



References to order

> Simple Logger® II L101	> P01157020
> Simple Logger® II L102	> P01157030

Accessories / Replacement parts

E3N AC current clamp	> P01120043A
MN60 AC current clamp	> P01120409
PAC12 AC current clamp	> P01120072
PAC22 AC current clamp	> P01120073
C160 AC current clamp	> P01120308
D38N AC current clamp	> P01120057A
Standard PVC leads with 4 mm straight male plugs	> P01295288Z
32 A crocodile clips	> P01102052Z
Bag with shoulder strap	> P01298076
2 m USB lead, type A to mini-B, 5 pins	> Contact us
Mains adapter for E3N clamp	> P01101965

L111 TRMS current logger

L111

> **The lightweight, compact Simple Logger® II L111 detects fault currents and intermittent problems. The L111 records on demand and can be used to monitor the neutral current in relation to the earth, as well as split-phase loads.**

- Fused input
- 64 samples/cycle
- Programmable storage rates from 8 per second to 1 per day
- 4 user-selectable storage modes
- Stores up to 240,000 measurements in non-volatile memory

	L111
Electrical specifications	
Channels	1
Input connection	Two recessed banana jacks
Current-probe output-voltage range	0 to 1 VAC (depending on probe)
Resolution	0.1 mV
Accuracy (50/60 Hz)	0 to 10 mV: unspecified 10 to 50 mV: ± (0.5 % R + 1 mV) 50 to 1,000 mV: ± (0.5 % R + 0.5 mV)
Sampling rate	64 samples/cycle
Storage interval	Programmable from 125 ms to 1 day
Recording modes	Start/Stop, FIFO and Extended Recording Mode (XRM™) and recording according to alarms
Recording duration	15 minutes to 8 weeks, programmable with DataView®
Storage	240,000 measurements (512 kB). The recorded data are stored in non-volatile memory and are kept even if the battery is low or removed
Communication	Optically-isolated USB 2.0
Power supply	2 x 1.5 V AA alkaline batteries
Battery life	100 hours to > 45 days *(depends on storage interval/recording duration)*
Mechanical specifications	
Dimensions	132 x 70 x 32 mm *(5.18 x 2.75 x 1.28")*
Max conductor size	Depends on current probe
Weight (with battery)	180 g *(6.4 oz)*
Electrical safety	IEC 61010, 50 V CAT III
Casing	UL94-V0
Vibrations	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)*
Environmental specifications	
Operating temperature	-10 to +50 °C (14 to 122 °F)
Storage temperature	-20 to +60 °C (-4 to +140 °F)

Accessories / Replacement parts

MN11 current clamp	> P01120404
C103 current clamp	> P01120303
Standard PVC leads with 4 mm straight male plugs	> P01295288Z
32 A crocodile clips	> P01102052Z
Bag with shoulder strap	> P01298076
2 m USB lead, type A to mini-B, 5 pins	> Contact us
Mains adapter for E3N clamp	> P01101965
Banana plug/female BNC adapter	> P01101846

State at delivery

> **L111** delivered with 1 type A to 5-pin mini-B USB 2 m, PC software, two 1.5 V AA alkaline batteries and 1 operating manual in 5 languages

Reference to order

> **Simple Logger® II L111**	> P01157080

L562 TRMS voltage/current logger

> The lightweight, compact Simple Logger® II L562 finds sags and surges. Ideal for diagnostics on industrial, commercial or residential networks, the L562 can be used to monitor power consumption on single-phase systems and to supervise energy consumption.

- 2 input channels
- 64 samples/cycle
- Programmable storage rates from 8 per second to 1 per day
- 4 user-selectable storage modes
- Stores up to 240,000 measurements in non-volatile memory
- 300 V CAT IV / 600 V CAT III with a safety-rated current probe attached

L562

	L562	
Electrical specifications		
Channels	2	
Connection	Current channel	Voltage channel
Input connection	BNC	One BNC connector per channel
Voltage range	0 to 1 VAC	0 to 600 VAC
Resolution	0.1 mA	0.1 V
Accuracy (50/60 Hz)	0 to 10 mV: unspecified 10 to 50 mV: ± (0.5 % R + 1 mV) 50 to 1,000 mV: ± (0.5 % R + 0.5 mV	0 to 5 V: unspecified 5 to 50 V: ± (0.5 % R + 1 V) 50 to 600 V: ± (0.5 % R + 0.5 V)
Sampling rate	64 samples/cycle	
Storage interval	Programmable from 125 ms to 1 day	
Recording modes	Stop when full, FIFO and Extended Recording Mode (XRM™) and recording according to alarms	
Recording duration	15 minutes to 8 weeks, programmable with DataView®	
Storage	240,000 measurements (512 kB). The recorded data are stored in non-volatile memory and are kept even if the battery is low or removed	
Communication	Optically-isolated USB 2.0	
Power supply	2 x 1.5 V AA alkaline batteries	
Battery life	100 hours to > 45 days *(depends on storage interval/recording duration)*	
Mechanical specifications		
Dimensions	136 x 70 x 32 mm *(5.38 x 2.75 x 1.28")*	
Max conductor size	Depends on current probe	
Weight (with battery)	181 g (6.4 oz)	
Casing	UL94-V0	
Vibrations	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)*	
Environmental specifications		
Operating temperature	-10 to +50 °C (14 to 122 °F)	
Storage temperature	-20 to +60 °C (-4 to +140 °F)	

State at delivery

> L562 delivered with 2 m USB lead, type A to mini-B, 5 pins, PC software, 2 banana leads 1.5 m long, two crocodiles clips, two 1.5 V AA alkaline batteries and 1 operating manual in 5 languages

Accessories / Replacement parts

Standard PVC leads with 4 mm straight male plugs	> P01295288Z
32 A crocodile clips	> P01102052Z
Bag with shoulder strap	> P01298076
2 m USB lead, type A to mini-B, 5 pins	> Contact us
Banana plug/female BNC adapter	> P01101846

Reference to order

> Simple Logger® II L562 > P01157060

Accessories for the Simple Logger® II

Current probes with VOLTAGE output


Model E3N


Model MN60


Model PAC12


Model D38N


Model C160


Model PAC22

Current probes with CURRENT output


Model MN 11


Model C103

References to order

Current probe E3N	> P01120043A
Current probe MN60	> P01120409
Current probe PAC12	> P01120072
Current probe PAC22	> P01120073
Current probe C160	> P01120308
Current probe D38N	> P01120057A
Current probe MN11	> P01120404
Current probe C103	> P01120303

	Model	Measurement range	Output signal	Phase shift**	Maximum conductor size		Ouput connection	Compatibility
		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 (0.46")	–	Lead w/BNC	L101 L102 L562
	MN 60	0.1 to 24 A 0.5 to 240 A	100 mV/AAC 10 mV/AAC	< 2.5 °	19.8 mm (0.78")	–	Lead w/BNC	
	PAC 12	0.2 to 40 A 0.5 to 400 A	10 mV/AAC 1 mV/AAC	< 1.5 °	One cable: 30 mm (1.18") Two: 24 mm (0.95")	Two 31.5 x 10 mm (1.2 x 0.4")	Lead w/BNC	
	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 (1.5") Two: 25 mm (0.98")	One 50 x 12, mm (1.96 x 0.49") Two 50 x 5 mm (1.96 x 0.19")	Lead w/BNC	
	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 (2.05")	50 x 5 mm (1.96 x 0.19")	Lead w/BNC	
	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 (2.52") 64 x 100 mm (2.52 x 3.94")	50 x 135 mm (1.97 x 5.31")	Lead w/BNC	
CURRENT OUTPUT	MN11	0.5 to 240 A	1 mA/AAC	< 2.5 °	19.8 mm (0.78")	–	Wire cable with reinforced or double insulation, length 1.5 m, terminated by 2 elbowed male banana safety plugs, Ø 4 mm	L111
	C103	0.1 to 1,200 A	1 mA/AAC	< 0.5 °	52 mm (2.05")	50 x 5 mm (1.96 x 0.19")	Wire cable with reinforced or double insulation, length 1.5 m, terminated by 2 elbowed male banana safety plugs, Ø 4 mm	

** For the AC measurements **Phase shift indicated at maximum rating*

ML912 current logger

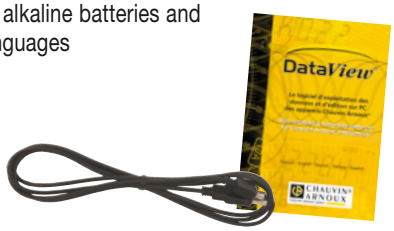
- Two integral MiniFlex™ flexible current sensors
- measure from 0.5 A to 1,000 A
- Dual range: 100 / 1,000 AAC
- Phase load monitoring
- Intermittent problem detection
- Harmonic current monitoring

ML912

	ML912	
Electrical specifications		
Channels	2	
Input connection	Integral 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: unspecified 1 to 100 A: ±(1 % R + 0.5 A)	0 to 5 A: unspecified 5 to 1,000 A: ±(1 % R + 1 A)
Sampling rate	64 samples/cycle	
Storage interval	Programmable from 125 ms to 1 day	
Recording modes	Start/Stop, FIFO and Extended Recording Mode (XRM™) and recording according to alarms	
Recording duration	15 minutes to 8 weeks, programmable with DataView®	
Storage	240,000 measurements (512 kB). The recorded data are stored in non-volatile memory and are kept even if the battery is low or removed	
Communication	Optically-isolated USB 2.0	
Power supply	2 x 1.5 V AA alkaline batteries	
Battery life	100 hours to > 45 days *(depends on storage interval/recording duration)*	
Mechanical specifications		
Dimensions	136 x 70 x 32 mm without sensor *(5.38 x 2.75 x 1.28")*	
Weight (with battery)	245 g (8.67 oz)	
Electrical safety	IEC 61010-1; 600 V CAT III; 300 V CAT IV; pollution degree 2	
Casing	UL94-V0	
Vibrations	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)*	
Environmental specifications		
Operating temperature	-10 to +50 °C (14 to 122 °F)	
Storage temperature	-20 to +60 °C (-4 to +140 °F)	
Safety - Electro-magnetic compatibility		
Safety	IEC 61010-1; 600 V CAT III; 300 V CAT IV; pollution degree 2	
Protection	IP 40	

State at delivery

> **ML912** delivered with 2 m USB lead, type A to mini-B, 5 pins, PC software, two 1.5 V AA alkaline batteries and 1 operating manual in 5 languages



Accessories / Replacement parts

Standard PVC leads with 4 mm straight male plugs	> P01295288Z
32 A crocodile clips	> P01102052Z
Bag with shoulder strap	> P01298076
2 m USB lead, type A to mini-B, 5 pins	> Contact us
Banana plug/female BNC adapter	> P01101846

Reference to order

> **Simple Logger® II ML912**	> P01157130

L261 - L481 voltage loggers

L261 and L481

	L261	L481
Electrical specifications		
Channels	1	
Input connection	2 recessed safety banana jacks	
Voltage range	0 to 600 VAC/DC	-850 VDC to +850 VDC
Accuracy (50/60 Hz)	0 to 5 V: unspecified 5 to 50 V: ± (0.5 % R + 1 V) 50 to 600 V: ± (0.5 % R + 0.5 V)	0 to 5 V: unspecified 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/cycle	8 samples per second
Storage interval	Programmable from 125 ms to 1 day	
Recording modes	Start/Stop, FIFO and Extended Recording Mode (XRM™) and recording according to alarms	
Recording duration	15 minutes to 8 weeks, programmable with DataView®	
Storage	240,000 measurements (512 kB). The recorded data are stored in non-volatile memory and are kept even if the battery is low or removed	
Communication	Optically-isolated USB 2.0	
Power supply	2 x 1.5 V AA alkaline batteries	
Battery life	100 hours to > 45 days *(depends on storage interval/recording duration)*	
Mechanical specifications		
Dimensions	125 x 70 x 32 mm *(4.94 x 2.75 x 1.28")*	
Weight (with batteries)	180 g *(6.4 oz)*	
Electrical safety	IEC 61010-1; 600 V CAT III; 300 V CAT IV; pollution degree 2	
Casing	UL94-V0	
Vibrations	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)*	
Environmental specifications		
Operating temperature	-10 to +50 °C (14 to 122 °F)	
Storage temperature	-20 to +60 °C (-4 to +140 °F)	

> L261

- 600 VAC/DC TRMS
- Suitable for industrial, commercial or residential monitoring,
- Logging of voltage drops and overvoltages

> L481

- 850 VDC
- Voltage monitoring on machines, wind turbines, railway applications, etc.
- Detection of intermittent voltage faults

600 V CAT III
300 V CAT IV

CE

AUTOMATIC REPORT GENERATION

Accessories / Replacement parts

Standard PVC leads with 4 mm straight male plugs	> P01295288Z
32 A crocodile clips	> P01102052Z
Bag with shoulder strap	> P01298076
2 m USB lead, type A to mini-B, 5 pins	> Contact us
Banana plug/female BNC adapter	> P01101846

State at delivery

> **L261 and L481** delivered with 2 m USB lead, type A to mini-B, 5 pins, PC software, 2 banana leads, 2 voltage leads 1.5 m long, 2 crocodiles clips, 2 x 1.5 V AA alkaline batteries and 1 operating manual in 5 languages

Reference to order

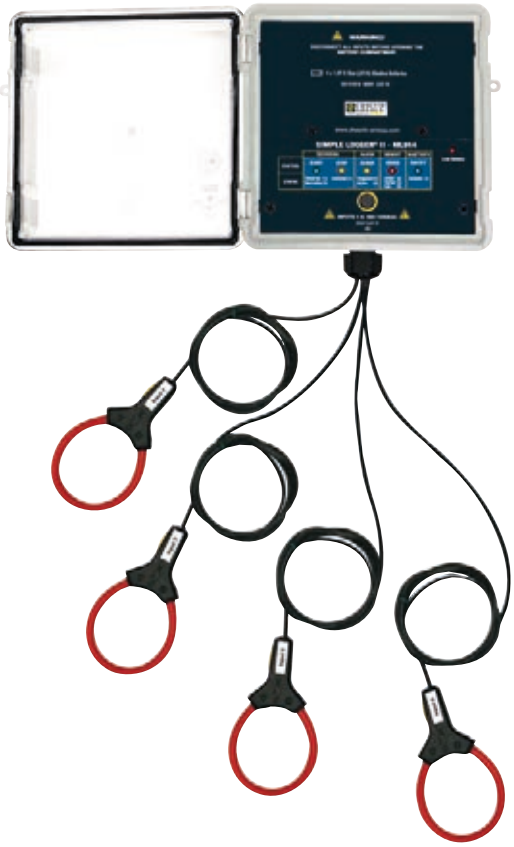
> Simple Logger® II L261	> P01157040
> Simple Logger® II L481	> P01157110

Current Logger

ML914

- Current loggers with compact flexible sensors
- TRMS measurements up to 3,000 AAC
- Safety and hazard-free access to measurements with BluetoothTM communication
- DataView® processing software for effective analysis of the measurements

	ML914	
Electrical specifications		
Number of channels	4	
Type of sensor	Built-in 6-inch Mini*FLEX*® sensors	
Range	100 AAC	1,000 AAC
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)
Resolution	0.1 AAC	
Sampling	64 samples. / period	
Acquisition interval	Programmable from 125 ms to 1 day	
Storage mode	Start/Stop, FIFO, XRM™ extended mode and on alarm	
Recording duration	from 15 minutes to 8 weeks, programmable with DataView®	
Memory	1,000,000 measurements (2 MB)	
Communication	BlueTooth (Class 2)	
Power supply	4 x 1.5 V type-C alkaline 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	
Max. electrical conductor size	45 mm	
Weight	1.1 kg	
Casing	IP50 according to IEC 60529	



600 V CAT IV
1,000 V CAT III

Accessories / Replacement parts

DataVIEW® software > P01102095
Bag > P01298078

State at delivery

> **ML 914** logger delivered with PC software, 4 type-C alkaline batteries, multilingual operating manual on CD Rom and safety datasheet.

Reference to order

> **Simple Logger® II ML 914** > P01157135

TRMS current logger

> Simple Logger® II AL 834

- TRMS current logger up to 3,000 A
- IP 65 MiniFLEX® current sensors
- Safety and hazard-free access to the measurements with BluetoothTM communication
- DataView® processing software for effective analysis of the measurements

600 V CAT IV
1000 V CAT III

IP 65

AL 834

	AL 834	
Electrical specifications		
Number of channels	4	
Type of sensor	Flexible et solidaire	
Range	300 Aac	3000 Aac
Accuracy (50 / 60 Hz)	0 to 5 A: not specified 5 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 Aac	0.5 Aac
Sampling	64 samples / period	
Acquisition interval	Programmable from 125 ms to 1 per day	
Storage mode	Start/Stop, FIFO, XRM™ extended mode and on alarm	
Recording duration	15 minutes to 8 weeks, programmable using DataView®	
Memory	1,000,000 measurements (2 MB)	
Communication	Bluetooth (Class 2)	
Power supply	4 x 1.5 V type-C alkaline 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 91 mm without sensor	
Max. electrical conductor size	203 mm	
Weight	1.77 kg	
Casing	IP65 according to IEC 60529	

State at delivery

> AL 834 logger delivered with PC software, 4 x type-C alkaline batteries, multilingual operating manual on CD-Rom and safety datasheet.

Accessories / Replacement parts

DataVIEW® software	> P01102095
Bag	> P01298078

Reference to order

> Simple Logger® II AL 834 > P01157140

L322 current logger (4 to 20 mADC)

L322

> The compact Simple Logger® II L322 can be used for monitoring and diagnostics in process control. It also offers the possibility of directly establishing the temperature, pressure and flow profiles, etc.

- 2 independent input channels
- –20 to +20 mADC
- Programmable storage rates from 8 per second to 1 per day
- 4 user-selectable storage modes
- Stores up to 240,000 measurements in non-volatile memory
- Scaling and engineering units entered via software prior to saving

	L322
Electrical specifications	
Channels	2
Input connection	One 4-position removable screw-type terminal block
Measurement range	-20 to +20 mADC
Resolution	0.01 mA
Accuracy	0.25 % R + 0.05 mA
Sampling rate	64 samples/cycle
Storage interval	Maximum of 8 samples taken at storage interval
Recording modes	Start/Stop, FIFO and Extended Recording Mode (XRM™) and recording according to alarms
Recording duration	From 15 minutes to 8 weeks, programmable with DataView®
Storage	240,000 measurements (512 kB) The recorded data is stored in non-volatile memory & retained even if the battery is low or removed
Communication	Optically-isolated USB 2.0
Power supply	2 x 1.5 V AA alkaline batteries
Battery life	100 hours to > 45 days *(depends on storage interval/recording duration)*
Mechanical specifications	
Dimensions	136 x 70 x 32 mm *(5.38 x 2.75 x 1.28")*
Weight (with battery)	181 g (6.4 oz)
Casing	UL94-V0
Vibrations	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)*
Environmental specifications	
Operating temperature	-10 to +50 °C (14 to 122 °F)
Storage temperature	-20 to +60 °C (-4 to +140 °F)

Accessories / Replacement parts

Standard PVC leads with 4 mm straight male plugs	> P01295288Z
32 A crocodile clips	> P01102052Z
Bag with shoulder strap	> P01298076
2 m USB lead, type A to mini-B, 5 pins	> Contact us
Banana plug/female BNC adapter	> P01101846

State at delivery

> L322 delivered with 2 m USB lead, type A to mini-B, 5 pins, PC software, two 1.5 V AA alkaline batteries and 1 operating manual in 5 languages

Reference to order

> Simple Logger® II L322	> P01157090

L432 DC voltage logger

> The compact Simple Logger® II L432 is ideal for diagnostics during circuit design. It can be used to establish the power supply profile, monitor the sensors and even test batteries.

- 2 independent input channels
- Ranges of ±100 mV, ±1 V and ±10 VDC
- Programmable storage rates from 8 per second to 1 per day
- 4 user-selectable storage modes
- Stores up to 240,000 measurements in non-volatile memory
- 50 V CAT III

L432

	L432
Electrical specifications	
Channels	2
Input connection	One 4-position removable screw-type terminal block
Measurement level (3 ranges/channel)	Range no. 1 : -100 mV to +100 mVDC Range no. 2: -1 V to +1 VDC Range no. 3: -10 V to +10 VDC
Resolution	Range no. 1: 0.1 mV Range no. 2: 1 mV Range no. 3: 10 mV
Accuracy (50/60 Hz)	Range no. 1: ± (0.5 % R + 1 mV) Range no. 2: ± (0.5 % R + 1 mV) Range no. 3: ± (0.5 % R + 10 mV)
Sampling rate	Maximum of 8 samples taken at storage interval
Storage interval	Programmable from 125 ms to 1 day
Recording modes	Start/Stop, FIFO and Extended Recording Mode (XRM™) and recording according to alarms
Recording duration	From 15 minutes to 8 weeks, programmable using DataView®
Storage	240,000 measurements (512 kB). The recorded data are stored in non-volatile memory and are kept even if the battery is low or removed
Communication	Optically-isolated USB 2.0
Power supply	2 x 1.5 V AA alkaline batteries
Battery life	100 hours to > 45 days *(depends on storage interval/recording duration)*
Mechanical specifications	
Dimensions	136 x 70 x 32 mm without sensor *(5.38 x 2.75 x 1.8")*
Weight (with battery)	181 g (6.4 oz)
Casing	UL94-V0
Vibrations	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)*
Environmental specifications	
Operating temperature	-10 to +50 °C (14 to 122 °F)
Storage temperature	-20 to +60 °C (-4 to +140 °F)

State at delivery

> L432 delivered with 2 m USB lead, type A to mini-B, 5 pins, PC software, two 1.5 V AA alkaline batteries and 1 operating manual in 5 languages

Accessories / Replacement parts

Standard PVC leads with 4 mm straight male plugs	> P01295288Z
32 A crocodile clips	> P01102052Z
Bag with shoulder strap	> P01298076
2 m USB lead, type A to mini-B, 5 pins	> Contact us
Banana plug/female BNC adapter	> P01101846

Reference to order

> Simple Logger® II L432	> P01157070

L642 thermocouple logger

L642

> **The compact Simple Logger® II L642 can be used to monitor industrial processes, heating systems and air-conditioning.**

- 2 independent input channels for selectable thermocouple types J, K, T, N, E, R, S
- Programmable storage rates from 1 per 5 seconds to 1 per day
- 4 user-selectable storage modes
- Stores up to 240,000 measurements in non-volatile memory
- 50 V CAT III

		L642
Electrical specifications		
Channels		2
Input connection		2 miniature thermocouple connectors
Measurement level		°C (°F)
	J	-210 to +1,200 (-346 to +2192)
	K	-200 to +1372 (-328 to +2501)
	T	-250 to +400 (-418 to +752)
	N	-200 to +1300 (-328 to +2372)
	E	-150 to +950 (-238 to +1742)
	R	0 to 1767 (32 to 3212)
	S	0 to 1767 (32 to 3212)
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 ° to 1 ° depending on the range and T/C type
Sampling rate		8 samples taken at storage interval
Storage interval		Programmable from 5 sec to 1 day
Recording modes		Start/Stop, FIFO and Extended Recording Mode (XRM™) and recording according to alarms
Recording duration		From 15 minutes to 8 weeks, programmable using DataView®
Storage		240,000 measurements (512 kB). The recorded data are stored in non-volatile memory and are kept even if the battery is low or removed
Communication		Optically-isolated USB 2.0
Power supply		2 x 1.5 V AA alkaline batteries
Battery life		100 hours to > 45 days *(depends on storage interval/recording duration)*
Mechanical specifications		
Dimensions		125 x 70 x 32 mm *(4.94 x 2.75 x 1.28")*
Weight (with batteries)		200 g (7 oz)
Casing		UL94-V0
Vibrations		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)*
Environmental specifications		
Operating temperature		-10 to +50 °C (14 to 122 °F)
Storage temperature		-20 to +60 °C (-4 to +140 °F)

AUTOMATIC REPORT GENERATION

Accessories / Replacement parts

SK6 K thermocouple	> P03652906
Standard PVC leads with 4 mm straight male plugs	> P01295288Z
32 A crocodile clips	> P01102052Z
Bag with shoulder strap	> P01298076
2 m USB lead, type A to mini-B, 5 pins	> Contact us
Banana plug/female BNC adapter	> P01101846

State at delivery

> **L642** delivered with 2 m USB lead, type A to mini-B, 5 pins, PC software, two 1.5 V AA alkaline batteries and 1 operating manual in 5 languages

Reference to order

> **Simple Logger® II L642**	> P01157050

L702 temperature and relative humidity logger

> The compact Simple Logger® II L702 is ideal for use in clean rooms, wine or cigar cellars, blood banks, etc.

- 2 independent input channels
- Choice of 4 recording modes
- Up to 240,000 measurements stored in non-volatile memory
- 50 V CAT III

L702

	L702	
Electrical specifications		
Channels	2	
Input connection	Temperature sensor	Humidity sensor
Range	-10 to +50 ° C (14 to 122 °F)	RH from 5 to 85 %
Resolution	0.1 °C / F	0.1 % RH
Accuracy	±(1 % R + 1 °C/F)	±(3 % R + 2 cts)
Sampling rate	Every 5 seconds maximum	
Storage interval	Programmable from 5 s to 1 day	
Recording modes	Start/Stop, FIFO and Extended Recording Mode (XRM™) and recording according to alarms	
Recording duration	15 minutes to 8 weeks, programmable with DataView®	
Storage	240,000 measurements (512 kB). The recorded data are stored in non-volatile memory and are kept even if the battery is low or removed	
Communication	Optically-isolated USB 2.0	
Power supply	2 x 1.5 V AA alkaline batteries	
Battery life	100 hours to > 45 days *(depends on storage interval/recording duration)*	
Mechanical specifications		
Dimensions	136 x 70 x 32 mm *(5.38 x 2.75 x 1.28") without sensor*	
Weight (with batteries)	180 g (6.4 oz)	
Casing	Polycarbonate UL94-V0	
Vibrations	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)*	
Environmental specifications		
Operating temperature	-10 to +50 °C (14 to 122 °F)	
Storage temperature	-20 to +60 °C (-4 to +140 °F)	
Relative humidity	Up to 85 % at 35 °C (95 °F) without condensation	
Altitude	2,000 m	
Safety - Electromagnetic compatibility		
Safety	IEC 61010-1; 50 V CAT III; pollution degree 2	
Protection	IP 40	
Electromagnetic compatibility	EN 61326-1; 07/1997 (+A1 10/1998, +A2 09/2001, +A3 05/2004)	

State at delivery

> L702 delivered with 2 m USB lead, type A to mini-B, 5 pins, PC software, two 1.5 V AA alkaline batteries and 1 operating manual in 5 languages

Accessories / Replacement parts

Standard PVC leads with 4 mm straight male plugs	> P01295288Z
32 A crocodile clips	> P01102052Z
Bag with shoulder strap	> P01298076
2 m USB lead, type A to mini-B, 5 pins	> Contact us
Banana plug/female BNC adapter	> P01101846

Reference to order

> Simple Logger® II L702 > P01157120

L404 event logger (4 channels)

L404

- Up to 50,000 measurements
- Operates with dry-contact closure or 0-3 and 0-5 VDC logic levels
- Determination of machine operating time/downtime
- Determination of event scheduling
- Counting and logging of events

	L404
Electrical specifications	
Channels	4
Input connection	Removable screw-on terminal strip with 8 inputs
Input level	0 to 5 VVDC / dry-contact closure
Input impedance	> 150 kΩ
Sampling rate	Maximum 8 per second
Storage interval	Maximum once every two sample periods (depending on events)
Recording modes	Event recording
Recording duration	15 minutes to 8 weeks, programmable with DataView®
Storage	50,000 measurements (512 kB). The recorded data are stored in non-volatile memory and are kept even if the battery is low or removed
Communication	Optically-isolated USB 2.0
Power supply	2 x 1.5 V AA alkaline batteries
Battery life	100 hours to > 45 days *(depends on storage interval/recording duration)*
Mechanical specifications	
Dimensions	136 x 70 x 32 mm *(5.45 x 2.75 x 1.28")*
Weight (with batteries)	181 g *(6.4 oz)*
Electrical safety	IEC 61010, 50 V CAT III; pollution degree 2
Casing	Polycarbonate UL94-V0
Vibrations	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)*
Environmental specifications	
Operating temperature	-10 to +50 °C (14 to 122 °F)
Storage temperature	-20 to +60 °C (-4 to +140 °F)
Relative humidity	Up to 85 % at 35 °C (95 °F) without condensation
Altitude	2,000 m
Safety - Electro-magnetic compatibility	
Safety	IEC 61010-1; 50 V CAT III; pollution degree 2
Protection	IP 40

AUTOMATIC REPORT GENERATION

Accessories / Replacement parts

MN11 current clamp	> P01120404
C103 current clamp	> P01120303
Standard PVC lead with 4 mm straight male plug (x 2)	> P01295288Z
32 A crocodile clips	> P01102052Z
Bag with shoulder strap	> P01298076
2 m USB lead, type A to mini-B, 5 pins	> Contact us
Mains adapter for E3N clamp	> P01101965
Banana plug/female BNC adapter	> P01101846

State at delivery

> **L404** delivered with 2 m USB lead, type A to mini-B, 5 pins, PC software, two 1.5 V AA alkaline batteries and 1 operating manual in 5 languages

Reference to order

> **Simple Logger® II L404**	> P01157100

Protection and transport accessories

Cases and hard cases

Dimensions	References to order
Cases	
270 x 195 x 65 mm	P01298071*
320 x 255 x 75 mm	P01298004*
440 x 310 x 135 mm	P01298072*
Hard cases	
272 x 248 x 130 mm	P01298068*
272 x 248 x 182 mm	P01298069*

Carrying cases

Dimensions	References to order
220 x 180 x 75 mm	P01298036
240 x 230 x 70 mm	P01298033
260 x 160 x 150 mm	P01298006
360 x 210 x 200 mm	P01298061A
385 x 260 x 240 mm	P01298056* P01298034*
470 x 290 x 240 mm	P01298066
480 x 380 x 260 mm	P01298067

Shoulder bags

Dimensions	References to order
180 x 75 x 45 mm	P01298012
185 x 70 x 30 mm	P01298007
185 x 135 x 85 mm	P01298046
210 x 120 x 30 mm	P01298532
230 x 140 x 130 mm	P01298049
240 x 160 x 90 mm	P01298032
250 x 190 x 80 mm	P01298051
260 x 205 x 65 mm	P01298055
265 x 125 x 60 mm	P01298043Z

** Intended for universal use, these transport accessories are fitted with foam inserts adapted to the product.*

Protection and transport accessories

	Hard cases		Bags		Sheaths		Cases		
Product	Reference	N° de photo	Reference	N° de photo	Reference	N° de photo	Reference	N° de photo	**Pages**
C.A 5001 / C.A 5003 / C.A 5005							P01298036	14	20
C.A 5011	P01298037	1	P01298033	15			P01298036	14	21
C.A 5205G / C.A 5220G / C.A 5260G	P01298038				P01298015	25	P01298036	14	25
C.A 5231 / C.A 5233			P01298074	16					26
C.A 5271 / C.A 52/73 / C.A 5275 / C.A 5277			P01298076	18					23 - 27
C.A 730 / C.A 735 / C.A 745 / C.A 740N / C.A 760N			P01298012 P01298012Z	8			P01298065Z	13	14 - 15 - 16
F3N			P01298043Z	10			P01298007	12	36
F01 / F03 / F05 / F07 / F09			P01298074	16			P01298532 P01298065Z	13	30
F11N / F13N			P01298043Z P06239502 P01298075	10 7 17			P01298065Z	13	32
F21	P01298017	4	P01298043Z P01298075	 17					37
F200			P01298074	16					33
F400 / F600			P01298076	18					34 - 35 - 80-81
F62 / F65			P01298075	17			P01298065Z	13	57
MA 400D / MA 4000D			P01298074	16					31
C.A 6030									40
C.A 6150 / C.A 6160									72
C.A 6240 / C.A 6250									68 - 69
C.A 6410	P01298011	2							67
C.A 6454 / C.A 6456									41
C.A 6512 / C.A 6515	P01298011	2							67
C.A 6521 / C.A 6523 / C.A 6525 / C.A 6531 / C.A 6533			P01298049	-					48 - 49
C.A 6545 / C.A 6547 / C.A 6549									52 - 53
C.A 8220 / C.A 8230			P01298049						82 - 83
C.A 8332B / C.A 8334B	P01298062 (site-proof case)	-	P01298055 P01298051	5 9					84 - 85
C.A 8335			P01298056 (ventrale)						86 - 87
FTV100			P0129805x						90
Simple Logger II			P01298055						138 à 150
C.A 1052	P01298072	3							112
C.A 1621 / C.A 1623 / C.A 1631							P01298075	17	92 - 93
C.A 1864 / C.A 1866							P01298033	15	105
C.A 1877 / C.A 1878 / C.A 1882							P01298075	17	98 - 99
C.A 40							P01298036	14	122
C.A 42	P01167308 (large size) P01167307 (small size)	-							123
C.A 7028			P01298532	11					121
RW 511 / RW 5012 / RW 501 / RW 521			P01298046	6					126
C.A 871 / C.A 879							P01298033	15	104


3
2
4
1


16
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18
Compatible with
MultiFix system


26
5
6
11
8
10
9
7
With strap

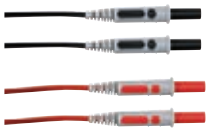

15
14
13
With belt fastener
12


19

Banana measurement leads Ø 4 mm

Measurement leads

Moulded leads

Model	Description	Specifications		Reference
	Red/black moulded PVC lead (x 2)	Insulated **straight** male plug Ø 4 mm – Insulated **straight** male plug Ø 4 mm	• 15 A • 1.5 m • 1,000 V CAT IV	P01295450Z
	Red/black moulded PVC lead (x 2)	Insulated **straight** male plug Ø 4 mm – Insulated **elbowed** male plug Ø 4 mm	• 15 A • 1.5 m • 1,000 V CAT IV	P01295451Z
	Red/black moulded silicone lead (x 2)	Insulated **straight** male plug Ø 4 mm – Insulated **straight** male plug Ø 4 mm	• 15 A • 1.5 m • 1,000 V CAT IV	P01295452Z
	Red/black moulded silicone lead (x 2)	Insulated **straight** male plug Ø 4 mm – Insulated **elbowed** male plug Ø 4 mm	• 15 A • 1.5 m • 1,000 V CAT IV	P01295453Z

Standard leads

	2 PVC leads (red/black)	Insulated **straight** male plug Ø 4 mm – Insulated **straight** male plug Ø 4 mm	• 15 A • 1.5 m • 600 V CAT IV / 1,000 V CAT III	P01295288Z
	2 PVC leads (red/black)	Insulated **straight** male plug Ø 4 mm – Insulated **elbowed** male plug Ø 4 mm	• 15 A • 1.5 m • 600 V CAT IV / 1,000 V CAT III	P01295289Z
	2 PVC leads (red/black)	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	P01295290Z

Leads with built-in test probes

	Red/black PVC leads with test probe (x 2)	Insulated **straight** male plug Ø 4 mm	• 15 A • 1.5 m • 1,000 V CAT IV	P01295455Z
	Red/black PVC leads with test probe (x 2)	Insulated **elbowed** male plug Ø 4 mm	• 15 A • 1.5 m • 1,000 V CAT IV	P01295456Z

Banana measurement leads Ø 4 mm

Removable test probes

For CAT IV & CAT III installations

Model	Description	Specifications		Reference
	Red/black moulded test probe (x 2)	Female plug Ø 4 mm	• CAT IV / CAT III 1,000 V	P01295454Z

For CAT II installations and below

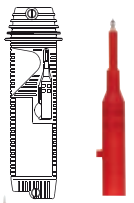
	Moulded test probe Ø 4 mm (x 2)	Female plug Ø 4 mm	• CAT II 300 V	P01295458Z
	Moulded test probe Ø 2 mm (x 2)	Female plug Ø 4 mm	• CAT II 300 V	P01295460Z

IP2X

	PVC IP2X test-probe lead for DMM (x 2)	Comply 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	P01295461Z
	IP2X PVC lead for VATs (x 2)	Comply 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	P01295463Z
For 	IP2X lead for VATs for C.A 7xx (x 2)	IP2X test probe Ø 4 mm Elbowed female plug Ø 4 mm	• 15 A • NF C 18-510 / IEC 61243-3 1,000 V	• 1.5 m: P01295462Z • 0,25 m & 0,85 m: P01295285Z

Banana measurement leads Ø 4 mm

Other accessories

Model	Description	Specifications		Reference
	2 crocodile clips (red/black)		• 15 A • 1,000 V CAT IV	P01295457Z
	Red/black crocodile wire grip (x 2)		• 20 A • 1,000 V CAT III	P01102053Z
	Measurement leads and accessories kit for electricians	2 x moulded test probes 1,000 V CAT IV 2 x red/black moulded PVC leads with straight male plug-elbowed male plug, 1.5 m, 1,000 V CAT IV 2 x red/black crocodile clips 1,000 V CAT IV 2 x moulded test probes Ø 4 mm, 300 V CAT II		P01295459Z
	Red/black magnetized measurement probe (x 2)	For voltage measurement only Test probe Ø 6.6 mm Elbowed female plug Ø 4 mm	• 1,000 V CAT III / 600 V CAT IV	P01103058Z
	PVC lead	Insulated male BNC – Insulated red/black straight male plugs Ø 4 mm with rear connection	• 1 m • 500 V CAT III	AG-1066Z
	Adapter (x 2)	Insulated female BNC – Red/black insulated male plugs Ø 4 mm with 19 mm spacing	• 600 V CAT III	P01102101Z
Product-specific				
	Removable test probe for tester or DMM	For "hands-free" use	• 600 V CAT IV	P01103060Z
For 	Ø 4 mm removable test probe with locking stud	For tester or remote-control probe	• 600 V CAT IV	P01103061Z
For C.A 740N & C.A 760N 	Red removable test probe		IEC 61243-3	P01102008Z
	Black test-probe lead	Isolated Ø4 mm elbowed female plug Length 0.85 m	IEC 61243-3	P01102009Z
 For C.A 740 & C.A 760	Red removable test probe		600 V CAT IV	P01103059Z
	Black test-probe lead	Isolated Ø4 mm elbowed female plug Length 0.85 m	600 V CAT IV	P01295464Z

Banana measurement leads Ø 4 mm

Other accessories

Model	Description	Specifications	For CAT II installations and below	Reference
	Current lead equipped with a French 2P+E socket	- To allow safe insertion of an ammeter in series - To allow current measurement with a current clamp without removing the external sheath of the power cable		P03295509
	Measurement lead for French and German 2P+E mains sockets	- For direct measurement on power sockets - Quick implementation and reliable connections		P06239307
	Red/black insulation-piercing clips (x 2)		• 30 V AC, 60 V DC	P01102055Z
	Adapter (x 2)	Male BNC adapters – Insulated female sockets Ø 4 mm with 19 mm spacing	• 500 V CAT I, 150 V CAT III	P01101846
	Adapter (x 2)	Male BNC adapters – Insulated female sockets Ø 4 mm with 19 mm spacing	• 500 V CAT I, 150 V CAT III	P01101847
	SMD clip	Gold-plated copper-beryllium contacts Output: male plugs Ø 4 mm	• 1.2 m • TBTS	HX0064
	SHT40KV high-voltage probe for multimeter	Maximum rated voltage: 40 kVDC, 28 kVrms or 40 kVpeak (50/60 Hz) Division ratio (input/output): 1 kV / 1 V For multimeters with 10 MΩ impedance		P01102097

Adapters and probes for multimeters

Adapters

Model	Description	Specifications	Reference
	Thermocouple safety adapter for multimeter (x 2)	Female thermocouple plug – Red/black insulated male plugs Ø 4 mm with 19 mm spacing	P01102106Z
	Pt100/Pt1000 probe adapter for multimeter	Female Pt100/Pt1000 plug – Red/black insulated male plugs Ø 4 mm	HX0091
	Safety adapter and K sensor temperature probe	For multimeters and multimeter clamps equipped with a temperature measurement range and banana inputs with 19 mm spacing - Measurement range from -50 °C to +450 °C - Sensor length: 100 cm approx	P01102107Z

Probes

Model	Description	Specifications	Reference
	> **C.A 1711** Infrared tachometric probe	- Pulse output 1.1 V / 0 / rev - 2 insulated banana plugs Ø 4 mm - Measurement range: 6 to 120,000 RPM - IP 53	P01102082
	> **C.A 1871** Infrared probe	Compatible with any multimeter with an mV range - Measurement range: -30 °C to +550 °C - Output: 1 mV/1 °C - Distance/diameter ratio: 8/1 - Accuracy: ± 2 %	P01651610Z
	> **C.A 801** Temperature adapter for multimeters	- -40 °C to +1,000 °C - 1 mVDC / °C (or /°F) Delivered with 1 K sensor and 1 battery	P01652401Z
	> **C.A 803** 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	P01652411Z

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 5,000	6 x 32	5 A	P01297035
C.A 5,000	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 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
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 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

Product	Standardized dimensions (mm)	Amperage	Reference
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 65113	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
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 2,000	6 x 32	1 A	P03297510
MAX 2,000	6 x 32	10 A	P03297510
MAX 3,000	6 x 32	1 A	P03297510
MAX 3,000	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

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