

Measurement > News CONTACT

Winter 2009



Case study

Temperature sensors for nuclear power

Solutions

E.online and solar power

Services

Focus on Health

New product

Qualistar+

Market

Focus on Education





Innovation at the core of our strategy

Faced with a troubled world economy, a slowdown in industrial investment and the collapse of financial institutions, **Chauvin Arnoux is sticking to its strategic policy and focusing even more on innovation.** In the last year, we have rolled out considerable resources to design and manufacture new tools and global solutions in order to meet the needs and demands of the French and international markets.

In this way, the constraints facing each sector, whether they involve electrical safety, standards, operating safety, ergonomics, the man-machine interface, languages or optimization of the quality/cost ratio, are identified and integrated directly by our Engineering teams and our factories when they develop our future products.

The C.A 8335 electrical network analyser offering 21 languages, the attractively-priced C.A 1884 high-resolution infrared camera, the new-generation Scopix digital oscilloscopes, the aesthetic high-performance Enerium power monitors, in-situ temperature measurement sensors for industry, data loggers and software: all these products demonstrate **the Chauvin Arnoux Group's determination to develop measurement instruments and solutions with ever-improving performance, matching our customers' expectations and the evolution of the measurement market.**

Today, with its Chauvin Arnoux®, Metrix®, Multimetrix®, Enerdis®, Pyro-Contrôle®, AEMC® and Amra® brands, the Group is the only industrial company to cover the whole range of needs, from self-employed electricians to cutting-edge industries, from the French market to international requirements and from simple testers to new-generation oscilloscopes.

The Chauvin Arnoux Group's offering is the broadest available. With its Metrix® brand and its dedicated engineering team in Annecy (France), it is a specialist in oscilloscopes. With its comprehensive Qualistar® range, it has also made major innovations in the field of network analysers and leads the avant-garde in terms of industrial design (Janus prize from the French Institute of Design won this year by Enerdis – see our article). In addition, it offers metrological expertise and complementary industrial services in France under the Manumasure brand. Its subsidiary Pyro-Contrôle, meanwhile, is helping to equip future EPR nuclear plants worldwide with its Nuclear-approved sensors and other products.

But Chauvin Arnoux is not just an industrial company which has been manufacturing and marketing electrical measurement instruments for 115 years, as it continues to support its customers from the installation phase through to after-sales service. Its Training unit covers a host of themes at the heart of your concerns, including electrical safety, standards, thermography, earth measurement certification, harmonics, etc. A special "network troubleshooting" team at Enerdis offers our customers electrical network quality auditing and advises on equipment installation in the context of an industrial approach to energy efficiency. We remain focused on the future, constantly assessing the best opportunities for the development of our products, our markets and our industrial production facilities.

Thank you to our customers for their collaboration and their confidence and thank you to the Chauvin Arnoux teams for all their efforts. Together, we can face the future with optimism.

Winthrop SMITH

Chief Executive Officer, Chauvin Arnoux

SUMMARY

›Company news	1
›Special report	2 > 4
›Solutions	5
›Case study	6 > 7
›News	8 > 9
›Solutions	10
›Field study	11
›Market	12 > 13
›Applications	14
›News	15
›Market	16 > 17
›News	18 > 20
›Brochure update	21



TECHNICAL INFORMATION JOURNAL
Communication Dept.
190, rue Championnet
75876 Paris Cedex 18
France
Tel.: + 33 1 44 85 44 85
Fax: + 33 1 46 27 73 89
www.chauvin-arnoux.com
info@chauvin-arnoux.com

Distributed free
All reproduction rights reserved
For further information, contact your local agency, or your export department in France

CHAUVIN ARNOUX
Tel.: + 33 1 44 85 44 86
Fax: + 33 1 46 27 95 59
export@chauvin-arnoux.fr

ENERDIS
Tel.: + 33 1 47 46 78 85
Fax: + 33 1 47 35 01 33
info@enerdis.fr

PYRO-CONTRÔLE
Tel.: + 33 4 72 14 15 52
Fax: + 33 4 72 14 15 41
export@pyro-contrôle.tm.fr

SPRING 2009
Print run: 7 000 copies

DIRECTOR OF PUBLICATION
Marlyne EPAULARD

COORDINATION, EDITING
Fulya HUET

PHOTOS
Philippe BATTON

TRANSLATION
Tom LANDON

THE FOLLOWING CONTRIBUTED TO THIS NUMBER
Sandrine ALA
Philippe BATTON
Didier BISAUULT
Marc RAMIREZ
Thierry VIGNERON

INFORMATION
Tel. : (33) 01 44 85 44 12

GRAPHIC DESIGN AND PRODUCTION
©CHROMATIQUES
Tel. : + 33 1 43 45 45 10



NEW SITES



Please note the new contact details for the headquarters of Manumasure and Enerdis in Ile-de-France (near Paris, France) and the Chauvin-Arnoux/Enerdis Agency in Nantes (West of France).

Enerdis

16, Rue Georges Besse – Silic 44
92182 Antony Cedex
FRANCE
Tel.: +33 1 75 60 10 30
Fax: +33 1 46 66 62 54
info@enerdis.fr
www.enerdis.fr

Manumasure

248, Avenue des Grésillons
92600 Asnières-sur-Seine
FRANCE
Tel.: +33 1 75 61 01 90
Fax: +33 1 47 33 28 02
info@manumasure.fr
www.manumasure.fr

Nantes agency

49, Rue Leinster
44240 La chapelle sur Erdre
FRANCE
Tel.: +33 2 40 75 45 22
Fax: +33 2 40 75 46 57
ct.nantes@manumasure.fr

2009 Exhibitions Calendar

Trade Fairs/Exhibitions	Subsidiaries	Dates	Location
RAILTEX 2009	CA Amra	10th to 12th March	London
Power Days	CA Austria	18th to 20th March	Messeszentrum / Salzburg
ELTEFA	CA GmbH	25th to 27th March	Stuttgart
Power Days	CA Austria	31st March to 2nd April	Messe / Vienne
INDUSTRIE - INTERKAMA	CA GmbH	20th to 24th April	Hanover
GLASSMAN	Pyro-Contrôle	13th and 14th May	Lyon
LIVINLUCE	CA Amra	26th to 30th May	Rho-Milan
ELEKTROTECHNICK	CA GmbH	2nd to 5th September	Dortmund
METERING EUROPE	Enerdis	6th to 8th October	Barcelona
SPS/IPC Drives	CA GmbH	24th to 26th November	Nuremberg





In-situ calibration

improves the performance of heat-treatment furnaces



7-tonne rolls of silicon steel ready to undergo pot-annealing treatment to give them the required magnetic properties.

ThyssenKrupp Electrical Steel in France



View of the Isbergues site which produces grain-oriented electrical steel.

ThyssenKrupp Electrical Steel produces grain-oriented electrical steel. This term, which may seem strange to the uninitiated, refers to rolls of steel for manufacturing magnetic circuits.

The group, one of the world leaders in this specialized sector, has two factories: one in Germany and one in France, at Isbergues in the Pas-de Calais region of Northern France. **The French site employs around 600 people and produces more than 120,000 tonnes of grain-oriented electrical steel rolls annually.**

Find out more about the site at www.tkes.com

At ThyssenKrupp Electrical Steel's Isbergues site, which produces grain-oriented electrical steel, the pot-annealing workshop has been equipped with temperature sensor assemblies allowing in-situ calibration. As a result, a whole range of productivity gains have been achieved.

Large-grain recrystallization of silicon steel gives it specific physical properties, and in particular excellent magnetic permeability.

"This heat-treatment phase involves jealously-guarded know-how," indicates Mr. Tripenne, an instrumentation control technician on the Isbergues site. Annealing in electric furnaces requires 4 to 5 days, with various temperature plateaux up to +1,200 °C. The atmosphere in the furnace is a controlled mixture of hydrogen and nitrogen gas. Precise temperature measurement and control during this phase are crucial for the final quality of **grain-oriented electrical steel**. Each furnace is equipped with four temperature sensor assemblies: three in the furnace itself and one in its base.



New removable-cover furnace during installation of instrumentation.

Improving periodic furnace calibration operations

"To guarantee accurate temperature measurements, we have to calibrate around 200 sensors equipping the furnaces in the pot-annealing workshop every year in August, when the Isbergues site is closed," explains Mr. Tripenne.

It's been well known for a long time: periodic calibration is an operation that is necessary, but also long and time-consuming, as they have to stop production to remove and then re-install each thermocouple. But there is also significant breakage during removal.



The solution: using temperature sensor assemblies with *in-situ* calibration



➔ Close-up of the interior of an electric removable-cover furnace and the end of a temperature sensor assembly with in-situ calibration.

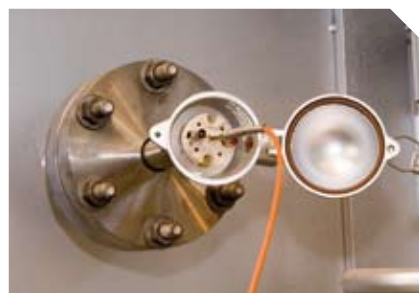
The solution was proposed by Pyro-Contrôle, using its patented in-situ calibration method. In 2007, after defining specifications corresponding to the specific requirements of the pot-annealing workshop, approximately 40 new temperature sensor assemblies were installed for tests lasting several months. The results confirmed the advantages of this new method: ThyssenKrupp Electrical Steel approved the assembly with in-situ calibration. To fully equip the removable-cover furnace workshop, two other series of temperature sensor assemblies have therefore been scheduled, in mid-2008 and early 2009.

Improved process availability

With the in-situ method, it is no longer necessary to shut down a furnace in order to calibrate its temperature sensors. Availability of the continuous manufacturing process is therefore ensured.

Shorter intervention time

"Implementation is now simple and quick. It only takes a few minutes to calibrate a measurement point, so there are genuine time-savings," specifies Mr. Tripenne. It involves simply inserting a standard sensor in the sheath of the sensor to be verified, after opening its connection head, and then measuring the temperature of the standard sensor with a calibrator. All that remains for you to do is compare the temperatures of the standard sensor and the sensor installed in order to deduce the drift.



➔ Close-up of the standard sensor inserted in the sheath of a temperature sensor assembly with in-situ calibration.

Equipment replacement gains

These new temperature assemblies mean it is no longer necessary to replace sensors broken during removal because the thermocouples to be calibrated no longer need to be removed. This feature won over the Purchasing Department.

Quality gains and energy-savings due to a lower set-point for regulation

"In general, the measurement deviation used to be 10 °C to 15 °C. With the new Pyro-Contrôle sensors this range has been reduced to 0 to 5 °C," explains Mr. Tripenne. The accuracy of the thermal process has been improved, leading to less dispersion of the metallurgical characteristics, thus improving output quality. At the same time, the lower setpoint has led to a reduction in energy consumption which has not yet been quantified, but will be in the near future.

Safety gains

Without going into the technical details, the definition of the new temperature sensor assemblies includes a totally hermetic seal inside the assembly, which means that there is no longer any risk of inflammable gas escaping when the connection head is opened.

More flexible scheduling

All the calibration operations can now be scheduled throughout the year while the furnaces are working. This flexibility for scheduling the tests helps to improve the traceability of the finished product.

Quality leads to more quality

ThyssenKrupp Electrical Steel has been applying a quality approach for a long time now. "Grain-oriented electrical steel is a technical product with high added value and a high level of accuracy is required to produce it," points out Mr. Tripenne. The advantages and production gains achieved by using temperature sensor assemblies with in-situ calibration have encouraged the managers of the Isbergues site to bring forward the installation of the third batch, initially planned in 2009, so that the whole pot-annealing workshop will be equipped with these assemblies by the end of 2008.



➔ View of a removable-cover furnace base with its 6 rolls of steel after heat treatment.

What is grain-oriented electrical steel for?

Transformers are used to raise or lower the electrical voltage. They are a key part of the system for transmitting electrical energy from the power station through to the end-user, whether industrial or domestic. A **transformer** comprises a winding and a **magnetic core**. This core is made by stacking electrical-steel sheets. These sheets are produced from rolls and coils of **grain-oriented silicon steel**. These sheets will be used to form the magnetic cores of power and transmission transformers, measurement transformers, inductors and the stators of turbogenerators.

ThyssenKrupp Electrical Steel benefits from long experience and proven industrial expertise in the production of grain-oriented electrical steel. **The production of grain-oriented steel requires a specific process which is:**

- > **continuous:** the Isbergues plant operates 24/7;
- > **complex:** drawing on the most sophisticated physical and chemical laws, involving the use of sulphuric acid baths and furnaces ranging up to +1,200 °C;
- > **long:** 3 to 4 weeks for a complete cycle

Under the PowerCore® brand, the rolls are delivered with a standard width of 1 m or split into coils as narrow as 15 mm. The sheet thicknesses fluctuate around 0.3 mm depending on the finished products.



The pot-annealing workshop at the Isbergues factory

The heat-treatment workshop is rather impressive. 17 batteries of 4 furnaces set up over a length of 150 m, giving a total of 68 electric furnaces. The dimensions of each furnace are also imposing, at around 3 m wide and 7 m long, with a height of 4 m. Each furnace treats 6 rolls of steel each weighing 7 tonnes. They are stacked in twos on the furnace base and covered with 3 metal covers. The furnace is then slotted onto the base, thus providing a closed "pot". All these operations are carried out using a travelling crane.

All the furnaces operate continuously for eleven months a year. They work in parallel at different stages of the five-day cycle. Some are at the beginning of the cycle, others a quarter of the way through, etc.



View of 2 furnace bases. The rolls are placed in pairs in black metal "pots".

Temperature sensor assembly with in-situ calibration: guaranteeing correct temperature measurements

Pyro-Contrôle has developed and proposes temperature sensor assemblies with in-situ calibration to test and guarantee the accuracy of the measurements over time (Patent no. 0213616).

In use, depending on the process constraints, the accuracy of a temperature sensor deteriorates at varying rates so that it no longer guarantees correct measurement as defined initially (with regard to the requisite standard (Pt100 probe or thermocouple)). As a result, it requires periodic calibration.

The method for checking that it measures correctly is quick and simple on an assembly with "in-situ calibration".

- > Opening of the connection head of the sensor to be tested.
- > Insertion of a standard sensor in the sheath of the sensor to be verified until the measurement point is reached.
- > After stabilization, measurement of the standard sensor's temperature with a calibrator.
- > Checking of the sensor's drift compared with the standard.

On a furnace equipped with temperature assemblies with "in-situ calibration", the accuracy tests are carried out directly on the production site, without having to remove the sensors or stop production.

This brings numerous advantages:

- > the process remains available, leading to production gains;
- > it also saves time on each calibration operation;
- > no risk of breaking the sensor during removal, so there are maintenance gains as well;
- > organization of periodic calibration without scheduling constraints, because it is no longer necessary to wait for the end of a production cycle;
- > by avoiding overheating, the life span of the furnace is prolonged;
- > in the end, the guarantee of correct temperature measurement helps to improve the traceability of a manufacturing process.



Pyro-Contrôle temperature sensor assemblies can be produced for any temperature process.

Pyro-Contrôle, Chauvin Arnoux Group

Main product lines: temperature sensors from -268 °C to +1,700 °C, in standard and made-to-measure versions, standard sensors, fixed-point temperature cells, transmitters, temperature and power controllers, temperature recorders, etc.

Find out more at
www.pyro-controle.com

Reader service no. 1



**PYRO
CONTROLE**
CHAUVIN ARNOUX GROUP

Tél : 04 72 14 15 40
info@pyro-controle.tm.fr
www.pyro-controle.com

E.online® backs solar energy

E.online is an effective long-term solution ideal for meeting the requirements of solar energy users, investors and promoters seeking to optimize costs while protecting the environment.

As the sole contact with the owner, this general contractor designs and constructs buildings for professional purposes using solar energy as their primary energy source. Selected for the construction of a business centre comprising office buildings combining evolutivity, ecology and economy, its two main requirements involve the possibility of **allocating consumption by cost centre** and by tenant and the possibility of receiving regular **consumption reports and breakdowns** by e-mail. This automatic information service means that the contractor can avoid costly investments for purchasing and maintaining computer equipment. It also means it does not have to provide a technician to supervise and operate the system.

After a comprehensive audit, E.online® is the solution chosen to meet the fundamental requirements defined with the contractor to:

- > Receive automatically by e-mail:
 - weekly information on the allocation of the energy supplied by each of the seven solar panels equipping the installation
 - monthly information on the allocation of the consumption from the 5 office metering points
 - monthly information on the allocation of the total consumption output by the seven uninterruptible power supplies
- > Be notified in real time by e-mail in the event of a fault on one of the uninterruptible power supplies

The energy produced by the seven solar panels powers the whole site. It is important for the contractor to receive weekly reports on the energy produced by these panels both upstream (direct current) and downstream (alternating current) from the uninterruptible power supplies, so that it can monitor the yield

The screenshot displays the E.online software interface. At the top, there's a menu bar with options like 'Données', 'Général', 'Météo', 'Paramètres', 'Rapports', 'Aide', and 'Quitter'. Below the menu is a toolbar with icons for various functions. The main window is titled 'Données' and contains a table of energy consumption data. The table has columns for 'Données', 'Unité', and 31 days of the month (01 Janvier to 31 Janvier), followed by a 'Total' column. The data is organized into several rows, each representing a different energy source or consumption category. The 'Total' row at the bottom shows the sum of all data.

Données	Unité	01 Janvier	02 Janvier	03 Janvier	04 Janvier	05 Janvier	06 Janvier	07 Janvier	08 Janvier	09 Janvier	10 Janvier	11 Janvier	12 Janvier	13 Janvier	14 Janvier	15 Janvier	16 Janvier	17 Janvier	18 Janvier	19 Janvier	20 Janvier	21 Janvier	22 Janvier	23 Janvier	24 Janvier	25 Janvier	26 Janvier	27 Janvier	28 Janvier	29 Janvier	30 Janvier	31 Janvier	Total
Production	kWh	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	3100.0	
Consommation	kWh	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	1550.0	
Reste à produire	kWh	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	1550.0	
Production	kWh	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	3100.0	
Consommation	kWh	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	1550.0	
Reste à produire	kWh	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	1550.0	
Production	kWh	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	3100.0	
Consommation	kWh	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	1550.0	
Reste à produire	kWh	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	1550.0	
Production	kWh	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	3100.0	
Consommation	kWh	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	1550.0	
Reste à produire	kWh	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	1550.0	
Production	kWh	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	3100.0	
Consommation	kWh	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	1550.0	
Reste à produire	kWh	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	1550.0	
Production	kWh	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	3100.0	
Consommation	kWh	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	1550.0	
Reste à produire	kWh	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	1550.0	
Production	kWh	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	3100.0	
Consommation	kWh	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	1550.0	
Reste à produire	kWh	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	1550.0	
Production	kWh	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	3100.0	
Consommation	kWh	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	1550.0	
Reste à produire	kWh	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	1550.0	
Production	kWh	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	3100.0	
Consommation	kWh	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	1550.0	
Reste à produire	kWh	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	1550.0	
Production	kWh	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	3100.0	
Consommation	kWh	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	1550.0	
Reste à produire	kWh	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	1550.0	
Production	kWh	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	3100.0	
Consommation	kWh	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	1550.0	
Reste à produire	kWh	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	1550.0	
Production	kWh	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	3100.0	
Consommation	kWh	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.																			

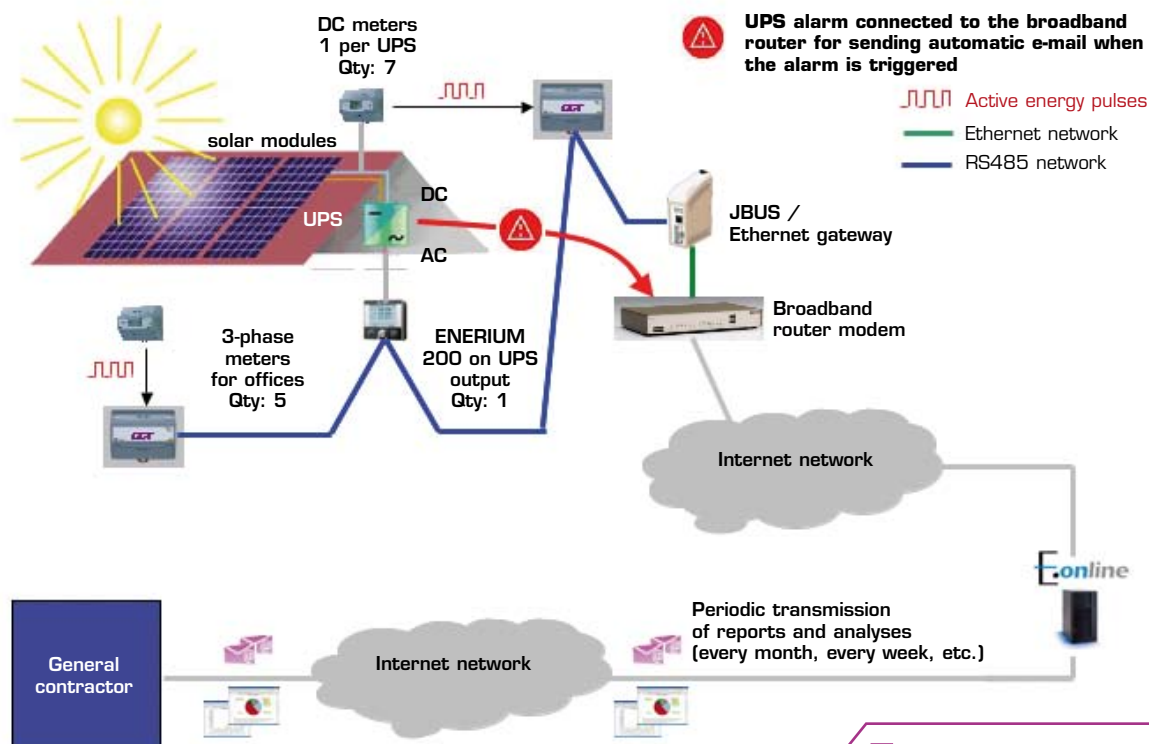
of the installation. The various analyses transmitted concerning the consumption data (distribution across the year; per month, per day, etc.) are used to establish a fair allocation of the consumption and confirm that the energy performance of the buildings complies with the project objectives.

In the context of projects increasingly integrating sustainable development standards, E.online® thus confirms **its position as a leader in the management of all types of energy.**

Reader service no. 2



Tél : 01 75 60 10 30
info@enerdis.fr
www.enerdis.fr



Non-contractual diagram of the metering network.



Industrial Design

Just a passing fad for good looks or a genuine necessity ?



JANUS 2008
DE L'INDUSTRIE

With a multimeter that looks like a telephone, a pyramid-shaped oscilloscope or a power monitor with a wide graphic screen, the Chauvin Arnoux Group made its choice a long time ago. Under the impetus of its technological intelligence unit, and thanks to close co-operation between the engineers in the in-house engineering teams and design agencies in the last ten years, many products now offer a highly original look. This approach has brought the Group a number of prizes, including the "Etoile du Design", the "Electron d'Or" and the Janus award.

LIn 2006, the **MTX Mobile®** handheld multimeter from the Metrix® brand revolutionized the classic concept of the rectangular multimeter left over from the 1980s, with its shape inspired by flip phones, its wide multi-display screen and its keys accessible one-handed. This was a radical change which may have surprised more conservative users. But this new-generation multimeter was not simply a manufacturer's whim, but the fruit of four years' work by the engineering department at Annecy. Designed above all for easy use, the instrument's technology is similarly advanced, with a resolution of 100,000 counts, a basic accuracy of 0.02 % and a 200 kHz bandwidth. As a result, it was highly acclaimed among professionals, who awarded the MTX Mobile® the **2007 "Etoile du Design"** and *Electronique* magazine's **"Electron d'Or"** prize.

The brand new **ENERIUM®** power monitor, designed by the Enerdis engineering department in collaboration with the firm Designers Associés, proved a commercial success in the year of its launch, while also winning two consecutive design prizes: **the "Etoile" from the "Observateur du Design" magazine in 2007** and the **Janus award for Industry** from the **Institut Français du Design** in October 2008. This prize rewards an industrial company's efforts to integrate design and ergonomics in their projects. And it's worth pointing

out that this product is particularly attractive, with its wide graphic LCD screen, its optical fibre for programming and its intuitive interface.

Many people might be surprised at a pyramid-shaped oscilloscope instead of the usual rectangular brick, but they needn't worry. The instruments in the oscilloscope family remain genuine laboratory instruments, giving priority to direct data access by means of keys on the front panel. As well as intuitive, computer-like ergonomics and a wide multi-display screen which may or may not fold away for protection, depending on the models, they also offer a built-in handle making them easy to transport. Entered for the **"Observateur du Design"** awards in 2006, the MTX oscilloscope won the **star prize in the Industry category**.

Our instruments are increasingly good-looking. Alongside technical performance and cost, design is becoming a genuine selling point. To provide real differentiation and make an instrument more attractive, considerable thinking is necessary before the design phase, including a study to take into account the technical constraints, manufacturing costs, feasibility, ergonomics, maintenance, etc. But make no mistake about it, in industrial applications, although the "look" may contribute added value, the man/machine interface and easy handling remain the crucial issues.



A multimeter unlike any other...

Its flip cover offers a large built-in LCD screen (58x58 mm and 160x160 pixels) without increasing the instrument's overall volume. In this way, its legibility and data display capabilities are improved. To avoid disorienting electronics engineers accustomed to electromechanical switches, Chauvin Arnoux has kept the outline of a switch, with the range selection buttons laid out around it. Three terminals for the connectors, instead of the usual four, help to avoid connection errors. A special "favourite measurement" button can be used to recall a specific measurement defined by the user.

An attractive oscilloscope which is not just a "pretty face"...

Although its shape and architecture are both innovative, the crucial feature is its

man/machine interface designed to make it user-friendly and easy to use by means of an environment based on a PC's.

A power monitor redesigned....

The **ENERIUM®** power monitor was awarded the **2008 Janus prize for Industry** by the "Institut Français du Design". As well as its unprecedented design compared with the other products on the market, the Enerium was particularly appreciated for its ergonomics and its functions which are ideal in the context of energy efficiency. The Janus award was presented by the "Institut Français du Design" at a ceremony held in the French Senate, in front of a audience of personalities and in the presence of the Chairman of Chauvin Arnoux, **Axel Arnoux**, the General Manager of Enerdis, **Patrick Kauffmann**, and our designer partner, **James Cole** from Designers Associés.



➤ **ENERIUM**, power monitor

The "**Janus de l'Industrie**" is a label awarded by the Institut Français du Design since 1953. It rewards products designed from the outset to provide users with added value while respecting their environment.

The origins of this prize date back to 1949, when Jacques Viénot (1893-1959) set up "Technès", the first design firm in France. In 1951, he founded the "**Institut d'Esthétique Industrielle**". In 1984, this organization was renamed the "Institut Français du Design", with the mission of encouraging projects durably rooted in an approach to "make life easier".



➤ Award of the Janus prize for the Enerium.



➤ **OX 6000**

➤ **Portable MTX**

MTX oscilloscope ➤

Reader service no. 3

CHAUVIN ARNOUX
CHAUVIN ARNOUX GROUP

Tél. : 01 44 85 44 85
Info@chauvin-arnoux.fr
www.chauvin-arnoux.fr



Experience and performance

The latest in the range of three-phase network and energy analysers, the **QUALISTAR+ C.A 8335**, has been designed, developed and manufactured entirely by the Chauvin Arnoux Group's engineering teams in France! This brand new measurement instrument benefits from the experience gained with the Qualistar C.A 8332B and C.A 8334B models which have proven their worth in the field.

The goal: saving energy!

Growing levels of pollution by conduction, induction or radiation are being observed on electrical networks due to the spread of equipment with switching power supplies, systems based on power electronics, etc. As a result, significant energy losses and disturbances affecting machine operation are becoming increasingly common.

To achieve **energy savings** and guarantee satisfactory operation of such equipment, the quality of the electrical network needs to be checked regularly. With the **QUALISTAR+**, this can be done very **quickly** because it is so easy to use.

Ergonomics designed to save time!

Ideal for the needs of inspection and maintenance teams, the **QUALISTAR+** is designed for **quick network quality verification** and **easy processing of the results**. The keyboard is divided into **immediately identifiable areas** (direct functions, pop-up menus, etc.). The wide colour screen (diagonal 148 mm) uses the same pictograms as the keyboard and the display modes are structured. **These direct access possibilities help to save additional time.**

The C.A 8335 is portable but can also be used on a benchtop thanks to its foldaway stand, a useful feature for recording campaigns over long periods. In addition, on the **QUALISTAR+**, colour-coded rings are fitted at each end of the measurement leads to make the connections easier to identify.

And more than **21 languages** are already available!

More functions



The **C.A 8335** measures all the voltage, current and power parameters required for full diagnosis of an electrical installation. It captures and records all the parameters, transients, alarms and wave forms **simultaneously**. The sensors connected are recognized automatically. It is possible to **view all four inputs simultaneously in real time** in graphic, vectorial or table mode. Diagnosis of the harmonics in **expert mode** allows you to analyse the effect of the harmonics on heating of the neutral or on rotating machines.



Recording and capture... advantages all round

The recording duration for **Inrush** measurements, used in particular for correctly sizing an electrical installation, has been extended to more than one minute. The **QUALISTAR+** records the Min and Max values and is capable of capturing several hundred transients.

If users want to record **all the parameters** at the maximum sampling rate once every second, the **QUALISTAR+** now allows up to **1 month** of recording. In addition, **10,000 alarms of 40 different types** can be programmed and recorded! It also allows several hundred transients to be captured – with a resolution of one microsecond!

Other advantages: pragmatism and time-saving

The **"screenshot"** function can be used to illustrate a report or support an analytical conclusion arising from a measurement campaign. **Dataview®** is multilingual software for presenting the data in graph, histogram or table form.

Only advantages!

Other advantages include voltage measurement up to 1,000 V, intuitive configuration, online help, the possibility of printing directly and, above all, 600 V Cat. IV safety.

Reader service no. 4



Tél. : 01 44 85 44 85
Info@chauvin-arnoux.fr
www.chauvin-arnoux.fr

The whole **QUALI STAR+** universe at www.chauvin-arnoux.com/qualistar

Discover the product universe of the new **QUALI STAR+** C.A 8335 electrical network analyser from Chauvin Arnoux®.

Recently launched on the market, the **QUALI STAR+** now has a special site of its own. As well as technical and product data concerning the latest in the range of three-phase analysers, this site invites internet users to find out about the product's application universe by means of a **video** and **summarized case studies**.

Users can move around the site very simply using a menu.

By easily clicking on the **"The Product"**, you can view all the ergonomic features of the **QUALI STAR+**.

Another click on **"Specifications"** displays all the product's technical details.

Case studies are also available to allow visitors to gain a concrete overview of the **QUALI STAR+** universe. Find out how and in what context to use the product, what harmonics and flicker are, and many other aspects...

To complete this information, visitors can also watch **the film showing the QUALI STAR+** in its environment or **view a set of photographs** of the product on its own or in use.

By clicking on **"Software"**, you can open the support area allowing you in particular to update your product and its software. There is also an **FAQ** section for asking questions concerning use of the product, problems encountered, etc.

In addition to this information, the site also allows you to download the documentation and a press review.



Reader service no. 5



**CHAUVIN
ARNOUX**
CHAUVIN ARNOUX GROUP

Tél. : 01 44 85 44 85
Info@chauvin-arnoux.fr
www.chauvin-arnoux.fr



MAP 607: network analysis accessible to all



➤ MAP 607.

*The simplicity of implementing and using the **MAP 607 plug & play network analyser**, which complies with **Class A** of the IEC 61000-4-30 standard, makes it the ideal tool for measuring the quality of **single-phase networks**.*

Based on an advanced platform capable of performing all the necessary analyses directly on site, the **MAP 607** comprises concentrated technology in a casing which is easy to handle and implement. Simply connect the instrument to a 230 V domestic power socket to start recording network quality measurements as specified in the predefined standard. This easy implementation will appeal to both electricity distributors and end-users.

Checking the quality of the energy supplied

The **MAP 607** can be used to **check the quality of the energy supplied by the distributor in relation to the standard, regulatory or contractual template** defined in the reference base of the EN 50160 standard. In this context, **it measures and stores all the qualimetric parameters**, including voltage (avg/min/max), frequency, THD, harmonics up to the 50th

order and flicker, as well as **analysing rapid disturbances on the network**, voltage swells, voltage dips, interruptions and cuts.

Producing incontestable data

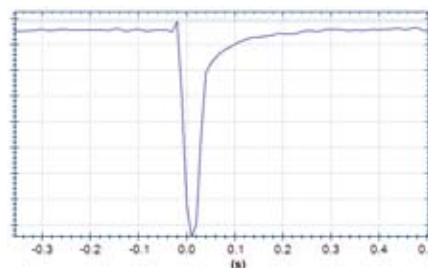
Each parameter measured by the **MAP 607** **complies with the algorithmic constraints defined by the IEC 61000-30 standard** in its severest class: **Class A**. This makes the product an instrument of reference for all professionals in the electrical sector.

Investigating for better understanding

The **MAP 607** gives expert information on the **events occurring on the network**, with the signatures of voltage swells, voltage dips and interruptions. After a measurement campaign covering at least one week, this type of event capture provides the user with a precise, time/date-stamped log.

Processing the data

The processing result can be read directly on the casing by means of the LED showing the status. If the parameters remain within the limits set by the template, the LED is green, whereas it is red if the values are outside these limits. The data recorded by the **MAP 607** are also analysed and reported quickly and simply by **dedicated software**. The **MAP 607** can also be integrated easily into a global energy quality monitoring system involving other products from the MAP 6xx range. All the data from the **MAP 607** can thus be processed by the same **software, E-qual-Premium**.



➤ Screenshot of a voltage dip.

Product advantages

- > Recording on 2 voltage channels: phase/neutral and phase/neutral-earth
- > All the qualimetric parameters measured according to your reference standard
- > Transfer of measurements by USB 2.0 "full-speed" port
- > Plug & play system (no driver to install)
- > Class A analyser
- > Dedicated software

Reader service no. 6



Tél : 01 75 60 10 30
info@enerdis.fr
www.enerdis.fr

↖ Synchronization of the MAP 620 using a GSM antenna

What's the point of having a permanent network analyser?

Electrical networks are subject to deterioration of the supply voltage caused by load modifications, disturbances generated by certain equipment or the appearance of faults due to external causes. All these sources of deterioration negatively affect the operation of electrotechnical installations and equipment. **The new MAP range of electrical network analysers, compliant with Class A of the IEC 61000-4-30 standard, can be used to measure and record the amplitude of the disturbances extremely accurately, helping you to assess the extent and origin of the disturbances. We present a study of the system used by an independent electricity producer.**

There are three aspects to this issue. As a producer, the **quality** of the electricity that it supplies must be beyond reproach and **comply with the templates** defined, so that it can guarantee effective billing of the energy produced for its customers.

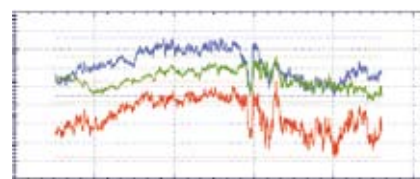
If it is connected to the national or regional electricity grid, permanent installation of a network analyser can also prove that, if there is disconnection from the grid leading to decoupling of its production unit, the interruption is not the producer's fault.

Lastly, repeated network reactivation operations may cause damage to its own production facilities. Because all the events occurring on the network are recorded, it is possible to confirm the real nature of the event and, if necessary, **clearly identify the different responsibilities. Permanent installation of an Enerdis network analyser from the MAP range** provides a solution to all these concerns.

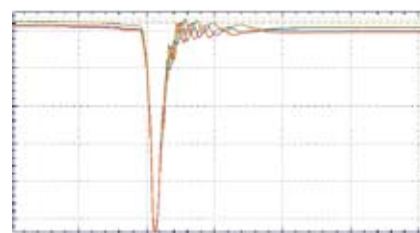
The range's strengths include **synchronization by GPS** ensuring dating of the measurements and events with an accuracy of ± 40 ms and the possibility of **communication via GSM** for remote processing of all the data gathered by the instrument. In the high-level version, data analysis is handled by client/server software using an automatic meter-reading engine. It is possible to open one or more analysis sessions on the measurements contained in the data-base. The views available include trend curves, power measurements, harmonic pollution, network unbalance, flicker and all the events (voltage dips, swells and interruptions). With some models in the range, it is also possible to view the wave forms of the signals during the event.



↗ MAP 620 in situ.



↗ Trend curve showing the evolution of the voltage on a MAP 620.



↗ View of a voltage dip captured by a MAP 640.

Did you know?

The synchronization is checked with a Metrix® product: the SCOPIX OX 7104.



Reader service no. 7

ENERDIS
CHAUVIN ARNOUX GROUP
Tél : 01 75 60 10 30
info@enerdis.fr
www.enerdis.fr



Pyro-Contrôle temperature probes at the heart of the Flamanville EPR reactor



Pyro-Contrôle temperature probes qualified as K1 and K3 will be fitted in the future Flamanville in Normandy 3 nuclear reactor. Pyro-Contrôle is acknowledged among experts and end-users as a supplier of high-performance qualified temperature probes for the nuclear industry.



© AREVA

➔ *The Flamanville nuclear power station in 2008. EDF operates two production units there, each capable of supplying 1,300 MW.*

Long experience...

Pyro-Contrôle began manufacturing temperature sensors for the nuclear industry in the 1970s, when the sector was expanding rapidly.

... and unchallenged know-how

Today at Pyro-Contrôle, they have built up considerable know-how concerning these products, dealing constantly with the difficulties inherent to this range of highly-sophisticated products. The many safety constraints tend to evolve and Pyro-Contrôle has to keep up with such changes. High-performance commercial and technical follow-up is also crucial, as the effects are of strategic importance for the expert decision-makers involved: Pyro-Contrôle's temperature probes help to ensure satisfactory operation of our customers' nuclear reactors and must therefore work without fail!

To maintain this high level of efficiency, the qualification, production and verification processes must remain under full control.

Key elements of our industrial policy include document structuring, traceability of the procurement, manufacturing and inspection procedures and stability of our teams.

Did you know?

The "Flamanville 3" EPR will be commissioned in 2012 and will be the first in a new generation of nuclear reactors. The initial work to prepare the site began in 2006. AREVA NP is supplying the nuclear reactor core, while ALSTOM POWER is providing all the general instrumentation outside the reactor.

Several advantages influenced the choice of the site at Flamanville, in the French department of Manche. In particular, EDF already owns the land required to build the new power station and its location close to the sea makes the cooling system easier and less expensive to implement.

The EDF-Flamanville nuclear power station, located on the west coast of the Cotentin peninsula in a former granite quarry, covers an area of 120 hectares, half of which has been reclaimed from the sea.

The two units currently on the production site, each with a power of 1,300 MW, produce 18 billion kWh, or approximately 3 % of French electricity consumption. This is equivalent to the consumption of Brittany and Lower Normandy combined.

An evolutionary design approach has been used for the EPR to take advantage of the experience built up over more than thirty years by French and German designers and operators. This is why the term "Evolutionary Pressure Reactor" is also used to refer to EPR technology (originally called the European Pressure Reactor). This advanced technology offers improvements in terms of safety, the environment and economic performance. During its operation phase, it will enable a reduction of at least 30 % in emissions into the environment for each kWh produced. The volume of radioactive waste will also be smaller overall. To limit the impact on fresh water supplies, a desalination plant is planned on the site.

This new reactor, with a power of 1,650 MW (compared with 1,450 MW for the most recent reactors), will consume 17 % less fuel due to the use of more effective assemblies and more efficient turbines. This improvement, combined with shutdowns 2 to 3 times shorter in duration, will allow a 36 % increase in annual electricity production compared with the current reactors.

© AREVA



➔ The Flamanville nuclear power station as it will be in 2012. The third production unit, currently being built, will use EPR technology for a generating capacity of 1,650 MW.

"Nuclear safety" means specific requirements

"Nuclear safety" covers all the measures taken during the design phase, the manufacture of the equipment, the construction of a power station, the operation phase and the final shutdown of the installation, with the purpose of ensuring safe operation, preventing incidents and limiting their effects should they occur.

The concept of safety is a fundamental part of the requirements covering our temperature probes intended for use in nuclear processes, involving **a genuine safety culture. This safety concept is applied in several ways:**

1 - All the people involved in manufacturing "nuclear-qualified products" must be made aware of the "nuclear safety" aspects. Awareness and acceptance of the individual responsibilities are essential for the development of this culture: "I'm involved in manufacturing a piece of equipment that will be used in a nuclear power station. I'm responsible for the quality of the items that I work on, so I contribute to "nuclear safety". I therefore have to comply scrupulously with the requirements in the production documents and must constantly be aware that my actions may affect "nuclear safety".

2 - The design must be based on validated construction rules: the RCCE and RCCM regulations.

3 - Certain purchasing or manufacturing operations are identified as ACQs (Actions Concerning Quality) and are the subject of particularly formalized supervision.

Necessity of qualified products

Qualification of the equipment is an essential preliminary process. The purpose of a qualification campaign is to test the behaviour of the equipment during an accident (e.g. earthquake) after first artificially ageing the equipment in question. "Qualification Summary Notes" are then drafted on the basis of these qualification campaigns.

The "Reference Folder" describes the exact conditions for producing the equipment which has been through this qualification procedure. All equipment delivered subsequently must be linked by traceability to this "Reference Folder". There are 4 levels of qualification: K1, K2, K3 and NC (from the lowest to the highest).

Did you know?

EDF has launched the construction of a third production unit at Flamanville which will be an EPR (European Pressurized Reactor), an improved version of pressurized water reactors.

What are our qualified probes used for in an EPR reactor?

Our temperature probes qualified as K1 and K3 are used in various places inside and outside the reactor building.

- > On the primary circuit loop, our K1 probes are used to measure the temperature of the primary coolant and detect any rapid overheating in the event of an accident. These probes are "fast" probes.
- > At other points in the primary circuit, for example on the pressurizer, or on other important circuits for safety, our classified probes are used to measure the temperature.

Certain probes are qualified to remain functional even after a nuclear accident, with technical constraints combining irradiation, temperature and pressure.

Key figures

Nuclear power in France

- > **58** production units on
- 19** sites
- > **86.6 %** of EDF's production

Reader service no. 8

 **PYRO
CONTROLE** Tél : 04 72 14 15 40
CHAUVIN ARNOUX GROUP info@pyro-controle.tm.fr
www.pyro-controle.com



➔ K1-qualified Pyro-Contrôle probe: DT 034 model with thermowell



➔ K1-qualified Pyro-Contrôle probe: DT 108 model with thermowell



The MTX1050PC spectrum analyser and its probes for EMC prequalification



The spread of electrical and electronic equipment is leading to an increase in electromagnetic disturbances. These may cause malfunctions in nearby equipment or systems. This applies to all electrical or electronic equipment, as well as equipment containing electronic components (computers, mobile phones, industrial machinery, lighting, etc.). Since 1996, any product marketed in Europe has had to comply with the electromagnetic compatibility standards concerning emission and immunity. For measurement instruments, the generic standard is EN 61326-1.

EMC prequalification

This means limiting the electromagnetic interference or disturbances caused by or affecting electrical or electronic equipment. When these tests are performed throughout the design and development of a product, they enable the disturbances detected to be eliminated by:

- > the choice of the components and their layout on a circuit board ;
- > reduction of the length of the wiring and, if possible, use of shielded cables ;
- > separation of circuits/cables of different types ;
- > verification of the electrical continuity, chip floorplan and shielding, etc.

This list is not exhaustive.

The prequalification tests are used to ensure that the finished product will comply with the applicable standards. Thorough tests offer a higher probability of success in the final EMC qualification phase. They avoid the **extra costs generated by rectification of the product if it fails the qualification phase.**

The tests are divided into two main categories: **immunity tests** and **emission tests**. They are also carried out on the basis of two distinct modes: **conducted mode** and **radiated mode**.

The MTX 1050PC spectrum analyser and the HX0082 near-field probes

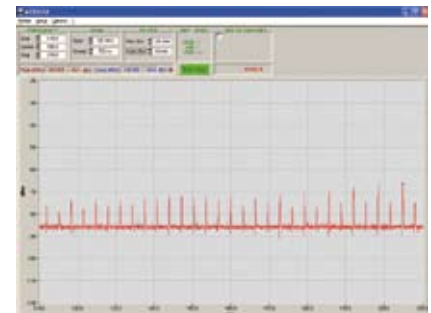


The probes are delivered with a BNC lead for connection to the spectrum analyser:

The different fields measured by this type of probe make it possible to locate the source of the high-frequency electromagnetic field causing disturbances. The active H-field probes operate by observing the disturbance currents. Insensitive to outside disturbances, they measure the intensity of the field directly related to the currents circulating in the conductors.

They do not require disconnection of the existing wiring. They can be used in combination with an **MTX 1050PC** spectrum analyser equipped with **Peak and Q-Peak detection** modes which are essential for carrying out measurements in the context of EMC prequalification tests.

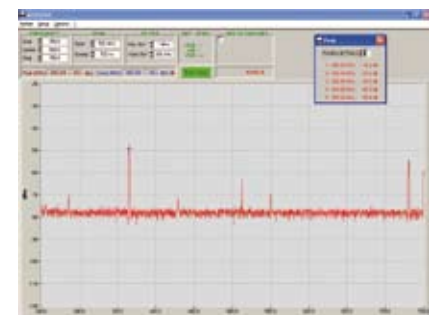
In "conducted mode", a **contact probe** can be used to detect magnetic fields emitted vertically from flat surfaces (*example 1*).



This allows accurate measurements on pre-defined areas (floorplan, trace, shielding, etc.). It is ideal for detecting disturbances originating on surfaces which are not easily accessible.

In "radiated mode", a **proximity probe** can be used to capture all the electromagnetic fields present in the space concerned (*example 2*).

For greater accuracy, these probes can be used with an HX0083 amplifier (20 dB), which helps to reduce the noise floor level. This makes it possible to observe very slight disturbances.



Reader service no. 9

metrix

Tél. : 01 44 85 44 85
Info@chauvin-arnoux.fr
www.chauvin-arnoux.fr

Simplicity and accuracy for remote temperature measurements

For industry and self-employed contractors, the new **C.A 1864** and **C.A 1866** infrared thermometers from Chauvin Arnoux® allow professionals to carry out inspections which match reality.

Ergonomic

The "pistol-shaped" casing makes them exceptionally comfortable to handle and easy to use for detecting any hot spots in just a few seconds. With its laser sight and flexible handling, users can point at the centre of any target without any risk of error. The results are then displayed on the 20,000-count backlit LCD screen. All the functions are accessible one-handed.



Particularly easy to read whatever the conditions thanks to their 20,000-count backlit display.

Performance

These thermometers offer the possibility of adjusting the **emissivity**. In this way users can ensure that their inspections match reality. The deactivatable trigger can be locked to keep the measurement result in the memory (HOLD function). A simple scan of the target is all it takes to detect any hot spots ("Continuous Measurement" function).

Equipped with an extensive temperature range (up to 1,000 °C), they offer a high distance/spot ratio (30/1 with the C.A 1864 and 50/1 with the C.A 1866). High and low alarm thresholds can be set to trigger a warning whenever the temperature is outside the range specified.

Their simplicity, wide measurement range and accuracy make these thermometers essential tools for maintenance and inspection teams. For even greater comfort, the **C.A 1864** and **C.A 1866** are delivered in a carrying bag.

Emissivity

A material's emissivity depends on its nature, its surface state and its temperature. It corresponds to the energy ratio that a body radiates in relation to that radiated by a black body at the same temperature. A black body absorbs and emits all the energy, giving it an emissivity of 1. All other bodies have an emissivity less than 1.

Knowledge of this quantity is essential for correct measurement with an infrared thermometer.

Reader service no. 10

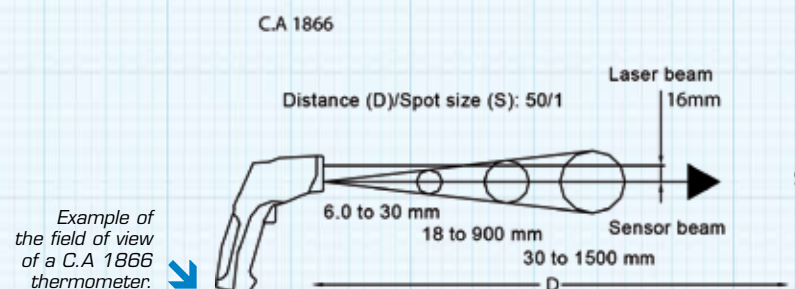
CHAUVIN
ARNOUX
CHAUVIN ARNOUX GROUP

Tél. : 01 44 85 44 85
Info@chauvin-arnoux.fr
www.chauvin-arnoux.fr

Did you know?

The field of view

This is a solid area or angle which can be observed using an optical instrument.



The higher the value of the distance/spot ratio, the better the measurement accuracy.

Additional specifications	
Extensive measurement range	-50 °C to +1,000 °C
Accuracy	± 1.5 % ± 2 °C
Distance/spot ratio	50/1 with C.A 1866 30/1 with C.A 1864
Functions	Continuous measurement, high and low alarms, Min/Max/Avg, Dif, HOLD

Instruments for education



➤ **SCOPIX II** communicating oscilloscopes for use in the field

"The education market is very important for us, because it involves tomorrow's technicians and engineers. Our job is to offer them the best in measurement and, above all, develop their taste for the electronics and electrical engineering professions."

Science and technology education is evolving due to the constant advances in these fields. Today's market is relatively stable. It is mainly a volume market requiring products to be renewed or replaced regularly. In this way, technological change has a direct effect on the disciplines involved and their curriculum.

Chauvin Arnoux® and Metrix® offer a comprehensive range of measurement instruments ensuring full coverage of the demand.

The C.A 1884 is so simple to operate that anyone can use it ➤

The RayCAM C.A 1884 thermographic camera and the C.A 1875 training bench

The **C.A 1884 camera** has been granted CNPP certification for the quality of its measurements. Equipped with a video output for group work, the RayCAM with its RayCAM Report software can be used to draft Q19-type professional reports. It also offers numerous other advantages, such as its 4 cursors (1 automatic and 3 manual), its 50 Hz frequency for real-time images and its adjustable emissivity.

The **C.A 1875 thermographic training bench** can be used to demonstrate the various causes of errors: emissivity, spatial resolution, reflection, transmission and inclination. It is supplied with ready-to-use experiments and practical exercises.



The Special Selection for Education



Every year, Chauvin Arnoux produces several versions of the Special Selection for Education, a catalogue grouping the Chauvin Arnoux®, Metrix® and Multimetrix® measurement instruments suitable for training applications.



➤ The new Probix
HX0072 & HX0073 probes



➤ The C.A 1875 training bench
for learning all about thermography

SCOPIX II analyser-oscilloscopes

With their touch screen, the portable SCOPIX models are ideal for electrical engineering and power electronics applications. They now also offer a power function, which is very useful for measuring power values on electronic systems such as switching power supplies. Their 2 or 4 isolated channels, depending on the model, mean that differential probes are no longer necessary while making it possible to view rapid signals. The **Ethernet link** with Web server can be used to print or project the image (curves, values, etc.) or to control the instrument remotely.

Other important features for training purposes include:

- > 2 or 4 built-in TRMS multimeters with a bandwidth of 200 kHz
- > Harmonic analyser
- > Automatic acquisition and storage of curves in the internal memory (50,000 points) or on external hard disk
- > Triggering on automatic measurements
- > Process recorder
- > 50,000 memory points per channel

Probix probes

The Scopix® portable oscilloscopes use patented Probix accessories offering users active safety. These probes can be used for quick voltage, current and temperature measurements without any risk of error.

Other features:

- > Safety message at connection
- > Scaling and units managed automatically by the system
- > Active sensors powered by the Scopix

The OX6000 SD series of oscilloscopes

Brand new and particularly reliable, the **SD versions of the OX6000** oscilloscopes benefit from a **Lifetime Warranty** !

The integration of an **SD card** has increased the data storage capacity to **2 GB**. Like the Scopix models, the OX 6000 SD versions are equipped with an Ethernet link with a web server for:

- > printing on network printers
- > remote management
- > file exchange on FTP server directly in Windows

The new products presented above are not an exhaustive list. There are many other measurement instruments meeting the requirements:

- > the **MTX Mobile** multimeters with their four 10,000-count graphic displays equipped with Bluetooth communication
- > the **MTX Compact** oscilloscopes with SPO display showing the traces with the same quality as an analogue oscilloscope, which is ideal for detecting rapid phenomena and intermittent disturbance signals
- > the **SCOPEin@BOX** oscilloscopes with SPO display which can be connected to any PC
- > and a host of other products such as the Qualistar electrical network analyser, the C.A 8220 and C.A 8230 power analysers, clamp-on ammeters, stabilized power supplies, etc.

To sum up, our determination to design the measurement instruments of tomorrow, offering ever-greater accuracy and reliability, remains a great source of motivation and satisfaction for us.

Reader service no. 11

 **CHAUVIN®
ARNOUX**
CHAUVIN ARNOUX GROUP

Tél. : 01 44 85 44 85
Info@chauvin-arnoux.fr
www.chauvin-arnoux.fr

The SD Card version of
the OX 6000 with 2 GB
of extra storage on
removable SD Card ➤



New generation of digital transducers

The quality, accuracy and reliability of the **MICAR 2** make it the new reference for programmable multi-function transducers designed for dispatching centres, HV/LV transformation stations and control-command switchboards.



The **MICAR 2 Class 0.2 programmable digital transducer** can convert up to 32 electrical quantities from a single or three-phase network (balanced or unbalanced) on 0, 2 or 4 configurable outputs

Product advantages

- > **Class 0.2 / 4 kV** insulation
- > Up to 4 configurable analogue outputs
- > Measurement of 32 electrical quantities
- > Mounting on DIN rail or plate
- > Option of 2 or 4 on-off outputs
- > **Communication** and programming via optical head or remotely via Ethernet network or RS485 output
- > **Electrical network supervision** and display of the energy values, harmonics and THDs with the E.view+ software

(analogue or on-off). As well as offering the traditional quantities U, V, I, P, Q, S, FP, F and $\cos \varphi$ on any electrical network, it can also measure earth voltage, neutral current and harmonics up to the 25th order.

Equipped with innovative functions, the **MICAR 2** range is particularly attractive: remote communication via Ethernet, on-off outputs for energy metering applications, electrical network supervision and display of the energy values, harmonics and THDs.

When used with the **E.view+ software** for configuration, installation diagnosis and display of the electrical quantities, **MICAR 2** offers unrivalled flexibility of use.

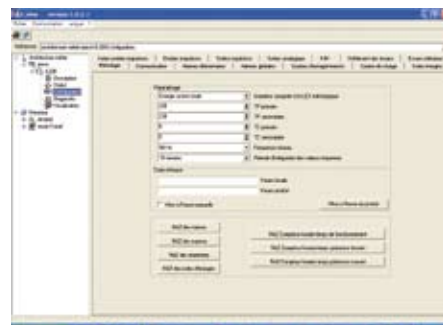
MICAR 2 is available in a **made-to-measure version**, a **standard version** or as a **kit** containing the product, the optical head and the **E.view+ software**.

Reader service no. 12



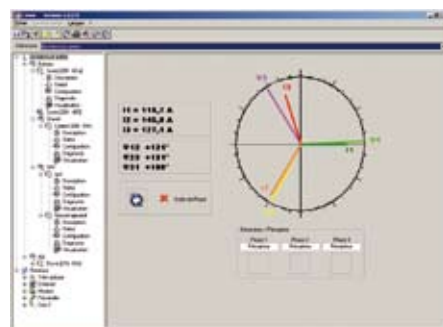
Tél : 01 75 60 10 30
info@enerdis.fr
www.enerdis.fr

The **E.view+ software** is used with the **MICAR 2** range for configuration, installation diagnosis and display of the electrical quantities.



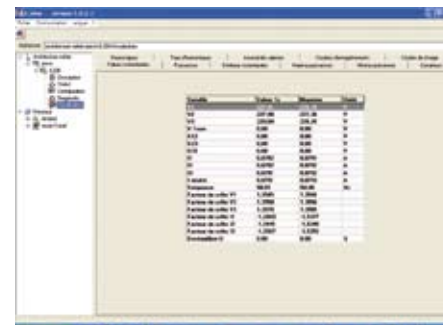
Configuration

- > **Carry out** remote configuration of the **MICAR 2** via the RS485, Ethernet or local network using the optical head
- > **Program** the communication parameters for the products (address, speed, parity, etc.) and the configuration parameters (CT ratio, VT ratio, alarm thresholds, etc.)



Diagnosis

- > **View** the phase order and angles with the Fresnel diagram
- > **Control** the analogue and on-off outputs remotely



Display

- > **View** the basic electrical quantities in real time
- > **View the harmonics** as histograms

Identify your phases very simply Make sure your equipment is safe

For installation, inspection and maintenance teams, Chauvin Arnoux® is launching the **C.A 6608** and **C.A 6609** phase rotation testers. These instruments are essential for identifying the phase order on an electrical installation and the rotation direction of any industrial equipment connected to the installation. Identifying the phases makes it easier to ensure correct, safe wiring on installations and motors, thus preventing damage to the equipment connected to the three-phase network.

The **C.A 6608** can be used to quickly identify the phase order and detect any phase loss.

The **C.A 6609** has additional functions for industrial equipment (motors, pumps, etc.):

- > indication of the rotating field direction without connection
- > determination of the order for connection of the phase wires

These tests are carried out as soon as the cables are connected, for the phase order, and by simply pressing a button for the industrial equipment test. The results are shown by LEDs (**C.A 6609**) or by an LCD (**C.A 6608**) display and are easy to interpret.

Comprehensive and simple to use thanks to the colour-coding of the terminals and cables, these instruments are ideal for industrial building inspection and maintenance teams. They are delivered with all the accessories needed for the various tests.

Functions and technical specifications:

- > automatic testing as soon as the instrument is connected
- > indication of phase presence or absence
- > determination of a motor's rotation direction with or without contact (**C.A 6609**)

Operating voltage:

- > 40 to 850 VAC between phases (**C.A 6608**)
- > 40 to 600 VAC between phases with connection / 120 to 400 VAC between phases without connection (**C.A 6609**)
- > Electrical safety 600 V CAT III



Reader service no. 13



CHAUVIN
ARNOUX®
CHAUVIN ARNOUX GROUP

Tél. : 01 44 85 44 85
Info@chauvin-arnoux.fr
www.chauvin-arnoux.fr

Scopix & Probix for measurements in total safety

The Scopix® portable oscilloscopes use patented Probix accessories offering users active safety.

The PROBIX "plug and play" probes and adapters are recognized immediately as soon as they are connected. Active safety is built-in, notably in the form of safety information and recommendations concerning the accessory used.

The PROBIX system ensures that SCOPIX oscilloscopes can be implemented quickly and, above all, without any risk of error, an essential feature for instruments used for troubleshooting. For flawless compatibility, it is always possible to connect BNC and standard leads using the safety adapters supplied.

The sensors are powered and calibrated directly via the oscilloscope. Some accessories even include three control buttons directly accessible on the probe. The system manages the scaling and measurement units automatically.

Wide range of accessories

The multiple Probix accessories can be used for all your measurements. They include a voltage probe (HX0030A), adapters for BNC or banana connections and an industrial accessories kit (HX0071).

There are several Probix probes available for current measurements, depending on the application:

- > HX0034 clamp-on ammeter: 0.02 A to 60 ARMS
- > HX0073 MiniAmpFLEX probe: 1 A to 300 ARMS
- > HX0072 AmpFLEX probe: 5 A to 3,000 ARMS

The Probix accessories for temperature measurement with linearization:

- > HX0035 Probix/K thermocouple adapters for a measurement range from -40°C to $+1,250^{\circ}\text{C}$
- > HX0036 Probix/Pt100 adapter for measurements from -100°C to $+500^{\circ}\text{C}$



➔ HX0072



➔ HX0035



➔ HX0030A, 1/10 voltage probe



➔ HX0073

The more specific HX0061 in-vehicle charger can be used to power the Scopix from a vehicle battery, a particularly attractive feature for users on the move.

The HX0063 can be used to recharge the Scopix battery after removing it from the instrument.

These accessories allow users to operate Scopix oscilloscopes in total safety, whatever the context, measurement, etc.

Reader service no. 14

metrix

Tél. : 01 44 85 44 85
Info@chauvin-arnoux.fr
www.chauvin-arnoux.fr



Qualistar +

All the ergonomic features and functions of the new Qualistar+ C.A 8335 electrical network analyser, as well as its predecessors the Qualistar C.A 8332B & C.A 8334B.



MICAR 2

The MICAR 2 new-generation programmable digital transducers. Discover all the functions and the full offer in the sales literature.

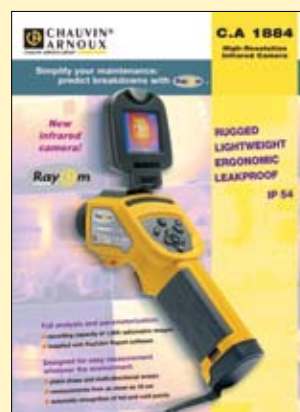
Reader service no. 4 (8 pages)

Reader service no. 12 (8 pages)



Export catalogue 2009

A selection of the top products from the Chauvin Arnoux and Metrix brands.



RayCAM C.A 1884

This document gives details of the specifications and multiple applications of the C.A 1884 thermographic camera.

Reader service no. 15 (42 pages)

Reader service no. 16 (4 pages)



C.A 6608 & C.A 6609

Discover the new phase rotation and motor testers designed for test and maintenance departments in industry.



Infrared thermometers

An overview of the technical specifications and advantages of Chauvin Arnoux's range of infrared thermometers.

Reader service no. 13 (2pages)

Reader service no. 10 (2pages)

METRIX Oscilloscopes, your New Reference

On site SCOPIX II



- 50 k memory depth
- Triggering on automatic measurement thresholds and recording of anomalies.

In the lab OX 6000 SD CARD



- Up to 2 GB of extra storage on removable SD Card



4 instruments in 1 : oscilloscope, multimeter, recorder & analyser
 • 2 or 4 channels from 40 to 200 MHz • 10 or 12-bit converter
 • 1 GS/s in real-time mode and 50 GS/s in ETS • "Windows-like" menus and graphical controls on touch screen • Ethernet communication with Web and FTP servers

For a free test, contact us without delay!

Tel.: 33 1 44 85 44 86 • info@metrix.fr • www.metrix.fr

metrix®

QUALI STAR+

Take *More* care
of your network quality

Everything you need for full analysis
Now even simpler

- ✦ more functions: 4U/4I, Inrush mode, 1,000 V
- ✦ more recordings & memory depth
- ✦ more alarms & transients
- ✦ more storage...



IEC 61010
1,000 V
CAT III

IEC 61010
600 V
CAT IV

Discover our range of ENERGY ANALYSERS at www.chauvin-arnoux.com/qualistar

Chauvin Arnoux - Test & Measurement • Tel: +33 1 44 85 44 38 • export@chauvin-arnoux.fr

CHAUVIN ARNOUX®
CHAUVIN ARNOUX GROUP