

THERMAL TREATMENT



Solutions for measuring and controlling
power and temperature

Quality and
Expertise
for your temperature processes



Pyrocontrole

Your partner for process measurement and control

CA Pyrocontrole, the French subsidiary of the Chauvin Arnoux Group, designs and manufactures industrial temperature measurement and control systems. A major partner of demanding industries such as the nuclear sector, petrochemicals, **aviation, metallurgy, agri-food** and **glassmaking**, CA Pyrocontrole continues to develop unique know-how backed by complete mastery of the qualification, production and temperature measurement processes. To meet the specific requirements linked to thermal treatment, CA Pyrocontrole designs and offers a wide range of temperature and power controllers, paperless recorders and temperature sensors enabling you to improve the quality of your products and your industrial processes. In the thermal treatment field, our measurement expertise helps to reduce your maintenance costs and cut your energy spending.



Made in France

The equipment is machined, assembled and checked in France by experienced, qualified teams, guaranteeing quality and reliability.

CA Pyrocontrole and its export department provide worldwide coverage, boosted by its membership of the Chauvin Arnoux Group with its ten international subsidiaries.

Our organization enables us to support you in all your projects, including those abroad.

Present worldwide

Thanks to its membership of the Chauvin Arnoux Group, Pyrocontrole is present worldwide through a network of ten subsidiaries and an Export Department which seeks out new markets.

Business offices and technical sites in Europe, Asia and the USA enable us to respond quickly all over the world, backed by a performance-focused strategy.



Tests and validations

- Calibration from -40 °C to +1550 °C in our Cofrac-accredited laboratory no. 2-1385
- PED, provision of design calculation notes

Non-Destructive Testing (NDT)

- Penetrant testing of welds
- Helium test
- Hydraulic tests
- X-ray examination of welds

Traceability of material and manufacturing method

- CCPU material certificate
- PMI testing on finished sensors, welds and flanges
- WPS (Welding Procedure Specifications), WPQR (Welding Procedure Qualification Record), WPQ (Welder Performance Qualification)



In-situ calibration without losing productivity, at intervals chosen by you

Depending on how demanding your needs are, Pyrocontrole proposes an in-situ verification methodology without halting production to ensure that your temperature measurements over time provide the required accuracy. Simple, reliable and quick to implement, our insertion pyrometer technology with in-situ calibration offers a host of advantages in terms of energy saving, productivity, quality and traceability.



Services

To help you with your measurement, control and acquisition applications, we propose the following services:

- Assistance in choosing equipment to suit your application
- Product configuration
- On-site commissioning
- Training

CUSTOMER REFERENCES:

SAFRAN
TOTAL
CRISTALLERIE DE SAINT-LOUIS

MICHELIN
ARKEMA
BOUTEILLERIE DE KINSHASA

AIRBUS INDUSTRIES
SOLVAY
SAINT-GOBAIN

To perform thermal treatment, you need to work on **3 ASPECTS**:

1. The temperature
2. The time
3. The environment

And control **3 PHASES**:

1. Temperature rise
2. Maintenance of the temperature
3. Cooling

Thermal treatment is used in industries such as foundries, iron and steel works and metallurgy for applications in the automotive and aerospace sectors, research, energy, cutlery, etc. Thermal treatment is also used in the glass and ceramics industries.



Temperature measurement

CA Pyrocontrole offers a choice of reliable, rugged temperature sensors equipped with specific protection, as required by your application. Metal, ceramic and composite protective sheaths make your temperature sensors highly resistant and extend their life span.

AMS 2750-qualified sensors for the aviation industry

CA Pyrocontrole supplies sensors compliant with the requirements of the AMS 2750 standard, with different diameters and lengths to handle the following applications:

- TUS (Temperature Uniformity Survey) sensors
- SAT (System Accuracy Test) sensors
- Process sensors
- Load sensors
- Standard reference sensors

Our Cofrac laboratory for calibration services

- Calibration from start to finish of the reel of sheathed cable used to manufacture the sensors
- Individual calibration of the sensors using 140 °C increments, up to 1550 °C if necessary
- Batch calibration to ensure the batch of sensors is homogeneous

FURNACES, BATHS AND OVENS

- Temperature measurement for:
- Molten baths and holding baths
 - Hardening furnaces
 - Annealing and stabilizing furnaces (with salt bath, with controlled atmosphere, under vacuum, ambient air and cryogenic cell)

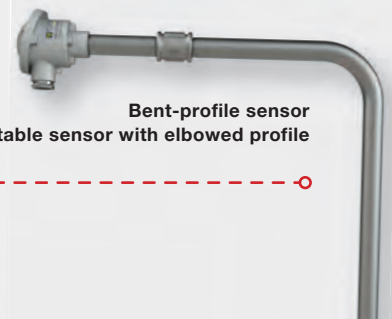
Bendable flexible sheathed thermocouple for perfect adaptation to the application



BLAST FURNACES

- Temperature measurement of:
- Furnace walls
 - Tuyere stock
 - Cowper outlets
 - Oil/water/air-cooling temperatures

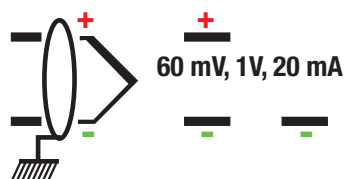
Bent-profile sensor Demountable sensor with elbowed profile



To ensure accurate temperature measurement and guarantee the treatment times, CA PYROCONTROLE proposes a wide range of STATOP single or bi-loop temperature controllers which are easy to integrate in your equipment.

Capable of simple or complex temperature control with several independent or cascaded heating zones, STATOP temperature controllers guarantee high-quality treatment of the load with the required control accuracy.

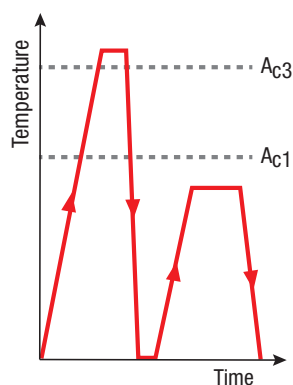
The maximum (safety) temperature must be monitored by a different system in the controller to ensure that the installation and the people around it remain safe.



Guaranteed of measurement accuracy

The STATOP 600 temperature controllers offer a linear TC-input **accuracy of 0.1 % of the value read**, a genuine guarantee for cutting-edge industries such as aviation, for which the AM S2750 standard requires 0.2% accuracy. **AMS 2750 compliance guarantee**

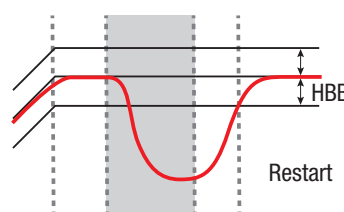
Guaranteed treatment time



Classic treatment:
hardening + tempering

STATOP controllers can operate in program generator mode up to **16 programs and 128 segments** (ramp + plateau) and can integrate up to **4 events per plateau**.

Various program start and end modes are available to suit the various applications.



The HBB (Hold Back Band) function can be used to block the time base of the program if the temperature is outside the tolerance band.

The time base is reactivated when the temperature returns to the tolerance band.

Step-by-step programming is simple with the PYRO_Tools configuration software and the program can be printed for insertion in the customer files.

The STATOP controllers include additional functions for optimizing process control and text messages for facilitating interaction with the operators (mathematical functions, logic functions, energy metering, synchronization of the programs, preventive maintenance, messages).

STATOP 600 SERIES temperature controllers

- Single-loop or bi-loop PID
- Simple and intuitive use and configuration
- Customizable alphanumeric messages
- Self-adjusting (PID) or self-adapting
- Programmer for up to 16 programs / 128 segments
- μ USB socket for software configuration
- Possible protection of the menus and parameters

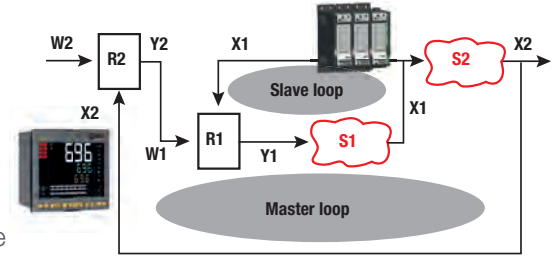


CA PYROCONTROLE proposes a complete range of THYRITOP thyristor power units for controlling and measuring the electric power transmitted to your 16 A - 2900 A furnaces.

Power control ($P = U \cdot I = U^2/R = R \cdot I^2$) helps you to improve the accuracy of your master temperature control by integrating a power slave loop (cascade control).

Power control may offer a control accuracy of less than 1%, depending on the settings used.

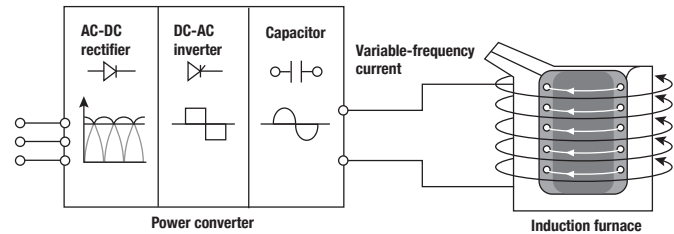
The THYRITOP models adapt to all types of electrical loads and can be used to manage the limitations due to the load, such as current and/or power limitation, making it possible to monitor the integrity of the load.



Resistive loads or transformer with resistors on the secondary

- **Low-temperature oven** (resistor with low temperature coefficient):
Iron-Nickel-Chrome / Iron-Chrome-Aluminium / Lanthanum chromite
- **High-temperature furnace** (resistor with high temperature coefficient):
Silicon carbide / Molybdenum disilicide (MO Si₂) / Graphite / Molybdenum / Tungsten / Tantalum

Inductive loads (Transformer + rectifier + inductor)



The "Power Manager" function allows multiplexing of the power demand between several THYRITOPs, thus reducing the energy bill.

Example: Heating by induction for surface hardening of gears
Photo Credit: EMAG eldec Hardening Systems



THYRITOP 600 power controllers



- Single-phase / three-phase with 2 or 3-phase control
- Load current from 40 A to 600 A
- Network voltage from 24 Vac to 690 Vac
- Power control ($U \cdot I$, U^2 , I^2 , U , I)
- External measurements (I , U) possible
- Current and/or power limitation
- Field bus
- Modbus RS485 communication



Advanced customization and parameterization with the **FREE PYROtools** software

A simple, clever tool for:

- Setting the parameters
- Viewing the data and analysing the parameters: measured values, setpoints, alarms, etc.
- Data recording and archiving

Download from www.pyrocontrole.com

- To provide customers with proof that the thermal treatment has taken place correctly, the main parameters monitored (temperature, pressure, gas flow rate, etc.) must be recorded by a data acquisition system.

In addition, to guarantee the quality of the treated product, these data must be encrypted to ensure that they cannot be modified subsequently. CA PYROCONTROLE has developed the PYROTRACER CA 6500 range of industrial data recorders.

The specific case of aviation

In the context of the AMS 2750 standard, it is necessary to check the temperature homogeneity of the furnaces (TUS: Temperature Uniformity Survey).

The data recorded after the TUS must be kept and presented to investigators if there is an inspection.

The frequency of TUS depends on the furnace class, while the number of measurement points depends on the volumes.

The procedures for checking the accuracy of the readings (SAT: System Accuracy Test) are also defined by AMS 2750.

CQI 9 is used for the automotive industry.



PYROTRACER 6500* SERIES recorder

- Touch video
- Formats: 144 x 144 and 288 x 288 (CA 6530)
- 3 to 72 channels (with 48 external channels)
- 100 ms minimum acquisition
- Batch management
- Ethernet as standard
- Mathematical functions / counters / timers
- Web Server
- Reinforced security function (management of users and passwords)

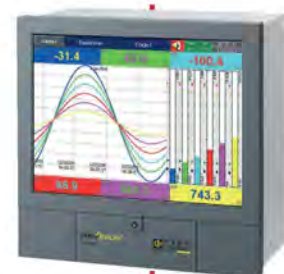
The OBSERVER software, delivered as standard, can be used to process archived data.

The PYRODACQ software can be used to view the data in real time on a remote PC.

* AMS 2750 certification pending

SERVICE

CA PYROCONTROLE can handle configuration of all the solutions proposed in accordance with your specifications. It can also handle commissioning on your site.



Discover the **PYROtracER** offer



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With its five companies - Chauvin Arnoux, Chauvin Arnoux Energy, CA Pyrocontrole, CA Indatech, CA Spectralys – and its service brand CA Manumasure, the Chauvin Arnoux Group is positioned among the European leaders in measurement, metrology, industrial thermography and quality control using spectroscopy and fluorescent processes, for the most demanding environments.

Visit **CA PYROCONTROLE** at www.pyrocontrole.com

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