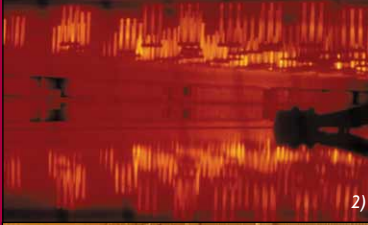


Glass and ceramic industries

TEMPERATURE MEASUREMENT AND CONTROL



- Specialized expertise in temperature measurement and power control recognized by the major players.
- Complete ranges of temperature sensors and power controllers specially designed for the stringent requirements of the glass and ceramic industries.



Contents

Temperature measurement

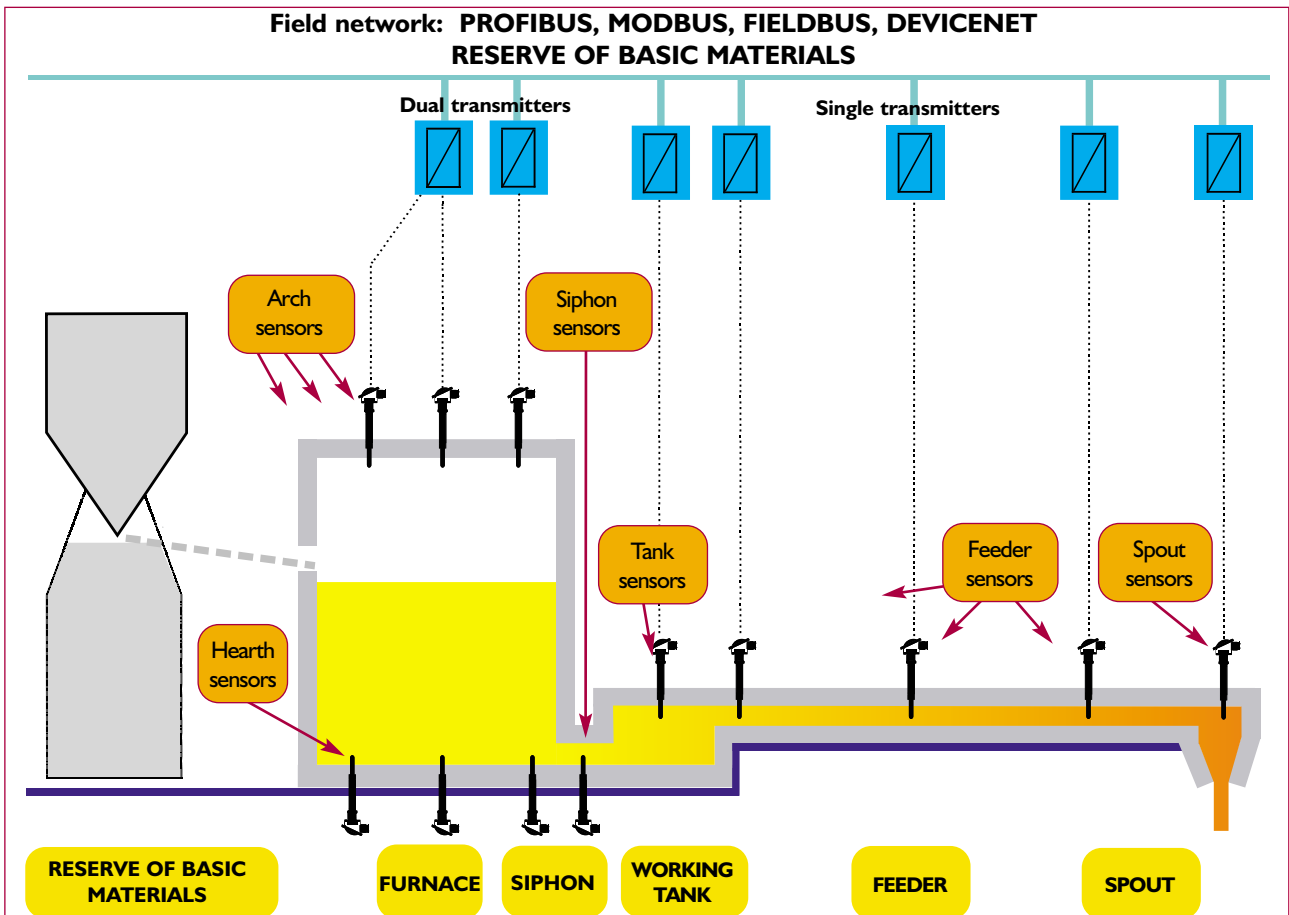
- Temperature sensors for:
 - furnaces, chambers, tanks, etc. _____ **3**
 - feeders, siphons, spouts, etc. _____ **4**
 - float baths, lehrs, etc. _____ **5**
- Fitting accessories _____ **5**
- Temperature transmitters _____ **5**
- Services _____ **5**

Power control

- Power controllers for melting furnaces, siphons and feeders _____ **6**
- Power controllers for float baths and feeders _____ **6**
- Static power relays for lehrs and processing furnaces _____ **7**
- Table for choosing Thyritop power controllers _____ **7**
- Services on site _____ **8**

Photo PILKINGTON
 Freyming-Merlebach Factory
 1) Loading of raw materials
 2) and on cover:
 molten glass on the surface of the tin bath
 3) Glass ribbon on float bath

Temperature measurement



The different types of temperature measurement probes used in glassmaking

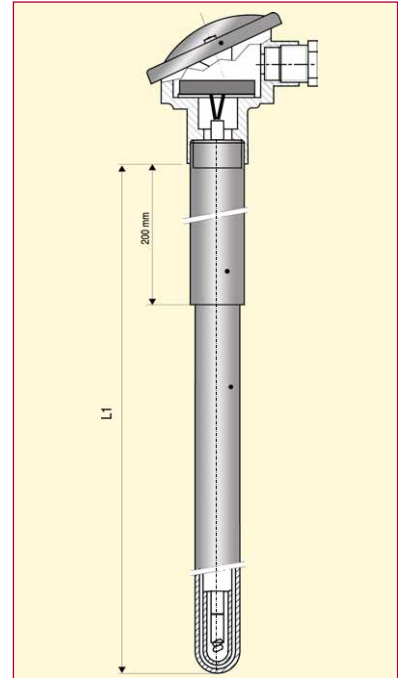
Temperature sensors

Sensors used in furnaces, chambers and working tanks,...

Arch probes



- **Typical characteristics of arch probes:**
- S, R or B beaded thermocouple
 - Single or double alumina protective sheath
 - Possibility of mounting flange
 - Extension (sealing sleeve) made of stainless steel or high-temperature steel
 - Electrical connection in DIN head (standard A form), with output via stuffing box or high-temperature linking lead wire

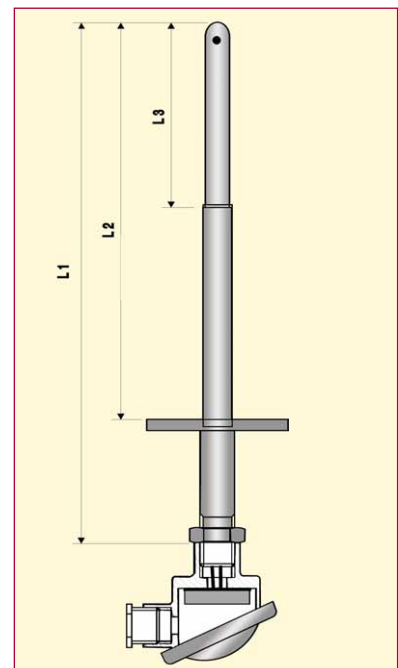


Hearth probes

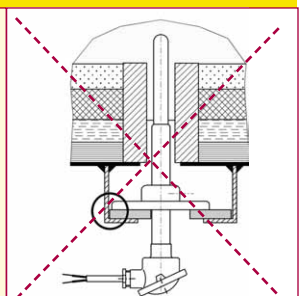
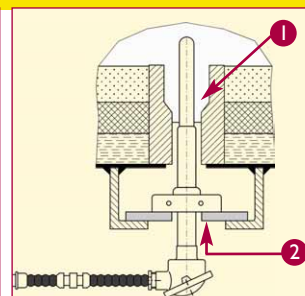
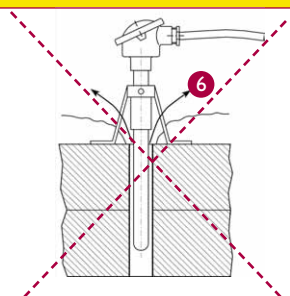
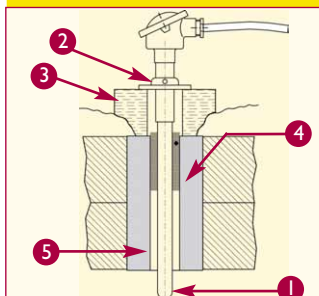


- **Typical characteristics of hearth immersion probes:**
- S, R or B beaded thermocouple
 - End-bushing of sheath made of platinum or 10, 15 or 20 % rhodium-platinum
 - With or without outer alumina sheath
 - Mounting flange
 - Extension (sealing sleeve) made of stainless steel or alumina
 - Electrical connection in DIN head (standard DAN form), with output via stuffing box or high-temperature linking lead wire

Non-immersion hearth probes have similar characteristics to the arch probes.



Installation recommendations



- 1 : max. immersion of 5 cm 2 : adjustment flange 3 : "closed" support" 1 : counter-bored support for better temperature measurement
 4 : packing to prevent chimney effect 5 : refractory support for maintaining the sensor 2 : insulator
 6 : chimney effect, hot gas cutting

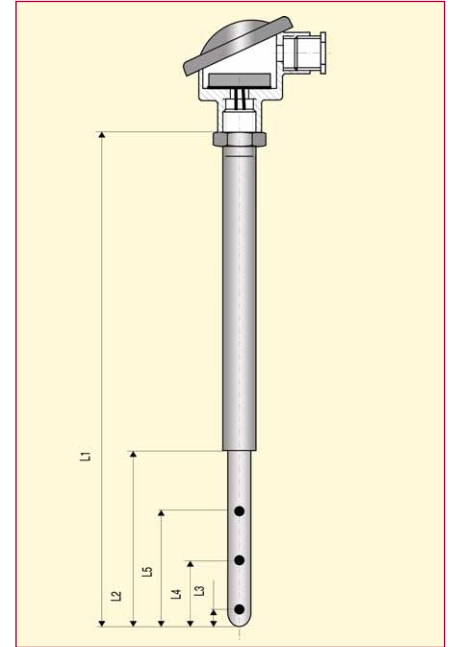
Sensors used for feeders, siphons, spouts, etc.

Probes for temperature measurement on 1, 2 or 3 levels



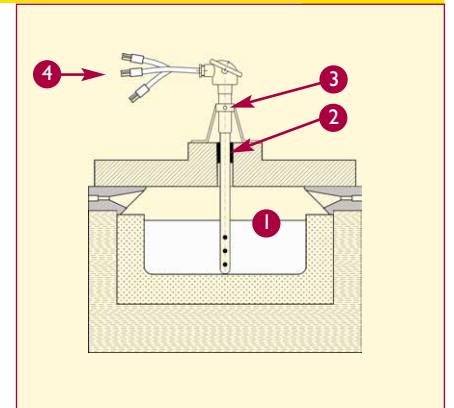
Typical characteristics of feeder probes

- S, R or B beaded thermocouple(s)
- End-bushing of sheath platinum or 10, 15 or 20 % rhodium-platinum
- With or without outer alumina sheath
- Mounting flange
- Extension (sealing sleeve) made of stainless steel or alumina
- Electrical connection in DIN head (standard: DAN form), with output via stuffing box or high-temperature linking lead wire



Installation recommendations

- ① : Level of molten glass
- ② : Packing to prevent chimney effect
- ③ : Feeder probe support with height adjustment and locking
- ④ : Connection via 3 connectors with compensated contacts

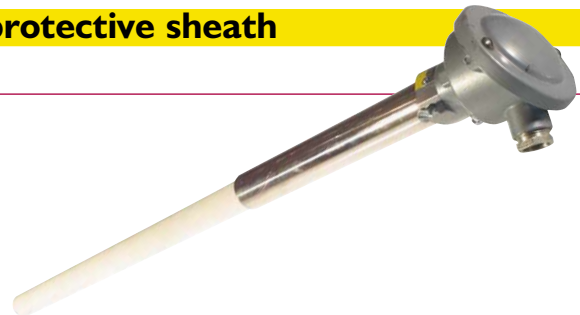


Sensors used for float baths, lehrs, etc.

Probes with alumina, ceramic or metal protective sheath

Typical characteristics:

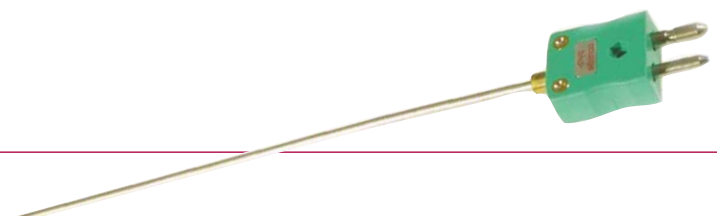
- K or S thermocouple
- Stainless-steel extension
- DAN-head connection with output via stuffing box or high-temperature linking lead wire



Sensors with Inconel protective sheath

Typical characteristics:

- K thermocouple
- Output by connector, lead wire or DIN head

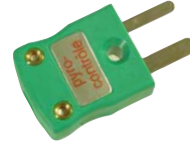


Fitting accessories

Connectors

Connectors with compensated contacts

- For K, S, R or B beaded thermocouples.
- Standard or miniature.
- Male or female.



Lead wires

Extension and compensating cables

- For K, S, R, B, etc., beaded thermocouples.
- Single- or multi-pair.
- Insulated with FEP or glass silk.
- With or without steel braid.



Probe mounting supports

- Supports made of refractory materials for fitting the probes in the furnaces
- Different diameters and lengths

Temperature transmitters

C.A 3100 digital transmitters

- Pour installation on DIN rail
- 4-wire assembly
- Universal input
- 2-wire RS485 digital output (MODBUS protocol)
- Programmable using digital display module or configuration software
- Two alarm relays
- 4...20 mA analogue output

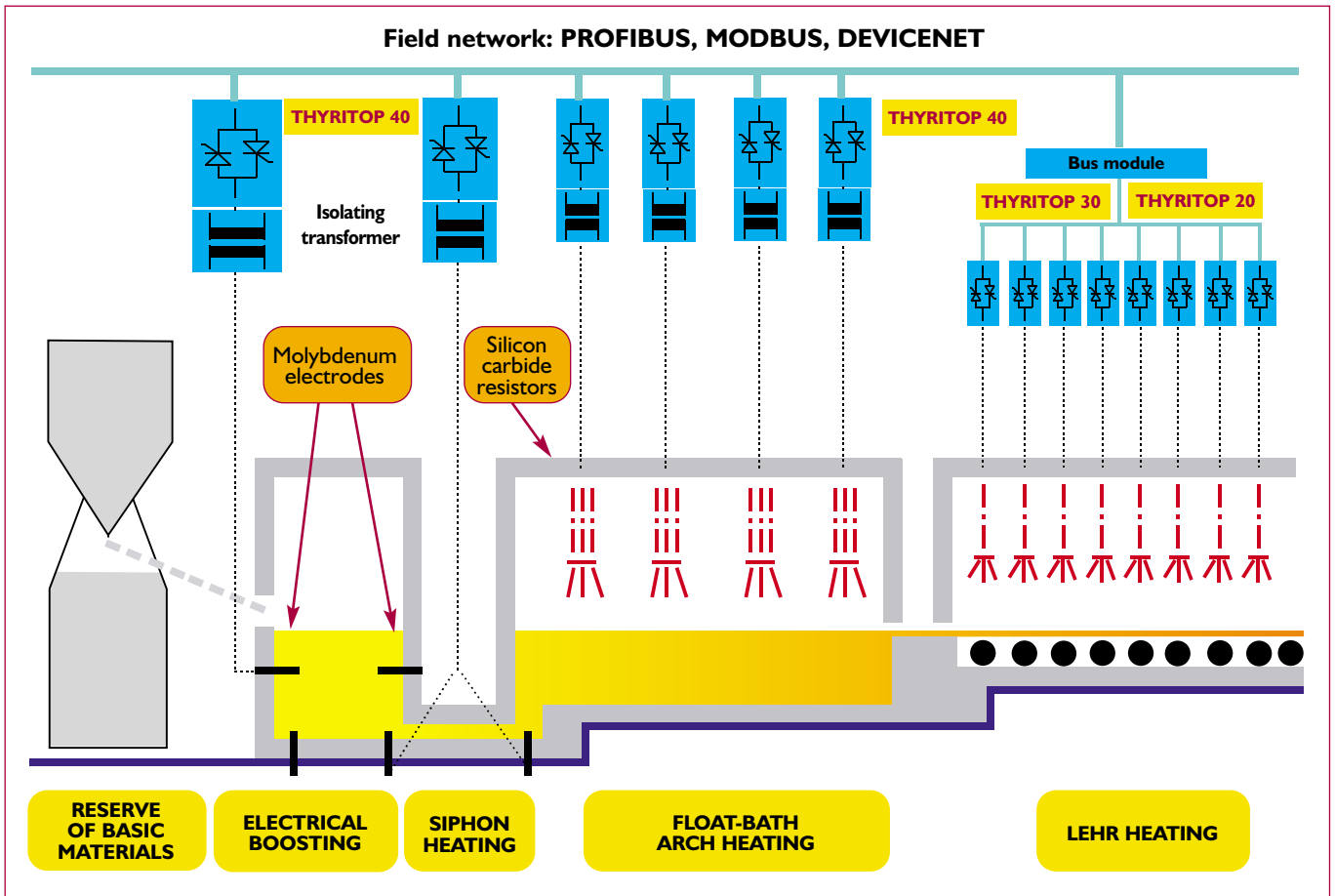


Services

- We handle recovery and refining of platinum waste
- Our COFRAC-accredited Metrological Department (accreditation no. 2-1385) performs calibration by comparison and provides certificates.)
 - Pt100 probe, measurement range -20 to $+450$ °C
 - Thermocouples, measurement range -20 to $+1,550$ °C
- Our calibration laboratory performs calibration by comparison, with attachment to the BNM through our standards (level 3) to fixed points of EIT-90, with provision of a calibration report.



Power control



Power controllers for melting furnaces, siphons and feeders

"Direct melting"



THYRITOP 40

"Direct melting", or heating in the core of the molten glass, is achieved by passing an electric current through it via molybdenum or platinum electrodes. This application requires:

- A high electrical intensity of several thousand amperes
- Dynamic control of the value of the DC component or control of the electrodes using an isolating transformer
- Phase angle or wave train operating modes

▶ The product solution: THYRITOP 40 power controllers

The THYRITOP 40 range contains two versions, for single-phase or three-phase networks. The models with a nominal voltage of 400, 500, or 690V, and a nominal intensity of between 1,000 et 2,900A are suitable for "direct melting" applications.

- Communication: Profibus or Modbus, equipped with a manual back-up set point in the event of a Bus error
- Integrated ultra-rapid fuse
- Integrated error Datalogger
- Wide range of limitation and control functions
- Fault indication
- Anti-flicker system for wave train control
- Alarm and measurement copy outputs

Power control for heating float baths and feeders

Heating by convection at very high temperature



THYRITOP 30

This type of very high-temperature heating uses complex resistors, such as silicon carbide, for example. This application requires:

- A lower intensity than “direct melting” (opposite)
- Control on primary winding of an isolating and step-down transformer
- A wave train function that does not generate any harmonics

▶ **The product solution: the THYRITOP 40 and THYRITOP 30 power controllers**

The THYRITOP 40 and THYRITOP 30 ranges each contain two versions, for single-phase or three-phase networks. The models with a nominal intensity of between 100 and 500 A fulfil the requirements for heating float baths and feeders.

- Communication: Profibus or Modbus, equipped with a manual back-up set point in the event of a Bus error
- Integrated ultra-rapid fuse
- Wide range of limitation and control functions
- Fault indication
- Anti-flicker for wave train control
- Alarm and measurement copy outputs

Power control for lehrs and processing furnaces (bushing, bulging, lamination, etc.)

Heating by convection at high temperature



THYRITOP 20

This type of heating is provided by standard resistors, e.g. Nickel-Chrome. This type of application requires:

- Low power levels
- High-speed execution
- A large number of heating zones

▶ **The product solution: THYRITOP 30 power controllers and THYRITOP 20 static power relays**

The THYRITOP 30 range is available in single- and three-phase versions, while the THYRITOP 20 operates in single-phase. The models with a nominal intensity of between 8 and 280 A are suitable for these low-power applications.

- Communication: Profibus or Modbus, equipped with a manual back-up set point in the event of a Bus error
- Very compact product for mounting on DIN rail
- Integrated ultra-rapid fuse
- Anti-flicker for wave train control
- Limitation and control functions
- Fault indication

Summary of the THYRITOP ranges: static relays and power controllers with digital communication

Range	Type	Network	Voltage	Intensity	Power
THYRITOP 20	Static relay	single phase	230 V, 400 V or 500 V	8 A to 280 A	up to 140 kW
THYRITOP 30	Power controller	single/three phase	230 V, 400 V or 500 V	8 A to 280 A	up to 242 kW
THYRITOP 40	Power controller	single/three phase	230 V, 400 V, 500 V or 690 V	37 A to 2,900 A	up to 2,900 kW

Services on site

- We propose an installation assistance service and specific training for your control application. This service, provided by our applications engineers, is formalized to match your requirements.
- We also propose assistance in starting up your furnace and training for your maintenance teams.

Chauvin Arnoux also includes:

TEMPERATURE MEASUREMENT & CONTROL Division
Export Sales Department

TEST & MEASUREMENT DIVISION

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

Hand-held testers and multimeters
Current measurement
Testing and electrical safety
Power, Energy, Disturbance
Environmental testing and measurement
Data Acquisition
Laboratory instrumentation and Teaching
RF and microwave measurement
LAN and telecommunications testing
Accessories

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

POWER MEASUREMENT & CONTROL DIVISION

Systems and equipment for the measurement, control, metering and monitoring of electrical networks

Measuring transformers and shunts
Transducers
Analogue and digital panel meters
Power monitors
Energy meters
Energy supervision and management systems
Network analysers and graphic recorders
Measuring relays
Industrial relays
Displacement sensors
Meteorological measurements

Tel: +33 1 47 46 78 85
Fax: +33 1 47 35 01 33
E-mail: export@enerdis.fr

SERVICE DIVISION

Repair, testing, calibration and maintenance of electronic instruments, on or off site

Testing and calibration
Contractual customer follow-up
Electromagnetic compatibility tests
Electrical safety tests
Pollution checking by testing atmospheric discharge
Biomedical apparatus maintenance
Maintenance and metrology training

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