

- Thermomètre Infrarouge + Couple K
- Infrared thermometer + K couple
- Infrarot-Thermometer mit K-Thermoelement
- Termometro a infrarossi + Termocoppia K
- Termómetro infrarrojo + Captador termo-par K


C.A 876



FRAN « AIS
ENGLISH
DEUTSCH
ITALIANO
ESPAÑOL

Notice de fonctionnement
User's manual
Bedienungsanleitung
Libretto d'istruzioni
Manual de Instrucciones

 **CHAUVIN
ARNOUX**

Significance of symbol 

Warning! Please refer to the User's Manual before using the instrument. In this User's Manual, the instructions preceded by the above symbol, should they not be carried out as shown, can result in a physical accident or damage the instrument and the installations.

Significance of the LASER symbol 

Laser radiation, do not look into the LASER beam.
LASER output < 0.5 mW
Class II LASER, as per IEC 60825 standard (Ed. 1991)

Thank you for purchasing this C.A 876 thermometer.
To get the best service from this instrument:

- **read** this user's manual carefully
- **respect** the safety precautions detailed

PRECAUTIONS FOR USE

- Do not place the thermometer on or close to objects with temperatures of > 65°C (150°F)
- If the thermometers is subjected to strong ambient temperature variations, wait 20 minutes after stabilization before resuming measurement.
- Do not expose the thermometer to strong electrical or magnetic fields since they may cause measurements errors (e.g. induction heating, arc welding kits, etc.).
- Do not direct the LASER beam towards your eyes.
- Comply with the environmental conditions (see β 5)
- Keep the lens perfectly clean.

WARRANTY

Our guarantee is applicable for twelve months after the date on which the equipment is made available (extract of our General Conditions of Sale, available on request).

<i>English</i>	13
<i>Deutsch</i>	24
<i>Italiano</i>	36
<i>Español</i>	48

CONTENTS

1.	PRESENTATION	15
2.	OPERATION - EMISSIVITY	15
3.	DESCRIPTION	16
4.	USE	17
5.	SPECIFICATIONS	20
6.	SENSORS	21
7.	MAINTENANCE	22
8.	TO ORDER	23
9.	EMISSIVITY TABLE.....	24
10.	FRONT PANEL.....	24

1. PRESENTATION

The **C.A 876** is a temperature measurement instrument, portable, easy to use, with an interchangeable K-type thermocouple sensor also enabling remote temperature measurement using infrared technology.

It uses an infrared sensor with an emissivity coefficient that can be parameterised by the user according to the material. To remotely measure the temperature of a body, it suffices to point using the laser pointer to the surface of the body to be measured.

The K-type thermocouple sensor may also be used in the other cases.

The thermometer is fitted with a programmable alarm, high or low, and a MIN/MAX function. It is supplied as standard with an anti-shock sheath and a type SK6 flexible thermocouple sensor (from -50°C to $+285^{\circ}\text{C}$). The CA876 features a backlit LCD screen, a HOLD function and a timed Auto Power Off system.

2. OPERATION - EMISSIVITY

All objects whose temperature is higher than absolute zero ($-273,15\text{ K}$) emit infrared energy. This energy radiates in all directions at the speed of light.








When you point the probe at an object, the probe's lens senses this energy and focuses it onto an infrared detector constituted by a stack of thermocouples. This detector transmits a voltage signal proportional to the amount of energy received, which means that it is proportional to the object's temperature.

Certain objects emit infrared energy but also reflect it. Unlike matt surfaces, shiny or highly-polished surfaces tend to reflect energy. This reflection is represented by a factor called emissivity which may vary from 0.1 for a highly reflective object to 1 for a black object.

In the case of thermometer CA876, we recommend the use of an emissivity coefficient of 0.95, current value that covers about 90% of applications. In other cases, adjust the emissivity to an adequate value according to the target material (See β 9 - Emissivity Table)

3. DESCRIPTION

See β 10 Front Panel (at the end of the operating manual)

- ① **Infrared measurement lens.**
 - ② **Laser pointer orifice.**
 - ③ K-type thermocouple sensor base.
 - ④ Backlit liquid crystal display :
 - Main display : numerical temperature value (\pm) 3 Ω digits or OL error code
 - Symbols :
 - K** K-type thermocouple sensor.
 -  Battery discharged.
 -  Last value measured.
 -  Unit of temperature displayed.
 - MAX** Maximum value of temperature measured.
 - MIN** Minimum value of temperature measured.
 - SET** Parameterising mode engaged (for adjustment of E, ALM Hi, ALM Lo)
 - ALM Hi** Temperature high alarm.
 - ALM Lo** Temperature low alarm.
 - ϵ Emissivity coefficient.
 - ⑤ 2-function push-button (*) :
 -  Backlit ON/OFF.
 -  Up scrolling command for emissivity adjustment or high and low temperature alarms ALM Hi - ALM Lo (command active if the MODE button was previously activated)
 - ⑥ 2-function push-button (*) :
 -  Laser pointer ON/OFF.
 -  Down scrolling command for emissivity adjustment or high and low temperature alarms ALM Hi - ALM Lo (command active if the MODE button was previously activated)
 - ⑦ **MODE** push-button (*) :
 - Successive operation push-button for selection of the specific function in the form of a pull-down menu in the following order :
- ϵ --> ϵ (SET) --> ALM Hi (SET) --> ALM Lo (SET) --> MAX --> MIN --> K --> ϵ

(*) For delayed operating mode, see β 4.2.



4. USE

4.1 Recommendations for ir measurements

- If the measured surface target diameter is less than 21/50mm \bar{y} , then place the sensor as close as possible to the target surface (<20i/50cm away). See Field of View (FOV) information under Specifications.
- If the target surface is covered with frost or any matter, clean it before taking a measurement.
- If the target surface is highly reflective put some matte tape, or matte paint, over it before measuring.
- If the Thermometer is erratic, or seems not to be measuring properly, make sure that the sensor is clean and not covered by condensation.

4.2 Operating method

4.2.1 Infrared operation

1. Press and hold the yellow measurement button - MEAS. The thermometer will display SET briefly on the main display while it auto-checks.
2. Aim the Thermometer towards the target.
3. If using the aiming laser, remove the laser cover, and press the  Button to turn the laser ON and OFF. The laser will go on when MEAS is pressed.
4. Infrared thermometer sensors need a certain time to stabilize to ambient temperature. Remember to let the IR meter reach ambient if brought in from different temperature environment.
5. Press the  button to turn ON the backlit.
6. If the measured temperature is outside the measurement range, OL will be displayed.
7. The thermometer will continue measuring as long as the MEAS button is pressed. When the button is released the measurement will be held in the display for 15-20 seconds. HOLD is displayed in the lower left-hand corner of the display.
8. The IR thermometer will shut OFF automatically after 15-20 seconds.


4.2.2 K Thermocouple operation


1. Connect the K thermocouple to the instrument input.
2. Press MEAS to turn the thermometer ON
3. Press the MODE button (six times) to enter the thermocouple mode. K will be displayed in lower right hand corner of the display.
4. Put the thermocouple near or on the sample tested.
5. Press MEAS button to measure. Thermocouples need a certain time to respond. Take the reading when the measurement has stabilized. The reading is displayed in the smaller lower display in front of the K symbol. The main larger display is the IR temperature reading.
6. The thermometer will continue measuring as long as the MEAS button is pressed. When the button is released, the measurement will be held in the display for 15-20 seconds.
7. When finished, remove the thermocouple from the sample, and unplug the thermocouple from the meter. The thermometer will shut OFF automatically after 15-20 seconds.

Note: IR measurements are active at the same time as the K t/c measurements.

4.2.3 Setting the temperature scale : °C or °F

The temperature scale is displayed on the upper part of the display. To select the temperature scale:

°F: When the thermometer is OFF, hold down  and press MEAS. °F will be displayed.

°C: When the thermometer is OFF, hold down  and press MEAS. °C will be displayed.

The selected temperature scale will remain until changed by the user.

4.2.4 Continuous measurement

The user may want to leave the thermometer ON to measure over an extended time period and not keep pressing the MEAS button.

To enter the continuous mode:

- When the thermometer is OFF, hold down the MODE button, and then press MEAS. This will set the thermometer in the continuous mode. HOLD will not be displayed in the continuous mode and the laser sighting will not run.
- When finished, press MEAS once. HOLD will be displayed and the thermometer will shut down in 15-20 seconds. Alternatively, press MEAS again to re-enter the continuous mode.

4.2.5 Operating method of the push buttons

● Centre (Yellow) Measurement Button - MEAS:

The centre button turns the thermometer ON and measures. The thermometer measures temperature when this button is pressed and held down.

When the button is released, it will automatically HOLD the last reading on the display for a few seconds before the meter automatically shuts OFF. iHOLDi is displayed.

The thermometer will shut off in approx. 15-20 seconds. At power-up the thermometer returns to the last settings used.

● Mode Button:



Pressing this button makes the thermometer enter and advance through several functions including some programmable functions.



The MODE button is used to select a specific function (i.e. MIN, MAX) or to adjust an Alarm or the emissivity.



To enter the mode program, press MODE once. SET is displayed in the lower right hand corner.

When pressed consecutively, it will scroll through the following settings: ϵ --> ϵ (Set) --> ALM Hi (Set) --> ALM Lo (Set) --> MAX --> MIN --> K --> ϵ

SET is displayed in the lower right hand corner of the display when a selected function is programmable (ϵ , ALM Hi, ALM Lo).

ϵ : Emissivity may be adjusted with the  and  buttons to match a particular target. We recommend leaving it at 0.95 for general use.

ALM Hi: The Hi alarm set point is adjusted using the  and  buttons. When this set point is reached the beeper will sound and ALM HI will be displayed.

ALM Lo: The Lo alarm set point is adjusted using the  and  buttons. When this set point is reached the beeper will sound and ALM Lo will be displayed.


MAX: The Max value measured will be displayed during measurement. While in the MAX mode and when measuring, the MODE button will toggle the measurement between MAX \bar{n} MIN \bar{n} Present reading \bar{n} MAX.


MIN: The Min value measured will be displayed during measurement. While in the MIN mode and when measuring, the MODE button will toggle the measurement between MIN \bar{n} Present reading \bar{n} MAX \bar{n} MIN.


K: The lower display will indicate the reading from the K type thermocouple.

Note: If the thermometer is OFF, pressing the MEAS button for more than 4 seconds will set the thermometer in the MIN/MAX record mode when powered up.

●  **Back-Light and ▲ Increase Button:**


Press the button  to turn the Back-Light ON.

Press the button  again to turn the Back-Light OFF.

In ξ , ALM Hi, ALM Lo, this button  increases the numerical value displayed in the lower smaller display are. If held down, the value change will increase in speed.

●  **Laser and ▼ Decrease Button:**

̄ Remove the laser cover before use.

̄ Pressing this button  makes the Laser toggle between ON and OFF. is displayed in the upper left hand corner when the laser is available.

̄ The laser goes on only during the measurement; when MEAS is pressed. blinks when the laser is ON.

̄ In ξ , ALM HI, ALM Lo, this button  decreases the numerical value displayed in the lower smaller display are. If held down, the value change will increase in speed.

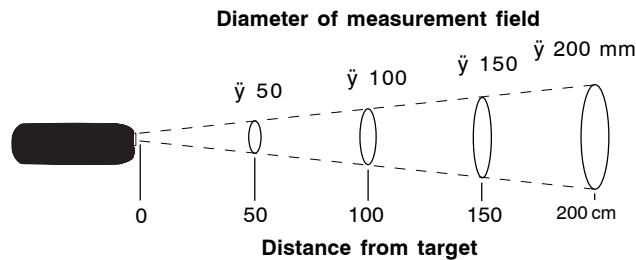
Note: There is no ON/OFF button. The thermometer turns ON when the MEAS button is pressed, and will automatically shut OFF after 15-20 seconds.

4.3 Distance from target / measurement field diameter ratio

This ratio, also called the field of vision, indicates the diameter of the measurement field at a given distance from the target, $D/\bar{y} = 10/1$ (see figure below).

The minimum measurement distance is 150mm - this gives a measurement spot diameter of 15mm.

In the case of small measurement points, it is important to bring the probe sufficiently close to the target to avoid including other points in the measurement field.



5. SPECIFICATIONS

5.1 Electrical


Infrared

- **Temperature Scale:** Celsius (°C) or Fahrenheit (°F) user-selectable
- **Temperature Range:** -4°F to 1022°F (-20°C to 550°C)
- **Display Resolution:** 0.1°C/°F or 1°C/°F
- **Accuracy:** ±2% of reading or ±6°F/3°C, whichever is greater at 64.4 to 82.4°F (at 18 to 28°C) ambient operating temperature.
- **Temperature Coefficient:** Changes in accuracy operating temperature above 82.4°F/28°C or below 64.4°F/18°C: ±0.2% of reading or ±0.36°C/0.2°C, whichever is greater.
- **Response Time:** 1 second
- **Laser:** Red, <1mW (670nm) Class II, 2 - 50ft Range.
- **Spectral Response:** 6 to 14μm nominal
- **Emissivity:** Pre-set at 0.95, user selectable from 0.10 to 1.00
- **Detection Element:** Thermopile
- **Optical Lens:** Fresnel Lens
- **Field of View (FOV) ratio:** 10:1 (Distance: Diameter)

K Type

- **Temperature Scale:** Celsius (°C) or Fahrenheit (°F) - User-selectable
- **Temperature range of the instrument in function of the K type thermocouple chosen (see § 6) :** -40 to +1350°C (-40 to 2000°F) -40 to 200°C (-40 to 392°F) with the K type thermocouple supplied as standard.
- **Resolution:** 0.1°C/°F or 1°C/°F
- **Accuracy (meter):** -40°C to 1350°C: ±(0.1% rdg ± 1°C) on -40°F to 2000°F: ±(0.1% rdg ± 2°F) (Accuracy is specified for operating temperatures over the range of 18°C to 28°C, for 1 year, excluding the sensor)
- **Temperature Coefficient:** 0.1 times the applicable accuracy specification per °C from 0°C to 18°C and 28°C to 50°C
- **Input Protection:** 24VDC or 24Vrms maximum input voltage on any combination of inputs.
- **Sample Rate:** 2.5 times per second.
- **Input Connector:** Standard miniature thermocouple connectors (flat blades spaced 7.9mm, center to center).
- **Temperature Response:** Temperature indication follows Reference Temperature/Voltage Tables N.I.S.T. Monograph 175 Revised to ITS -90 for K-type thermocouples.

5.2 General specifications

- **Display:** 3Ω digit liquid crystal display (LCD) with maximum reading of 1999
- **Over-Range:** (OL) or (-OL) is displayed
- **Low battery indication:**  is displayed when the battery voltage drops below the operating level
- **Sample rate:** 2.5 times per second, nominal.
- **Environment:**
 - **Operating:** 32°F to 122°F (0°C to 50°C) at < 80% relative humidity
 - **Storage:** -4°F to 140°F (-20°C to 60°C), 0 to 80% RH with battery removed from meter
- **Auto power OFF:** 15 seconds approx.
- **Altitude:** 2000m max.
- **Input Protection:** 24VDC or 24rms maximum input voltage on any combination of inputs.

- **Battery:** Standard 9V battery (NEDA 1604, IEC 6F22 006P, or equivalent)
- **Battery Life:** 100 hours (continuity) typical with carbon-zinc battery (Back-Light not illuminated)
- **Dimensions:** 173mm(H) x 60.5mm(W) x 38mm(D)
- **Weight:** 183g including batteries
- **Safety:** EN61010-1 (1995-A2), Protection Class III
Overvoltage Category (CAT III, 24V), Pollution Degree 2, Indoor Use

6. SENSORS

The following K-type thermocouple sensors can be used with thermometers C.A 861 and C.A 863.

Sensors with grips and extendible spiral leads

Model	Reference	Measurement range	Response time	Dimensions (mm)
SK 11 Needle	P03.6529.17	-50...+600°C	12 s	∅ 3 - L = 130
For penetration of viscous thick substances.				
SK 13	P03.6529.18	-50...+1100°C	12 s	∅ 3 - L = 300
General purpose All uses				
SK 14	P03.6529.19	-50...+450°C	8 s	∅ 6 - L = 130
Curved surface For temperature measurement of poorly accessible surfaces. End ∅ 15 x 30 mm				
SK 15 Surface	P03.6529.20	-50...+900°C	2.3 s	∅ 8 - L = 130
8 mm ∅ spring-loaded end, ensuring optimum contact even when the sensor is not perpendicular to the surface.				
SK 17 Air	P03.6529.21	-50...+600°C	2.6 s	∅ 6 - L = 130
For measurement of ambient air temperature. Thermocouple is protected by a 8.5 mm ∅ metal shield				
PK 9	P03.6529.15	-20...+250°C	5 s	∅ 1 - L = 55
Retractable needle Designed for automobile pneumatics. Penetrates by up to 15 mm.				

Sensors without grips *

SK 1 Needle	P03.6529.01	-50...+800°C	1 s	∅ 3 - L = 150
For penetration of viscous, thick substances.				
SK 2	P03.6529.02	-50...+1000°C	2 s	∅ 2 - L = 1000
Bendable Bendable as required for application.				
SK 3	P03.6529.03	-50...+1000°C	6 s	∅ 4 - L = 500
Semi-rigid Slightly bendable.				
SK 4 Surface	P03.6529.04	0...+250°C	1 s	∅ 5 - L = 150
Suited to measurement on small surface areas.				
SK 5 Surface	P03.6529.05	-50...+500°C	1 s	∅ 5 - L = 150
8 mm ∅ spring loaded end, ensuring optimum contact even when the sensor is not perpendicular to the surface.				

* to be used between 0 and 50°C

SK 6 Flexible	P03.6529.06	-50...+285°C	1s/contact 3 s in	γ 1 - L = 1000 ambient air
Recommended for difficult-to-get-at measurement points				
SK 7 Air	P03.6529.07	-50...+250°C	5 s	γ 5 - L = 150
For ambient air temperature measurement. Thermocouple protected by 8.5 mm γ shield				
SK 8 For pipes Self-gripping	P03.6529.08	-50...+140°C	10 s on 12 mm γ stainless pipe	10 ≤ γ ≤ 90
The thermocouple is located on a copper sheet at the end of a double-sided velcro tape that wraps around the pipe, ensuring good contact.				
SK 19 Magnetic	P03.6529.22	-50...+200°C	7 s	γ 14 - L = 1000
Automatic mounting on metal surfaces thanks to magnet				

Extension leads with grips

Model	Reference	Diameter	Length
CK 1	P03.6529.09*	4 mm	1 m
Extension lead Ended with male/female connectors			
CK 2	P03.6529.10*	4 mm	1 m
Extension lead Ended with male connector / 2 bare wires			
CK 3	P03.6529.13*	4 mm	1 m
Extension lead Ended by DIN 5-pin socket / female connector			
CK 4	P03.6529.14*	4 mm	1 m
Extension lead Ended by 2 banana plugs/ female connector			
PP 1	P03.6527.12*	-	11 cm
Hand grip Compatible with extension leads CK 1 to CK 4			

* Extension leads can withstand temperatures : -40...+100 °C

7. MAINTENANCE

⚠ Use only factory specified spare parts for maintenance. The manufacturer will not be held responsible for any accident, incident, or malfunction following a repair done other than by its Service Center or by an approved repair center.

7.1 Battery replacement

A standard 9-volt battery supplies power. (NEDA 1604, IEC 6F22).
The appears on the LCD display when replacement is needed.

To replace the battery:

- Turn the Thermometer OFF

- Remove the yellow holster.
- Remove the screw from the back of the meter and lift off the battery cover.
- Replace the battery, rear cover and yellow holster.

7.2 Cleaning

- Periodically wipe the case with a damp cloth and very mild soap, if needed.
- ⚠ ● Do not use any abrasives or solvents.
- Do not let any liquid enter the case or sensor area.

7.3 Metrological checks

- ⚠ **It is essential that all measuring instruments are regularly calibrated.** For checking and calibration of your instrument, please contact our accredited laboratories (list on request) or the Chauvin-Arnoux subsidiary or Agent in your country.

7.4 Repairs

Repairs under or out of guarantee : please return the product to your distributor.

8. TO ORDER

C.A 876.....P01.6514.03Z
Comes with a shoulder bag, 9 V battery, a K type thermocouple and these operating instructions.

Spare parts:

Battery.....P01.1007.32
 SK6 flexible sensor.....P03.6529.06

Accessories:

Refer to B6. Sensors

9. EMISSIVITY TABLE

See p. 59 Emissivity table.

10. FRONT PANEL

