CHAUVIN ARNOUX

CA 1550

Logger micromanometer

For pressure-free measurement!

- Differential air pressure, speed and flow rate measurement
- Manual or automatic temperature compensation
- Compensation of atmospheric pressure
- MAP mode
- Min, Max, Average & Hold modes
- Recording of snapshots or continuous recording of up to 1 million points
- Magnetized product compatible with the Multifix accessory!

Data Logger Transfer
Automatic report generation

Android application
CA Environmental Loggers

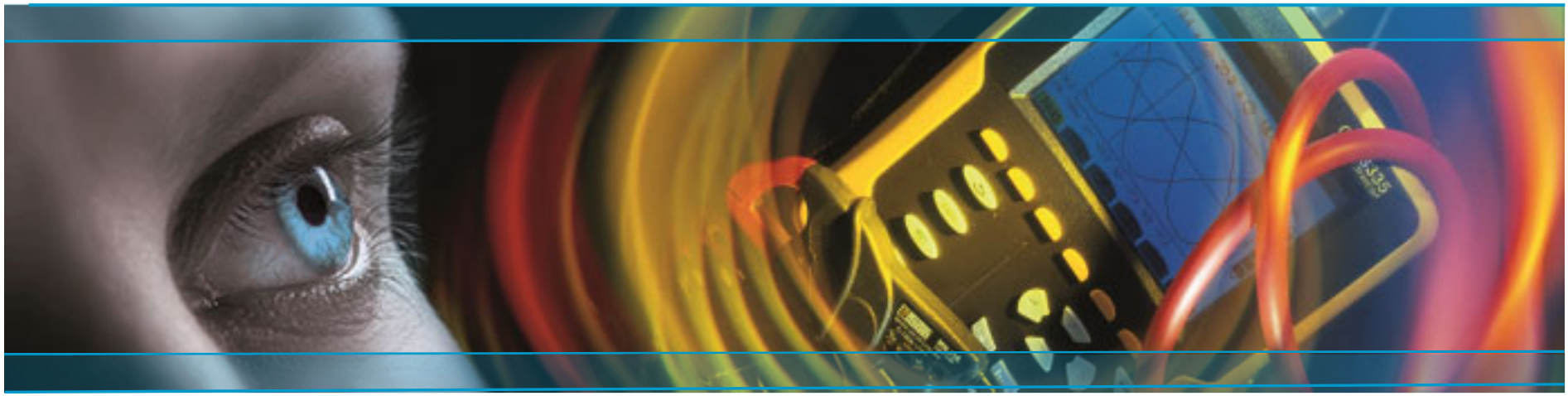
USB Bluetooth®

Measure up

CHAUVIN ARNOUX

Test & Measurement Instruments

Portable and laboratory measurement



Sales Presentation - CA 1550 micromanometer

04/2021

CHAUVIN ARNOUX GROUP

Measure up

Contents

- ✓ Overview of pressure measurement
  Definitions / Air speed measurement with Pitot tube / Case Study
- ✓ Target markets and target users
- ✓ Presentation of the CA 1550
  Strengths / Operation / State at delivery / Specifications
- ✓ Communication

Overview of pressure measurement

Definition

Pressure is defined as a force in relation to the surface on which it is applied.

$$P = F/S$$

Where:
P = pressure in Pa
F = force, in Newton
S = surface area, in m^2

Characteristic units

There are several units used for pressure, with the choice depending on the field of use or the geographical area

S.I. unit

The pascal (symbol Pa) is the unit in the SI international system. A pressure of 1 pascal corresponds to a force of 1 newton exerted on an area of 1 m^2

Other units

The bar: 1 bar = 100,000 Pa

The atmosphère (symbole atm) : 1 atm = 101,325 Pa

The millimetre of mercury (symbol mmHg): 1 mmHg = 1 torr = 133.3 Pa.

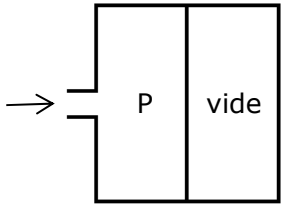
The millimetre of water (mmH2O) or the centimetre of water (cmH2O): 1 cmH2O = 98.0638 Pa.

The psi, from the English 'pounds per square inch' is a very widely-used Anglo-Saxon unit:
1 psi = 6,894 Pa.

Overview of pressure measurement

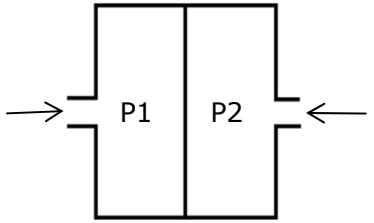
✓ 3 ways of expressing pressure, depending on the reference system chosen:

Absolute → P



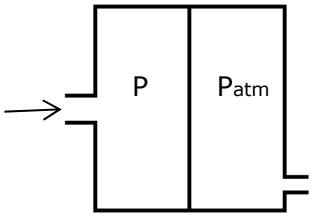
The absolute pressure is the pressure in relation to the zero pressure of a vacuum.
Air pressure measurement is an absolute pressure measurement. It may be used for weather forecasting or altitude measurements.

Differential → P1 – P2



The differential pressure is the difference between two pressures.
This is the pressure measured directly by a manual manometer

Relative → P – P_{atm}



The relative pressure is the pressure measured in relation to the ambient pressure, which is often atmospheric pressure.

Overview of pressure measurement

In a fluid in motion

Although the pressure is uniform within a volume of gas at rest, this is not the case for a fluid in motion.

Static pressure → P_s

The static pressure is the pressure exerted by the air on elements perpendicular to the direction of flow.

Dynamic pressure → $P_d = \frac{1}{2} \rho V^2$

In a duct, this is the kinetic energy of the circulating air.
This dynamic pressure depends directly on the air speed (V) and the density (and therefore the temperature) of the fluid.

Total pressure → $P_t = P_s + \frac{1}{2} \rho V^2$

This is the sum of the static pressure and the dynamic pressure.

Overview of pressure measurement

Air speed measurement with Pitot tube

The Pitot tube is inserted perpendicularly in the duct via points determined in advance. The antenna, composed of an ellipsoid nose, is maintained parallel and facing the flow to be measured.
The total pressure (+) measured by the nose is linked to the + sign on the manometer.
The static pressure (-) measured via the little holes on the outside of the antenna is linked to the - sign on the manometer.
The instrument also indicates the dynamic pressure.
The dynamic pressure corresponds to the difference between the total pressure and the static pressure:

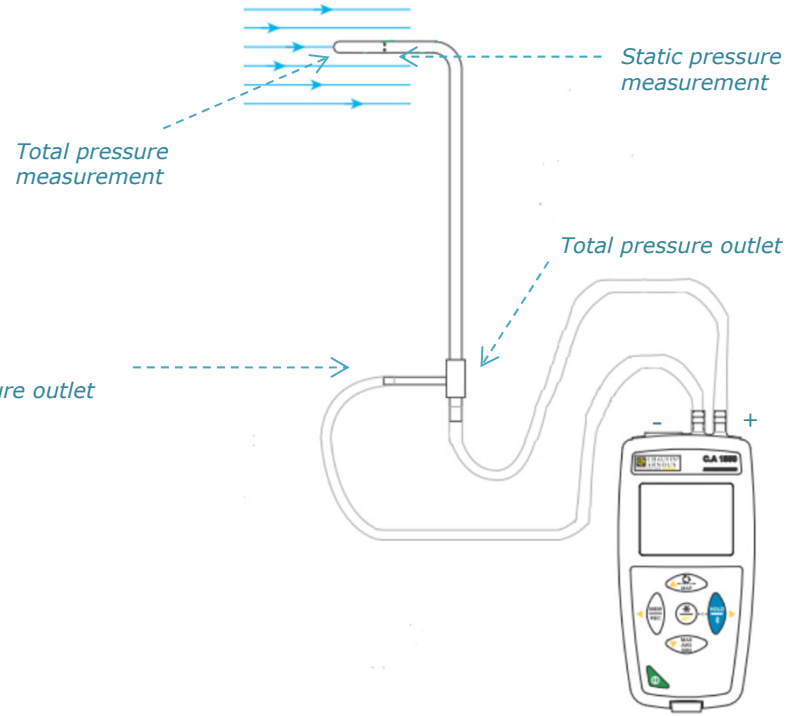
$$\mathbf{Pd = Pt - Ps = \Delta P =} \frac{1}{2} \rho V^2$$

It is therefore possible to deduce: $V = \sqrt{\frac{2.\Delta P}{\rho}}$

Taking into account the Pitot tube's coefficient:

$$V = = \alpha \sqrt{\frac{2.\Delta P}{\rho}}$$

α : Pitot tube coefficient (close to 1)
ρ : Air density
V : Air speed



Measure up

Overview of pressure measurement

Air speed measurement with Pitot tube (continued)

$$V = \alpha \sqrt{\frac{2.\Delta P}{\rho}}$$

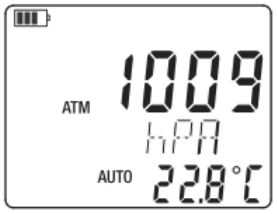
α : Pitot tube coefficient (close to 1)
ρ : Density of the air
V : Air speed

Compensations:

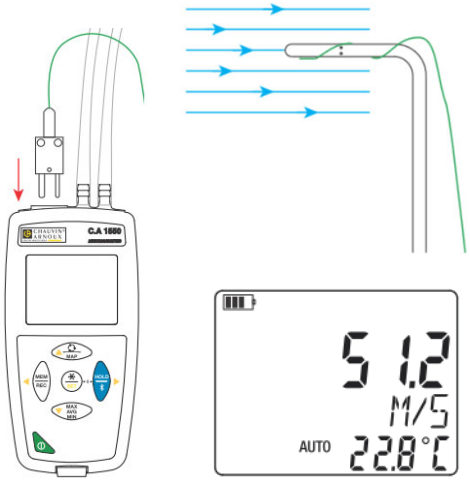
For greater accuracy, it is necessary to find out the density of the circulating air. To do so, you have to consider the real air temperature and the operating pressure.

1- The CA 1550 allows manual or automatic temperature compensation: by pairing a thermocouple with the Pitot tube.

2- The CA 1550 also automatically compensates the atmospheric pressure



Example: display of atmospheric pressure



Automatic temperature measurement by thermocouple

Overview of pressure measurement

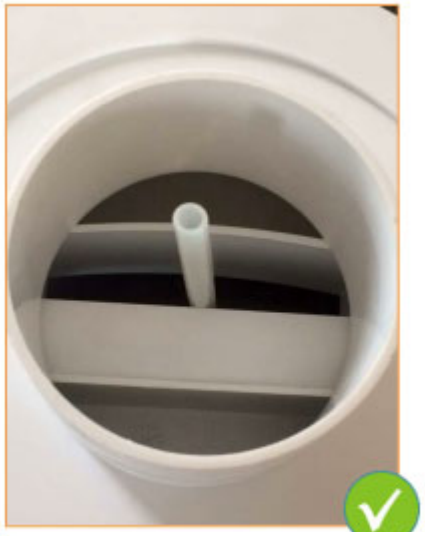
✓ Case study: use of a micromanometer in HVAC

Pressure measurement on air extraction vents

Goal: to make sure that the pressure behind each vent corresponds to the normal operating pressure range of the flow-modulating vents as indicated by the manufacturer.
For example, for humidity-sensitive systems.

Precautions: close the windows and internal and external doors, making sure that they remain closed for each measurement.
The pressure tube must protrude behind the adjustment system).

1. View of tube on front of vent



2. View of tube at rear of vent

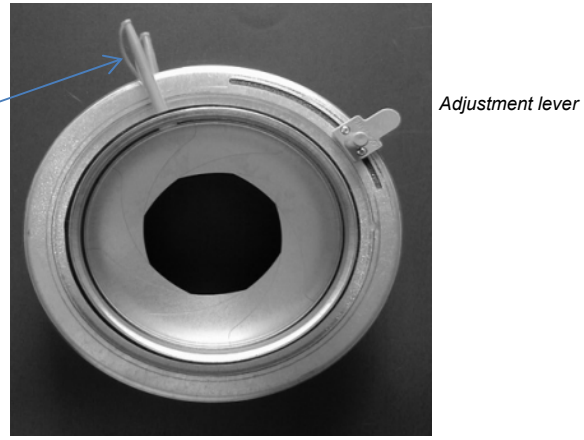
Overview of pressure measurement

✓ Case study: use of a micromanometer in HVAC

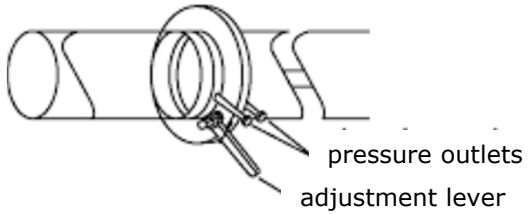
Measurement on orifice plate
E.g. on iris diaphragms for flow measurement in ducts

Iris diaphragms are used in ducts for simple adjustment of air flows. In identical pressure conditions, an air flow is guaranteed by reducing the orifice of the diaphragm.
This system has two built-in pressure measurement outlets which can be used to measure air flow by means of the pressure difference.

Goal: Verification / adjustment of the flow rate by means of the built-in pressure measurement outlets. The relation between flow rate and the pressure difference measiured is indicated on the manufacturers' calculation charts.



Example of diaphragm front view

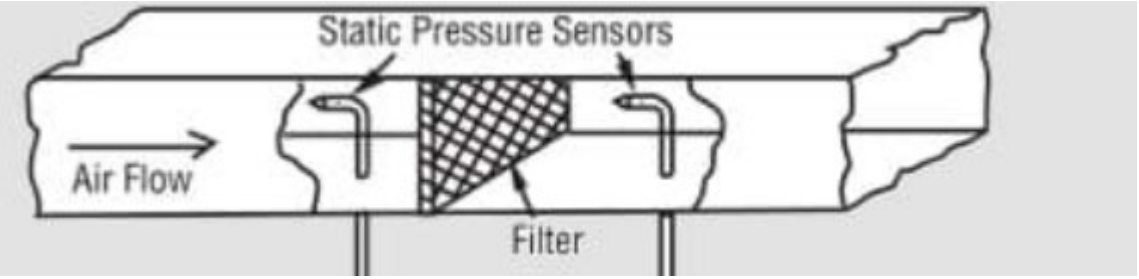


Overview of pressure measurement

✓ Case study: use of a micromanometer in HVAC

Choking of filter on air handling unit

To measure the choking of a filter in an air handling unit and determine whether the filter needs to be cleaned or replaced, the differential pressure on the filter can be determined and monitored. Because of the filter's positioning, air accumulates in front of the filter, making the pressure higher in front of the filter than behind it. The more the filter is choked, the greater this pressure difference will be.

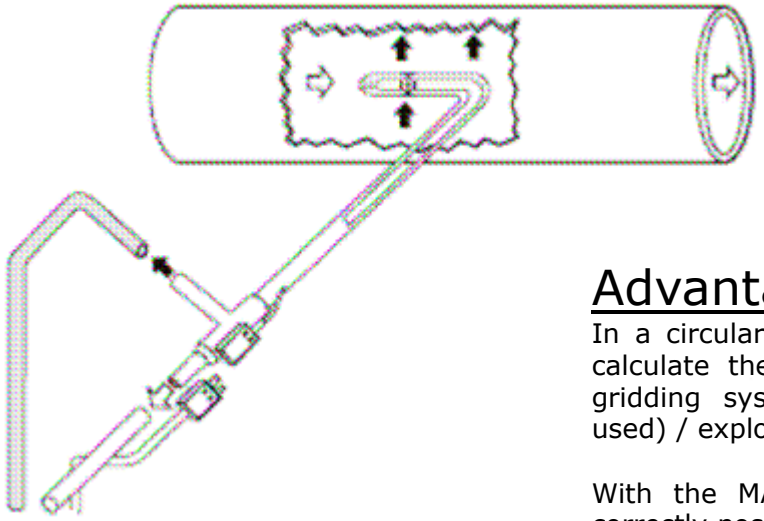


Overview of pressure measurement

✓ Case study: use of a micromanometer in HVAC

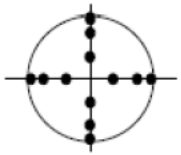
Air speed measurement using a Pitot tube

Pitot tube:
For air speed or air flow measurement in ducts, offering the advantages of a rugged design and a wide measurement range.



Advantage of MAP mode:

In a circular or rectangular duct, you are advised to calculate the average of the speeds according to a gridding system (defined by the reference system used) / explore the speed range.



With the MAP mode, you can record these points correctly positioned in the field.
If you press the MIN,MAX,AVG key, the spatial average of these points will be displayed.

Target markets / Targets

Environmental engineering sector

Sel:f-employed technicians, employees (fitter, technician) of installation and maintenance companies, operators, environmental engineering R&D teams

Complementary requirements

Temperature: simple, differential, no-contact
Humidity of the air
CO_2
Noise level measurements

Presentation of the CA 1550 micromanometer

Mesurer pour mieux Agir

CA 1550 micromanometer

Competitive advantages

- ✓ Measurement of differential pressure**, air speed and flow rate**
- ✓ Manual or automatic temperature compensation
- ✓ Atmospheric pressure compensation
- ✓ MAP mode
- ✓ Min, Max, Avg & Hold modes
- ✓ One-off recordings or continuous recordings up to 1 million points
- ✓ Magnetized product compatible with the Multifix accessory!
- ✓ PC software and Android app.

CA 1550 micromanometer

Operation:

One-off recording

Constant recording Start/Stop on the product

> 2s

Max/AVG/Min mode and viewing of values

Exit from mode

> 2s

Display switch

MAP mode (as on CA 1227)

> 2s

Backlighting

Activation SETup

> 2s

Display hold

Bluetooth activation

> 2s

CA 1550 micromanometer

State at delivery / P01654550

with

In screen-printed box

- **Carrying bag**
- **3 x 1.5V AA alkaline batteries**
- **USB cable,**
- **Connection hoses**
- **Test report**
- **Quick Start Guide**
- **Complete User's Manual and Data Logger Transfer software on CA website**

CA 1550 + Pitot Tube kit / P01654550

- **Product delivered with Pitot tube in rigid bag**

Accessories / replacement parts

Pitot tube (length 324 mm, $Ø_{connector}$ 6 mm, $Ø_{tube\ tip}$ 8 mm)……..P01654560
Transparent tube ($Ø_{Internal}$ 5 mm, length 2 metres……..P01654561
Shockproof sheath + Multifix.....P01654252
Multifix……P01102100Z
Mains adapter ……P01651023
Carrying bag ……P01298075
Dataview software……..P01102095
Bluetooth BLE / USB modem for PC……P01654253
4 x NiMH AA/LR6 batteries + Charger……HX0053
SK20 flexible K thermocouple sensor…… P01655010

Communication

Mesurer pour mieux Agir

Communication

Sales media

- ✓ Sales brochure
- ✓ Product package (*Sales Presentation, Sales Guide, Press Release, photos)*
- ✓ Advertising insert
- ✓ Web product datasheet
- ✓ Web banner
- ✓ Various emailshots + newsletter

CA 1550 Micromanomètre enregistreur		
Pression différentielle		
Domaine de mesure	- 2 450 à + 2 450 Pa	- 0,355 à + 0,355 PSI
Résolution	0,1 Pa pour mesure comprise entre ±200 Pa / 1 Pa au-delà	0,001 PSI
Incertitude intrinsèque en Pa	± 0,5 % Pleine échelle ± 1 pt	
Vitesse et débit d'air		
Type de capteur	Avec sonde de Pitot en accessoire	
Domaine de mesure en vitesse d'air	de 2 m/s à 60 m/s	de 393 à 9 999 fpm
Résolution	0,1 m/s	1 fpm
Incertitude intrinsèque en m/s	de 2 à 5 m/s : ± 0,7 m/s / de 5 m/s à 60 m/s : ± 0,5 % L ± 0,3 m/s	
Domaine de mesure en débit d'air	0,00 à 9999 m^3/h	0,00 à 9999 cfm
Résolution	de 0,01 m^3/h à 1 m^3/h	de 0,01 cfm à 1 cfm
Incertitude intrinsèque	± 0,5 % L ± 1 pt	± 0,5 % L ± 1 pt
Compensations	Compensation manuelle ou automatique de la température (entrée thermocouple K) Compensation automatique en pression atmosphérique	
Fonctionnalités		
Enregistrement	Déclenchement et arrêt manuel sur le produit - Appui court MEM : enregistrement ponctuel Appui long REC : enregistrement réalisé à la cadence du mode en cours - Enregistrement programmé Date de déclenchement, cadence d'enregistrement (de 1 seconde à 2 heures) et la date de fin sont personnalisables grâce au logiciel PC. Verrouillage de l'affichage et du clavier possible dans ce mode	
Modes d'affichage / rétroéclairage	Double affichage avec présentation de la pression différentielle, vitesse ou débit d'air, pression atmosphérique & température / Oui	
Mémoire	Supérieure à 1 million de points	
Min-Moyenne-Max-Hold	Oui	
Auto-Zéro	Oui	
Mode MAP	La fonction MAP permet d'établir une cartographie des vitesses d'air mesurées.	
Unités	Unités en mesure de pression : Pa, PSI, DaPa, hPa, mbar, mmHg, inHg, mmH2O, inH2O - Unités de vitesse d'air : m/s et km/h ou en fpm et mph, Unités de débit d'air : m^3/s, m^3/h, l/s ou cfm - Température : °C, °F	
Extinction automatique	Oui (configurable)	
Alimentation		
Type	- Piles alcalines: 3 x 1,5V AA / LR6 ou accumulateur rechargeable NiMH - Branchement sur le secteur possible grâce à l'adaptateur secteur / micro USB proposé en accessoire	
Autonomie	500h (mode portatif) / 3 ans en enregistrement (base de mesure 15 minutes)	
Caractéristiques physiques		
Interfaces	2 modes de communication : liaison sans fil Bluetooth et liaison USB, le produit est alors reconnu comme clef USB pour aisément transférer les fichiers.	
Fixations	Boitier disposant : d'un aimant, d'un système d'accroche mural, d'une fente pour suspension du produit . Compatible avec l'accessoire Multifix. Gaine disponible en accessoire	
Connectique	Prise de pression via raccordement Ø 6 mm, 1 entrée de type compensé miniature femelle pour thermocouple K	
Dimensions / Masse	150 x 72 x 32 mm / 260 g avec piles	
Plage de fonctionnement du produit	Température : de -10 à +50 ° C / Humidité : de 10 à 90 %HR	
Généralités		
Fonctions du logiciel Logger Control Panel	Représentation graphique ou sous forme de tableau de valeurs, Exportation des données sous forme de graphe ou de tableau Excel, Configuration du produit et d'enregistrements, Mode temps réel, Génération de rapport automatique en format Word, Format de données compatible avec le logiciel Dataview	
Application Android	Oui, application CA Environmental Logger	
Garantie	2 ans	

STANDARD STATE AT DELIVERY:

(Carrying bag, 3 x 1.5 V AA alkaline batteries, 2 transparent connection hoses, USB cable, test report and Quick Start Guide).
Complete User's Manual and free software available from the Chauvin Arnoux website.

TO ORDER:

CA 1550 logger micromanometer..... **P01654550**
Kit of CA 1550 + Pitot Tube **P01654555**

ACCESSORIES / REPLACEMENT PARTS:

Pitot tube (length 324 mm, Ø 6 mm fitting, Ø at tube mouth 8 mm)..... **P01654560**
Transparent hose (Internal Ø 5 mm, length 2 metres)..... **P01654561**
Shockproof sheath + Multifix **P01654252**
Multifix **P01102100Z**
Mains adapter..... **P01651023**
Carrying bag..... **P01298075**
Metal case..... **P01298004**
Dataview software..... **P01102095**
Modem Bluetooth BLE / USB for PC..... **P01654253**
NiMH AA/LR6x4 batteries + Charger..... **HX0053**
SK6 K-thermocouple sensor **P03652906**

FRANCE
Chauvin Arnoux
12 - 16 rue Sarah Bernhardt
92600 Asnières-sur-Seine
Tél : +33 1 44 85 44 85
Fax : +33 1 46 27 73 89
info@chauvin-arnoux.fr
www.chauvin-arnoux.fr/com

UNITED KINGDOM
Chauvin Arnoux Ltd
Unit 1 Nelson Ct, Flagship Sq, Shaw Cross Business Pk
Dewsbury, West Yorkshire - WF12 7TH
Tel: +44 1924 460 494
Fax: +44 1924 455 328
info@chauvin-arnoux.co.uk
www.chauvin-arnoux.com

MIDDLE EAST
Chauvin Arnoux Middle East
P.O. BOX 60-154
1241 2020 JAL EL DIB - LEBANON
Tel: +961 1 890 425
Fax: +961 1 890 424
camie@chauvin-arnoux.com
www.chauvin-arnoux.com

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