# EAS 200/400/800
# Iodines & Aerosols Sampler

## TECHNICAL SPECIFICATIONS

**Designation : Sampler of airbone aerosols and iodines.**

**Reference : P-537-902 200m$^3$.h$^{-1}$**
**P-537-904 400m$^3$.h$^{-1}$**
**P-537-908 800m$^3$.h$^{-1}$**

**Classification :**

**High flow air sampler for air-borne aerosols and iodines with deferred analysis.**

**Description :**

**A servo maintains the sampling flow rate at preset values for each sampling channel.**

**The device is monitored locally and/or remotely.**

**Results are available locally and/or remotely.**

**Operation**

**24/24, by continuous periods of 1 to 7 days (depending on the type of filter)**
**One air flow measure every minute, ensuing an adjustment of the pump supply voltage frequency.**
**Stop/Start locally and/or remotely.**
**Shutdown and re-start in the event of a mains power fault.**
**Daily SMS / e-mails testing communication.**
**SMS / e-mails sent for every abnormal occurrence.**
**Local setting of operating parameters.**

**EAS 200/400/800 is organised in several compartments within a metal housing.**

**The « user » compartment is easily accessible and contains the aerosols and iodine sampling heads, as well as the human / machine interface.**
**The « control » compartment incorpo-rates data management, control of the sampling channels as well as commu-nication modules.**
**The « pumps » compartment contains the pumps operating on the 2 sampling channels.**

*EAS 200/400/800 complies with the following standards:*

*NF-M-60-760: sampling of aerosols for the measurement of radioactivity in the environment.*
*NF-M-60-759: determination of the volumic activity of airborne iodines in the atmospheric environment.*


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## AEROSOL CHANNEL

The aerosol channel is made of an air inlet, a sampling head, a flow meter and a pump.
The air inlet is shared by both aerosols and iodines channels.
It is protected by an antistatic coated cowling, and can be equipped with a wire mesh against insect ingress.

### ➢ Suitable filters

Paper filters, fibreglass, electrostatic polypropylene.
Circular: outside diameter / effective diameter: 130/120 mm, 140/130mm.
Rectangular: 200x200, 300x400, 450x450 mm
Other dimensions on request, subject to pump capacity.
Filter support supplied with storage case.

### ➢ Sampling head

Compliant with NF M 60-760 standard.
The sampling head is placed inside the housing for circular filters, outside or rectangular filters.

Composition
Stationary lower half.
Mobile upper half enabling filter positioning.
Fastening handle actioning lateral locks.
Sealing ensured by o-ring and rubber bellow.
Antistatic coated cover
Condensation is prevented during sampling by heating of the air. This will be achieved with a heated collar for circular filter or infrared radi-ating heater for rectangular filter.

### ➢ Flow rate measure

Mass flow meter placed on a branch on the main air circuit with adequate branch circuit ratio.
The response of the assembly is determined by calibration.
Output voltage 1 to 5 volts.

### ➢ Aerosol sampling pump

Turbine.
Powered by three phase variable frequency drive 10-50 Hz 400 Volts.
Monitoring of the sampling flow by three phase variable frequency drive 10-60 Hz.

| | /200 | /400 | /800 |
|---|---|---|---|
| Power usage at maximum pressure loss: | 3kw | 5.5 | 7.5 |
| Maximum pressure loss acceptable at nominal flow rate | 120mbar | 100mbar | 80mbar |

The air sampled is evacuated through an exhaust pipe.

## IODINE CHANNEL

The iodine channel is made up of an air inlet, a setup measuring relative humidity, a cartridge holder head, a flow meter and a pump.

### ➢ Air inlet

Part of the air previously sampled by the aerosols sampling head is pumped through an activated carbon cartridge.
The air is returned to the circuit after the branch circuit.

### ➢ Filtering media

« Activated carbon »: impregnated activated vegetable carbon to trap radioactive iodine Standard cartridge diameter 57.7 mm.
Air humidity monitoring.
The efficiency of the activated carbon depends on humidity. The iodine sampling channel is equipped with a patented device ensuring that humidity is kept below 30%.

### ➢ Iodine sampling head

The sampling head can hold 1 to 2 cartridges.
Standard: isolated by two solenoid valves with monitoring of overpressures caused by atmospheric variations by means of a membrane situated upstream of the iodine sampling head.
Cam locking mechanism.
Cartridge effective diameter 51 mm.
Sealed by two o-rings.
Stationary upper part.
Mobile lower part to release the cartridge.

### ➢ Flow measurement

Mass flow sensor situated in the air circuit of the iodine channel.
Response time of the assembly determined by calibration.
Relative error on the sampled flow rate < 0.8%.
Output voltage 1 to 5 Volts.

### ➢ Iodine sampling pump

90W single channel turbine.
24V continuous power voltage.
Monitoring of the sampling flow rate by continuous voltage 0-10V.
Maximum acceptable pressure loss at 4.5 $m^3.h^{-1}$ : 90 hPa.
Power usage at maximum pressure loss: 90 W.
Adjustable sampling flow rate from 2.1 $m^3.h^{-1}$ to 4 $m^3.h^{-1}$
Exhaust pipe.

### ➢ Iodine sampling pump

Evacuation nozzle available.
Flexible connecting pipes inside the housing.
Fast connection of the exhaust pipe

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## Power supply

**Mains 230V / 50Hz.**
**13.8V continuous power for the battery charge.**
**In the event of a power failure, the battery will allow message reports to be sent, and proper shutdown of the PC.**

**Protections :**
**Variable frequency drive: 50A fuse gL/gG**
**Electronics: circuit breaker Curve C**
**Heated collars: circuit breaker Curve C**
**SIEMENS variable frequency drive with EMC filter.**

### ➢ Option three phase

**400V three phase without neutral supply 50Hz**
**Upstream differential circuit breaker advised: 300 mA high immunity (type SI (Schneider) HPI (Legrand) G (Moeller)) curve C, 32 A.**
**Maximum power usage 5.5 kW**

## ADDITIONAL FEATURES

### ➢ EMC

**Designed for optimal protection.**
**Electrical continuity between mechanical parts.**
**Electromagnetic compatibility tests have been carried out by an external agency accredited by COFRAC.**

### ➢ Environment

**Sound level at a distance of 1m at nominal flow. < 70 dB 200 $m^3.h^{-1}$., .< 75 dB 400 $m^3.h^{-1}$, .< 80 dB 800 $m^3.h^{-1}$**
**Temperature range: -20°C, + 40°C**
**Ingress Protection rating IP 54.**

### ➢ Miscellaneaous

**EEX Certification: none**

### ➢ Decommissioning

**We undertake to remove free of charge our appliances at the end of their working life, and to have them dismantled in approved waste treatment plants.**

## MONITORING

Onboard PC operating under Windows XP, 5.7" TFT tactile screen.

Flow measurement chains:
10 bits analog - digital converter.
Each flow measurement results from the average of 10 single measures.
Calculation of the sampling flow rate from the calibration curve.
Calculation of the volume since the last volume counter reset.

Temperature measurement chain:
10 bits analog - digital converter.
Calculation of the temperature from the manufacturer's calibration curve.

Servo control of the flow in the aerosol channel via an 8 bits digital potentiometer for the control of the variable frequency drive associated to the centrifugal pump.
Servo control of the flow in the iodine channel by variation of the centrifugal pump power voltage.
Regulation ratio : ± 1.0% of the nominal flow.

Multi level access (user / administrator / maintenance), pin code protected.

Power failure occurrence:
Battery power backup for both PC and GPRS modem for a lapse of time allowing emission of report messages and PC shutdown.
Operating parameters backup
Sampled volume backup

### ➢ Input Output

8 " tactile screen

RS232 port
USB port
Ethernet port
Modbus TCP port

Data backup by USB key.
Software update by USB key
Reports sent via GPRS Modem.
Onboard web server.


**Detectable anomalies:**

Flow rate out of factory set range.
Abnormal current supply to the pump.
Temperature out of factory set range.
Communication anomaly on a sampling channel
Mains power failure > 10 seconds.


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## References to order :

### 1- Sampler

| | |
|---|---|
| EAS 200 $m^{-3}.h^{-1}$ | P-537-902 |
| EAS 400 $m^{-3}.h^{-1}$ | P-537-904 |
| EAS 800 $m^{-3}.h^{-1}$ | P-537-908 |

### 2- Aerosol sampling head

| | |
|---|---|
| Sampling head dia 130/125 mm | P-535-115 |
| Sampling head dia 140/130 mm | P-535-123 |
| Sampling head dia 1230/210 mm | P-535-117 |
| Sampling head 400x400 mm | P-537-920 |
| Sampling head 450x450 mm | P-537-920 |

### 3- Filter holder and storage case

| | |
|---|---|
| Filter holder dia 130/125 mm | P-535-122 |
| Filter holder dia 230/220 mm | P-535-123 |
| Filter holder for 400x400 mm | P-537-930 |
| Filter holder for 450x450 mm | P-537-932 |

### 4- Iodine Sampling head

| | |
|---|---|
| Single | P-535-144 |
| Double | P-535-145 |

### 5- Options

| | |
|---|---|
| Extented temperature range | M-531-154 |
| Sintered stainless steel dia 130 mm | P-537-121 |
| 130 mm Insect protection wire mesh | |

***Additional options developed on request***

## MECHANICAL CHARACTERISTICS

### ➢ Materials

Air circuit: Aluminium.
Aerosols sampling head: Alodyne 1200 treated aluminium.

Filter support: Gold anodized aluminium.
Storage case: Aluminium.

Branch circuit: Teflon coated polyamide.
Tube upstream of the iodine head: Teflon
Iodine channel heater: Aluminium.
Iodine channel cartridge holder: Alodyne 1200 treated aluminium
Frame: Anodized aluminium.
Sheet metal work: Lacquered EZ steel

### ➢ Dimensions and weight

Frame dimensions: (l x p x h) 1100x700x1330 mm
Weight 200/400/800: 170 / 200 /250 kg
Air inlet height: 1800 mm
Ground clearance: 98 mm

### ➢ Housing

40 mm cross section anodized aluminium profile.
Walls and bottom out of stainless steel sheet.
Formed stainless steel lid.
White lacquered paint RAL 9002

The pumps are located in the lower part of the housing. Side vents allow air circulation.

The upper part of the housing is divided in two areas:
Air circuits and Human Machine Interface at the front.
Electronics and computing at the back.

An inspection hatch is located at the back of the housing. The inspection hatch is fastened with screws. The top compartments front and back have sliding doors equipped with a turn/push key lock.
The door frames are made out of 25mm cross section profile, the door panels are made of a coloured composite (RAL 9016).

4 adjustable feet.
Ground anchors.

Electrical compartment located in the upper part at the rear of the housing.
3 x 10 $mm^2$ power cable
Default output: active security on-off contact (contact open in the absence of voltage).
Main switch.

Aerosol / iodine / input ouput monitoring housing: proprietary onboard circuit boards and software.
Onboard PC operating under Windows XP Embedded.
Communication between PC and monitoring housings via RS485 / MODBUS.

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