



- **Stable and Sensitive:**  
*Unique Detection Technology and Advanced Algorithms*
- **Proven and Tested System:**  
*Designed to Meet the Requirements of IEC60761-3 and 10CFR820*
- **No False Alarms:**  
*Low Background Sensor with Low Sensitivity to External Sources of Gamma Radiation*
- **Ease of operation:**  
*Modular System, Simple Maintenance Routines, Many Training Packages Available*
- **Flexible:**  
*Designed for Process, Stack Emissions and Radiation Protection Applications*

*The Lab Impex CMS Gas Activity Monitor continually measures the level of airborne concentration of radioactive (beta emitting) noble gases.*

*Suitable for process, stack and health physics applications, the CMS Gas Activity Monitor is installed at many nuclear facilities around the world.*

### **Operational Benefits**

Lab Impex are fast becoming a renowned leader in the field of airborne radiation measurement systems. A high level of build standard coupled with sensitive and often unique measurement technology, leads to an industry-wide reputation for quality, reliable radiometric systems.

The CMS Gas Activity Monitor is designed to offer real operational benefits to the user. All aspects of system performance and system maintenance have been evaluated and optimised with a view to providing the user with simple, trouble-free operation at all times.

The CMS Gas Activity Monitor is the first system of its type to provide the very best in sampling efficiency, detector technology, processor electronics and data analysis.

### **The PG-10**

The detector aspect CMS Gas Activity Monitor is a recently developed PG-10.

Offering unparalleled sensitivity to noble gases, the PG-10 uses a 750 ml measurement chamber and specially designed plastic scintillation sensor to give a stable, accurate measurement of airborne concentration.

In operation gas is sampled through the PG-10 by a vacuum pump located downstream. In addition, an in-line flow sensor continually measures flow through the circuit in order to generate alarms in the event of pump fail or blockage.



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Many options exist for mounting and shielding the PG-10. As standard a 50 mm shielding assembly that may be skid mounted or floor standing is available, although other solutions, to suit the performance and installation requirements of the client, may be catered for.

The PG-10 provides a measurement range of  $<10 \text{ kBq/m}^3$  to  $10 \times 10^9 \text{ Bq/m}^3$  ( $2.7 \times 10^{-7} \mu\text{Ci/ml}$  to  $2.7 \times 10^{-2} \mu\text{Ci/ml}$ ) for  $^{85}\text{Kr}$ .

## The CMS

A CMS Continuous Monitoring Station, located either locally or remote from the PG-10 acts as the processor and display for the system.

At the core of the Lab Impex range, the CMS is a respected, proven, monitoring station. The CMS will display the current noble gas concentration result, generate activity / status alarms, enable the user to access parameters and compile a database of result data.

## Stack / Duct Monitoring

The CMS Gas Activity monitor will also accept stack or duct flow data and will report the stack / duct gap concentration.

An option to provide total activity discharged is also available and may be reported as daily, weekly, monthly or annually.

Features of the CMS include:- high levels of environmental protection; ability to add other sensors (gamma dose rate, particulate, iodine etc); unique calculation algorithm; fast alarm generation; modular construction; stainless steel housing; high intensity audio-visual alarm; multiple parameter sets.

**The PG-10 plastic scintillation sensor offers a direct measurement of noble gas beta emissions.**

## The Result:

- 1. A higher sensitivity than conventional systems for those noble gases where the gamma yield is low i.e. Kr-85.**
- 2. A lower sensitivity to external sources of gamma that traditionally can lead to false alarm conditions on conventional systems.**



## Specifications

### Scintillation Detector

Unshielded scintillation counter consisting of a 25mm plastic scintillator with light guide, photomultiplier and dynode chain

### Typical Detector Characteristics

Diameter: 65 mm  
Length: 110 mm  
Temperature range: -10 to +50°C  
Weight (approx.): 2kg

### Measuring Chamber

Type: 0.75 litre stainless steel  
Air Connections: 2 x 10 mm O.D. pipe  
Dimensions (approx): 100 mm diameter  
110 mm height

### Performance

Efficiency (Carbon-11): 10%  
Typical background: 6 cps

## Specifications for CMS1 Controller

### Detectors

- Detector interface - internal UDI processor(s) with direct connection to probe
- Maximum probe-CMS separation is 100m (330 ft) with internal UDI and >1100m (3600ft) with external UDI

### Alarm Facilities

- Fast, accurate warning of high activity or faults
- Traffic light configuration: 3 multi-element 20mm (1") diameter flashing LEDs.  
Green = NORMAL, Yellow = ALERT,  
Red = ALARM
- Clearly visible from 9m (30ft)
- Optional relay outputs for remote audio/visual alarms
- Alarm thresholds and other parameters can be set by the user and pass-code protection available

### Outputs (optional)

- RS485 data link to master CMS communications controller
- RS232 port for data logging to a PC
- RS422
- TCP/IP
- Analogue (4-20mA) or digital output
- Four way volt free relay contacts

### Audible Alarm Output

- Standard: 2 tones alternating at 1.2Hz>100dBA (other tones optional)

### Visual Display

- Alpha-numeric display: 2 rows x 20 characters, 8.5mm (1/3") character height
- Large clear 20 x 142mm (1" x 5 1/2") digital display with 4 colour function key indicators
- High intensity alarm - An additional alarm Red xenon strobe module warning

### Keypad

- 24 soft keys keypad with tactile feedback with four special function keys.

### Data Buffer (Optional)

- Cyclic FIFO (first in first out) buffer which retains historical data. Provides 1 week data retention with historical review on LCD display
- Results stored every 10 minutes in Normal (LED green) mode and every 2 minutes in Alert (LED yellow) and Alarm (LED red) modes
- Contents of the data buffer are retained without mains power providing the internal battery is in place

### Internal Battery

- Calendar clock
- Maintains stored data
- Available for power failures

### Power

- AC single phase mains connection
- Voltage: 90 - 264V (local mains supply) or 9 - 20v unregulated supply from CMS 1M network controller (where appropriate)
- Frequency: 47 - 370Hz
- Max. Current: 500mA
- Mains supply plug: 3A fuse
- Internal 1A anti-surge fuse

### Physical Characteristics

- Stainless steel enclosure
- Width = 256mm (10")
- Height = 530mm (21") including strobe
- Depth = 170mm (6.1/2")
- Weight = 7kg (nett) (15 1/2lbs) Approx

### Flow Monitoring input (optional)

- One or more solid state flow sensors may be connected to continuously monitor air flow in gas detectors

### Self Test Facilities

- The CMS1 Continuously self-tests. Conditions checked include:
  - Detector failure
  - Power failure
  - Overrange

### Operating Environment

- Indoor use
- Operating temperature range - 20 to 50°C (-4°F - 122 °F)
- Maximum relative humidity 95% (up to 30°C)
- CMS1 case designed to IP-65 (NEMA Type 13 equivalent)

### CE Marking

- CMS1 is CE marked. Declarations of conformity with:
  - EMC directive 89/336/EEC, 92/31/EEC
  - Low voltage directive
  - EMC standards BSEN50081-1 1994 and BSEN50082-2 1995

### Options

- Multiple detectors can be attached to one single unit for multi point monitors
- Dual detectors can be used for increased dynamic range

### Applications

- Wide dynamic range environmental monitoring
- Stand alone gamma monitoring
- Process monitoring
- Gamma interlock monitoring
- Multi detector intervention

### Test Data

- NRPB - CMS1L2 Evaluation Report 25591 TT39B