Noble Gas Monitor Station
CMS Gas Activity Monitor

**Highlights**
- Stable and sensitive: unique detection technology and advanced algorithms
- Proven and tested system: designed to meet the requirements of IEC60761-3 and 10CFR820
- Reduced 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

**Operational Benefits**
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 offers users the very best in sampling efficiency, detector technology, processor electronics and data analysis.

**The Noble Gas Sensor**
The detector used by the CMS Gas Activity Monitor is a recently developed PG-10. Offering unparalleled sensitivity to Noble Gases, the PG-10 uses a 750ml 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 inline flow sensor continually monitors flow through the circuit in order to generate alarms in the event of pump fail or blockage.

Many options exist for mounting and shielding the PG-10. As standard a 50mm 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 \(10\times10^9\ \text{Bq/m}^3\) (\(2.7\times10^{-7}\mu\text{Ci/ml}\) to \(2.7\times10^{-2}\mu\text{Ci/ml}\)) for Kr-85.

A relatively unique feature of the PG-10 is that it offers a direct measurement of Noble Gas Beta rather than Gamma decays.

**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.

**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 Systems 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 CMS Gas Activity Monitor is also available in transportable cart configuration.
Noble Gas Monitoring Station

### Detectors
- Scintillation Detector comprising plastic scintillator with light guide, photomultiplier and dynode chain
- Typical Detector Characteristics
- Diameter: 65mm
- Length: 110mm
- Temperature range: -10 to +50°C
- Weight: Approx 2Kg

### Measuring Chamber
- Type: 0.75 litre stainless steel
- Air Connections: 2 x 10mm O.D. pipe
- Diameter: Approx 100mm
- Height: 110mm

### Performance
- Efficiency Krypton-85: 10%
- Typical background: 6ps

### CMS Controller for Noble Gas Monitor

#### Physical Characteristics
- Stainless steel enclosure

#### Dimensions (HxWxD) & Weight
- Height: 458mm (18") including LED beacon and cable connectors
- Depth: 150mm (5.5") including sounder projection
- Width: 200mm (8")
- Weight: Approx 7kg (15.5lbs)

#### Environmental Protection
- P54 (IP65 option available)

#### Display
- Large LCD graphic display (114mm x 64mm (4.5" x 2.5") with backlight)
- Both digital and analogue display
- Key switch
- Two layer status light column (Totem Pole, Red + Green LED)

#### Data Storage
- Non-volatile data capability for 7 days count history at minimum 5 minute data log intervals with historical review on LCD display
- Non-volatile data capability for event history (last 100 events)
- Non-volatile data storage for operating parameters

#### Visual Display
- Alpha-numeric display; 2 rows x 20 characters, 8.5mm (.3") character height
- Large clear 20 x 142mm (1" x 5.5") 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

#### 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

#### Operating Environment
- Indoor use (or suitably enclosed)
- Operating temperature range -10 to 50°C (-4°F to -122°F)
- Maximum relative humidity 95% (up to 30°C)

#### Power Details
- Mains AC single phase connection (85-260V AC)
- Battery: Internal 1 hour back-up rechargeable battery (facilitates full operation for 1 hour)
- Frequency: 47 to 60Hz
- Max.Current: 500 mA
- Internal 1 A anti surge fuse

#### Outputs
- Fail-safe relay contacts for fault and alarms
- Four relay outputs (Alert 1, Alert 2, Alarm 3 and Fault)
- RS-232/RS-48
- 2 x analogue outputs configurable 0.5V, 4-20mA, 0-20mA
- Ethernet 10base T (Lab Impex Systems protocols, HTTP, FTP)

#### Alarm Facilities
- Fast, accurate warning of high activity or faults
- Tower light configuration: Visual alarm (12V LED Totem Pole)
- Audible alarm sounder: 2 tones alternating at 1.2Hz=100dB (other tones optional)
- Alarm clearly visible from 9m (33ft)
- Three activity alarm thresholds and other parameters can be set by the user and pass-code protected.

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Lab Impex Systems Ltd
Impex House, 21 Harwell Road
Nuffield Industrial Estate, Poole Dorset, BH17 0GE, UK
T +44 (0) 1202 68 48 48
F +44 (0) 1202 68 35 71
E info@labimpex.com

Lab Impex Systems Inc
Suite 100, 106 Union Valley Road
Oakridge, TN 37830
USA
T +1 865 483 2600
F +1 865 381 1654
www.labimpex.com

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