



- **Low Cost Area Gamma Monitor - Single or Dual Detector**
- **Wide Dynamic Range (suitable for a variety of applications)**
- **Detector Measurement Options including GM Sensors, ION Chambers and Scintillation Detectors**
- **Installed or Transportable**
- **Full Network Capability**

Applications

- **Wide Dynamic Range Environmental Monitoring**
- **Stand Alone Gamma Monitoring**
- **Process Monitoring**
- **Gamma Interlock Monitoring**

The CMS-GAMMA is a new generation continuous monitoring station for measurement of gamma radiation providing essential, reliable information to personnel when radiation levels are above normal. The versatile unit can also be used in conjunction with the SIL Safeguard monitor, providing interlock control at a Safety Integrity Level 2 rating in hot areas such as fuel stores, caves, glove boxes and cells as required.

The CMS-GAMMA is a compact, mains-powered, gamma monitor designed specifically for building, area and process monitoring in nuclear facilities. The monitor offers all the classic functionality of its predecessor the CMS-1LG with wide range capability providing measurements from ambient background up to 10Sv/h (1000rem/h).

The CMS-GAMMA is intended for installed applications, but can also be used with a transportable frame or trolley to provide temporary monitoring or to supplement permanently installed monitors during site maintenance procedures. The only requirements of the CMS-GAMMA monitor is that it and its associated detector is suitably mounted and has mains power supply in the range 85-260 VAC.

Two major advantages of the CMS-GAMMA against its nearest competitor are: 1) internal back up battery which enables full operation for up to 1 hour in the event of mains failure and 2) the detector arrangement can be installed at distances of up to 1000 (3,280ft) from the CMS station.

Operation and Security

The CMS-GAMMA performs a self-test on power up and then commences continuous monitoring. All system parameters are password and key protected and can be modified using the local keypad and display. In addition to this, all operating parameters can be read and updated via FTP using a personal computer. Current alarm status, parameter settings and recent count and event log data can be read using a web browser ensuring that all key personnel can have 24 hour access to data remotely.

The following actions may be passcode/keyswitch protected:

- Clear Historic Count data
- Clear Event Log
- Reset Pass codes
- Modify Pass code
- Reset Instrument.
- Test / Calibrate analogue I/O.
- Test Digital Outputs.



Laboratory Impex Systems. 21 Harwell Road, Poole, Dorset, BH17 0GE, UK.
Tel: +44 (0) 1202 684 848 Fax: +44 (0) 1202 683571

Laboratory Impex Systems Inc. Suite C4, 103 Rio Rancho Dr, NE
Rio Rancho, NM 87124-1442 Tel: (505)892 9654 Fax: (505) 890 8319

sales@lab-impex-systems.co.uk www.lab-impex-systems.co.uk

Dose Rate Indicators

The CMS-GAMMA provides two separate indications of dose rate:-

- An analogue vertical graph representing the percentage of the alarm level selected on the LCD display (which is visible from a distance of 9m (30 ft.)
 - An LCD display with LED backlighting which provides a numerical indication of the dose rate
- Both indicate the current alarm level setting simultaneously. The display (viewing area 114mm x 64mm (4.5" x 2.5")), also allows sixteen rows of text to be visible at any one time when the user is locally changing parameters or viewing historical results.

When the CMS-GAMMA is operating normally, the green beacon is constantly illuminated. During alarm conditions, the red beacon flashes. In addition to the beacon, two LED's located above the display indicate normal operation or fault.

Alarms and Annunciators

The CMS-GAMMA has four alarms (three alarm thresholds and fail alarm), all of which are user settable via the display and keypad or Ethernet connection (TCP/IP). The 'Alert' and 'High' alarms are triggered when the ambient radiation level exceeds these thresholds. The 'Low' failure alarm is triggered if the radiation falls below this level. Its main purpose is to identify a detector failure.

Alarm annunciation is by means of:

- The red beacon (can be configured to flash or remain on constantly)
- The sounder

The user may suppress alarm annunciation for each or all of the activity alarms if required (this facility is passcode protected). In the event of a sustained mains failure, dose rate measurement continues supported by an internal battery for up to 1 hour (when using GM detector).

Outputs and Communications

Connections to the CMS-GAMMA are located on the underside of the instrument. The CMS-GAMMA enables the user to control external devices and to transmit data to local (or remote) locations via:

- Four relay outputs (Alarm 1, Alarm 2, Alarm 3 and Fault) (NB: Relays operate in the fail-safe mode - they are energised during normal operation)
- One RS-485 (or RS-232) serial port for communication with remote monitoring systems
- Ethernet (TCP/IP)



Safety Integrity SIL Applications

The CMS Gamma can be used in conjunction with the Lab impex SIL Safeguard Monitor (SSM) for both interlock and process applications that require a high level of safety integrity. More information on the SSM board, CMS Interlock and the CMS Process, all of which have been designed to meet the specifications of IEC61508, can be obtained by requesting the datasheets L327, L328 and L333 respectively.

Self Test Facilities

The CMS-GAMMA continuously self-monitors for faults. Conditions checked include:-

- Detector Failure
- Power Failure
- Detector Over range
- Alarm Beacon Failure
- Incorrect Detector Fitted
- Low Battery Voltage

Occurrence of any of these conditions will cause the green beacon to flash and the nature of the fault will be displayed on the LCD.

Calibration

The CMS-GAMMA can be calibrated using a suitable gamma source providing a known dose rate. LIS can supply details of calibration sources if required.

CMS-GAMMA SPECIFICATIONS

STANDARD GM DETECTORS

GDI RANGE

- GDI-1304 Range: 0.1mSv/h - 10Sv/h (0.01rem/h - 1000rem/hr)
- GDI-1314 Range: 10 uSv/h - 3Sv/h (1mrem/h - 300rem/hr)
- GDI-1324 Range: 0.1uSv/h - 0.1Sv/h (0.01mrem/h - 10rem/hr)
- GDI-1202 Range: 0.1uSv/h - 40mSv/h (0.01mrem/h - 4rem/hr)
- GDI-1301 Range: 0.1mGy/h - 10Gy/h (0.01rad/h - 1000rad/h)
- GDI-1313 Range: 10uGy/h - 3Gy/h (0.001rad/h - 300rad/h)
- GDI-1321 Range: 3uGy/h - 0.1Gy/h (0.3mrad/h - 10rad/h)

PHYSICAL CHARACTERISTICS

- 304 Stainless steel enclosure
- Wall, trolley and transport frame
- Designed for quick low cost installation with easy access

DIMENSIONS (Height x Depth x Width)

- H = 458 mm (18") including LED beacon and cable connectors
- D = 150mm (5½") including sounder projection
- W = 200 mm (8")

WEIGHT approx. 7 kg (15 ½ lb)

DISPLAY

- Large LCD graphic display (114mm x 64mm (4.5" x 2.5")) with backlight.
- Fully sealed membrane keypad
- Both digital and analogue display
- Large dose range
- Key switch.
- Two layer status light column (Totem Pole, Red + Green LED).

ENVIRONMENTAL PROTECTION

IP54 (IP65 option available*)

OPERATING ENVIRONMENT

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

POWER DETAILS

- Mains AC single phase connection (85-260 V ac)
- Battery: Internal 1hr back-up rechargeable battery (facilitates full operation for 1 hour with single GM detector option/ CMS monitors the battery voltage)
- Frequency: 47 to 60 Hz
- Max. Current: 500mA
- Internal 1A anti surge fuse

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)
- Optional relay outputs for remote audible/visual alarms
- Three activity alarm thresholds and other parameters can be set by the user and pass-code protected.

INPUTS

- 1 x RS232 port (LIS protocols).
- 1 x RS485 port (LIS protocols).
- 1 x Ethernet 10baseT (LIS protocols, HTTP, FTP).
- 2 x counting channels (Twin detector, Single channel, using external SGM).
- 2 x analogue 4-20mA inputs - with option of hardware dampening
- Detector Interface RS-422 (balanced differential line)

OUTPUTS

- Fail-safe relay contacts for faults and alarms - Four Relay outputs (Alarm1, Alarm2, Alarm3 and Fault)
- RS-232/RS-485
- 2 x analogue outputs configurable 0-5V, 4-20mA, 0-20mA
- Ethernet 10baseT (LIS protocols, HTTP, FTP).

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 storage for operating parameters.

PARAMETER UPLOAD/DOWNLOAD

All operating parameters can be read and updated via FTP over Ethernet using a personal computer.

WEB SERVER

Current alarm status, parameter settings and recent Count and Event Log data can be read over ethernet using a Web browser.

SECURITY

The following actions may be passcode/keyswitch protected:

- Change Parameters
- Clear Historic Count data
- Clear Event Log
- Reset Pass codes
- Modify Pass codes
- Reset Instrument.
- Test / Calibrate analogue I/O.
- Test digital outputs.

SELF TEST FACILITIES

The CMS-GAMMA continuously self-monitors for faults. Conditions checked include:-

- Detector Failure
- Power Failure
- Detector Over range
- Lamp Failure
- Battery Voltage
- Detector Type

APPROVALS/RADIOLOGICAL STANDARDS

- Compliant with 73/23/EEC- EMC Directive
- Type approval at NRPB
- Compliant with 93/68/EEC Low Voltage Directive
- Designed to IEC 61017-1 (Environmental gamma)
- Designed to IEC 61017-2 (Transportable gamma)
- Designed to IEC 60532 (Installed gamma)
- Designed to ANSI N42.17 (parts A and C)

* Subject to Testing

CMS-GAMMA ACCESSORIES

- Transportable Stand
- Transportable Trolley
- Adapter Backplate (allows fitment for CMS-1 replacements)



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