

Product Data Sheet

Area Monitors



Low-cost area gamma monitor: single or dual detectors

Wide dynamic range (suitable for a variety of applications)

Detector measurement options, including GM sensors, ionization chambers, and scintillation detectors

Ethernet communications

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 (SIL) 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 10 Sv/h (1,000 rem/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 or decommissioning procedures. The only requirements of the CMS Gamma monitor is that it has a mains power supply in the range 110 – 230 Vac and that its associated detector is suitably mounted.

Applications

- Environmental monitoring
- Stand alone Gamma monitoring

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/key switch protected:

- Clear historic count data
- Clear event log
- Reset pass codes
- Modify pass codes
- Test/calibrate analogue I/O
- Test digital outputs

Dose Rate Indicators

The CMS Gamma provides two separate indications of dose rate:

- An analog vertical graph representing the percentage of the alarm level selected on the LCD display (which is visible from a distance of 9m (30ft)).
- An LCD display with LED backlighting which provides a numerical indication of the dose rate and indicates 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 Ultra Electronics SIL Safeguard Monitor (SSM) for both interlock and process applications that require a high level of safety integrity. More information on the CMS Interlock SIL and the CMS process SIL, both of which have been designed to meet the specifications of IEC61508, can be obtained by requesting the datasheets L328 and L333 respectively.

Self Test Facilities

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

- Detector failure
- Detector over range
- Alarm beacon failure
- Low battery voltage

The 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 with a traceable dose rate. Ultra Electronics can supply details of calibration sources if required.

Performance Specification: Standard GM Detectors

GDI Range

- GM-1304 Range:
0.1 mSv/h – 10 Sv/h
(0.01 rem/h – 1,000 rem/hr)
- GM-1314 Range:
10 μ Sv/h – 3 Sv/h
(0.03 mrem/h – 300 rem/hr)
- GM-1324 Range:
0.3 μ Sv/h – 0.1 Sv/h
(0.03 mrem/h – 10 rem/hr)
- GM-1202 Range:
0.1 μ Sv/h – 40 mSv/h
(0.01 mrem/h – 4 rem/hr)
- GM-1301 Range:
0.1 mGy/h – 10 Gy/h
(0.01 rad/h – 1,000 rad/h)
- GM-1313 Range:
10 μ Gy/h – 3 Gy/h
(0.001 rad/h – 300 rad/h)
- GM-1321 Range:
3 μ Gy/h – 0.1 Gy/h
(0.3 mrad/h – 10 rad/h)

Detector Interface

- Universal detector interface (UDI-1G)
- Provides a high performance interface between detector and measurement system
- The output stage is designed to drive long cables reliably
- UDI – Detector 10m
- CMS – UDI 100m but with the inclusion of a separate external PSU distances greater than 1000m can be achieved

Physical Characteristics

- 304 Stainless steel enclosure
- Wall, trolley and transport frame
- Designed for quick low cost installation with easy access
- Alarm levels – ATTN, ALERT, ALARM
- Displayed Units i.e. μ Sv/h, mRem/h etc.
- Calibration Factor, Detector Dead Time, Overage Threshold
- Detector Count Averaging time (Time constant Low and Time Constant High)
- Parameters (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

Dimensions (HxWxD)

AND Weight

- Height: 458mm (18") including LED beacon and cable connectors
- Depth: 150mm (5.9") including sounder projection
- Width: 200mm (8")
- Weight: Approx 7kg (15.5lb)
- Environmental Protection
- Designed to meet IP54
- Display
- Large LCD graphic display (114mm x 64mm (4.5" x 2.5") with backlight
- Fully sealed membrane keypad
- Both digital and analog display
- Large dose range
- 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 storage for operating parameters
- Operating Environment
- Indoor use (or suitably enclosed)
- Operating temperature range -10°C to 50°C (14°F – 122°F)
- Maximum relative humidity 95% (up to 30°C)

Power Details

- Mains AC single phase connection (110-230 Vac)
- Battery: Internal 1hr backup recharging battery (facilitates full operation for 1 hr) single GM detector option/CMS monitors the battery volt)
- Frequency: 50 to 60 Hz
- Max. Current: 500 mA
- Internal 1A anti-surge fuse

Security

- The following actions may be passcode/key switch protected:
- Change parameters
 - Clear historic count data
 - Clear event log
 - Reset passcodes
 - Modify passcodes
 - Reset instrument
 - Test/calibrate analog 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

Inputs

- 1 x RS232 port
- 1 x RS485 port
- 1 x Ethernet 10BaseT (HTTP, FTP).
- 2 x counting channels (Twin detector, single channel, using external detectors)
- 2 x analogue 4-20mA inputs
- 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 analog outputs configurable 0-5V, 4-20mA, 0-20mA
- Ethernet 10BaseT (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 1.2 Hz >100 dB (other tones optional)
- Alarm clearly visible from 10 m (33ft)
- Optional relay outputs for remote audible/visual alarms. Three activity alarm thresholds and other parameters can be set by the user and passcode protected
- Fast, valid warning of high activity or fault
- Three activity alarm thresholds and other parameters can be set by the user and passcode protected

Approvals/Radiological Standards

- Compliant with 2014/30/EU EMC directive
- Type approval at HPA
- Compliant with 2014/35/EU Low Voltage directive
- designed to IEC 61017-1 – 2016 Environmental Gamma
- designed to IEC 61017-2 – 2016 Transportable Gamma
- designed to IEC 60532 Installed Gamma
- designed to ANSI N42.17 Parts A and C
- EMC EN61326-1
- LVd EN61010-1

CMS Gamma Accessories

- Transportable stand
- Transportable trolley
- Adapter backplate (allows fitment for CMS-1 replacements)