Product Data Sheet
CMS Interlock SIL

- **Fast alarm**
- **Simple/Safe hardware only safeguard monitor**
- **IEC 61508 compliant: SIL 2 independently certified by SIRA and CASS**
- **Proven detectors and amplifier electronics**

The CMS Interlock SIL is a safety-related gamma monitor intended to be installed in areas where interlock control is required to restrict access to high dose areas.

The device may be used with a range of sensor options including GM, Ion chamber and Scintillator. Typical applications include the use within accelerator facilities or nuclear cell containment areas where high levels of activity are present. The CMS Interlock SIL is based on the standard Ultra Electronics area monitor, the CMS. While retaining all the features and functionality of the CMS, the CMS Interlock SIL also includes an additional counting circuit called the SIL Safeguard Monitor (SSM). The SSM works in parallel with the CMS and provides safety-related interlock relays.

SSM and IEC61508

This SSM has been designed, manufactured, commissioned and is maintained to IEC61508. The SSM is also the first of its type to achieve SIRA and CASS independent product certification. The monitor offers fast alarm, security of operation and SIL 2 compliance on the system relay outputs.

Housed within a rugged stainless steel enclosure, the CMS element provides an indication of dose equivalent levels via a large LCD. Fault conditions are controlled by the SSM, providing the high level and fault alarms.

SIL 2 Alarm

The monitor has two SIL 2 Alarms (high and fail alarm). The 'high' alarm is triggered when the ambient radiation level exceeds the preset threshold. The 'fail' alarm is set when the count-rate falls below the preset level for the detector (detector in failure).

Outputs and Communications
External connections to the CMS Interlock SIL are via a separate but integral terminal box at the base of the instrument. The unit contains two external relays, one for the alarm and one for the fault function. Each relay contains three sets of contacts, two 2 pole change-over a one single pole N/O contact set. NB: Relays operate in the fail-safe mode; energized during normal operations; SIL 2 compliant.

The separate termination box is provided to isolate external terminations from the main instrument electronics to ensure SIL 2 integrity is maintained during the installation process.

Dose Rate Indicators
The monitor's LCD display with LED backlighting provides two separate indications of dose rate. One is an analog vertical graph representing the percentage of the alarm level selected and the second is a numerical indication.

Calibration
The CMS Interlock SIL monitor can be calibrated using a suitable gamma source providing a traceable dose rate. Ultra Electronics can supply details of calibration sources if required.

Self Test Facilities
The CMS SIL Interlock continuously self monitors for faults. Conditions checked include :
• Detector failure
• Power failure

The occurrence of any of these conditions will cause the failure condition and trip the Fault Relay. The nature of the fault will be displayed on the LCD.

Visual Alarms
A visual indication is provided in the form of a red LED for SSM failure and alarm. Failure indications include mains failure and SSM failure. The type of failure is also displayed on the LCD screen.

It is also possible to provide attention, alert and alarm visual indications for the CMS portion of the Interlock SIL monitor via red and green LEDs located on the front panel.

GM Detectors and Ranges
• GM-1304 Range: 0.1 mSv/h – 10 Sv/h (0.01 rem/h – 1,000 rem/hr)
• GM-1314 Range: 10 μSv/h – 3 Sv/h (0.03 mrem/h – 300 rem/hr)
• GM-1324 Range: 0.3 μSv/h – 0.1 Sv/h (0.03 mrem/h – 10 rem/hr)
• GM-1202 Range: 0.1 μSv/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 – 1000 rad/h)
• GM-1313 Range: 10 μGy/h – 3 Gy/h (0.001 rad/h – 300 rad/h)
• GM-1321 Range: 3 μGy/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
• Maximum probe separation is 100 m (330 ft) directly from the UDI and >1,100 m (3,600 ft) with an external power unit

Alarm Facilities
• Fast, valid warning of high activity or fault
• Three activity alarm thresholds and other parameters can be set by the user and passcode protected

Communications (Non-SIL)
• 1 x RS232 port
• 1 x RS485 port
• Ethernet 10BaseT (HTTP, FTP)
• Detector Interface RS-422 (balanced differential line)

Outputs
• Fail-safe relay contacts for faults and alarms
Ethernet 10baseT (HTTP, FTP)

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

Environmental
• IP54 (IP65 detector option available)

Approvals & Standards
• IEC 61508 Safety Integrity Systems
• Compliant with 73/23/EEC- EMC Directive
• Type approval at NRPB
• Compliant with 93/68/EEC Low Voltage Directive
• Designed to IEC 60532 (Installed Gamma)

Operating Environment
• Indoor use (or suitably enclosed); designed to IP54
• 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)
• Frequency: 47 to 60Hz
• Max. Current: 100mA
• Internal 1A anti-surge fuse

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

Dimensions (HxWxD) & Weight
• Height: 458 mm (18 in)
• Depth:150 mm (5.5 in)
• Width: 200 mm (8 in)
• Weight: Approx 7 kg (15.5 lb)

Visual Display
• Large LCD graphic display 114 x 64 mm (4.5 x 2.5 in) with backlight
• Fully sealed membrane keypad
• Both digital and analog display
• Key switch

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 Interlock SIL continuously self monitors for faults. Conditions checked include:
• Detector failure
• Power failure
• Detector over range

Specifications

NAME	DESCRIPTION
0017/0013	CMS Interlock SIL with GM-1304 detector