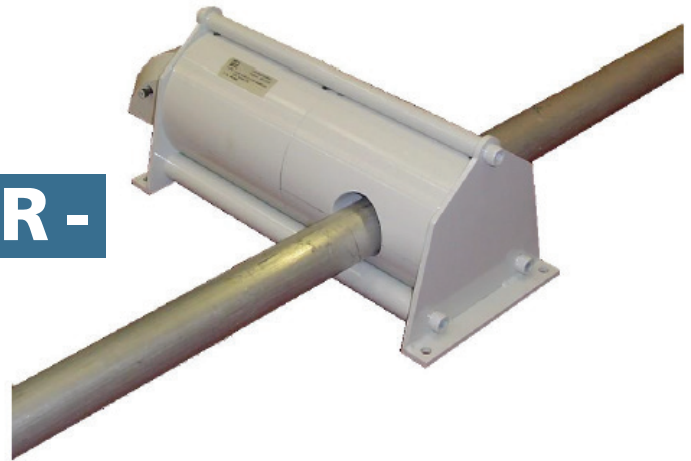


ON-LINE LIQUID EFFLUENT MONITOR - OLEM



FAST INDICATION OF GENUINE RELEASES THROUGH ADVANCE ALARM ALGORITHM

UNIQUE LEAD DESIGN FACILITATES SHIELDED INSTALLATION

NaI AND CsI DETECTOR OPTIONS ALLOWS THE SELECTION OF THE RIGHT DETECTOR FOR YOUR APPLICATION

VERSATILE DESIGN FOR BOTH HORIZONTAL AND VERTICAL PIPE RUNS

HIGH SAFETY INTEGRITY (OPTIONAL SSM BOARD PROVIDES HIGH INTEGRITY REDUNDANCY CIRCUIT)

Ultra Electronics Nuclear Control Systems On-line Liquid Effluent Monitor (OLEM) has been developed to continuously measure radioactive gamma emitting isotopes in process lines.

The OLEM system includes detector, electronics and lead shielding. The detector and shield assembly is totally non-invasive to the process line, and there is no need for a pumping system or tapoff points for sample removal and return.

EASY INSTALLATION

The 'clamp-on' arrangement of the OLEM system also makes it easy to install. The shielding can be mounted horizontally or vertically to accommodate process pipe runs, and a mounting plinth may be supplied to raise the OLEM above the floor line if necessary.

HIGH EFFICIENCY

The OLEM can be configured to measure gross gamma radiation, or isotopic specific radiation in the process line. A high efficiency NaI(Tl) or CsI(Tl) detector (sized depending on the diameter of the process line), is used to take the measurement. The detector is optionally temperature stabilized and can also possess an in-built radioactive pulser that allows the user to perform routine performance checks on the system.

CMS DIGITAL RATEMETER

The standard OLEM shielding solution uses 2 inches of lead around the detector and pipe to minimize interference from background. Alternative shielding assemblies are available and if required, the system may be furnished with an optional cooling jacket for high temperature process applications.

After amplification and pulse shaping, the detector signal is transmitted to a Continuous Monitoring Station (CMS). The CMS is an advanced digital ratemeter providing a continuously updating display of result values and generating audible-visual alarm indications in the event of an activity event or system fail.

LOW DETECTABLE LIMIT

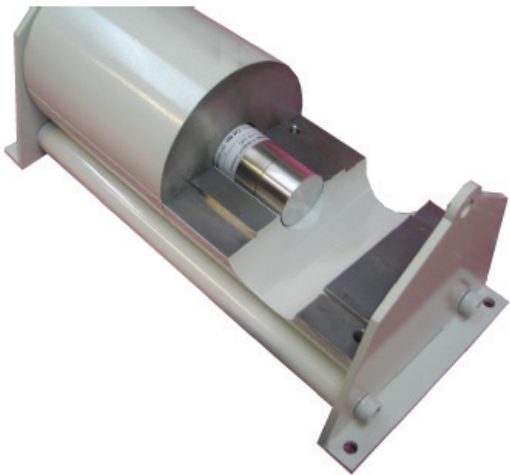
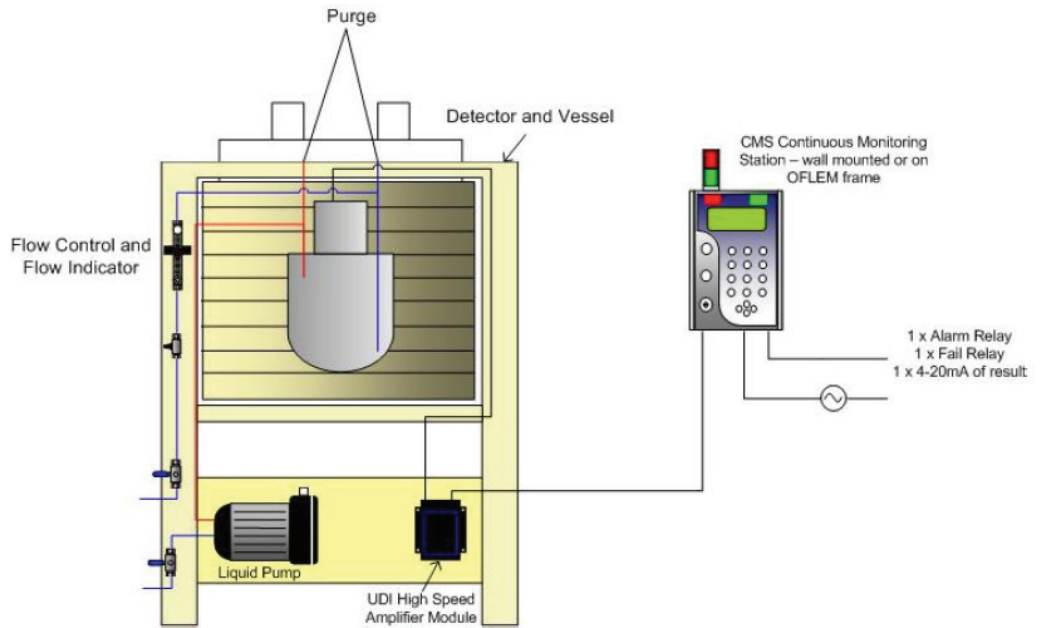
The CMS can be configured to report in raw count-rate (cps or cpm) or engineered units (i.e. $\mu\text{Ci}/\text{ml}$). Under typical conditions and using a 60 second count time the OLEM offers a minimal detectable activity (MDA) of well below $1 \times 10^{-6} \mu\text{Ci}/\text{ml}$.

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HIGH SAFETY INTEGRITY

As an added benefit, the CMS can be provided with additional hardware for high safety integrity. This hardware, called the SIL Safety Module (SSM*) conforms to Safety Integrity Level 2 (SIL2) in accordance with the IEC 61508 standard. The SSM independently monitors the detector output with a simple and separate scaler circuit. Detector counts are evaluated in this way, and the SSM will activate alarms in the event of a high detector count. No software is used with the SSM and each component in the circuit has been evaluated using a detailed failure mode and effects analysis. Although the SSM is resident within the CMS, the board is fully isolated and possesses its own power supply, power backup and output relays for driving audible and visual alarms and interlocks.

* More information on the SSM module is available on request.



By offering users a SIL2 compliant solution, the OLEM gives added protection over conventional systems. The SSM provides a safeguard in the event the main CMS processor fails and reduces the overall risk of fail to alarm' scenarios. This is especially important when a failure of the system could indirectly expose people, the process or equipment to radiological or other hazardous conditions.



THE INNOVATIVE LEAD SHIELDING DESIGN OF THE OLEM MAKES INSTALLATION AND MOUNTING OF THE SYSTEM EXTREMELY EASY

DETECTOR ASSEMBLY

PERFORMANCE SPECIFICATION

Detector Type	Nal(Tl) or CsI(Tl), depending on application. Crystal size selected to suit
Shielding	2" to 4" (50.8mm to 101.6mm) as required
Pipe Size	Can accommodate 1" to 12" (25.4mm to 203.8mm) diameter pipework
Measuring Range	$<1 \times 10^{-6}$ $\mu\text{Ci/ml}$ - 1×10^{-1} $\mu\text{Ci/ml}$
Temperature Range	0°C to 50°C (32°F - 122°F) Ramp Rate (Max) - 2°C / hr
Shield Dimensions	8" x 8" x 16" (203.2mm x 203.2mm x 406.4mm) (2" / 50.8mm shield)
Calibration / Check Source	Stick mounted for manual check. Optional solenoid operated automatic source

CMS GAMMA

PERFORMANCE SPECIFICATION

Dimensions	18" x 8" x 5½" 457.2mm x 203.2mm x 139.7mm
Enclosure	304 Stainless Steel
Display	Large LCD graphic display with backlight
Alarm Indication	<ul style="list-style-type: none"> • Two layer status light column (Totem Pole, Red + Green LED) • Audible alarm sounder: 2 tones alternating at 1.2Hz > 100dB
System Outputs	<ul style="list-style-type: none"> • Up to four relay outputs (Alarm1, Alarm2, Alarm3 and Fault) • RS-232 • RS-485 • 2 x analogue outputs • Ethernet 10baseT
Power	<ul style="list-style-type: none"> • 85 to 260 VAC • 47 to 60 Hz



making a difference

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