



MIRION
TECHNOLOGIES

SafePoint™ RMS : SUSTAINABLE » COMMITTED » SECURE

OLM Series, On-Line Process Monitoring Systems

Features

- Continuous liquid and gas radioactivity monitoring in pipes
- Configurable to fit various pipe sizes
- Modular design
- Gain stabilized scintillation detector
- Extended dynamic range
- Excellent linearity and accuracy

Major Assemblies

- OLM100 sampler
- MD55EV1 detector
- PA300E preamplifiers
- iR7040 Intelligent Ratemeter
- MX9B(V19) isotopic check source

Description

The OLM series on-line monitors are designed to continuously measure the quantity of radioactive gamma activity in a liquid or gaseous stream. The system is attached to the exterior of the process pipe and has no intrusion in the pipe and therefore no impact on the pipe flow. This setup is functional for pipe sizes between 25 to 178 mm (1 to 7 in.) in diameter. For larger pipes, CANBERRA offers floor or plinth mounted configurations which fit horizontal or vertical process pipes.



The on-line sampler is designed to fit the pipe curvature and mounts directly on the pipe. It includes a MD Series scintillation detector and a isotopic check source assembly for routine operability checks. The output from the detector is amplified by the PA300E preamplifier and sent to the wall mounted iR7040 intelligent ratemeter. The iR7040 provides complete local display and control of the monitoring channel, as well as local indication of alarm trips and system malfunctions. Optional remote ratemeters or alarm annunciators can be connected to the local unit.

The calibration cycle for the OLM is 18 months. The extended calibration cycle is achievable because of a simple functional design with no moving parts, use of low current consuming electronics, and technological advantage of CANBERRA's exclusive gain stabilization circuit that automatically compensates gain shifts caused by changes in temperature and aging.

Clam Shell Style, On-Line OLM Sampler

The OLM sampler is a shielded unit that surrounds the pipe being monitored. Lead wall minimize background radiation interference. A well inside the sampler provides the gamma scintillation detector with a repeatable geometry for measurement. The detector sits inside a nylon tube that electrically insulates it from the shield assembly. A preamplifier, mounted on the shield, takes the detector output to the iR7040 Intelligent Ratemeter. A Solenoid operated check source is mounted to the sampler for routine operability checks.

Cannon Style, On-Line Pipe Sampler, Model OLM100

The on-line pipe sampler consists of a 2π lead shield with the lead thickness designed to furnish the required sensitivity with a known background (normally 3 in. lead). A shadow shield or back shield is available for mounting on the other side of the pipe to provide an effective 4π shielding.

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Check Source

A solenoid operated check source assembly is mounted on the outside of the OLM sampler. The assembly contains a nominal 9 μCi of ^{137}Cs or ^{90}Sr isotope for use in checking detector, preamplifier and ratemeter operational status. The mechanism is powered from the ratemeter.

MD Series Gamma Scintillation Detector

Detector selection is based on the application requirement such as temperature and required range. CANBERRA offers a series of scintillation detectors for a wide temperature range of $-10\text{ }^{\circ}\text{C}$ to $+150\text{ }^{\circ}\text{C}$ ($+14\text{ }^{\circ}\text{F}$ to $+302\text{ }^{\circ}\text{F}$). The standard MD55EV1 offers high sensitivity within a temperature range from $-10\text{ }^{\circ}\text{C}$ to $+50\text{ }^{\circ}\text{C}$ ($+14\text{ }^{\circ}\text{F}$ to $+122\text{ }^{\circ}\text{F}$). This includes a NaI thallium activated crystal, 50.8 x 50.8 mm (2 x 2 in.). The detector is mounted inside the sampler. The pulses are sent to a preamplifier, PA300E.

PA300E Preamp/SCA

The PA300E is controlled via the host ratemeter using software controls to adjust the single channel analyzer (SCA) window settings such as window width and energy threshold. PA300E settings are maintained in non-volatile memory to automatically reset the system after power disruptions.

For additional information including scintillation detectors principle of operations, see the Scintillation Detectors – MD Series data sheet.

iR7040 Intelligent Ratemeter

The iR7040 takes the signal from the PA300E preamplifier, digitally filters the rate and displays the activity on the display. The iR7040 also provides power through the relay contact to energize the check source solenoid mounted on the OLM100 sampler housing.

CANBERRA's iR7040 advanced, multi-microprocessor-based digital ratemeter will support any reporting requirement and radiation or activity unit of measure. Its large industrial color touch-screen interface is easily readable under all conditions. An integrated termination panel makes installation and servicing quick and simple. All data is captured and stored in a 2 GB flash memory providing a complete history of all parameters, readings, alarms and functions, source check readings and calibrations. System reliability is enhanced through the iR7040s rigorous self test functionality.

- **Configuration not customization!** The iR7040 Set-up is performed through the on-board menu or with a PC-based utility. One hardware configuration accommodates all detectors and applications. Configurations, once established, may be saved to a database for back-up and then used to rapidly configure a replacement should that need arise.
- **Virtual Channels™.** A feature unique to the CANBERRA iR series ratemeters is its virtual channel capability. The ratemeter provides up to 32 user configurable channels that can be used to marry any or all of the four probe inputs and external measurement inputs to monitor and control parameters and processes normally done through an attached control system.
- **Termination Panel.** The iR7040 incorporates an integrated, deportable termination panel on the rear of the ratemeter. This unique feature speeds installation and any subsequent maintenance.
- Unparalleled Measurement and data integrity via redundant internal processing and error checking
- Color touch screen display, provides bright and easy to read display of ratemeter data. The touch screen interface provides a fluid, intuitive interaction without the need for another laptop to interface or the tedium of scrolling through menus.
- Enhanced Calibration Capabilities to simplify calibration routines, reduce error-likely situations, improve traceability and maximize equipment availability.

For additional information see the iR7040 specification sheet.

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Specifications

SAMPLER SPECIFICATIONS

- OLM-100 SAMPLER
WEIGHT – 272 kg (600 lb) nominal.
- OLM-4 SAMPLER
WEIGHT – 753 kg (1660 lb) nominal.
- FLOW RATE –
Determined by existing flow rate.
- MAX DESIGNED PROCESS FLUID TEMPERATURE –
+150 °C (+302 °F).
- SIZE – Configuration dependent.



MD55EV1 GAMMA DETECTOR SPECIFICATIONS

- DETECTOR TYPE – NaI crystal, 50.8 x 50.8 mm (2 x 2 in.).
- DYNAMIC RANGE – 3.7×10^3 to 3.7×10^9 Bq/m³ (1×10^{-7} to 1×10^{-1} μ Ci/cc).
- EXTENDED RANGE – to $3.7 \times 10^{+12}$ Bq/m³.
- TEMPERATURE – -10 °C to +50 °C (+14 °F to +122 °F).

PA300E PREAMP

- AMBIENT TEMPERATURE – -10 °C to +50 °C (+14 °F to +122 °F).
- HUMIDITY – 0-95%, non-condensing.
- HOUSING – NEMA-4X stainless steel box.
- DIMENSIONS – 152.4 x 152.4 x 101.6 mm (6 x 6 x 4 in.) (L x W x H).
- WEIGHT – 1.81 kg (4 lb).

For complete specifications, see the Scintillation Detectors – MD Series data sheet.

MX9B(V19) Check Source Assembly

- SIZE – 102 x 76 x 38 mm (4 x 3 x 1.5 in.).
- WEIGHT – 0.5 kg (1 lb).
- CHECK SOURCE – 9 μ Ci (nominal) ¹³⁷Cs.

iR7040 Intelligent Ratemeter

RANGE

- Dependant on probe(s) attached.

MICROPROCESSORS

- One Embedded PC (EPC) running Windows® CE, display operations.
- One Control Processor, receives and processes probe and analog data from probe processor.
- One Probe Processor, processes probe inputs.

CHANNELS

- Four external detector inputs.
- Thirty-two virtual channels, user configurable incorporating any ratemeter input, external input or algorithm.

USER INPUT/OUTPUT

- User input and configurations served by:
 - Direct input from the touch sensitive screen.
 - Via USB, from a laptop computer or keyboard.
 - For Ratemeters integrated into a system, from the system.

CONTROLS

- Easily configured with key switch security.
 - Key switch selects ratemeter modes, off/on, remote or maintenance.
- Installed Pulser for test (manual or automatic).

ACTIVATES AND LOGS TESTS

- Internal or external check source.
- Scintillator LED test rate.
- Adjustable pulser.
- Adjusts regions of interest for MD series scintillators.

INPUT/OUTPUT

INPUTS

- Four detectors (any of CANBERRA's line of RMS detectors including, GM detector, ion chamber, scintillation, neutron, gas proportional and specialty), each with:
 - TTL/current signal.
 - Analog 0-10 V, 10 bit resolution.
 - RS-422 serial.
 - +5 V, \pm 15 V and 24 V dc power outputs.
 - Switched 24 V dc (check source control).
- Each channel uses a 12-bit DAC capable of high resolution and good linearity.
- Five analog, fully isolated: 4-20 mA or 0-10 V 12 bit resolution. (Flow measurement, temperature, etc.)
- Eighteen digital (TTL logic) (flow switches, sample changers, etc.).

OUTPUTS

- TEN DIGITAL – TTL 0-5 V. (Pump/purge/heat trace control, sample changers, etc.).
- SIX ISOLATED ANALOG – 4-20 mA or 0-10 V. (Data reporting, flow control, temperature, etc.).
- Eight safety relays. One for faults, seven for alarms, test, etc.
- Each safety relay has four contacts that mechanically move together with one monitored to detect failure. Remaining three contacts consist of two normally open (form A) and one normally closed (form B). Form C function is met using one Form A and one Form B. Relays may be configured to be normally energized or deenergized.

COMMUNICATIONS

- One Ethernet (10Base-T).
- Three RS-485 serial, two isolated.
- Two RS-232 serial.

DATA HANDLING

- Two External USB ports (for exporting log data, importing and exporting system configuration and for internal firmware updates).
- Two GB Flash Memory (histogram).

DISPLAYS AND ALARMS

- Large, 21 cm (8.25 in.), diagonal industrial, hardened, color touch-screen display.
- Bright, tricolor LED; red, amber and green.
- Front panel embedded audible alarm annunciator with adjustable volume and local or remote silencing.
- Tricolor light tower for optimum visibility and indication of status; red, amber and green.

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POWER

- AC (100 to 240 V, 50 to 60 Hz at 100 VA) or DC, 24 V dc ($\pm 10\%$ at 120 W).

PHYSICAL

- CONFIGURATION – wall-mounted.
- CONSTRUCTION – stainless steel, IP65 enclosure, NEMA4X.
- Termination panel for connecting plant wiring interface is located in the rear of the ratemeter in a separate hinged, IP65 enclosure to conserve wall space. Opening the termination panel does not open the main Ratemeter case, which has a separate hinged and sealed door.
- SIZE – 320 mm high x 275 mm wide x 250 mm deep (13 x 11 x 10 in.); light tower adds 263 mm (10.4 in.) height.
- WEIGHT – 10 kg (22 lb).

ENVIRONMENTAL

- OPERATING TEMPERATURE RANGE – 0 °C to 60 °C (32 °F to 140 °F).
- Meets the environmental conditions specified by EN 61010, Installation Category I, Pollution Degree 2.
- HUMIDITY – 95%, non-condensing.
- SEISMIC – Qualification in accordance with IEEE Std 344-2004, IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations.
- SAFETY – Tested to IEC 61010-1:2001 (Second Edition) / EN 61010-1:2001.
- EMC – Tested to IEC 61326-1:2006.

QUALITY

iR series ratemeters are designed and manufactured under a quality system in compliance with the following standards and requirements:

- ISO 9001.
- 10CFR21.
- 10CFR50, Appendix “B”.
- IEEE-730.
- ANSI/ASME NQA-1, ANSI/ASME NQA-2, Part 2.7.
- CE.
- TUV SUD America is a listed NRTL.
- IEC 60532
- IEC 61513, class 2 and 3

Optional versions available for safety-related, SIL2, safety category B.



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