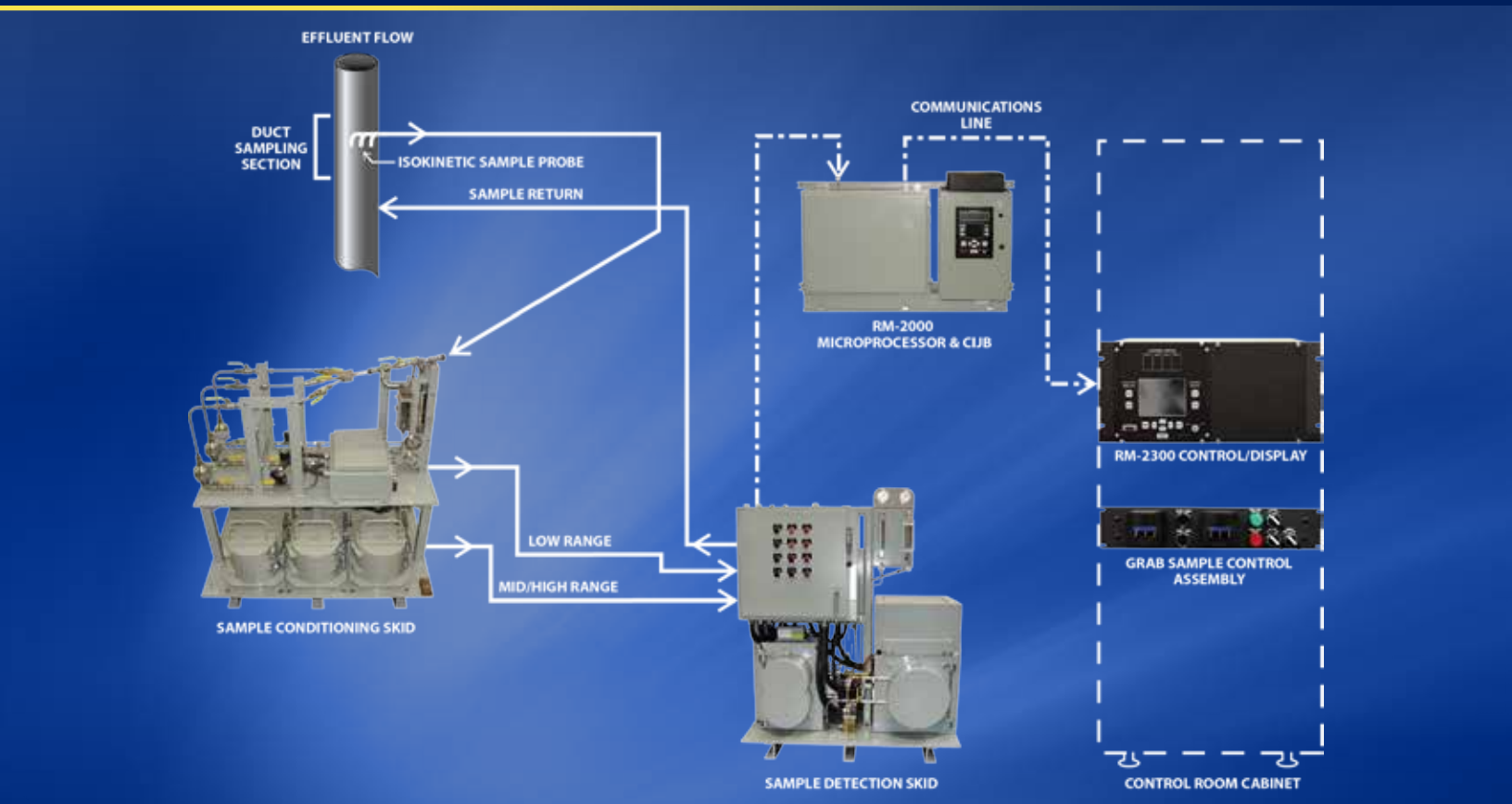
WIDE RANGE GAS MONITOR



RADIATION MONITORING SYSTEMS FOR A LIFETIME OF SERVICE

Since 1965, General Atomics has been a recognized world leader in the design, manufacture, and support of high quality, extremely reliable radiation monitoring systems for the nuclear industry. Our unmatched technical expertise, support services, and extensive manufacturing and testing capabilities keep systems operating efficiently and safely for a lifetime of service.

GENERAL ATOMICS
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WIDE RANGE GAS MONITOR SYSTEM ASSEMBLIES

SAMPLE CONDITIONING SKID

- Separate particulate and iodine filter sets for each flow path
- Two prefilters and one sample filter in each set
- 4π lead shielding enclosures for the high concentration filters
- Manual filter selection controls located in side enclosure
- Filter selections can be made locally or remotely
- Remote control grab sample assembly

The Sample Conditioning Skid is located down-stream from the Isokinetic Sample Probe Assembly. Each of the two sample flow paths is provided with two prefilters and one sample filter. The selectable prefilters prevent contamination of the detectors on the Sample Detection Skid by filtering particulates and iodine. The sample filter provides particulates and iodine sample for laboratory analysis. Solenoid valves control the sample flow path by operator request. This configuration allows filters to be changed quickly without affecting the monitor. Filters on the mid/high-range flow path have 4π solid-cast lead shielding enclosures to minimize exposure to personnel. A sample can be collected or a prefilter path selected locally with switches in the electrical enclosure or remotely with switches in the Control Room Display Assembly.

10 CFR 50 APPENDIX B | ISO 9001:2008 | NQA-1 QA PROGRAM | NUPIC CERTIFIED | NRC APPROVED VENDOR | REGULATORY GUIDE 1.97 | SAFETY RELATED, CLASS 1E

SAMPLE DETECTION SKID

- RD-52 Gas Detector for low concentrations
- RD-72 Dual-Range Gas Detector for mid and high range concentrations
- 12-decade range
- 4π lead shielding for detectors & electronics
- Long half-life integral checksources for each detector
- Automatic purge and isolation of RD-52 Gas Detector or RD-72 Dual-Range Gas Detector when concentration is out of range
- Separate flow sensors, flow control valves, and pumps for each sample path

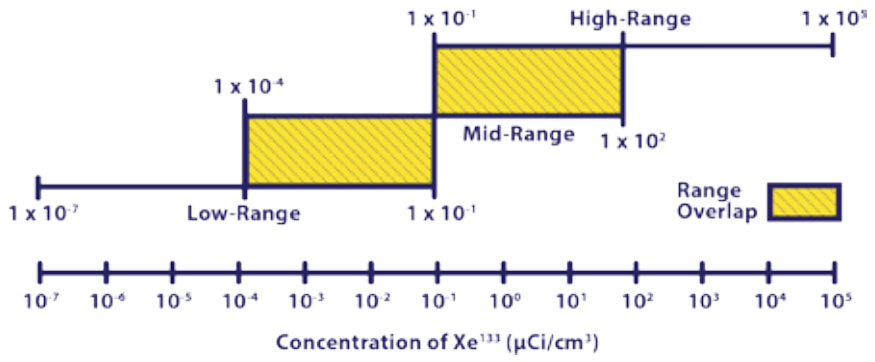
The Sample Detection Skid is located down-stream from the Sample Conditioning Skid. It monitors radioactive gas concentrations over a 12-decade range using three radiation detectors. Each of the two flow paths has separate pumps, valves flowmeters, relays, and control switches. The flow through the monitor is automatically controlled by the RM-2000 Digital Radiation Processor to maintain isokinetic sample flow rates from the Isokinetic Sample Probe Assembly. Each detector has a radioactive checksource to verify proper operation, and a 6-inch lead shield to reduce background radiation effects. The low concentration flow path uses the RD-52 Gas Detector which contains a thin plastic scintillation detector. The mid/high concentration flow path uses the RD-72 Dual-Range Gas Detector which has two beta/gamma-sensitive solid-state CdTe detectors (one each for mid-and high-range detection). Range overlap provides continuity of measurement.

WIDE RANGE GAS MONITOR SYSTEM ASSEMBLIES

RM-2000 DIGITAL RADIATION PROCESSOR

- 8-channel capability
- Data acquisition and control
  - Multiple history files
- Menu-driven operator interface
- Application-specific database
- Local status indication
- Digital signal processing of analog signals
- External digital communications
- Automatic diagnostics/continuous self-test
- Electronic calibration
- Multi-channel analyzer
- Internal 120 Vac power filter
- Outlet for test instruments

The RM-2000 performs data acquisition, analysis and display, as well as monitor control functions, alarm relays, analog outputs, and digital communications. The RM-2000 database, which can be programmed for specific applications by the user, contains the calibration constants for the RD-52 Gas Detector and RD-72 Dual-Range Gas Detector, alarm set-points, and history files. The RM-2000 is easy to maintain, providing electronically adjustable high voltage power supplies, location-independent circuit cards, and a swing-out card cage for improved accessibility. The RM-2000/CIJB can be located up to 500 ft. from the Sample Detection Skid.



RM-2300 CONTROL ROOM DISPLAY ASSEMBLY

- Easy menu-driven access to database items
- Remote control of RM-2000 Radiation Processor
- Multi-channel, simultaneous display
- Easy, numeric entry
- Numerical and graphical display of radiation monitoring data
- High-resolution 12-bit digital-to-analog converter outputs to plant interface
- Provides alarm relay outputs

The RM-2300 Control Room Display Assembly provides remote control and display for the Wide Range Gas Monitor system. The RM-2300 continuously polls the RM-2000 for the radiation level and operation status. It provides data collection and display, and alarm annunciation for the RM-2000. Additionally, the RM-2300 performs RM-2000 database loading and changing provides 8 voltage analog outputs, and includes 32 relay drivers with programmable and selectable outputs. The RM-2300 also provides a supervisory key lockout switch and full self-diagnostic/testing capability.

Custom System Options Available

WIDE RANGE GAS MONITOR ASSEMBLY SPECIFICATIONS

WRGM SYSTEM SPECIFICATIONS	
Power/Voltage	120 Vac, 50 to 60 Hz, 15 A nominal at the main power disconnect switch on the Sample Detection Skid which provides power to the Sample Detection and Sample Conditioning Skids
- RM-2000 Microprocessor/ CIJB	4.0 A nominal
- RM-2300 Control Room Display	2.5 A nominal
Operational Range - Pressure - Temperature - Humidity	 Atmospheric 39^{0}F to 122^{0}F (4^{0}C to 50^0 C) To 95% (non-condensing)
Sample Temperature	120^{0}F (49^{0}C) maximum at 90% RH; 130^{0}F (54^{0}C) maximum at 70% RH
Environmental Temperature - RD-52 - RD-72	 39^{0}F to 122^{0}F (4^{0}C to 50^0 C) 39^{0}F to 122^{0}F (4^{0}C to 50^0 C)
Environmental Humidity - RD-52 - RD-72	 90% non-condensing 5-95%
Range* **Ranges & MDCs dependent on cosmic background & local fission product background*	10^{-7} to 10^5µCi/cm^3 (Xe^{133}) with 1 mR/hr background
Sensitivity - RD-52 - RD-72 Mid-Range - RD-72 High-Range	 Kr^{85} 7.19E7 cpm/µCi/ml, Xe^{133} 2.94E7 cpm/µCi/ml Kr^{85} 1.51E4 cpm/µCi/ml, Xe^{133} 1.42E4 cpm/µCi/ml Kr^{85} 58.9 cpm/µCi/ml, Xe^{133} 49.4 cpm/µCi/ml
Sample Pressure	15psig (0.10 MPa) maximum
Sample Flow Rate - Low Range - Mid/High Range	 1.7 ft.^{3}/min (802 cm^3/sec) nominal 0.06 ft.^{3}/min (28 cm^3/sec) nominal
Sample Connections - Low Range - Mid/High Range - Common Return Line - Connecting Lines	 0.5 in. (1.3 cm) tube fitting 0.25 in. (0.64 cm) tube fitting 0 .5 in. (1.3 cm) tube fitting Between Isokinetic Sample Probe Assembly manifold and Sample Conditioning Skid per ANSI N13.1-1969
Overall System Accuracy	Meets or exceed U.S. Regulatory Guide 1.97 (Rev.3)
Quality Assurance	Meets 10 CFR 50, Appendix B; ANSI N45.2

RMS-WRGM rev B 0505-2016