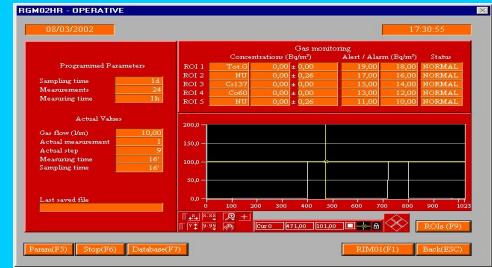
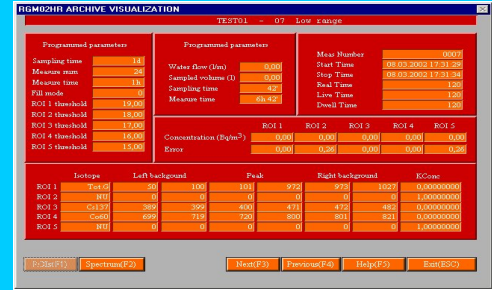


RGM-02 GAS MONITOR



The General Atomic Electronic Systems, Inc. RGM-02 gas monitor, in its complete configuration, includes two channels for high and low gamma activity concentrations and a local processor common for both the channels. A frequently used configuration includes an aerosol monitor placed upstream of the gas monitor. If the aerosol monitor is not provided, an aerosol filter is provided at the inlet of the gas monitor. The detectors are installed on skid frames for floor mounting and includes the measuring channels, for low and high range, including high and low volume stainless steel Marinelli sample chambers for installation of the radiation detectors. The sample chambers are lead shielded. Gas continuously passes through the sample chambers while flow-rate is measured. A vacuum pump is used to assure a flow-rate through the measuring units with proper flow splitting when both the channels are present. Isolation and manual flow control valves are included, as well as suitable grab sample ports when needed. A local processing unit (common to low and high range sub-units) provides for displaying, alarming, controlling and data communication.

The monitor measures gamma activity concentration in MBq/m³. As mentioned up to two measuring chambers (for low and high range) can be included with separate measurements or a composite measurement for the total range. The low range chamber contains a detector made of an integral assembly with a 3"x3" NaI(Tl) crystal and photo multiplier tube and associated electronics. This detector is installed in a 6150 cc (6.15 l) stainless steel Marinelli sample chamber with a thickness of 1 mm (0.04 ") for the external housing and a 0.7 mm (0.03 ") thickness for the detector. 5 cm (2 ") thick lead fully shields (4n configuration) the sample chamber and detector assembly from background radiation. The nominal gas flow-rate range is 1 to 5 m³/h (0.5 to 3 cfm), but other ranges can be provided. The high range chamber contains a detector made of an integral assembly with a 1"x0.5" NaI(Tl) crystal and photo multiplier tube, and associated electronics. The detector is installed in a 316 cc (0.316 l) stainless steel Marinelli sample chamber whose thickness is 1 mm (0.04 ") for the external housing and a 0.7 mm (0.03 ") thickness for the detector. 5 cm thick lead fully shields (4n configuration) the sample chamber and detector assembly from background radiation. The nominal gas flow-rate range 0.1 – 1 m³/h (0.05 to 0.5 cfm), but other ranges can be provided.

The RGM-02 uses an integral NaI(Tl)/PM/electronics assembly both in the low and high range measurement sections to ensure long term stability and temperature independent calibration. The detector assembly is coupled to a microprocessor based multi-channel analyzer that allows the control of all the measurement parameters via software from the local processor. Using a MCA for the spectrometric measurement allows several Regions Of Interest (up to 5 ROIs as standard with overlapping possibility) to be selected and placed on the relevant peaks of the radioactive gases or on spectrum areas. The net area of the regions is used with background subtraction to increase both sensitivity and measured concentration dynamic range. Gamma activities and concentrations are automatically computed at the end of each counting interval, whose duration can be adjusted both locally and remotely. The refresh rate is fixed at 120 seconds as standard, but special features and different timing can be included on request.

The system automatically checks each measurement against the alarm and alert set points and any data which is found to be outside the thresholds is recorded for diagnostic purposes. Set points, sampling intervals, and counting intervals may be defined both locally and remotely. All measurements are flagged with a diagnostic message indicating the current status of the system and measured values against set values.

The two chambers are calibrated at factory using the isotope of interest and a precise correlation between the 'Marinelli response' and the 'point-source response' is provided. Each chamber is provided with a hole into which a point source can be inserted reaching a precise axial position to confirm the correlation.

As an option, a remote actuated checksource can be provided for remote checking.

The Local Processor Unit includes: a CPU (x86 266 MHz type) with its auxiliaries and service memories (FD and 20 GB HD),

input/output analog and digital interfaces, dual serial interface for data communication, power supply.

The user interface includes: LCD b/w 10" display (color as option), keyboard with 'mouse' functions, main on/off and access controls. At the end of each sampling interval the monitor stores the following data: date and time of the measurement, total (and specific) gamma activity concentrations with confidence level, sampled air volume, operating conditions. All the above data are available locally and remotely. The management software provides the following basic functions: data acquisition and processing, alarm and Alert management, failure monitoring, data logging, communication with the central computer, local output and readout.

The units are supplied with a tool for placing a test/calibration source at a precise position in the measuring chamber.

TECHNICAL SPECIFICATIONS

Sampling volume: low range 6150 cm³ (6.15 l) lead shield 5 cm (2 ") 4π
 high range 316 cm³ (0.316 l) lead shield 5 cm (2 ") 4π

Measuring ranges: low range 10³ to 5·10⁸ Bq/m³ (27 to 1.25·10⁷ pCi/l) - other on request
 high range 10⁵ to 5·10¹⁰ Bq/m³ (2700 to 1.25·10⁹ pCi/l) - other on request

Nal(Tl) detector low range 3" x 3" typ. res. 7.5% (Cs-137)
 high range 1" x 0.5" typ. res. 7.5% (Cs-137)

Typical sensitivities: in cps per MBq/m³ (27,000 pCi/l) - other sensitivities and geometries available on request

Nuclide	Energy (keV)	HR Sensitivity	LR Sensitivity
Xe-133	81	1,77	74,9
Kr-85m	151	3,56	180,2
Xe-133m 233	0,27	20,4	
Xe-135	250	2,15	182,8
Kr-85	514	0,001	0,2
Ar-41	1294	0,16	64,5
Kr-88	2392	0,03	12,8

Calibration: programmable, resident on HD
 Accuracy: ± 15% typically
 Measuring Units: MBq and MBq/m³ (other units available on request – option G02-1)
 Stability: +/-10% over 500 h
 Test source actuator: optional (option G02-6)
 Local Processing Unit: includes industrial grade x86 CPU with auxiliaries & service memories, 32 MB RAM, 1.44 MB FD and ≥ 20 GB HD, 10" b/w LCD display (colour as option G02-2), keyboard with mouse functions, power supply, communication interfaces, main on/off and access controls etc

Alarms: Alert and alarm levels can be preset on the entire measuring ranges
 Free contact relays for alert, alarm and failure outputs (option G02-3)
 Display and visual & acoustic indicators for normal operation and equipment failure, alert, alarm
 The log file contains all the abnormal events including failures and alarms

Retention of Data: The system parameters are retained in case of power failure. More than half a million of archived data (up to 1 year's record) can be retained on the hard disk of system

Test Routines: Self-diagnostic routines are automatically performed for monitoring operation status, and failure message is displayed or/and indicated. Off-line testing routines include channel counting and gain calibration, pump and air flow rate regulation/measurement, outputs, mechanics etc

Analog Output: 0 or 4 - 20 mA or 0 - 1V (option G02-4)
 Serial interface: RS232 or RS422 or RS485
 Network interface: RJ-45 100/10 BASE-T Fast Ethernet (option G02-5)
 Pump: (autonomous models only) rotative, oil free
 Flow-rate functions: measurement 5% (typ)
 Connectors: all the electrical and pneumatic connectors can be customized
 Power Supply: 220 or 110 Vac – 50 or 60 Hz
 Dimensions: low range 760 x 600 x 500 mm (30 x 24 x 20") - high range 660 x 600 x 500 (26 x 24 x 20")
 local processor rack module 6U
 mounted at the top of a cabinet 24 to 28 U – 1380 or 1460x565x800 mm (54.3 or 57.5x22.2x31.5")

Weight: low range; approx. 300 kg (approx. 660 lbs) high range; approx. 200 kg (approx. 440 lbs)
 rack cabinet approx. 60 kg (approx. 130 lbs)
 Other on request

Models: RGM-02 (with both measuring heads), RGM-02LR (with low-range head only)
 RGM-02HR (with high-range measuring head only)

Operating Environment: 0°C to 40°C (32 to 104 °F), 0 - 90% RH non-condensing
 Protection: IP43 (higher available on request)
 EMC: current CE directives
 IEC Reference std.: 60761-1/3, 61306