

AM1G Continuous Air Monitor (Noble Gas)

INTERNET READY

GAIN STABILIZED



SDA3E

RM1R DISPLAY & CONTROL UNIT



Model AM-1G Noble Gas Monitor.

The model AM1G is a single channel air monitoring system used for continuous measurement of noble gases. The AM1G includes an Apantec model GS45 Noble Gas Sampler for repeatable measurement and attenuation of gamma background energies. The GS45 provides a sensitive volume of approximately five liters surrounded by a 4" thick lead shield. A particulate and iodine inline fixed filter is provided upstream of the inlet to the GS45 noble gas volume to remove unwanted particulate and iodine activity from interfering with the noble gas measurement. Internal to the sampler and mounted in close proximity to the filter media is an Apantec SD series scintillation detector. The standard detector is the Apantec model SD201 beta scintillation detector. The detector has an associated Preamp/SCA model SDA3E for operation of the detector, and for signal conditioning. The output of the SDA3E is wired to a locally mounted RM1R display and control unit. The detector includes a beta sensitive plastic scintillator for measurement of beta activity.

A vacuum pumping system capable of 1 SCFM (30 LPM) is included on the AM1G monitoring skid. The pumping system includes a flow control valve and rotameter for establishing the desired flow rate through the sampler. Pump controls will be provided on the local skid. The local RM1R units interface with remote RM1R units via serial communications for optional full remote control of each channel.

Noble Gas Activity:

Lower Limit of Detection: 1E-7 uCi/cc

Dynamic Range: 1E-7uCi/cc-1E-1uCi/cc(Ref. Xe-133)

System Features

- System Skid Assembly, fully wired & plumbed
- GS45 Lead Shielded Sampler
- SD201 Beta Scintillation Detector
- Isotopic Check Source (optional)
- Fixed Filter Holder
- Preamplifiers/SCA/HV Supply
- RM1R Display and Control Units
- Pump and Sample Control (purge) Modules
- Power Distribution Box

SD201 Scintillation Detector/Preamp

Apantec has developed the SD Series of detectors for use in process monitoring systems. For the AM1G channel, Apantec has selected the **SD201** plastic scintillation detector for continuous measurement of the beta & noble gas activity. The **SD201** consists of a NE102 plastic scintillation, photomultiplier tube, mu-metal shield, dynode chain, Lucite light pipe, cylindrical enclosure and four foot long integral cable pigtail. A light emitting diode (LED) is located in the Lucite light pipe for automatic gain control. A thermistor located within the Lucite light pipe provides a temperature signal for temperature compensation. The detector housing is 2.5" in diameter x 7 inches long. The detector will be positioned within the lead shielded sampler for attenuation of gamma background contribution.

SD201 SPECIFICATIONS:

Detector: NE102 beta plastic scintillator
Dynamic Range: 1E+0 to 1E+7 CPM
Detector Output: Negative Pulse.
Accuracy: $\pm 15\%$ of true field intensity.
Linearity: $\pm 5\%$.
Operating Voltage: 500 to 1500 V.
Nominal Bgrnd: 10–15 CPM.
Humidity: up to 95% non-condensing.
Housing: Moisture Proof Stainless Steel.
Weight: 2.7 kg (5 lb).

SDA3E Preamplifier/analyzer

The SD201 beta scintillation detector detects the beta events and provides the nuclear pulses to an external SDA3E preamplifier/analyzer unit for pulse analysis. The preamplifier/analyzer unit analyzes the nuclear pulses, provides the detector biasing voltage, and performs gain stabilization. The preamplifier unit communicates with the skid mounted RM1R display and control unit for display of the measured activity and for alarm. The SDA3E is a NEMA-4 enclosed assembly mounted within five feet of the detector. The SDA3E 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. SDA3E settings are maintained in non-volatile memory to automatically reset the system after power disruptions.

Stabilization Benefits

The SD/SDA-series operates with a unique gain stabilization circuitry for temperature compensated drift-free operation ($< 5\%$ per year), resulting in improved accuracy and an extended 18 month calibration cycle. Inside the detector is a light emitting diode (LED) that is optically coupled to the light pipe assembly. The LED is pulsed at a known low pulse repetition rate with a known pulse width and amplitude to provide a reference signal. The SDA-3E contains circuitry that compares the LED pulses with a reference to provide closed loop feedback for automatic gain compensation, thus offsetting the effects of thermal drift and aging.

RM1R Display & Control Unit

The RM Radiological Activity Monitor series instruments are used as distributed display and control units with multi-function capabilities. The units utilize a single board PC/AT compatible design that includes robust communication capabilities such as RS485 serial ports, USB and TCP/IP Ethernet communication for networking. Digital and analog Input/Output (I/O) circuitry is included to allow the RM units to operate as data concentrators and controllers for devices external to the RM unit. The RM design has three radiological counting channels, allowing simultaneous processing of radiological data from up to three “smart” sensor channels. Information is displayed on a 240 x 128 pixel bit mapped LCD display mounted on the front panel of the RM unit. In addition to the bit mapped main display, the RM also provides discreet indicators for instrument status, such as High, Alert radiation alarms, and Fail/Malfunction conditions. An audible sounder is also included for audible annunciation of a radiological alarm.

AM100HT

NOTE: Apantec uses Model No. AM1HT to refer to the High Temperature version (such as 122⁰ to 200⁰F)