

AM31F

Continuous Air Monitor - Fixed Filter Particulate, Iodine and/or Noble Gas

SELF-CONTAINED

SINGLE SHIELD DESIGN



The **AM31F** is a continuous air monitoring system designed to measure the particulate, iodine and noble gas activity in a sample airstream. The **AM31F** uses three separate measuring channels arranged in series within the same lead shield to perform the measurement. A common vacuum pumping system is used for transport of the sample gases through the system. Local RM1R display and control units are included for system operation, data concentration and communication.

The particulate channel uses a lead shielded fixed filter sampler providing collection of airborne on industry standard 47mm diameter filter paper. The filter paper deposition is designed to provide an even distribution and positions the active end of the detector in close proximity to the filter media for maximum sensitivity. The particulate channel will be equipped with a beta sensitive plastic scintillation detector (model SD201P) for detection of beta emitting particles. The detector interfaces with a locally mounted spectrum analyzer (model SDA3E) which provides the low voltage power to the detector, interfaces the detector/SCA with the ratemeter, and provides an automatic gain control function.

The SDA3E unit communicates with the skid-mounted display and control unit (model RM1R) using Ethernet (TCP/IP), RS232 or RS485 communications for display of the measured activity and for alarm determination. The exhaust from the particulate channel is plumbed to the inlet of the iodine monitoring channel. The iodine monitoring channel is similar to the particulate channel and also uses a lead shielded sampler for collection of the iodine activity. In the iodine channel, a TEDA activated charcoal cartridge or silver zeolite cartridge replaces the particulate fixed filter media. A gamma sensitive scintillation detector (model SD220N) is placed within the lead shielded sampler with the sensitive end exposed to the collection cartridge. The SD220N detects the gamma events and provides the spectral information to an external SDA3E analyzer unit. The sample gases, with particulate and iodine activity removed, enter the noble gas sampler for measurement. The noble gas sampler is a lead shielded sampler enclosing a sensitive volume. A SD220N gamma scintillation detector or SD201P beta scintillation detector is located with the sensitive volume for measurement of noble gas activity.

The detector detects the nuclear pulses, provides biasing voltage, and transmits the count rate information to the locally mounted SDA3E analyzer. The noble gas sampler includes a vacuum transducer to automatically correct the measured activity to standard pressure.

The Vacuum pumping system uses a positive displacement carbon vane pump for transport of sample gases through the monitoring system. A flow meter and proportional control valve allows the sample flow rate to be manually set to the desired flow.

The AM31F is available in three configurations depending on the desired measurements(s):

One Channel	AM31-1F
Two Channel	AM31-2F
Three Channel	AM31-3F

Particulate Activity:

Lower Limit of Detection: 1E-11 uCi/cc
Dynamic Range: 1E-11 uCi/cc to 1E-5 uCi/cc Referenced to Cs-137

Iodine Monitors:

Lower Limit of Detection: 1E-11 uCi/cc
Dynamic Range: 1E-11 uCi/cc to 1E-5 uCi/cc Referenced to I-131

Noble Gas Activity:

Lower Limit of Detection: 1E-7 uCi/cc
Dynamic Range: 1E-7 uCi/cc to 1E-1 uCi/cc Referenced to Xe-133

Component Specifications:

SD201P

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

SD220N

Detector: NAI 2" x 2" Gamma Scintillation
Dynamic Range: 1E+0 to 1E+7 CPM
Detector Output: Negative Pulse.
Detector Accuracy: ±15% of true field intensity.
Detector Linearity: ±5%.
Operating Voltage: 500 to 1500 V.NOMINAL LED BKGND: 10–15 CPM.
Operating Humidity: up to 95% non-condensing.
Housing: Moisture Proof Stainless Steel.
Weight: 2.7 kg (5 lb).

SD201A Alpha Scintillation Detector

Apantec also offers the model SD201A ZnS alpha scintillation detector for measurement of alpha particles.

RM1R Series Display and Control Unit

Processor: 32-Bit High Performance ARM-base Integrated Microcontroller, with three integrated timer/counter channels for data acquisition, four UARTs for serial communications, digital I/O for user interfaces, Real Time Clock, Watchdog Timer, Battery-backed RAM, Program FLASH memory, and real time clock.

Display: 2 x 20 character vacuum fluorescent display Analog/Digital Auto ranging and Auto zeroing

Alarm/Status Indicators:
Red indicator: HIGH
Amber indicator: ALERT
White indicator: FAIL
Green indicator: NORMAL

Outputs: Digital (1) RS232, (3) RS485, or optionally (2) Ethernet Analog (4) 0-10VDC, or (4) 4-20 mADC isolated Six DPDT and one SPDT relays for FAIL, ALERT, HIGH & other alarms contact rating 5A @ 115VAC

Power: 90-260VAC, single phase, 47 to 63 Hz, 15 watts

Temp: -10⁰ to +50⁰ C

Humidity: 0-95% RH, non-condensing

SDA3E Analyzer

Power Requirements

Power requirements: max. 250 mA, +/-15 VDC

SCA parameters

Energy Range: 100 keV to 2.55 MeV variable In steps of 10 keV from keypad
Energy Sensitivity: 100 mV to 2.55 V approx. corresponding to energy range.
Mode: Integral or Differential
Window Width: +/- 1% to +/- 90% around center Energy.
Output Signal: Positive pulses, 0.5 usec wide Capable of driving 500 ft of cable
Energy Nonlinearity: +/-1% of full scale Window Width
Accuracy: +/-0.5% of energy setting

LED Test Signal

Equivalent Energy: 3 MeV
Background Rate: 10 to 15 CPM

Environmental

Temperature: 0 to 50 °C,
Dimensions: 6.25" W x 7.5" H x 5.03" D
Weight: 2 lbs. nominal

The **AM31F** is provided fully wired and plumbed in an enclosed cabinet for ease of maintenance. A power distribution circuit is provided which distributes the required operating voltages to the system electrical components. In addition, the power distribution circuit provides an instrument ground function as well as providing circuit breaker protection for the system.