

AIR or STACK MONITOR
GAS, GROSS BETA-GAMMA PARTICULATE, AND IODINE
Optional Alpha, Tritium and C14
MODEL # CAM-33, CAM-33-4, CAM-33-6

The **CAM-33** series are multi-channel air monitors for simultaneous measuring of gross beta / gamma particulates, and noble gas radioactivity, and iodine. Plus option of Alpha particulates, Tritium and Carbon-14.

Like all of the **CAM-33** series, these are leak free continuous duty, high capacity, rugged skid or caster mounted systems. Electronics includes computer with 17" COLOR LCD Monitor.

Electronics are plug-in modules allowing change or addition of function as needed and allowing rapid repair by substitution of modules in the field. The modular system is covered by T/A's unique exchange warranty, in addition to the full one-year warranty covering all T/A products.

Shields are void free lead encased in welded steel and with stainless steel liners and other features for long, useful life.

Filters are easily changed via quick disconnect, o-ring-sealed filter holder. Shield can be opened for filter change or cleaning with minimum effort. All shield connections and openings are sealed against air leaks.



The air moving system is based on a high capacity oil less air pump capable of delivering 120 lpm (4cfm) free air and including Real time flow rate measurement and data analysis. Resists corrosion and dust.

The entire system is mounted in a self-contained rugged wheeled cabinet and comes complete with all cabling, connectors, and software in place, setup, and ready to operate. The standard unit is operated from 115 V single phase, 60 Hz; 220V optional, 50 or 60 Hz. Stack monitor, room or duct monitor.

SPECIFICATIONS FOR CAM-33

Specifications	CAM-33	CAM-33-4	CAM-33-6
Channels	Three	Four	Six
Activity Detected	1. Beta-gamma particulate, 2.- Iodine, 3.- Noble gas	1,2,3 plus, 4 Alpha particulate	1-4 plus, 5.Tritium and 6. Carbon-14

STANDARD DETECTORS

Activity Detected	Beta-Gamma Particulate	Iodine	Nobel Gas
Filters	2" dia	2.5" dia x 1" thick	One Liter Chamber
Filter Type	Glass Fiber Filter	TEDA Activated Charcoal Cartridge	Stainless Steel Lined
Collection Efficiency	99% Efficiency at 0.3 micron particle size	60 KeV to 3 MeV (7 MeV optional)	60 KeV to 3 MeV (7 MeV optional)

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OPTIONAL DETECTORS

Activity Detected	Alpha Particulate	Organic Carbon-14	Tritium
Filters	2" dia	2.5" dia	Dual Ion Chamber
Filter Type	Glass Fiber Filter	TEDA Activated Charcoal Disk	Stainless Steel Lined

SPECIFICATIONS FOR CAM-33

Detector: 1 each Particulate Beta-Gamma: 2 inch diameter GM.
 Standard 1 each Iodine: 2 inch diameter NaI(Tl) Model PGS-3LI (Spectroscopic Grade)
 2 each Gas Standard Range: 2 inch diameter GM.

Detectors 1 each Alpha 2" dia- Kapton window GM
 (Optional) 1 each C-14- organic 2" dia Window Mica GM
 1 each C-14- 2" dia - CO₂ Dual Ion Chamber
 1 each H-3 Dual Ion Chamber

Shielding: 3" Lead; 4pi. Plus 1 to 3 inch lead placed between adjacent detectors
 Detector Sensitivity: Monitor is more sensitive on all channels by factors of 5 to 500 than is required by USNRC and other Regulatory Agencies.

Calibration: Follow on-screen instructions for user-assisted automatic calibration.

Decontamination: Shields are straight-through bore with Stainless Steel liner for easy Decontamination. Other wetted parts are stainless steel or quick + easy replacement.

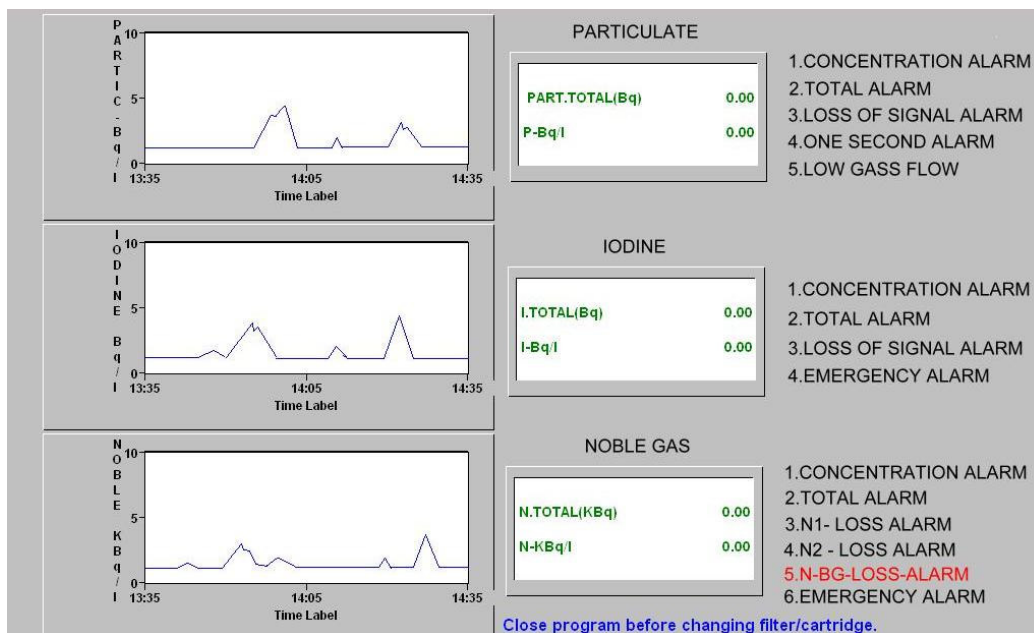
Type of Detector	1 Minute	1 Hour	10 Hours	1 Day	1 Week
Particulate Beta-Gamma Cs-137, Co-58, etc	6 x 10 ⁻¹⁰ uCi/ml/min	1x10 ⁻¹¹ uCi/ml 3.7 x 10 ⁻⁷ Bq/ml	1x10 ⁻¹² uCi/m 3.7 x 10 ⁻⁸ Bq/ml	6 x 10 ⁻¹³ uCi/ml 2.4 x 10 ⁻⁸ Bq/ml	1 x 10 ⁻¹³ Bq/ml 4 x 10 ⁻⁹ Bq/ml
Iodine I-131, etc.	3 x 10 ⁻⁹ uCi/ml/min	1 x 10 ⁻¹¹ uCi/ml 3.7 x 10 ⁻¹ Bq/ml	1x10 ⁻¹² uCi/m 3.7x10 ⁻⁸ Bq/ml	6x10 ⁻¹³ uCi/ml 2.4 x 10 ⁻² uCi/ml	1 x 10 ⁻¹³ Bq/ml 4 x 10 ⁻⁹ Bq/ml
Gas-Standard Range Xe-133, etc	6 x 10 ⁻⁷ uCi/ml	1x10 ⁻⁷ uCi/ml 3.7 x 10 ⁻³ Bq/ml	2.7 x 10 ⁻⁸ uCi/ml 1 x 10 ⁻³ Bq/ml	1 x 10 ⁻⁸ Bq/ml 3.7 x 10 ⁻⁴ Bq/ml	2.7 x 10 ⁻⁹ Bq/ml 1 x 10 ⁻⁴ Bq/ml

Each detector is protected against corrosion and moisture by design, construction, and 0.0005" window.

Measurement Ranges of Optional Detectors	From	4 Decade Model	6 Decade Model
Tritium	10 ⁻⁷	10 ⁻³	10 ⁻¹ uCi/cc
Inorganic C-14	10 ⁻⁸	10 ⁻⁴	10 ⁻² uCi/cc
Organic C-14	10 ⁻⁹	10 ⁻⁵	10 ⁻³ uCi/cc
Alpha particulate	5 x 10 ⁻⁸	10 ⁻⁴	uCi/cc

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Display Mode: Model CAM-33 features a Intel Processor Computer with a Color LCD Monitor.
 Reads out directly in concentration-Bq/l or other units plus total activity thru CAM-33 in KBq or Curies, etc.
 Operation: When CAM-33 continuous air monitor is in normal operation, the Color LCD Monitor displays:



High Voltage Supply: Separately variable from 0 to 2000. Extremely stable HV.
 LCD Color Monitor: 17 inch Monitor shows both real time concentration and accumulated dose for all channels. Data is shown both graphically and numerically.
 ACCURACY: +/- 10% except for resolution loss and statistical variation.
 ALARMS: Alarms are pre-settable by user to any trigger level.
 Low level Alarm: Automatic Reset
 High Level Alarm: High level alarm remains activated until RESET button is pushed.
 Alarm Indication Lights: 6 lamps Red-high level Amber-Low count for each channel, plus more indicators also shown on LCD monitor.
 Audio: 1000 Hz, greater than 80db.
 Outputs:

1. Logic Level Signal
2. Contact Closure or Opening
3. Ethernet LAN Connection
4. USB ports
5. DVD Writer

AIR MOVING SYSTEM:

Air Pump: Extremely rugged continuous duty- no lubrication required.
 Pumping System: Pump noise is reduced by heavy duty internal muffler.
 Oil less Pump Motor: ¾ Horsepower, 50/60hz, capacitor start, induction run.
 Flow Control: Flow Regulator Controls the flow from 0-4 cfm +/- 0.2 cfm.
 Optional Flowrate Display: On screen Flow Rate Display 0 to 4 or 0-120 lpm.
 Inlet and Outlet: (Available) (20 foot ¾) hose inlet: 6 meter 2.5 cm I.D. 20 foot 1" hose outlet. May be extended.
 Grab Sample Port:(Optional) Grab sample port.
 Flow Rate: Factory setting is at 4 cfm. Electronic mass flowmeter feeds Real Time data to CAM-33 software.

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Standard Installation:	Cart-Cabinet of heavy gauge steel. Caster mounted with 4 five inch ball bearing casters. Rubber rim. Two of these are full 360 degree swiveling. (Skid mount is optional.)
Special Safety:	Loss of system vacuum air flow alarm and relay switch closure. Loss of signal alarm. All system circuits are fused.
Power:	120 VAC – 220 VAC optional 50/60 Hz.
Features:	Thermal Protection on Motor. Positive displacement Pump
Options:	Three Channel push-button check sources (License Exempt Quantities) to Detect and Test each of the three channels. Also as a final option the flow rate can be increased to 30 cfm with larger pump and minor changes in the plumbing.
Dimensions:	29" wide by 31" long by 41" high exclusive of casters.
Weight:	1800 lbs standard. (Lighter weight models are available with 1" Shielding).
Shipping Weight:	1900 lbs.

ELECTRONIC SYSTEM DESCRIPTION : Computer is Intel Pentium based, including:

1. CPU with data acquisition
2. High Resolution, 17" LCD Color Monitor Display
3. Mouse
4. Graphic Printer for hard copy – 3 trace graphs.
5. 3 Channel 4-20mA interface is provided.
6. Keyboard
7. Audio
8. Manuals
9. CD/DVD Writer Combo for archiving data from previous year.
10. Minimum 200 gigabyte hard drive – Stores programs, plus room to add additional new software functions in the future.
11. Non-volatile 1 year data storage. Data is stored every 2 minutes- all year.
12. Specialized Air Monitor software custom tuned and designed for the CAM-33.
13. Ethernet-LAN and USB ports.

Technical Associates standard modular series – all solid state:

- 1 ea Digital Acquisition Board
- 1 ea. MGA-5202 with 4 amplifiers including fully adjustable single channel analyzer w/ independent High Voltage power supply for scintillation detector.
- 1 ea. MVR-0-5-24 Power Supply Module - individual +/- 1% stable high voltage for each detector. Once the high voltage levels are set by the technician, they do not change.
- 1 ea. HP Deskjet Color Inkjet Printer
- 1 ea. MAL-B3 Alarm Module
- 1 ea. PPC-33 Pump Power Control Module
- 1 ea. Mass Flow Meter with on-screen display

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Special Upgrades Incorporated Into TA CAM-33 Air Monitors:

- 4-20mA output signals – 3 channels
- Big 17" Color LCD Monitor
- LABTECH Virtual Instrument Software
- Real-Time Mass Flowmeter
- 3" Lead (Pb) shields now lighter weight due to more compact Beta-Gamma Detectors.
- Optional positive position motor-driven check sources with LED position indicator with greater "throw length" to preserve low background when source is retracted and to give trouble free operation.

CAM-33 IS A GOOD REPLACEMENT FOR PING-1A

Other Available Options or Choices:

- Shrouded probe or other air collection Nozzles are available.
- Touch-screen feature on the LCD color monitor
- Lighter weight system with 1" shielding
- Titanium detector cover
- Other detector types to replace 2" dia. GM detectors

PLEASE SEE SOFTWARE ["SCREEN SHOTS" FOR CAM-33](#) ON TA WEB PAGE "ALPHABETICAL LIST OF PRODUCTS".