AIR or STACK MONITOR

NOBLE GAS, GROSS BETA-GAMMA PARTICULATE, & IODINE

Optional Alpha, Tritium, Carbon-14

PART OF THE TOTAL-6 SERIES AIR & STACK MONITORS

Model – CAM-33 Series - CAM-33, CAM-33-4, CAM-33-6

FEATURES:

- THREE to SIX CHANNEL SIMULTANEOUS MEASUREMENT OF:
  - BETA-GAMMA PARTICULATE
  - IODINE
  - NOBLE GAS
  - ALPHA PARTICULATE
  - TRITIUM
  - CARBON-14
- DETECTORS MORE SENSITIVE BY FACTORS OF 5-500 THAN REQUIRED BY NRC
- BUILT-IN 4 GB COMPUTER
- 17" COLOR MONITOR
- HIGH CAPACITY OIL-LESS AIR PUMP
- REAL-TIME FLOW MEASUREMENT
- DATA ANALYSIS, ARCHIVE
- RUGGED, CASTER MOUNTED, SELF-CONTAINED CABINET

DESCRIPTION:

The **CAM-33 Series** are three to six channel air monitors for simultaneous measuring of Gross Beta / Gamma Particulates, and Noble gaseous radioactivity, and Iodine. The **CAM-33-4** includes Alpha Particulates.

The **CAM-33-6** has six channels for also measuring Alpha Particulates, Tritium, & Carbon-14.

These are continuous duty, high capacity, rugged skid or caster mounted systems. Electronics consists of 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 for long, useful life and easy decontamination.

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.

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

TECHNICAL ASSOCIATES
OVERHOFF TECHNOLOGY
Divisions of US NUCLEAR CORP

AIR or STACK MONITOR
NOBLE GAS, GROSS BETA-GAMMA PARTICULATE, & IODINE
Optional Alpha, Tritium, Carbon-14
PART OF THE TOTAL-6 SERIES AIR & STACK MONITORS
Model – CAM-33 Series - CAM-33, CAM-33-4, CAM-33-6

SPECIFICATIONS for CAM-33 SERIES:

	CAM-33	CAM-33-4	CAM-33-6
Channels	**Three**	**Four**	**Six**
Activity Detected	1. Beta-Gamma Particulate 2. Iodine 3. Noble Gas	1. Beta-Gamma Particulate 2. Iodine 3. Noble Gas 4. Alpha Particulate	1. Beta-Gamma Particulate 2. Iodine 3. Noble Gas 4. Alpha Particulate 5. Tritium 6. Carbon-14

STANDARD DETECTORS:

Activity Detected	Gross Beta-Gamma Particulate	Iodine	Noble 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	Up to 99% efficiency at 0.3 micron particle size	60 KeV to 3 MeV (7 MeV optional)	60 KeV to 3 MeV (7 MeV optional)

OPTIONAL DETECTORS:

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

AIR or STACK MONITOR

NOBLE GAS, GROSS BETA-GAMMA PARTICULATE, & IODINE

Optional Alpha, Tritium, Carbon-14

PART OF THE TOTAL-6 SERIES AIR & STACK MONITORS

Model – CAM-33 Series - CAM-33, CAM-33-4, CAM-33-6

DETECTORS for CAM-33 Series:

- **Particulate Beta-Gamma:** 2" diameter GM or optional Proportional Detector. **(1 each)**
- **Iodine:** 2" diameter NaI(Tl) Model PGS-3LI (Spectroscopic Grade) **(1 each)**
- **Gas Standard Range:** 2 inch diameter GM **(2 each)**
- **Shielding:** 3" lead; 4 pi. Plus 1 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 and easy replacement.

DETECTOR TYPE	1 MINUTE	1 HOUR	10 HOURS	1 DAY	1 WEEK
PARTICULATE BETA-GAMMA	6×10^{-10} µCi/ml	1×10^{-11} µCi/ml 3.7×10^{-7} Bq/ml	1×10^{-12} µCi/ml 3.7×10^{-8} Bq/ml	6×10^{-13} µCi/ml 2.4×10^{-8} Bq/ml	1×10^{-13} µCi/ml 4×10^{-9} Bq/ml
IODINE	3×10^{-9} µCi/ml	1×10^{-11} µCi/ml 3.7×10^{-7} Bq/ml	1×10^{-12} µCi/ml 3.7×10^{-8} Bq/ml	6×10^{-13} µCi/ml 2.4×10^{-8} Bq/ml	1×10^{-13} µCi/ml 4×10^{-9} Bq/ml
GAS-STANDARD RANGE	6×10^{-7} µCi/ml	1×10^{-7} µCi/ml 3.7×10^{-3} Bq/ml	2.7×10^{-8} µCi/ml 1×10^{-3} Bq/ml	1×10^{-8} µCi/ml 3.7×10^{-4} Bq/ml	2.7×10^{-9} µCi/ml 1×10^{-4} Bq/ml

OPTIONAL DETECTORS:

- **Alpha Particulate** 2" diameter Kapton window GM **(1 each)**
- **Organic Carbon-14** 2" diameter Window Mica GM **(1each)**
- **Carbon-14** 2" diameter $_2$DualCOIon Chamber **(1 each)**
- **Tritium** Dual Ion Chamber **(1 each)**

AIR or STACK MONITOR

NOBLE GAS, GROSS BETA-GAMMA PARTICULATE, & IODINE

Optional Alpha, Tritium, Carbon-14

PART OF THE TOTAL-6 SERIES AIR & STACK MONITORS

Model – CAM-33 Series - CAM-33, CAM-33-4, CAM-33-6

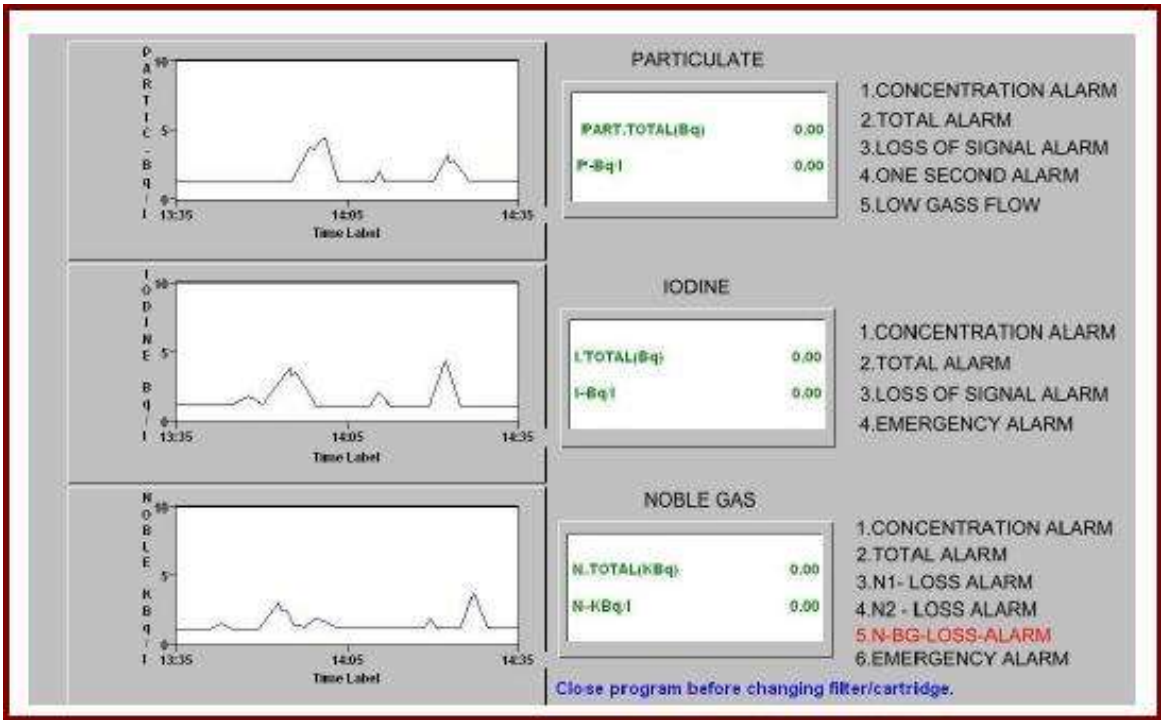
Measurement Ranges of Optional Detectors	Bottom of Range	Top of Range 4 Decade Model	Top of Range 6 Decade Model
Tritium	10^{-7} µCi/cc	10^{-3} µCi/cc	10^{-1} µCi/cc
Inorganic Carbon-14	10^{-8} µCi/cc	10^{-4} µCi/cc	10^{-2} µCi/cc
Organic Carbon-14	10^{-9} µCi/cc	10^{-5} µCi/cc	10^{-3} µCi/cc
Alpha Particulate	5 x 10^{-8} µCi/cc	10^{-4} µCi/cc	N/A

Each Detector is Protected Against Corrosion & Moisture by Design, Construction, & 0.0005" Window.

Display Mode: Model CAM-33 Series features a Computer with a Color LCD Monitor. Direct read out in concentration Bq/l or other units.

Daily total activity reads through the CAM-33 in KBq or Curies, etc.

Operation: In normal operation the CAM-33 Series, the Color LCD Monitor displays:



AIR or STACK MONITOR

NOBLE GAS, GROSS BETA-GAMMA PARTICULATE, & IODINE

Optional Alpha, Tritium, Carbon-14

PART OF THE TOTAL-6 SERIES AIR & STACK MONITORS

Model – CAM-33 Series - CAM-33, CAM-33-4, CAM-33-6

High Voltage Supply:	Separately variable from 0 to 2,000 VDC at 200 µa on scintillation or proportional channels
LCD Color Monitor:	17" Monitor shows both real time concentration & accumulated dose for all Channels
Accurancy:	+/- 10% except for resolution loss and statistical variation
Alarms:	Alarms are pre-settable 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 Lights Red-high level; Amber-low level count for each channel, plus more indicators shown on LCD Monitor.
Audio:	1,000 Hz, greater than 80 db
Outputs:	Alarm Condition Outputs: 1. Logic Level Signal 2. Contact Closure or Opening
Standard Installation:	Cabinet: heavy gauge steel. Skid or caster mounted 4 five inch ball bearing casters. Two of these are full 360 degree swiveling.
Special Safety:	Loss of system vacuum air flow alarm and relay switch closure. Loss of signal alarm. All system circuits fused.
Power:	120 VAC – 220 VAC; optional 50/60 Hz
Features:	Thermal protection on motor. Positive Displacement Pump.

AIR MOVING SYSTEM:

Air Pump:	Extremely rugged continuous duty
Pumping System:	Pump noise is reduced by heavy duty internal muffler
Oil-less Pump Motor:	3/4 Horsepower, 50/60Hz capacitor start, induction run
Flow Control:	Flow Regulator Controls the flow from 0-4 cfm, +/- 0.2cfm
Settable Flowrate:	On screen Flow Rate Display 0 to 4 or 0-120lpm
Inlet and Outlet:	20 foot 3/4" hose inlet: 6 meter 2.5 cm I.D 20 foot 1" hose outlet. May be extended
Flow Rate:	Factory setting is at 4 cfm. Mass flowmeter feeds Real-Time data to CAM-33 software.

AIR or STACK MONITOR

NOBLE GAS, GROSS BETA-GAMMA PARTICULATE, & IODINE

Optional Alpha, Tritium, Carbon-14

PART OF THE TOTAL-6 SERIES AIR & STACK MONITORS

Model – CAM-33 Series - CAM-33, CAM-33-4, CAM-33-6

OPTIONS:

- Caster or Skid Mount
- Grab Sample Port
- Three push-button Detect & Test sources (License exempt quantities) of the three channels.
- Flow rate can be increased to 30 cfm with larger pump and minor changes in the plumbing

WEIGHT, DEMENSION, SHIPPING:

Dimensions: 29" wide x 31" deep x 41" high - exclusive of casters.

Weight: 1800 lbs. (Lighter weight model available with 1" shielding**CAM-33-1P**). See

Shipping Weight: 1900 lbs.

ELECTRONIC SYSTEM DESCRIPTION:

1. CPU with data acquisition
2. High Resolution, 17" LCD Color Monitor Display
3. Mouse
4. 3 Channel 4-20mA Chart Recorder Drive available as option
5. Keyboard
6. Audio
7. Manuals
8. 4 GB hard drive - Stores programs, plus room to add additional new software functions in the future
9. Non-volatile 1 year data storage. Data stored every 2 minutes all year.
10. Specialized Air Monitor software custom tuned and designed for the CAM-33 Series Air Monitors.
11. Output:
    - Ethernet LAN Connection
    - USB Ports

OPTIONAL:

- Graphic Printer for hard copy - 3 trace graphs

AIR or STACK MONITOR

NOBLE GAS, GROSS BETA-GAMMA PARTICULATE, & IODINE

Optional Alpha, Tritium, Carbon-14

PART OF THE TOTAL-6 SERIES AIR & STACK MONITORS

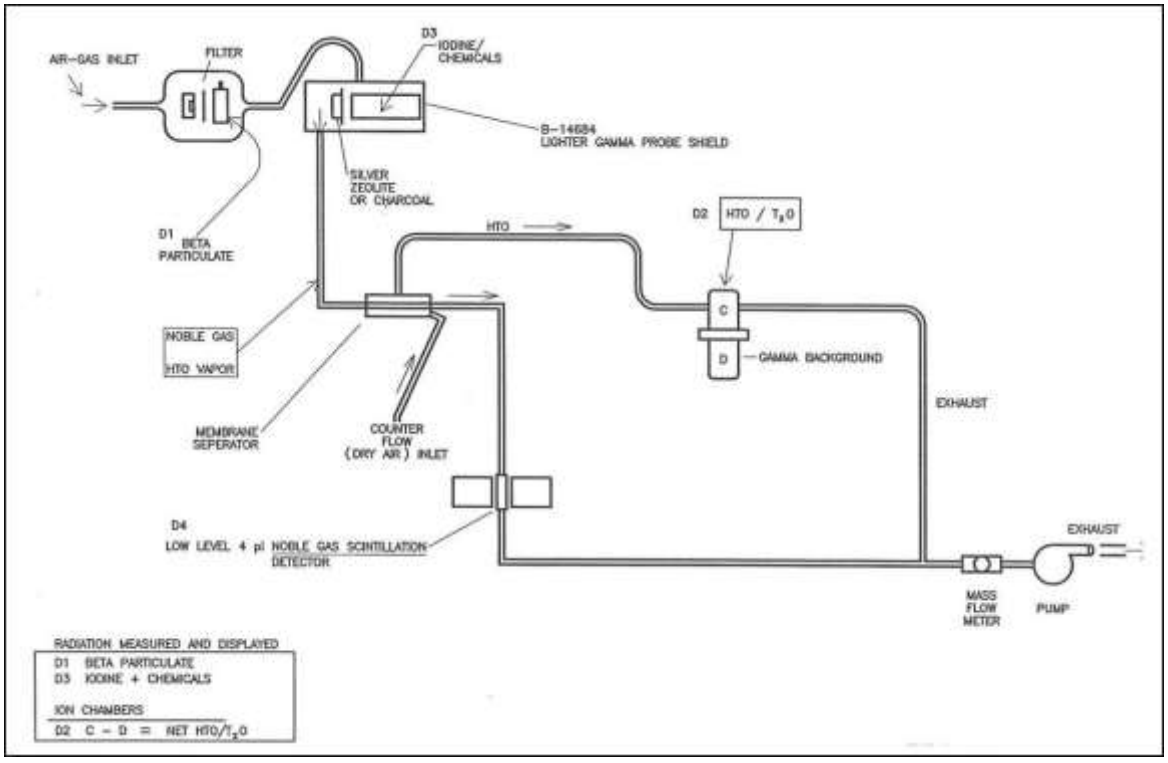
Model – CAM-33 Series - CAM-33, CAM-33-4, CAM-33-6

Special Upgrades Incorporated into CAM-33 Series Air Monitors:

- 17" Color LCD Monitor
- Real-Time Mass Flowmeter
- 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.

OPTIONS:

- Shrouded probe or other air collection Nozzels are available
- Touch screen feature on the LCD color monitor
- Titanium detector cover
- 4-20mA output signals - 3 channels
- 1" Lead (Pb)shields now lighter-weight due to more compact Beta-gamma Detectors (**CAM-33-1P**)



CAM-33-4

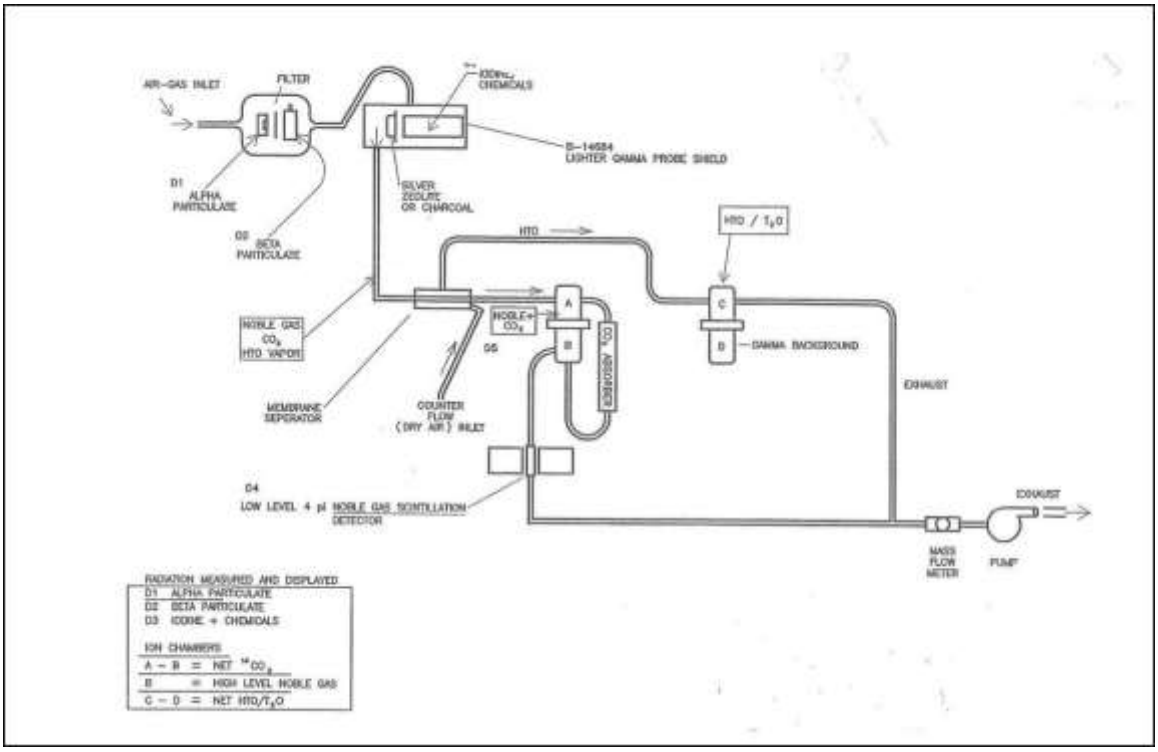
AIR or STACK MONITOR

NOBLE GAS, GROSS BETA-GAMMA PARTICULATE, & IODINE

Optional Alpha, Tritium, Carbon-14

PART OF THE TOTAL-6 SERIES AIR & STACK MONITORS

Model – CAM-33 Series - CAM-33, CAM-33-4, CAM-33-6



CAM-33-6

TECHNICAL ASSOCIATES **Divisions of** US NUCLEAR CORP
OVERHOFF TECHNOLOGY

Active Radsys
W:www.activeradsys.it Tel: 0544 408071
E: info@activeradsys.it Fax: 0544 201477