

AIR MONITOR-GAS, GROSS BETA GAMMA PARTICULATE AND IODINE

Model # BAM-4HVM

DESCRIPTION:

The **BAM-4HVM** series are four channel air monitors for simultaneous measuring of gross beta/gamma particulates and gaseous radioactivity and Iodine. Like all of the BAM-4 series, these are continuous duty, high capacity, rugged skid or caster-mounted systems. Electronics are microprocessor with color LCD display. Also preamps etc. 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 a 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 air pump capable of delivering 5 cfm (**Optional** up to 30 cfm) free air and including fine regulation in the 3 cfm to 5 cfm operating range. The entire system is mounted in a self-contained rugged cabinet and comes complete with all cabling and connectors in place ready to operate. The standard unit is operated from 115 V single phase, 60 Hz; 220 V optional, 50 or 60 Hz.

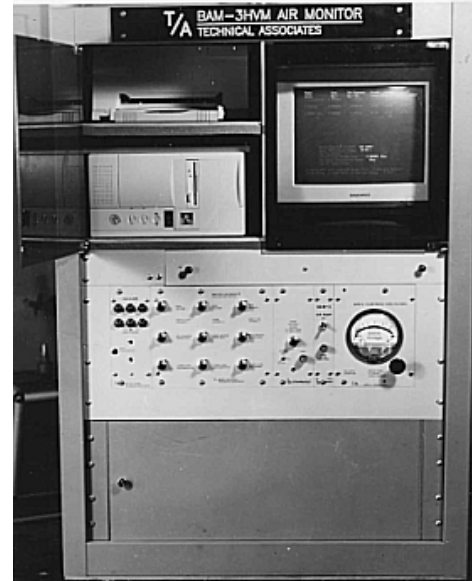


Figure 1: BAM-4HVM

SPECIFICATIONS:

Channels:	Four
Activity Detected:	Gross beta-gamma particulate, iodine/noble gas low and high.
Detectors:	
Particulate Beta-gamma:	Solid state silicon or beta scintillation or 2" Pancake GM Model T-1190.
Iodine:	2" D x 2" NaI (TI) Model PGS3LI spectroscopic grade.
Gas Standard Range:	One Beta Scintillator or 2 ea. GM Model T-1190.
Gas High Range:	One each GM Model T-1216
Shielding:	3" lead; full 4 pi
Detector Sensitivity:	Monitor is more sensitive on all channels by factors of 5 to 500 than is required by USNRC and other regulatory agencies.

T/A TECHNICAL ASSOCIATES
7051 ETON AVENUE * CANOGA PARK, CA 91303 TELEPHONE (818) 883-7043 * FAX(818) 883-6103

\$Revision: 1.3 \$

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SPECIFICATIONS (Continued):

- Particulate Beta-Gamma:** $6 \times 10^{-10} \mu\text{Ci/ml/min}$
- Iodine:** $3 \times 10^{-9} \mu\text{Ci/ml/min}$
- Gas-Standard Range:** $6 \times 10^{-7} \mu\text{Ci/ml/min}$
- Gas-High Range:** High limit $1 \mu\text{Ci/ml}$ (Note 2)
- Display Mode:** Model # BAM-4HVM features micro-processor control and color LCD display.
- Operation:** When BAM-4HVM continuous air monitor is in normal operation, the color LCD displays:

CHANNEL NAME STATUS	REALTIME AIRBORNE CONCENTRATION $\mu\text{Ci/m}^3$ (Note 1)	ACCUMULATED DOSE FOR THIS SHIFT $\mu\text{Ci-Hrs/m}^3$ (Note 1)	CONCENTRATION ALARM STATUS	ACCUMULATED DOSE ALARM
BETA				
PARTICULATE	—	—	—	—
IODINE	—	—	—	—
NOBLE GAS	—	—	—	—
Other alarms:	status			
	Low Air Flow	—	Loss of Signal Beta	—
			Loss of Signal Iodine	—
			Loss of Signal Noble Gas	—

- MENU OPTIONS:**
- | | |
|------------------------|-------------------|
| 1. Modify shift length | 2. Change filter |
| 3. Configure energies | 4. Set alarms |
| 5. Start shift | 6. Save to floppy |

NOTE 1 - User can easily change engineering units at will.
 NOTE 2 - High Range Gas can be adjusted to see $> 10 \mu\text{Ci/ml}$.

Clear audio and visual alarms are provided.

- High Voltage Supply:** Separately variable for each detector from 0 to 2000 V μA . Standard FM-5 modular series.
- Color LCD Readout:** Showing both realtime concentration and accumulated dose for all 4 channels
- Accuracy:** $\pm 10\%$ except for resolution loss and statistical variation.

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```

Name Conc. Tot. Exposure Alarm1 Alarm2 Alarm3
Units Bq/l (cpm) (Exposure) (one sec gross)
I-125 0 95 13:45 13:45 13:45
not used 0 0 13:45 13:45 13:45
not used 0 0 13:45 13:45 13:45
In-111 0 129 13:45 13:45 13:45
Ga-67 0 101 13:45 13:45 13:45
Mo-99 0 64 13:45 13:45 13:45
semon 0 226 13:45 13:45 13:45

Health Physicist on Shift: not named
Space remaining on floppy 62.00%
Low Flow Alarm: 13:45
Outflow Gross Channel Level: 3 13:45 NOT OKAY
One Second Concentration Alarm: Okay
Inactive Alarm: Okay

1) Modify Next Shift Length 2) Change Filter 3) Configure Energies
4) Set Alarms 5) Start Shift 6) Save onto Floppy 7) Exit
    
```

MAIN DISPLAY SCREEN

Model shown in photo is 7-channel version

```

DATA.TXT
=====
SAVING TO FLOPPY
Time of Start Shift: Thur Jan 01 5:00:00
Current Time is 11:02
Health Physicist on Duty: not named
Shift Length: 8.00
Engineering Units: Bq/l
Engineering multiplier conversion units:
Channel Total Exposure up to now
1 107
2 194
3 370
    
```

DATA.TXT DISPLAY SCREEN SHOWS DATA SAVED TO FLOPPY

Model shown in photo is 7-channel version

DATA REVIEW MODE: (DATA.TXT)

Model **BAM-4HVM** continuous air monitor automatically saves all data and set-up parameters to 3.5" floppy diskette every hour. This data can e reviewed on the CRT display.

```

1 I-125 0.035
2 not used 0.000
3 not used 0.000
4 In-111 0.245
5 Ga-67 0.300
6 Mo-99 0.739

Enter Channel to change name and energy
Enter 'c' to continue
    
```

TEST.EXE DISPLAY SCREEN FOR SETTING ENERGIES

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SPECIFICATIONS (continued):

Alarms:	Alarms presettable to any trigger level. Low Level Alarm: Automatic Reset High Level Alarm: High level alarm remains activated until RESET is pushed. Alarm Indication: Red-High Level, Amber-Low Level Audio: 1000 Hz, greater than 80 db. Also see Safety Features below.	
Air Moving System:	Air pump: Extremely rugged continuous duty Positive displacement low rotating speed pumping system. Pump is high capacity positive displacement. Pump noise is reduced by heavy duty muffler. Pump Drive Motor: 1 HP, 50/60 Hz, capacitor start, induction run. Flow Gage: Magnehelic 3-10 cfm, 4" dial. Flow Control: Automatic flow control settable 0-4 cfm \pm 0.2 cfm. Inlet and Outlet: 20 foot 3/4" hose inlet: 20 foot 1" hose outlet. May be extended. Flow Rate: Factory set at 4 cfm, can be reset up to 10 cfm with larger motor and up to 30 cfm with some plumbing change.	
Controls:	System: ON-OFF Printer/Recorder: ON-OFF (each channel) High Level Alarm: Reset (each detector) Voltage: Set	Air: ON-OFF (each channel) High Level Alarm: Set (each channel) Low Level Alarm: Set (each detector) Energy Threshold/Window Set
Outputs:	Alarm condition outputs: 1. logic level signal 2. contact closure-or opening. 3. Ethernet LAN connection.	
Standard Installation:	Cabinet of heavy gage steel. Skid or caster mounted with 4 five inch ball bearing casters, two of which are full swiveling.	
Special Safety:	Loss of air flow alarm. Loss of signal alarm. All circuits fused.	
Features:	Thermal protection on motor. Positive displacement. (Optional ROOTS pump).	
Options:	Air monitor available without air mover or with alternate air movers. Broader range 12 decades. Different detector types. Three push-button check sources (License exempt quantities).	
Dimensions:	29" wide x 31" long x 41" high exclusive of casters.	
Weight:	1800 lbs.	
Shipping Weight:	2100 lbs.	

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ELECTRONIC SYSTEM DESCRIPTION - Micro-processor is Pentium-based, including:

CPU with data acquisition Keyboard
High resolution, color Color LCD display
Mouse Audio
Manuals Graphics printer for hard copy - 4 trace graphs
3.5" floppy disk - For data storage - 30 days per disk. Plus CD Read-Write Drive.
50 gigabyte hard drive - Stores programs, plus room to add additional new software functions in the future.
Specialized air monitor software.
Technical Associates standard modular series - all solid state.
4 ea. MGA-5202 - Fully adjustable single channel analyzer with independent High Voltage power supply;
1 ea. SUB-1 Preamp for solid state silicon detector.
1 ea. MVR-5R Power Supply.
1 ea. LNM-5 Strip Chart Recorder or GRP-10 graphics printer.
1 ea. Magnehelic gage.
4 ea. 5202 HV bias supply/amp disc (SCA).

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