

# TOTAL 6 ~ STACK MONITORS

## GAS, PARTICULATE ~ TRITIUM ~ CARBON-14

### GROSS BETA-GAMMA ~ IODINE

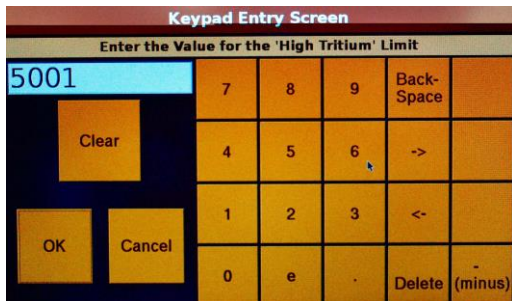
#### Model Series TOTAL-6

- Model ~ TOTAL-6-TCI-H<sup>3</sup> Tritium & Inorganic C-14 (CO<sub>2</sub>)
- Model ~ TOTAL-6-TCO-H<sup>3</sup> Tritium & Organic C-14
- Model ~ TOTAL-6-TC- H<sup>3</sup> Tritium & Total C-14
- Model ~ CAM-33 SERIES Multi-Nuclide System

#### FEATURES:

- FOUR, FIVE, OR SIX CHANNEL SIMULTANEOUS MEASUREMENT
- SENSITIVE TO:
  - H<sup>3</sup> 10<sup>-7</sup> µCi/cc
  - CO<sub>2</sub> 10<sup>-8</sup> µCi/cc
  - Organic C-14 10<sup>-7</sup> µCi/cc
- READS DIRECTLY IN µCi/cc or Bq/l
- REAL TIME FLOW MEASUREMENT
- DYNAMIC BACKGROUND COMPENSATION
- ALARM & CAN ACTUATE REMOTE CONTROLS
- CAN OPERATE IN PRESENCE OF OTHER RADIOACTIVE GASES (See Chart)
- MICRO PROCESSOR OPERATION
- DIGITAL ACCURACY
- INCLUDES DATA, ANALYSIS, DATA ARCHIVE & DATA RETRIEVAL
- USB & ETHERNET PORTS
- RUGGED CABINET
- OPTIONAL: CASTER OR SKID MOUNTED CABINET
- IP33

**PWR & BWR Produce Tritium  
10 Curie/Giga-Watts per Year**



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- Model ~ CAM-33 SERIES**       **Multi-Nuclide System**

#### **APPLICATION:**

All six models, the TOTAL-6 Stack Monitors and the CAM-33 are good for Nuclear Power Plants, Stacks, Room Air, etc. They are sensitive, rugged stack or effluent monitors.

- The **TOTAL-6 series** stresses Tritium and C-14 detection.
- The **CAM-33 series** stresses particulates, Iodine, and Nobel Gas.
- The **CAM-33-6** monitor has the most channels for 6 simultaneous measurements of Gross Beta/Gamma Particulates, Alpha Particulates, Noble Gas, Iodine, Tritium, & C-14.

**NOTE:** See the TOTAL-6 Series Stack Monitor Chart & the flow diagrams included here for details to help you select the detector suite that best serves your need.

See Spec Sheet details for the [CAM-33 Series](#).

Commercial versions are available for research labs, room air, glove boxes and other applicable uses.

#### **TRITIUM & <sup>14</sup>CO<sub>2</sub> MEASUREMENT DESCRIPTION:**

- The subtractive balanced chamber electrometer circuit and optional Radon Rejection decreases background effects to negligible levels.
- The deionized and filtered intake reduces to negligible levels spuriousity based on smokes, dusts, and existing ionization in the air.
- Inlet and outlet hoses provide return of monitored air to source: interiors of fume hoods and exhaust stacks, etc.
- All instruments are calibrated at the factory. Calibration check may be performed in the field with a license exempt µCurie level Beta source

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



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**Model ~ CAM-33 SERIES**    **Multi-Nuclide System**

DETECTOR TYPE	1 MINUTE	1 HOUR	10 HOURS	1 DAY	1 WEEK	TOP OF RANGE
<b>ALPHA</b>	6 x 10 <sup>-10</sup> μCi/ml	1 x 10 <sup>-11</sup> μCi/ml 3.7 x 10 <sup>-7</sup> Bq/ml	1 x 10 <sup>-12</sup> μCi/ml 3.7 x 10 <sup>-8</sup> Bq/ml	6 x 10 <sup>-13</sup> μCi/ml 2.4 x 10 <sup>-8</sup> Bq/ml	1 x 10 <sup>-13</sup> μBq/ml 4 x 10 <sup>-9</sup> Bq/ml	1.0 Bq/ml
<b>PARTICULATE BETA-GAMMA</b>	6 x 10 <sup>-10</sup> μCi/ml	1 x 10 <sup>-11</sup> μCi/ml 3.7 x 10 <sup>-7</sup> Bq/ml	1 x 10 <sup>-12</sup> μCi/ml 3.7 x 10 <sup>-8</sup> Bq/ml	6 x 10 <sup>-13</sup> μCi/ml 2.4 x 10 <sup>-8</sup> Bq/ml	1 x 10 <sup>-13</sup> μBq/ml 4 x 10 <sup>-9</sup> Bq/ml	1.0 Bq/ml
<b>IODINE</b>	3 x 10 <sup>-9</sup> μCi/ml	1 x 10 <sup>-11</sup> μCi/ml 3.7 x 10 <sup>-7</sup> Bq/ml	1 x 10 <sup>-12</sup> μCi/ml 3.7 x 10 <sup>-8</sup> Bq/ml	6 x 10 <sup>-13</sup> μCi/ml 2.4 x 10 <sup>-2</sup> Bq/ml	1 x 10 <sup>-13</sup> μBq/ml 4 x 10 <sup>-9</sup> Bq/ml	0.1 Bq/ml
<b>GAS-STANDARD RANGE</b>	6 x 10 <sup>-7</sup> μCi/ml	1 x 10 <sup>-7</sup> μCi/ml 3.7 x 10 <sup>-3</sup> Bq/ml	2.7 x 10 <sup>-8</sup> μCi/ml 1 x 10 <sup>-3</sup> Bq/ml	1 x 10 <sup>-8</sup> μCi/ml 3.7 x 10 <sup>-4</sup> Bq/ml	2.7 x 10 <sup>-9</sup> μBq/ml 1 x 10 <sup>-4</sup> Bq/ml	10 <sup>15</sup> Bq/ml <b>POST-ACCIDENT</b> 4 X 10 <sup>21</sup> Bq/ml



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#### TOTAL 6 SERIES – STACK MONITORS

Airborne Activity	Model	TOTAL-6-TCI-H <sup>3</sup>	TOTAL-6-TCO- H <sup>3</sup>	TOTAL-6-TC- H <sup>3</sup>	CAM-33-3-1P	CAM-33-3	CAM-33-4	CAM-33-6	CAM-3XG
	Chemical								
Tritium H3	T <sub>2</sub> , HTO T <sub>2</sub> O	YES	YES	YES	OP	NO	OP	YES	OP
Carbon C-14:  Inorganic Organic	CO <sub>2</sub>	YES		YES	OP			OP	OP OP
Particulate	Alpha				YES	OP	OP	OP	OP
Particulate	Beta				YES	YES	YES	YES	OP
Iodine				OP	YES	YES	YES	YES	OP
NOBLE GAS – GROSS - ALL				YES	YES	YES	YES	YES	YES
NOBLE GAS – Curie MeV									YES
ARGON				OP				OP	YES
XENON				OP				OP	YES
KRYPTON				OP				OP	YES
RADON		RX	RX	RX				OP - RX	

#### Number of Channels:

- YES = Measures Each Separately
- RX = Rejects
- OP = Optional

**NOTE:**            TOTAL-6-TCO = Tritium plus Organic Carbon-14  
                       TOTAL-6-TCI = Tritium plus Inorganic Carbon-14  
**Models TOTAL-6-TCO & TOTAL-6-TCI work best if no other nuclides are present**

**See Data Sheet for Details on the CAM-33 Series**



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### SPECIFICATIONS:

See [CAM-33 series](#) Spec Sheet for Details

#### ELECTRONICS:

- Circuit:** Electrometer circuit amplifies net difference between a 2 liter Tritium internal chamber & a background chamber of similar size & configuration.
- Calibration:** Can be calibrated internally with Tritium (or HTO) & <sup>14</sup>CO<sub>2</sub> gas,  
**OR** on a Gamma calibration course;  
**OR** can be checked at a single point with an external (not provided) Beta source.  
 Organic Carbon Channel can be calibrated with C-14 disk source.
- Alarm:** High Level: Red flashing light plus warbling sound  
 System Fault Alarm: White steady light
- Remote Alarm:** 3 Relays provided for operators use
- Output:** USB Port & ethernet port  
 Optional 0-5 volt or 4-20 mA.
- On-Board Computer:** Data Archive & Data Retrieval
- Background:** Essentially eliminated by subtractive balanced chambers.  
**Optional** - Radon Rejection
- Smoke, Dust & Ion Elimination:** Filter and deionizer reduce effects to negligible levels.
- WEIGHT & DIMENSIONS:**
- Dimensions:** 23"W x 66"H x 36"D
- Shipping Weight:** 635 lbs.

**User Manual shipped with instrument.**

#### OPTIONAL:

<ul style="list-style-type: none"> <li>• Interconnection to / from port of other gas or particulate monitors</li> </ul>	<ul style="list-style-type: none"> <li>• Remote Alarm (audio &amp; visual) (Model RDX-8) includes 25" of cable. Can be used to 500 feet.</li> </ul>
<ul style="list-style-type: none"> <li>• Serial Printer</li> </ul>	<ul style="list-style-type: none"> <li>• Casters or Skid Mounted</li> </ul>
<ul style="list-style-type: none"> <li>• Higher Tritium Count Rate using Both Proportional Detectors for Tritium Measurement</li> </ul>	<ul style="list-style-type: none"> <li>• Additional Lead Shielding for Greater Gamma Rejection</li> </ul>
	<ul style="list-style-type: none"> <li>• 4-20 mA for computer.</li> </ul>



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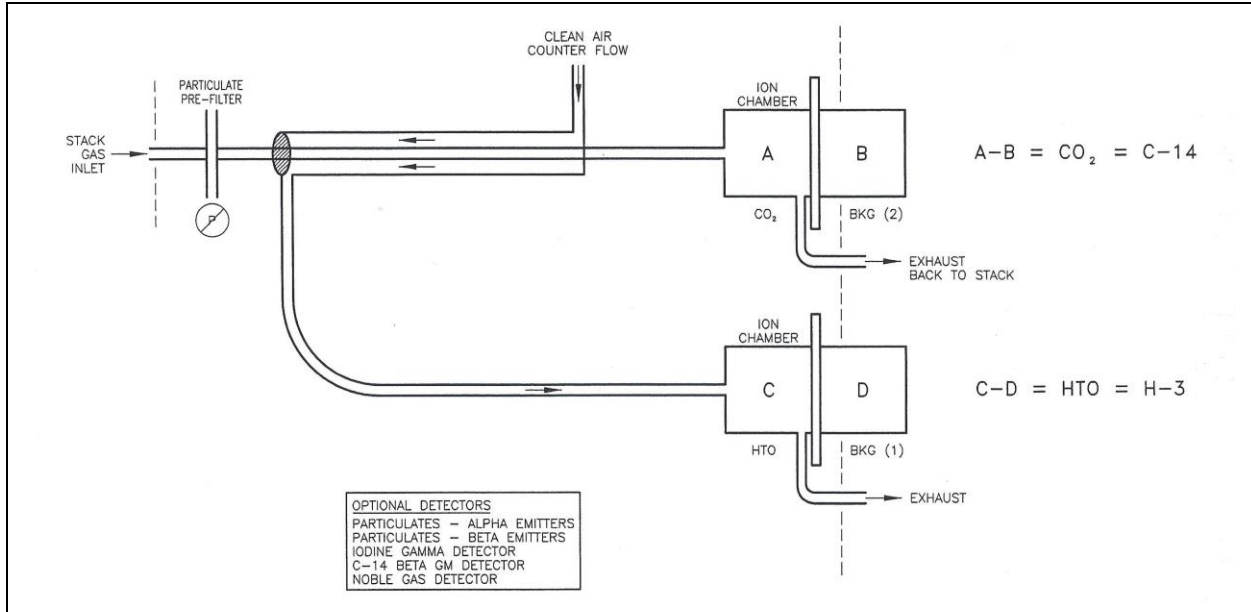
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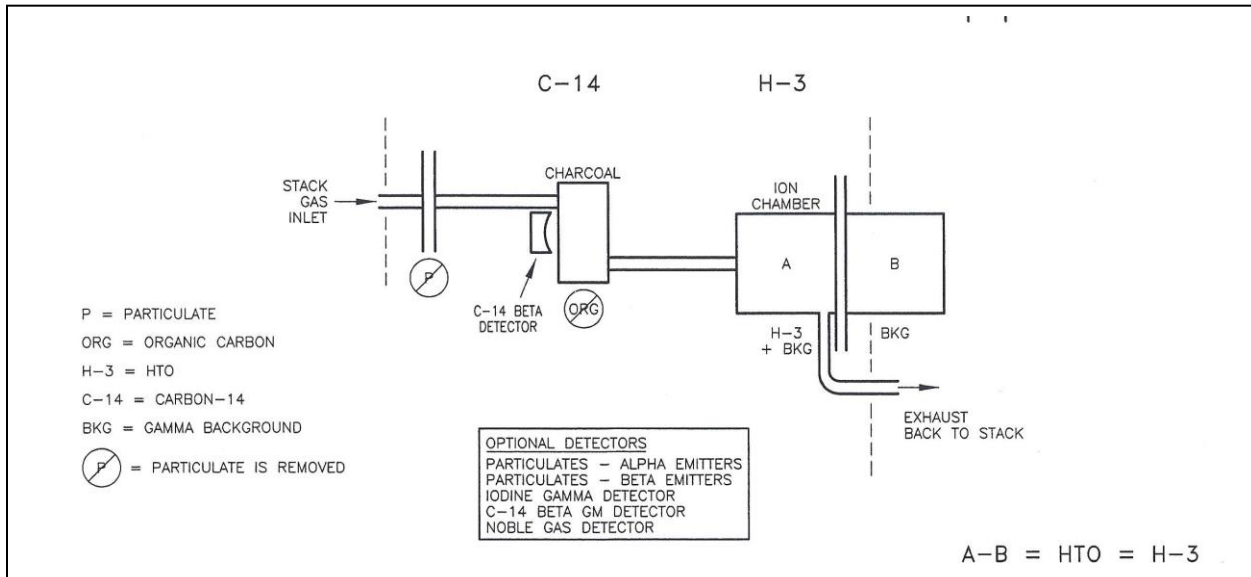
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#### TOTAL-6-TCI-H<sup>3</sup>



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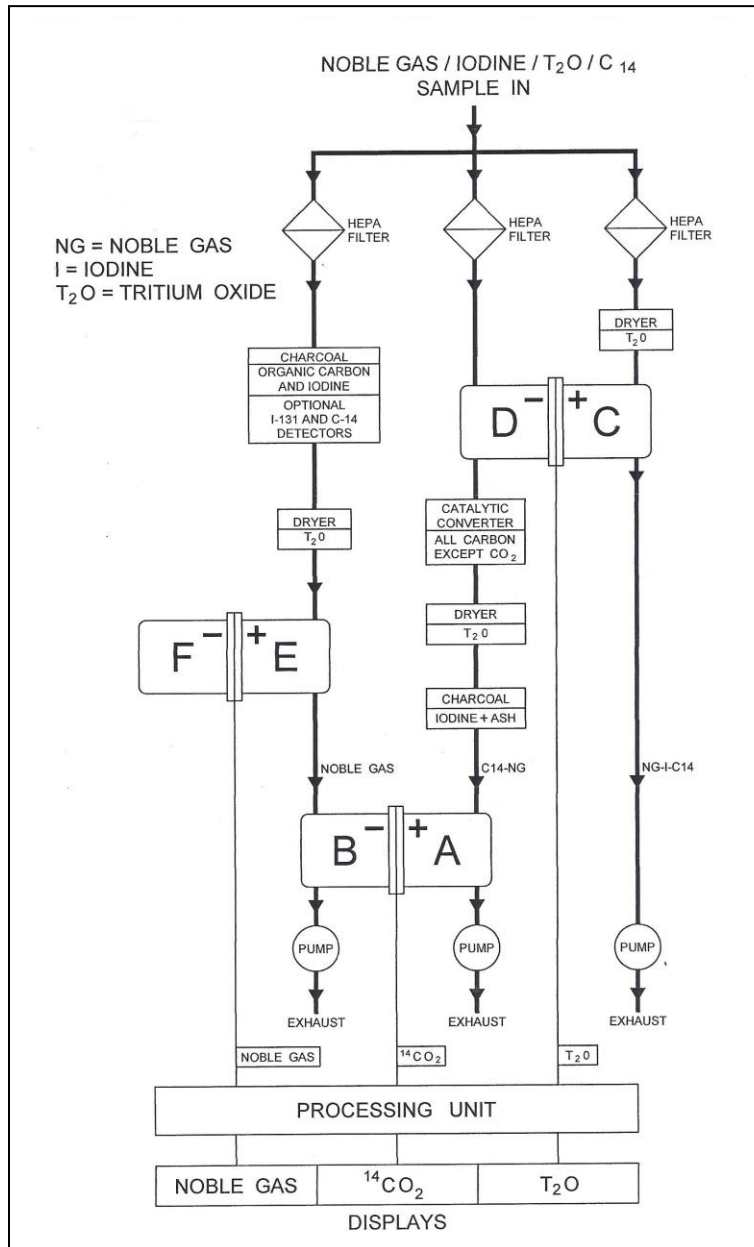
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**TOTAL-6-TC-H<sup>3</sup>**



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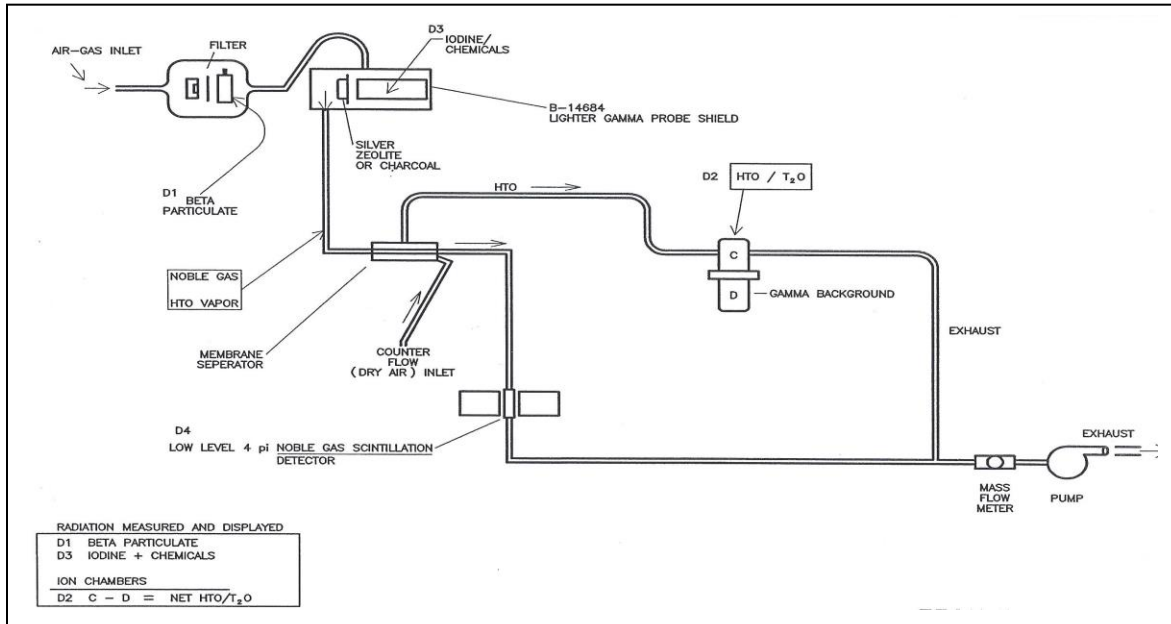
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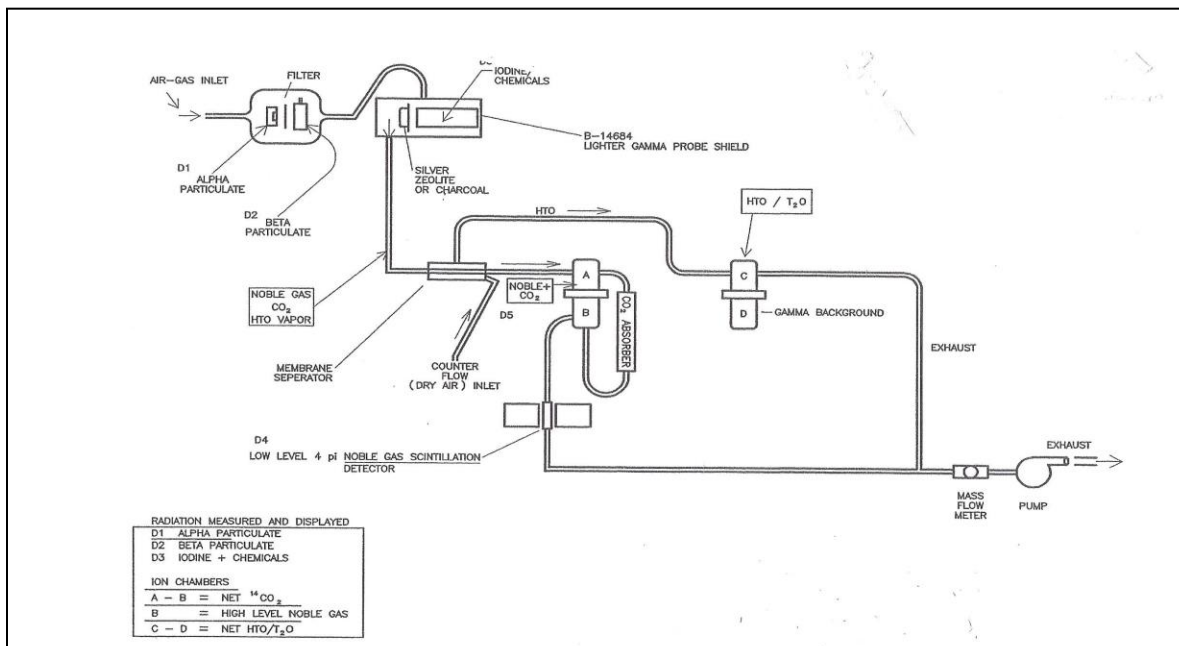
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**CAM-33-4**



**CAM-33-6**



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