

# Vehicle Portal Monitors

## VM-250AG

Gamma vehicle portal monitor



## VM-250AGN

Gamma-Neutron vehicle portal monitor

### Specifications

- **SENSITIVITY:**
  - Gamma: Will detect 1,000g of <sup>235</sup>U (HEU) or 10g of <sup>239</sup>Pu, 50% probability of detection, 95% confidence in a 20 µR/hr background at a passage speed of 5 mph (8km/h).
  - Neutron: Will detect less than 200g of <sup>239</sup>Pu in a shielded container that reduces the gamma flux to 1% of the unshielded gamma flux.
  - Refer to Los Alamos publication number LA-13247-MS\*, April 1997, "An Update for the Applications Guide to Vehicle SNM Monitors".
- **DETECTORS:**
  - VM-250AG: Two, 30" h x 6" w x 1.5" d (76 x 15 x 4cm) organic plastic scintillator detectors per pillar; provides approximately 1,080 in<sup>3</sup> (17.7 liters) of detector volume per system. The scintillator detectors are shielded on four sides with 0.375" (10mm) of lead.
  - VM-250AGN: Two, 30" h x 6" w x 1.5" d (76 x 15 x 4cm) organic plastic scintillator detectors per pillar and four 2" diameter x 36" (5 x 91cm) <sup>3</sup>He tubes per pillar; provides approximately 1,080 in<sup>3</sup> (17.7 liters) of detector volume per system. The scintillator detectors are shielded on four sides with 0.375" (10mm) of lead.
- **FALSE ALARM RATE:** Typically less than 1 in 1,000 passages
- **ALARM INDICATION:** Alarms are indicated by a red strobe light mounted on the master pillar. High and low faults along with other fault conditions are indicated by an amber light. Neutron alarm is indicated by a blue strobe light. Audio alarm is triggered in gamma or neutron alarm conditions.
- **DISPLAY:** Alphanumeric LCD, 4 lines x 16 characters
- **COMMUNICATIONS:** Both models are equipped with RS-232 and Ethernet communications capability.
- **DATA STORAGE:** Flash memory (256 KB) is used to store average hourly background data and alarm data. Under normal conditions the memory should be adequate to store data for at least 3 months of operation.
- **POWER REQUIREMENTS:** 90 - 250 Vac, 47 - 63 Hz, less than 100 VA
- **BATTERY LIFE:** Greater than 12 hours of normal operation
- **DIMENSIONS:**
  - VM-250AG: 120" h x 10" w x 10" d (305 x 25 x 25cm) per pillar
  - VM-250AGN: 120" h x 26" w x 8" d (305 x 66 x 20cm) per pillar
- **WEIGHT:**
  - VM-250AG: ≈300 lb (136kg) per pillar
  - VM-250AGN: ≈600 lb (272kg) per pillar
- **ENVIRONMENTAL:** -30° to 122°F (-34° to 50°C) Designed for outdoor use in most climates. For extreme conditions, optional heating/cooling is available.
- **OPTIONAL COMPONENTS:** Heaters and Insulation, AM-270

\*The Los Alamos publication number LA-13247-MS\*, April 1997, "An Update for the Applications Guide to Vehicle SNM Monitors" is available to DOE and DOE contractors from the Office of Scientific and Technical Information, P.O. Box 62, Oak Ridge, TN 37831, (423) 576-8401. It is available to the public from the National Technical Information Service, US Department of Commerce, 5285 Port Royal Road, Springfield, VA 22616.

### Description

TSA's vehicle portal monitor VM-250AG consists of two self-contained weather resistant pillars placed on either side of the roadway to be protected. Each pillar contains two organic plastic scintillator detectors, an occupancy detector, and an amplifier/controller.

The master pillar also has a battery, power supply/battery charger and an SC-770 system controller. Model VM-250AGN adds neutron detection capability to the basic VM-250AG. Both models are equipped with RS-232 and Ethernet communications capability.

The VM-375 system (not shown) is essentially a VM-250AG with a third pillar positioned horizontally between the two upright pillars. The third pillar can be mounted above or below the other pillars. The VM-375AG provides improved sensitivity over the VM-250AG. Please contact TSA to discuss configuration and requirements for a VM-375 system.

TSA's VM-250 systems require two conduits, one to provide ac power to the battery charger, and one for the pillar to pillar connections. A third conduit may be required to route signals to TSA's AM-270 alarm monitor.

The pillars are usually bolted to a concrete footing, with the interconnecting conduits installed under the roadway. The pillar spacing varies from 10 feet (3m) to 32 feet (10m) depending on local requirements for sensitivity and traffic.

**OPERATION:** When the system is powered up, it takes twenty seconds to acquire an initial background. The background is continually updated until the system is occupied.

When the detector senses occupancy, the system starts comparing the current count to the most recent background data. Alarm comparisons are made every 200ms. If the count exceeds the alarm level, both audible and visual alarms will be triggered. The system monitors itself and indicates low and high background conditions. A closed circuit tamper output is available for connection to TSA's AM-270 or site security system. System status is continuously updated on TSA's system controller SC-770, located in the master pillar.

### Applications

These monitors are designed to automatically scan vehicular traffic without the need for frequent calibration. They are intended for applications where the relatively low energy emissions from <sup>235</sup>U and <sup>239</sup>Pu are the main concern.

They are currently in use in installations such as uranium enrichment plants, weapons manufacturing and storage plants, nuclear laboratories, and nuclear waste disposal and storage sites where protection of SNM is essential. The units can be insulated, heated and/or cooled for use in severe environmental conditions.