innovation in Radiation Monitor design

Pedestrian Portal Monitors

PM-700A

Gamma-Category III* pedestrian portal monitor

PM-700AGN

Gamma-Neutron-Category II* pedestrian portal monitor

Description

TSA's PM-700A and PM-700AGN monitors are stand-alone, pedestrian portal monitors with excellent sensitivity and reliability. The PM-700A's large detectors and unique detection algorithm improve its performance to the point that it can achieve ASTM Standard C 1169 Category III* sensitivity for SNM.

All of the essential components are contained in the pillars; radiation detectors, controllers, and occupancy detector. The systems operate from an internal battery. The battery is constantly charged from the site's ac line during normal operation. In the event of a power outage, the battery permits continued operation for at least 24 hours.

Model PM-700AGN adds neutron detection capability to the basic PM-700A. Both models are equipped with RS-232 and Ethernet communications capability.

The PM-700A and PM-700AGN systems utilize TSA's model SC-770 controller, and model SCA-775.

OPERATION: After the initial site preparation is completed, the systems can be installed and operating in less than an hour. When the system is powered up, it acquires an initial background. The process takes twenty seconds. The background is continually updated until the system is occupied.

When the infra-red 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 the AM-270 or site security system. System status is continuously updated on the SC-770 display.

Specifications

- SENSITIVITY:
  - PM-700A: Will detect 3g HEU or 0.08g ^{239}Pu when tested in accordance with ASTM Standard C 1169 for Category III* monitors
  - PM-700AGN: Will detect 10g HEU or 1g ^{239}Pu when tested in accordance with ASTM Standard C 1169 for Category II* monitors; will detect 120g of 99% shielded ^{239}Pu based solely on neutron detection
- DETECTORS:
  - PM-700A: Two, 36″h x 10″w x 1.5″d (90 x 25 x 3.8cm) organic plastic scintillator detectors per pillar; provides approximately 2,080 in^3 (35.4 liters) of detector volume per system
    The detectors are shielded on five sides with 0.375″ (10mm) of lead
  - PM-700AGN: Two, 30″h x 6″w x 1.5″d (75 x 15 x 3.8cm) organic plastic scintillator detectors and two 2″ diameter x 36″ (5 x 91cm) He^3 neutron detectors per pillar
    The detectors are shielded on five sides with 0.375″ (10mm) of lead
- ALARM LEVEL: SPRT for neutron, N*sigma for gamma, entered from the numeric keypad
- FALSE ALARM RATES: Typically less than 1 in 1,000 passages, as tested in accordance with ASTM Standard C 1169*
- ALARM INDICATION: Gamma 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.
- DISPLAY: Alphanumeric LCD, 4 lines x 16 characters
- COMMUNICATIONS: Both models are equipped with RS-232 and Ethernet communications capability
- DATA STORAGE: 256k bytes of flash memory 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 24 hours normal operation
- DIMENSIONS:
  - PM-700A: 84″h x 22″w x 8″d (214 x 56 x 20cm)
  - PM-700AGN: 84″h x 26″w x 8″d (214 x 66 x 20cm)
- WEIGHT:
  - PM-700A: ≈400 lb (182kg) per pillar
  - PM-700AGN: ≈600 lb (273kg) per pillar
- ENVIRONMENTAL: -30˚ to 122˚F (-34˚ to 50˚C); designed for use in a sheltered area
- OPTIONAL COMPONENTS: AM-270

*ASTM Standard C 1169 is available from TSA Systems, Ltd. or The American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428, (610) 832-9585

Applications

These monitors are designed to automatically scan pedestrian traffic without the need for frequent calibration. They are intended for applications where the relatively low energy emissions from ^{235}U and ^{239}Pu are the main concern. They are currently in use at uranium enrichment plants, weapons manufacturing plants, weapons storage sites, nuclear laboratories, nuclear waste disposal, and storage sites where protection of SNM is essential.

Neutron monitoring adds the capability of detecting shielded neutron emitters.

Both models share TSA's unique design features of high sensitivity and reliable operation in variable background environments. These systems cover most pedestrian monitoring applications. TSA's expert engineering staff can adapt them to meet special requirements, if necessary.