LUDLUM MEASUREMENTS, INC.

Model 53 Legacy
Personnel Gamma Portal Monitor

Part Number: 48-3784

Features

- Large plastic scintillator detectors for optimized detection efficiency
- Fast Alarm/Fast Clean counting technology for shorter counting cycles
- Customized voice prompts - user adjusted
- Three counting modes to maximize throughput, maximize sensitivity, or fix the count time
- Four user modes: Walk-Thru, Pause, Pause-and-Turn, Front-and-Back
- Automatic background updating
- Recount and contaminated detector check options
- Individual detector and sum channel alarms
- Informative 9 in. color touchscreen LCDs at ingress and egress
- PIR (Passive Infrared) sensor to sense personnel approach
- Photoelectric sensor to detect personnel presence
- Two levels of password security
- 2.5 cm thick lead shielding (option for 5.1 cm)
- Single Board Computer (SBC) running Windows™ Operating System
- Additional USB (Universal Serial Bus) connectors to transfer information from the system, or for input of user ID etc.
- Ethernet connectivity
- Option for implementing transmission factors according to user's weight

Introduction

The Model 53 Gamma Personnel Portal is used to detect gamma radiation in or on personnel passing through the portal from either direction. This highly sensitive portal utilizes eight large plastic scintillation detectors and is shielded with either 2.5 cm (1 in.) (standard) or 5.1 cm (2 in.) of lead. The user-friendly interface guides personnel through the monitor via its automated voice prompts, and is accompanied with 22.9 cm (9 in.) color LCD articulating screens presenting the instrument readiness and status at the ingress and egress to the portal. Alarms are manifested audibly and visually, and can be silenced and acknowledged via control buttons located on either side of the instrument.

There are three statistical counting modes to maximize throughput, maximize sensitivity, or to fix the count time. Several parameters can be modified to adjust the alarm set point, including the false alarm probability, detection probability, background sigma coefficient (K_B), and the composite sigma coefficient (K_{S+B}). Fast alarm and clean options provide the ability to quickly determine if personnel are contaminated or clean before the entire count cycle has ended.

There are also four user modes to choose from that include a walk-through mode, a pause mode, a pause-and-turn mode, and a front-and-back mode. Voice prompts may be customized in any language for each of these modes. These prompts can, for example, dictate in-house procedures to follow. Instrument technicians have password-protected access to set up the instrument, as well as to advanced automated routines for calibrating and verifying operation.

Easily accessible USB ports facilitate connecting a keyboard to implement changes, input user ID, or upload revised software. The system additionally includes an Ethernet link. Ludlum's optional Universal network software can be used to log instrument status, user activity, and other information from one or more instruments connected to the network. This software additionally broadcasts emails whenever radiological alarms or instrument failures occur, and has the ability to capture images from network cameras that can be stored along with the user ID (if implemented).

A unique feature is an optional weight scale that assesses the weight of the individual passing through the portal and assigns an appropriate transmission factor for a more accurate gamma measurement. Other options include a second 2.5 cm (1 in.) lead shielding, a second alarm/light stack, and the Universal network software.

Specifications

INDICATED USE: gamma personnel monitoring

DETECTORS: 6 identically sized plastic scintillators (3 on each side, one overhead, one under feet)
    Scintillator Type: EJ-200
    Size: 38.1 x 71.1 x 5.1 cm (15 x 28 x 2 in.) (H x W x D)
    Volume: 61,940 cm^3 total (3780 in^3)
    Shielding: 2.5 cm (1 in.) standard, 5.1 cm (2 in.) optional

SENSITIVITY: will detect 10 nCi of ^{137}Cs in 17 seconds and 10 nCi of ^{60}Co in 8 seconds (front-and-back mode)

OPERATION: bi-directional
    Operating Modes: Walk-Thru, Pause, Pause-and-Turn, Front-and-Back
    Counting Modes: maximized throughput, maximized sensitivity, or fixed count time
    Status Conditions: ready, door open, clean, counting, alarm, high alarm, failure, updating background, extending background, initializing, contamination check, contaminated
    Voice Prompts: can be customized to any language and in-house procedure

CONTROLS/DISPLAYS
    Displays: dual 22.9 cm (9 in.) color touchscreen LCDs mounted to an articulating arm for optimized viewing, one on ingress, the other on the egress side
    Alarm Acknowledge: single button on the ingress/egress sides that silence and clear any alarm
    Portable Keyboard: USB plug-in keyboard with convenient mounting bracket to facilitate setup, parameter editing and calibration functions, included with instrument
    Light Stack/Audio Annunciator: green (operational), yellow (warning), red (alarm) lights display instrument status, audio output is 70–85 dB at 1 meter, mounted to either the ingress or egress sides (egress standard), a second light stack is available as an option

ELECTRONICS:
    Central Processor: Single Board Computer (SBC) running Windows™ Operating System
    Detector Signal Conditioning: Ludlum's single detector board technology located on each detector assembly
    Proximity Sensors:
      • PIR (Passive Infrared) sensor to sense personnel approach
      • Photoelectric sensor to detect personnel presence
    Interfaces:
      • USB Ports: 2 per side (ingress/egress) for connecting plug-in keyboard or user ID devices
      • Ethernet connection: supports centralized and distributed viewing of instrument operation. Optional Ludlum Universal network software connects several Ludlum instruments (including different types) to a common radiological network for performing data logging, remote alarm notification, email notification, and image capturing upon an alarm.

TEMPERATURE RANGE: 0 to 50 °C (32 to 122 °F)

POWER: 85 – 250 Vac, 50 – 60 Hz

MECHANICAL:
    Construction: aluminum construction with ivory and beige powder coat
    External Dimensions: 205.7 x 94 x 53.3 cm (86 x 34.5 x 30 in.) (H x W x L), ramp extends 43.2 cm (17 in.) per side, LCD monitors protrude 12.7 cm (5 in.) per side
    Portal Inside Dimensions: 196 x 61. cm (77 x 24 in.) (H x W)
    Portal Step: 10.2 cm high (4 in.)
    Detector Doors/Covers: 15.2 mm (0.060 in.) aluminum
    Weight:
      • Without lead shielding: 288 kg (635 lb)
      • With 2.5 cm (1.0 in.) lead: 1014 kg (2235 lb)
      • With 5.1 cm (2.0 in.) lead: 1558 kg (3435 lb)

OPTIONS: See our website for a list of available options.