LUDLUM MEASUREMENTS, INC.

Model 53
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 10.1 in. color touchscreen LCDs at ingress and egress
- PIR (Passive Infrared) sensor to detect 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

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. Two 25.7 cm (10.1 in.) color LCD articulating screens, one on each side of the portal, show the instrument readiness and status, while the user-friendly interface guides personnel through the monitor via its automated voice prompts. 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).

Specifications

INDICATED USE: gamma personnel monitoring

DETECTORS: 8 identically sized plastic scintillators (3 on each side, one overhead, one under feet)

  Scintillator Type: EJ-200

  Size: 48.26 x 48.26 x 5.08 cm (19 x 19 x 2 in.) (H x W x D)

  Volume: 92,668 cm^3 total (5655 in^3)

  Shielding: 2.5 cm (1 in.) standard, 5.1 cm (2 in.) optional

SENSITIVITY:

  Walk-Thru Mode: will detect 50 nCi (1850 Bq) of ^{137}Cs and 22.5 nCi (830 Bq) of ^{60}Co

  Two-Step Mode: will detect 10 nCi of ^{137}Cs (370 Bq) in 17 seconds and 10 nCi (370 Bq) 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 25.7 cm (10.1 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 to facilitate setup, parameter editing and calibration functions. Optional mounting shelf available (PN 4381-300).

  Light Stack: green (operational), yellow (warning), and red (alarm) lights display instrument status, mounted to either the ingress or egress sides (egress standard), a second light stack is available as an option

  Audio: output is 70–85 dB at 1 meter,

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 on ingress side 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: carbon steel construction with ivory powder coat, forklift slots in base

  External Dimensions: 217 x 87.4 x 76.2 cm (85.5 x 34.4 x 30 in.) (H x W x L), ramp extends 43.2 cm (17 in.) per side, LCD monitors protrude 14.6 cm (5.75 in.) per side

  Portal Inside Dimensions: 196 x 62 cm (77.1 x 24.4 in.) (H x W)

  Portal Step: 10.2 cm high (4 in.)

  Detector Doors/Covers: 15.2 mm (0.060 in.) aluminum

  Weight:

    • With minimal lead shielding installed: 545 kg (1200 lb)

    • With 2.5 cm (1.0 in.) lead: 1207 kg (2660 lb)

    • With 5.1 cm (2.0 in.) lead: 1730 kg (3815 lb)

Options

• **Ludlum Universal Software** (PN 1370-093)

• **5.1 cm (2.0 in.) Lead Shielding** (PN 4540-257)

• **Additional Light Stack** (PN 4540-950)

Also Available

• **Model 53-1:** identical to Model 53 but with no foot detector (PN 48-3150)

• **Model 53B:** beta/gamma version (PN 48-3925)