



DETECTION

 **LUDLUM MEASUREMENTS, INC.**

## Model 4525 Series Radiation Portal Monitors

### Features

- Monitor Trucks, Rail Cars, Personal Vehicles, etc.
- Large, Highly Sensitive, Industrial Duty Plastic Scintillation Detectors
- Reliable Operation with Very Low False Positives
- Flexible Configurations Accommodate Up to Four Lanes, Each with Two to Six Detectors
- Real-Time Central Data Logging, Reporting, and Alarm Notification
- Bi-Directional Entry
- User-Friendly Operation
- Excellent Service and 24-Hour Tech Support
- 8-Hour Battery Backup in Event of Power Loss
- Modular and Upgradeable
- Variety of Options to Customize the System to Meet Your Needs
- Made in USA



The Model 4525 Series of Radiation Portal Monitors (RPMs) represents state-of-the-art technology for detecting low levels of radiation, such as orphan radiation sources and NORM (naturally occurring radioactive materials), at facilities including scrap yards, recycling companies, landfills, and foundries. These systems are composed of ruggedized, large plastic scintillation detectors optimally arranged to monitor items passing through. Each system can be configured with two to six large detectors, with individual detector volumes of 9.8 L (600 in<sup>3</sup>), 41 L (2500 in<sup>3</sup>), or 57 L (3500 in<sup>3</sup>).

Real-time data acquisition and analysis is performed directly at each detector system and then reported to a central PC for logging, reporting, and alarm notification. Up to four detector systems (lanes) can be networked together via Ethernet or wirelessly to a central PC so that vehicles entering from either direction can be monitored in real time. An optional remote control/annunciator panel is available to support operator awareness, alarm acknowledgement, and if necessary, backup operation in the event the central PC is unavailable.

Data from all the system sensors are acquired and checked by powerful, field-tested, and time-proven algorithms designed to check each load vigorously in a multi-dimensional and multi-layered manner before declaring any load as clean. Any abnormality is immediately indicated via both local and remote alarms. An optional camera system can capture an image of the offending vehicle and store the image with the logged data for permanent record keeping. Alarms can also be configured to automatically notify shift supervisors directly by e-mail if desired. The system is designed for ease of use and can be customized to accommodate a wide variety of site and application specific criteria. Intuitive menus and controls combined with pre-defined automatic event handlers ensure each situation is handled properly and consistently. All of the main components of these systems are manufactured in-house in the USA.

## Standard Configurations



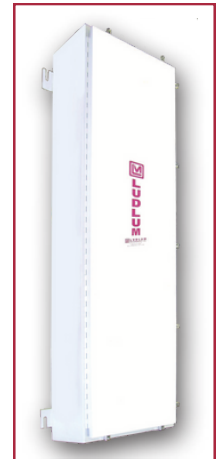
**Detector Size**  
9.8 L (600 in3)



**Model 4525-2400**

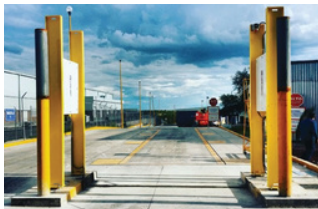
PN: 48-3908

**Detectors: 4**  
**Total Detector Volume:**  
39 L (2400 in3)



**Detector Size**  
41 L (2500 in3)

**Detector Size**  
57 L (3500 in3)



**Model 4525-5000**

PN: 48-4018

**Detectors: 2**  
**Total Detector Volume:**  
82 L (5000 in3)



**Model 4525-7000**

PN: 48-3605

**Detectors: 2**  
**Total Detector Volume:**  
115 L (7000 in3)



**Model 4525-7500**

PN: 48-4020

**Detectors: 3**  
**Total Detector Volume:**  
123 L (7500 in3)



**Model 4525-10500**

PN: 48-3606

**Detectors: 3**  
**Total Detector Volume:**  
172 L (10,500 in3)



**Model 4525-10000**

PN: 48-4019

**Detectors: 4**  
**Total Detector Volume:**  
164 L (10,000 in3)



**Model 4525-14000**

PN: 48-3607

**Detectors: 4**  
**Total Detector Volume:**  
229 L (14,000 in3)



**Model 4525-12500**

PN: 48-4021

**Detectors: 5**  
**Total Detector Volume:**  
205 L (12,500 in3)



**Model 4525-17500**

PN: 48-3608

**Detectors: 5**  
**Total Detector Volume:**  
287 L (17,500 in3)



**Model 4525-15000**

PN: 48-4022

**Detectors: 6**  
**Total Detector Volume:**  
246 L (15,000 in3)



**Model 4525-21000**

PN: 48-3609

**Detectors: 6**  
**Total Detector Volume:**  
344 L (21,000 in3)

## Base System

- Two to six plastic scintillation detectors
- High gain, low noise, 2 in. dia. photomultiplier tubes (PMTs), 2 ea. per detector; Dual PMT design delivers 30% more efficiency than single PMT designs
- Shock protection to resist vibration-induced noise
- Thermal protection to avoid temperature shock
- Carbon steel frame and detector enclosure
- NEMA 4 rated control box and detector enclosures with white powder-coat for environmental protection
- 6.4 mm (0.25 in.) thick lead shielding on five sides of detector to reduce background
- Low density aluminum detector door for enhanced low energy measurements
- Dual-Channel: Increased sensitivity by analyzing separate Hi and Low Gamma channels with independent thresholds and alarm ratios
- Two pairs of IR sensors
- Alarms: Radiation, Overspeed, Detector Fail
- Model 4525 Series Vehicle Monitoring Software
- Reporting Feature
- Computer Requirements – Windows 7 or higher
- Power: 120 - 240 Vac, 2 A
- Temperature Range: -40 to 150 °F (-40 to 65 °C)

## Recommended Options

- Remote Annunciator Panel (4517-608-100): Provides audible and visible alarm annunciation. Includes 30.5 m (100 ft) cable (other cable lengths available).
  - LED status indicators: POWER OK, CHECKING, GAMMA ALARM, OVERSPEED ALARM, INSTRUMENT FAIL, USING BATTERY POWER
  - Audio Alarm: 85 dB at 30.5 cm (1 ft.)
- Additional Two Pairs of IR Sensors (4511-990-01)
- Stainless Steel Control Box and Detector Enclosure Upgrade
- Fog-Free Plastic Scintillation Detector Upgrade

## Other Available Options

- Detector Stand Set
- Strobe & Horn (4517-073): 12 Vdc strobe and horn assembly (30 ft. cable)
- Strobe (8517-025): 12 Vdc strobe with 9.1 m (30 ft.) cable
- Wireless System (4558-048): An antenna that establishes a point-to-point wireless network for sending data from detector systems to monitoring stations.
- Neutron Detection Capability
- Indoor/Outdoor Bullet Camera Kit (4511-448)
- Control Computer with Printer and Wall Mounting Brackets
  - 55.9 cm (22 in.) LCD monitor with HDMI and built-in speakers
  - Ethernet network capability
  - Uninterruptable power supply (UPS)
  - Color laser printer
  - Mini USB keyboard with built-in touchpad



### Remote Annunciator Panel



### Strobe & Horn



### Wireless System



### Strobe



### Camera



## Vehicle Monitoring Software

- Supports Up To 4 Lanes
- 8 Relay Outputs for Options
- Radiation Profile
- Data Logging with Automatic Daily Back-Up

The base Model 4525 Series system includes vehicle monitoring software for the system control computer that can be used to monitor up to four separate Model 4525 Series configured systems (lanes) via an Ethernet or wireless connection. The software automatically collects and archives data from all available lanes, displays alarms, and generates reports. When equipped with optional cameras, the system can be configured to automatically capture images of vehicles passing through the system, either every vehicle or only those triggering an alarm, and store the images in the database.

The vehicle monitoring software has three main component programs:

- **Supervisor:** Collects all data, saves to databases, and contains all parameter settings. It displays alarms and provides all control over the system.
- **Echo:** Used for remote monitoring. It mirrors the Supervisor component and performs all alerting and reporting functions, but does not allow any control functions. Up to 10 Echo stations can be configured per Supervisor computer. Each Echo station can monitor an unlimited number of Supervisor computers.
- **Data Viewer:** Used to query the databases (background, alarms, and event log), filtering records based on date, alarm, and lane number. The Data Viewer can also reprint an alarm report, print summary reports for user-defined data and time ranges, and create new databases based on the current search queries.

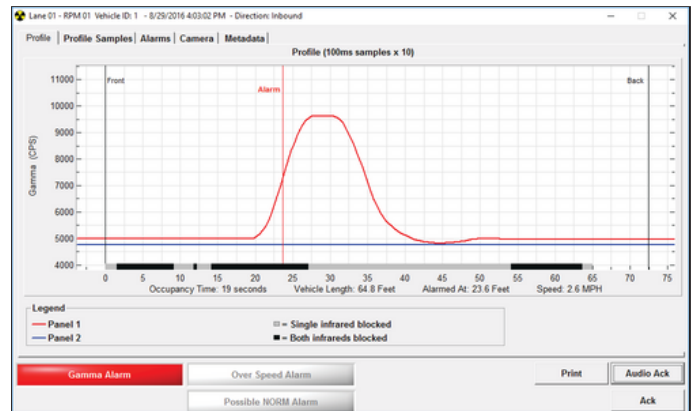
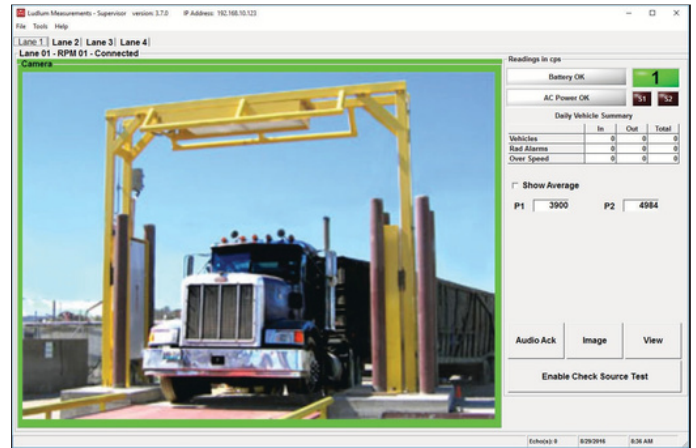
## Reporting Feature

Ludlum's reporting feature accumulates the data, and sends you an easy-to-read report on a regular basis (weekly, monthly, or quarterly) about the activity during that timeframe.

Reports include:

- How many vehicles passed through the system
- How many radiation alarms occurred
- Detail (date, time, extent) of radiation alarms
- How many overspeed alarms occurred
- Any other failure alerts or messages
- Any unusual background radiation issues
- Indication if vehicles are parking the system for too long
- Indication if parameters have been changed

When you receive these reports on a regular basis, it's easy to see when something changes, or when you need to address a training or hardware problem. You determine how often to get these reports, and you can also choose to have Ludlum technicians review the data for an additional fee.



The Data Viewer software interface shows a table of calibration constants and a summary of system performance metrics. The table includes the following data:

Panel	Alarm Type	Background (CPS)	Max (CPS)	Set Point (CPS)
P1L	Sigma	3356	4632	3900
P1H		4762	4264	5179
P2L		N/A	N/A	N/A
P2H		N/A	N/A	N/A
GL Sum	Sum	3356	4632	3900
GH Sum		4762	4764	5003
Percent 1	Percent Sum	8888	9288	9688
Percent 2		0	0	0
P1 Ratio Low		41.2 %	49.3 %	91.2 %
P2 Ratio Low		0.0 %	0.0 %	50.0 %
Ratio Low Sum		41.2 %	49.3 %	91.2 %
P1 Ratio High		58.7 %	59.6 %	108.7 %
P2 Ratio High		0.0 %	0.0 %	50.0 %
Ratio High Sum		58.7 %	59.6 %	108.7 %

The Lane Summaries report provides a detailed summary of vehicle activity and radiation alarms for Lane 1 and Lane 2. The report includes the following data:

Location	System Type	Lane	Number of Vehicles	Down time	Report Start Date	Report End Date
LM - Truck	Model 4525	1	1529	0:00:00	06/01/2019	06/30/2019
Software	39651N43	3.7.8				
Serial Number						
Direction						
Number of Inbound Radiation Alarms	Number of Outbound Radiation Alarms	Number of Inbound Over Speed Alarms	Number of Outbound Over Speed Alarms	Total Number of Alarms	Check Source Tests	
22	2	148	7	179	24	
Number of Sensor Blockage Events	Number of Background Events	Total Number of Events				
4	0	4				