



SYSTEM DEVELOPMENT

PRIMAS PORTAL MONITORING SYSTEM

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The PRIMAS portal monitoring system is designed for the detection of ionizing radiation originating from moving vehicles and/or cargo trains. The detection system consists of two pillars typically installed face to face, with a distance between the two columns of 3 – 6 m. Weather-resistance of the columns is provided by a stainless-steel cover, which allows installation and operation of PRIMAS systems under permanent outdoor conditions. Also, optical and acoustic alarm features as well as light barriers for the detection of objects entering the portal monitoring system are mounted on the cover.

The detector columns are designed to guarantee maximum sensitivity in the direction of the vehicles passing through the portal. In addition, lead shielding on the outer side of pillars effectively reduces influence of natural ambient background radiation during measurements to a minimum. Radiation detection is carried out by gamma-sensitive detectors. Every detector consists of a plastic scintillator with a volume of 13 liters and a connected, highly sensitive photomultiplier with downstream evaluation electronics. Each detector column contains two detectors adding up to a total effective detection volume of 52 liters for the PRIMAS system. For applications requiring less sensitivity, a system configuration, which contains only one detector per column, is available.



In normal operating mode, the portal system permanently monitors ambient background radiation, which can show quite high fluctuations dependent on weather conditions. Integrated (light barrier) sensors determine, if objects enter the measuring range. As soon as this happens, the system switches to another measurement mode, which dynamically calculates and checks a radiation alarm level based on most recent mean values of background radiation measurement data. If the measured radiation is higher than the calculated alarm level, an optic and acoustic signal is triggered by the system. In reaction to an alarm, evaluation of measurement data can be done separately for each column. This allows to perform a rough localization of radiation sources within the measurement range of the portal. In addition, velocity of passing vehicles is checked and if pre-set speed limits are exceeded, this will be indicated by optic and acoustic alarm signals.

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The portal monitoring system consists of one master and one slave pillar, each containing two scintillation detectors, light barriers for object detection and optical and acoustic signal generators for status- alert and alarm signals. The master column contains all the control electronics and power supply. Furthermore, the control panel and display are mounted in this column. The display visualizes the current system status and gives an overview of recent alarm events. Optionally, the control panel can be installed separated from the system (e.g. inside buildings etc.)

Data acquisition and graphic visualization software - another optional feature – facilitates generation and automatic storage of digital documentation of all incoming and outgoing vehicle movements in combination with respective radiation measurement data. Measurement graphs can be amended by adding pictures from up to two networked cameras to get even more comprehensive documentation of all passage events. Protocols in pdf-format can very easily be generated and printed out or shared via email by one click.



TECHNICAL SPECIFICATION

Detector geometry:	two pillar system
Detector material:	plastic scintillator
Number of scintillator pieces per system:	4 (optionally 2)
Detection volume per piece of scintillator:	13 liters
Detection volume per system:	52 liters
Maximum distance between detector pillars:	6 m (dependent on required sensitivity)
Shielding material:	6 mm lead (low activity)
Operating temperature:	-40 °C to +50 °C
Mode of operation:	permanent monitoring
Dimensions of detector pillars:	2625 x 945 x 380 mm
Weight per column (incl. cover):	app. 290 kg
Operating voltage (power supply):	230 V / 40 W

CONTACT

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