

PERM™: PCS Enabled Radiation Monitor

A modular, spectroscopic gamma detector capable of stand-alone operation in extreme environments or as a subcomponent to larger systems

The PERM uses a low-cost 2 in. x 4 in. x 16 in. NaI(Tl) crystal as scintillation material. The crystal and photomultiplier tube (PMT) assembly resides within an IP67 PERM housing.

When combined with a custom Thermal Management Unit (TMU) and the built-in software stabilization algorithm, the PERM provides high quality spectra required for maximum detection performance.

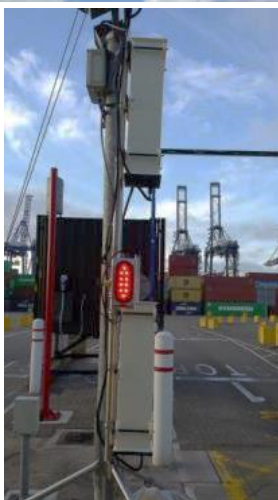
Extensive field operation and independent testing in changing environmental conditions such as in maritime ports, desert environments, and as gantry installations over highways has demonstrated that the PERM achieves ~ 0.5% absolute energy calibration uncertainty with < 0.5% instability.

Designed to maximize the detection and identification performance of PSI's proven Poisson Clutter Split (PCS) algorithm in low SNR conditions

Field Uses and Applications:



Gantry mounted PERMs (above), Radiation Portal Monitor with PERMs (left) and stand-alone PERMs in ocean port environment (right)



PERFORMANCE ADVANTAGES

- Sourceless automatic gain stabilization and calibration
- Absolute energy calibration accuracy and stability to better than 0.5%
- IP67 rating and suitable for operation in extreme environments including ambient temperatures of -40°C to 55°C
- Ruggedized design with internal thermal management insures outstanding stability and reliability
- Modular design weighing 39 lbs, measuring 8" by 8" by 32" and consuming less than 12 watts average*

*For ambient temperatures at or above 20°C

PERM™ and PERM-S™ Specifications

A variant of the PERM, known as the PERM-S is also available. The PERM-S package includes additional electronics and provides GPS data and cellular connectivity.

These additional features allow the PERM-S to be used as part of a large, distributed network of radiation sensors.

The PERM radiation detection technology has demonstrated excellent performance in operational environments and as part of independent testing:

- Accurate, real-time ($\geq 1\text{Hz}$) identification of shielded and masked threat materials with full NORM rejection
- Compliant against ANSI N42.38 and N42.35 when installed in radiation portal monitors
- Greater than 10x reduction in false alarm rates over existing radiation portal monitor capability
- High probability of detection and identification of sources moving at high speed

PERM and PERM-S SWaP					
Attribute	Requirement		PERM / PERM-S		Comment / Justification
Size	No constraint		8 in x 8 in x 32 in		Insulated enclosure for NaI crystal, PMT, base, and associated electronics
Weather Resistance	Protection from precipitation and occasional wash downs		IP67 Rating		Protected from immersion in up to 1 meter of water
Weight	≤ 50 lb		39 lbs.		Driven by remove-replace requirements
PERM™ and PERM-S™ Specifications	PERM		PERM-S		
	Peak	Average	Peak	Average	
Electronics	2.5 W	2.5 W	3.6 W	3.6 W	Based on high-performance MCA PMT base. PERM-S includes GPS and cellular modem.
TMU G3	0.64 W	0.19 W	0.64 W	0.19 W	
Heaters	125 W	6 W (@20°C)	125 W	6 W (@20°C)	Maximum Draw per DC bus: 1.4 A @ 12 VDC, 1.5 A @ 24 VDC, 2.5 A @ 48 VDC
Total (Total w/o Heaters)	128.14 W (3.14 W)	8.69 W (2.69 W)	129.24 W (4.24 W)	9.79 W (3.79 W)	Peak power draw is from cold start at -30°C

Kromek Group plc

Kromek NETPark Thomas Wright Way Sedgefield County Durham TS21 3FD UK T: +44 (0) 1740 626060

Kromek 143 Zehner School Road Zelienople PA 16063 USA T: +1 724 352 5288

E: sales@kromek.com W: www.kromek.com