

Excellent
performance per
unit price

M800: Rugged-by-Design™ Neutron Detectors

Highly sensitive SiPM-based neutron detectors

He-3-free, highly sensitive and scalable neutron detectors. For seamless integration into detection systems such as radiation portal monitors, mobile detection systems or measurement networks. The M800 is powered via PoE* and accessible by its IP address, making integration and maintenance straightforward. The M800 allows operation in magnetic fields and does not require high voltage.

Key features

- Modular, scalable, straightforward integration
- Rugged SiPM** -based design (no PMT)
- He-3 free, not dependent on scarce or expensive materials
- No high voltage required
- IP adressable
- Not susceptible to magnetic fields
- No toxic materials
- Based on LiF converter foils and noble gas scintillation
- Ingress-proof environmental package on request

* PoE = Power over Ethernet

** SiPM = Silicon Photomultiplier

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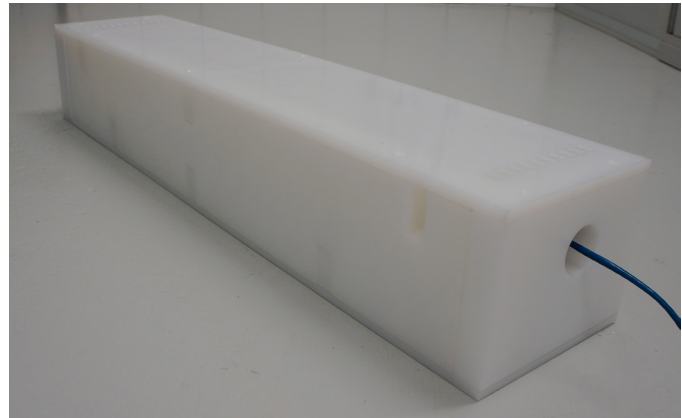
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Case Studies: M800 Integration

- Integration in RPMs as technology upgrade
- Integration into tactical vehicles (pursuers, patrols etc.)
- Coastal guard speed boats integration

Technology Description

Helium-4 is used as a scintillation medium. Helium-4 (natural helium) has proven to be an excellent choice for a neutron detection medium as it is transparent to its own light and has low electron density, making it insensitive to gamma radiation. A proprietary, large area LiF-based coating inside the detector tube captures neutrons, emitting highly energetic charged particles in the process. The energy of the charged particles is converted into light and detected by SiPM light sensors. On board electronics perform digital pulse shape discrimination to reject gamma-induced events and provide a pulse for every detected neutron. Robustness is achieved by eliminating fragile components such as crystals, photomultiplier tubes and sensitive anode wires.



The M800 in a moderator. A single PoE Ethernet cable serves as control and signal output. Multiple detectors can be connected to commercially available PoE devices (e.g. PoE Switch, PoE Injector).

Detector Specifications	M800
Package	Detector with integrated signal processing. User configurable data broadcasted on TCP/IP.
Physical Specifications	Size: 916.2 mm x 144 mm x 144 mm, weight: 8.6 kg (without HDPE moderator)
Neutron Sensitivity	0.5 -1.05 cps/ng Cf-252 at 2 m (1 ng Cf-252 emits ~2300 n/s), depending on HDPE moderator
Gamma Rejection	Gamma rejection: <math><10^{-6}</math> Gamma immunity up to 100 $\mu\text{Sv/hr}$ with $0.9 < \text{GARRn}^* < 1.1$
Signal Output	A single Ethernet cable serves as the control and signal output interface TTL output optional. TTL pulse width: standard 80 ns, can be programmed from 10-2560 ns.
Control Cable Connection	RJ45 (Cat6)
Power Supply	IEEE 802.af Type 1 Class II; Typical consumption: 4W No high voltage required
Operating Temperature	-30°C to 55°C
Storage Conditions	-30 °C to 65 °C
Case	IP65 rated Aluminum Casing
Relative Humidity	up to 93% at 40 °C
Salt Water Spray	up to 5% NaCl at 35 °C
Ingress Protection Degree	IP62
Standards	CE; 2014/68/EU
Certifications	IEC 60068-2-66, 60529:2014 (IP6X, IPX5, IPX4), IEC 62706:2012-12, IEC 62706, table 5 EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-6, EN 61000-4-8 ANSI42.43-2016/7.2, ANSI42.43-2016/7.4, ANSI42.43-2016/8.2, ANSI42.43-2016/8.3, ANSI42.43-2016/9.3, IEC 62244:2006/8.1, IEC 62244:2006/8.3, IEC 62244:2006/8.4, IEC 62244:2006/8.5, IEC 62244:2006/10.2

* Gamma Absolute Rejection Ratio for neutrons. See R. Kouzes et al, "Neutron detection gamma ray sensitivity criteria", <http://dx.doi.org/10.1016/j.nima.2011.07.030>.

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