



MDN55EV1PA/MDNR55EV1PA High Sensitivity, Extended Range Scintillation Detector/Preamplifier Set



*MDNR55EV1PA Scintillation
Detector/preamplifier assembly
(Calibrated, matched pair)*

FEATURES

- Automatic gain stabilization using built in LED
- Operates in pulse mode and extended range current mode
- Linear over 9 decades
- Calibration cycles of up to two years
- Detectors are packaged in a water resistant O-ring sealed cylinder with a mu-metal shield
- Operated with PA300E preamplifier with three single channel analyzer channels

The MDN55EV1PA/MDNR55EV1PA matched pairs consist of a gamma scintillation detector coupled to a PA300E preamplifier. While the MDN55EV1PA variety utilizes a straight cable connection at the back of the detector, the MDNR55EV1PA utilizes a right angle connection for use in tight spaces. These factory matched and calibrated detector pairs simplify deployment in new or existing systems by eliminating the need for calibration/matching during installation. See ordering information for details.

The MDN55EV1/MDNR55EV1 high sensitivity extended range gamma scintillation detector consists of one NaI(Tl) gamma scintillator optically coupled to a photomultiplier (PM) tube via a Lucite light pipe. A reference Light Emitting Diode (LED) and a temperature sensor are embedded in the Lucite pipe.

This detector operates with a unique gain stabilization circuitry for temperature-compensated drift-free operation, resulting in improved accuracy and extended calibration cycles.

MDN55EV1 operates in conjunction with a preamplifier, Model PA300E. The preamplifier contains circuitry that compares the LED pulses with a reference to provide closed loop feedback for automatic gain compensation. The PA300E also amplifies and shapes the detector output signal in order to provide digital pulses to the remotely located ratemeter. Procurement of matched detector/preamplifier set is recommended to simplify field maintenance and system support.

Together with its preamplifier, the MDN55EV1/MDNR55EV1 can be connected to multifunction control and display units such as iR7040, ADM606 and ADM616.

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DETECTOR

- Scintillator Type and Size – NaI(Tl): 50.8 x 50.8 mm (2 x 2 in.) (dia. x L)
- Nominal Detector Sensitivities –
 - In CANBERRA Reference Geometry RG-1:
 - 6.4 cpm/Bq (2.4×10^5 cpm/ μ Ci) for ^{137}Cs 1 in. dia. disc source;
 - 12.2 cpm/Bq (4.5×10^5 cpm/ μ Ci) for ^{60}Co 1 in. dia. disc source;
 - 9.7 cpm/Bq (3.6×10^5 cpm/ μ Ci) for ^{133}Ba 1 in. dia. disc source
- Detector Effective Range –
 - Pulse mode: 1×10^1 to 5×10^6 cpm
 - Current mode: 2.5×10^6 to 1×10^{10} cpm
- Energy Range: 50 keV to 2.55 MeV
- Natural Background (100 nGy/hr) in 2-inch Lead Shield: 220 cpm Typical 0.07-2.5 MeV
- Photomultiplier Tube: Electron Tubes 9266B
- Detector Window Assembly: Thin Stainless Steel
- Detector Output: Negative Pulse; 62 μ V/keV
- Accuracy under Reference conditions: $\leq \pm 10\%$
- Linearity under Reference conditions: $\leq \pm 10\%$ over pulse mode range
- Detector Cable Assembly: Integral pigtail cable
- Typical Applications –
 - High Sensitivity Extended Range Gamma monitor in Air/Liquid
 - Offline/Online Liquid Monitor

PHYSICAL

- Housing: Sealed Stainless Steel
- Size: 63.5 x 239 mm (2.5 x 9.4 in.) (dia. x L) straight; 63.5 x 251 mm (2.5 x 9.9 in.) (dia. x L) right angle
- Weight: 1.8 kg (4.0 lb) straight; 2.0 kg (4.4 lb) right angle



ENVIRONMENTAL

- Operating High Voltage: -300 to -1000 V Typical
- Operating Temperature Range: -10 °C to +60 °C (+14 °F to +140 °F)
- Operating Humidity: 0 to 98% non-condensing

SPECIFICATIONS FOR PA300E

- Input Impedance: 9.1 K
- Voltage Gain: 16
- Energy Sensitivity: Approx. 1 mV per keV
- MCA Output: Positive or negative, adjustable amplitude
- Digital Output: Differential
- Operating Temperature Range: -10 °C to +55 °C (+14 °F to +131 °F)
- Energy Low Range: 50 keV to 2.55 MeV
- Housing: Sealed stainless steel box
- Size: 152.4 x 152.4 x 101.6 mm (6 x 6 x 4 in.) (L x W x H)
- Weight: 2.0 kg (4.4 lb)
- Power: ± 15 V dc
- Placement from Detector: Up to 1.8 m (6 ft)
- Placement to Ratemeter: Up to 304 m (1000 ft)

ORDERING INFORMATION

- MDN55EV1PA – 2 x 2 NaI(Tl) High Sensitivity, Extended Range Scintillation detector with straight connector, matched and calibrated with PA300E Preamplifier
- MDNR55EV1PA – 2 x 2 NaI(Tl) High Sensitivity, Extended Range Scintillation detector with right angle connector, matched and calibrated with PA300E Preamplifier
- MDN55EV1 – 2 x 2 NaI(Tl) High Sensitivity, Extended Range Scintillation detector, straight connector
- MDNR55EV1 – 2 x 2 NaI(Tl) High Sensitivity, Extended Range Scintillation detector, right angle connector
- PA300E – Assembly Preamplifier (Needs match-pair calibration in field)



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