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**LUDLUM MODEL 44-10
GAMMA SCINTILLATOR**

**October 2007
Serial Number PR107232 and Succeeding
Serial Numbers**



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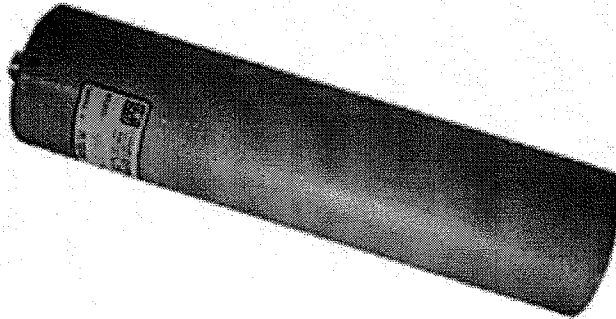
Model 44-10 Gamma Scintillator

Introduction

The Model 44-10 sodium iodide (NaI) gamma scintillator is primarily used for detecting high energy gamma radiation in the range of 60 keV - 2 MeV. It consists of a 2" (5.1cm) diameter X 2" (5.1cm) thick NaI crystal coupled to a photomultiplier tube and is housed in a 0.062" thick aluminum housing. The detector is energy dependent, over responding by a factor of five in the 100 keV range and underresponding by a factor of 0.5 above 1 MeV when normalized to ^{137}Cs .

The Model 44-10 will operate with any Ludlum instrument or equivalent instrument that provides 500 - 1200 volts. The recommended instrument input sensitivity is approximately 10 mV or higher.

Some common applications for this detector include background radiation monitoring, high-sensitivity surveying, and spectrum analysis when used in conjunction with a single or multi channel analyzer.



Model 44-10

Model 44-10 Gamma Scintillator

Note:

The detector does not contain any consumable materials.

Note:

If the detector is used in a manner not intended by the manufacturer, the detector may not function properly.

Unpacking and Repacking

Remove the calibration certificate or detector functional check certificate and place it in a secure location. Remove the detector and accessories (cable, etc.) and ensure that all of the items listed on the packing list are in the carton. If more than one detector is in the carton, refer to the calibration certificate(s) for serial number(S/N) match. The Model 44-10 S/N is located on the side of the detector near the connector.

To return the instrument or detector for repair or calibration, provide sufficient packing material to prevent damage during shipment and appropriate warning labels to ensure careful handling. The following items and information should also be included to insure a quick turnaround time on your repair/calibration:

- instrument(s) and related cable(s)
- brief description as to the reason for return
- description of service requested
- return shipping address
- customer name and telephone number

Model 44-10 Gamma Scintillator

Specifications

SCINTILLATOR: 2" (5.1 cm) diameter X 2" (5.1 cm) thick NaI(Tl) crystal

SENSITIVITY: Typically 900 cpm/ μ R/hr (^{137}Cs gamma)

ENERGY RESPONSE: Energy dependent

COMPATIBLE INSTRUMENTS: General purpose survey meters, ratemeters, and scalars

TUBE: 2" (5.1 cm) diameter magnetically shielded photomultiplier

OPERATING VOLTAGE: 500 - 1200 volts

DYNODE STRING RESISTANCE: 60 megohm

CONNECTOR: Series "C" (*others available*)

CONSTRUCTION: Aluminum housing with beige polyurethane enamel paint

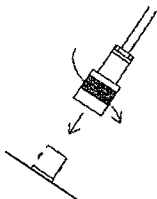
TEMPERATURE RANGE: -4°F(-20°C) to 122°F(50°C) May be certified to operate from -40°F(-40°C) to 150°F(65°C)

SIZE: 2.6" (6.6 cm) diameter X 11" (27.94 cm)L

WEIGHT: 2.3 lb (1.04kg)

Operating Procedures

CONNECTING TO AN INSTRUMENT



Connect one end of the cable provided to the detector by firmly pushing the connector together while twisting clockwise $\frac{1}{4}$ turn until latched. Repeat the process in the same manner with the other end of the cable and the instrument.

TESTING THE DETECTOR

1. Insure that the instrument high voltage (HV) is at the proper setting for the detector (900 volts).
2. Connect the detector to the instrument and check for a proper background reading (typically 25-50 cpm at 8-15 $\mu\text{R/hr}$).
3. Expose the detector to a check source and verify that the instrument indicates within 20% of the check source reading from the last calibration. Alternatively, expose the detector to a source of known value and verify that the detector detects greater than or equal to the efficiency listed in the specification section of this manual.
4. Instruments and detectors which meet these criteria are ready for use. Failure to meet these criteria may indicate a malfunction in the detector.

Safety Considerations

ENVIRONMENTAL CONDITIONS FOR NORMAL USE

1. Indoor or outdoor use (in a dry environment)
2. No maximum altitude
3. Temperature range of -20°C to 50°C (5°F to 122°F);
May be certified for operation from -40°F to 150°F .
4. Maximum relative humidity of less than 95% (non-condensing)

Pollution Degree 1 (as defined by IEC 664)

CLEANING INSTRUCTIONS AND PRECAUTIONS

The detector may be cleaned externally with a damp cloth, using only water as the wetting agent. Do not immerse the instrument in any liquid. Observe the following precautions when cleaning:

1. Turn the instrument electronics OFF.
2. Allow the instrument to sit for 1 minute.
3. Disconnect the detector cable before cleaning the detector.

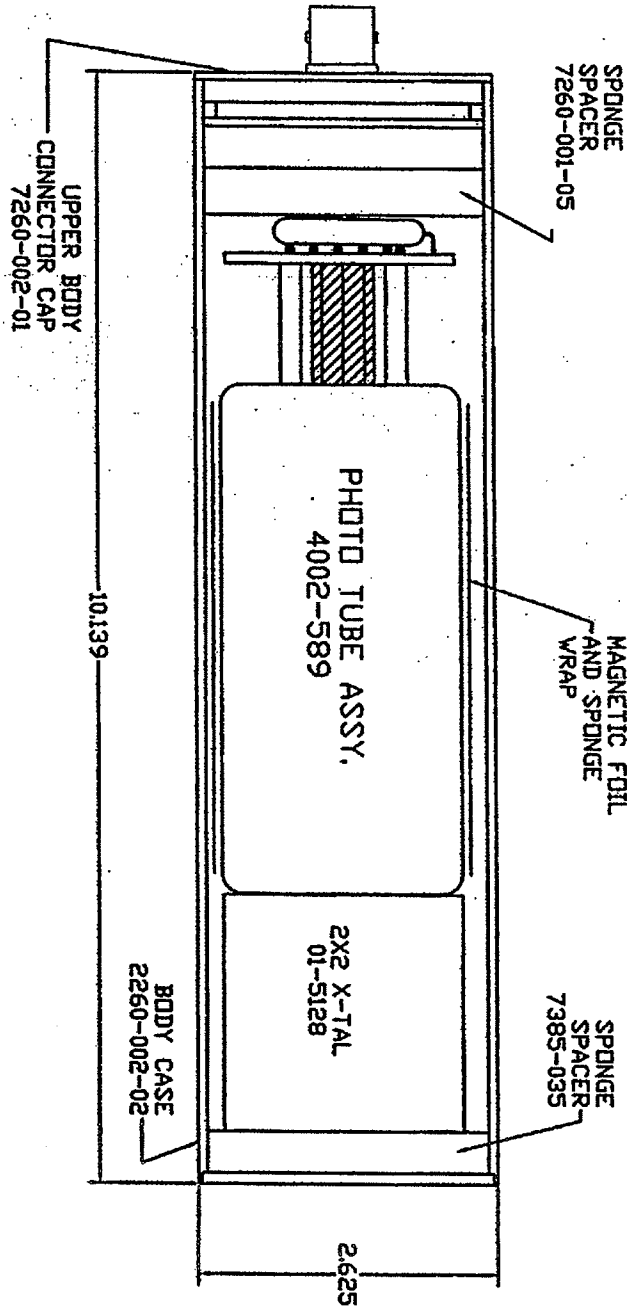
Model 44-10 Gamma Scintillator

Parts List, Drawings and Diagrams

Model 44-10 Gamma Scintillator

<u>Reference</u>	<u>Description</u>	<u>Part Number</u>
UNIT	Completely Assembled Model 44-10 Gamma Scintillator	47-1540
1 EA	BODY CASE W/ CAP	2260-002-02
1 EA	CONNECTOR CAP	7260-002-01
1 EA	2" x 2" NaI CRYSTAL	01-5128
1 EA	2" PHOTO TUBE ASSY	4002-589
1 EA	2" PM TUBE	01-5640
1 EA	CONNECTOR, UG706/U	4478-011
1 EA	O-RING	16-8289
8 EA	SPONGE SPACER	7260-001-05
1 EA	END SPONGE SPACER	7385-035
*	MAGNETIC FOIL	01-5019/5026
1 EA	SPONGE WRAP	21-9267

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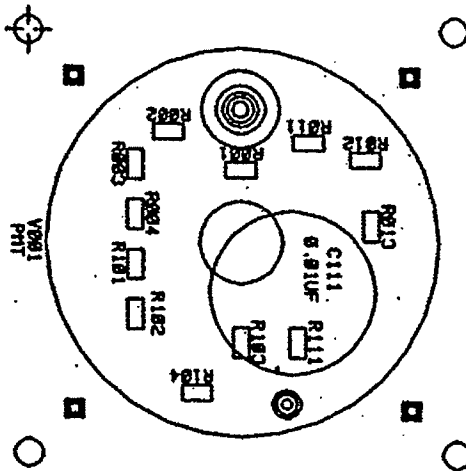


Model 44-10 Gamma Scintillator

Reference Description Part Number

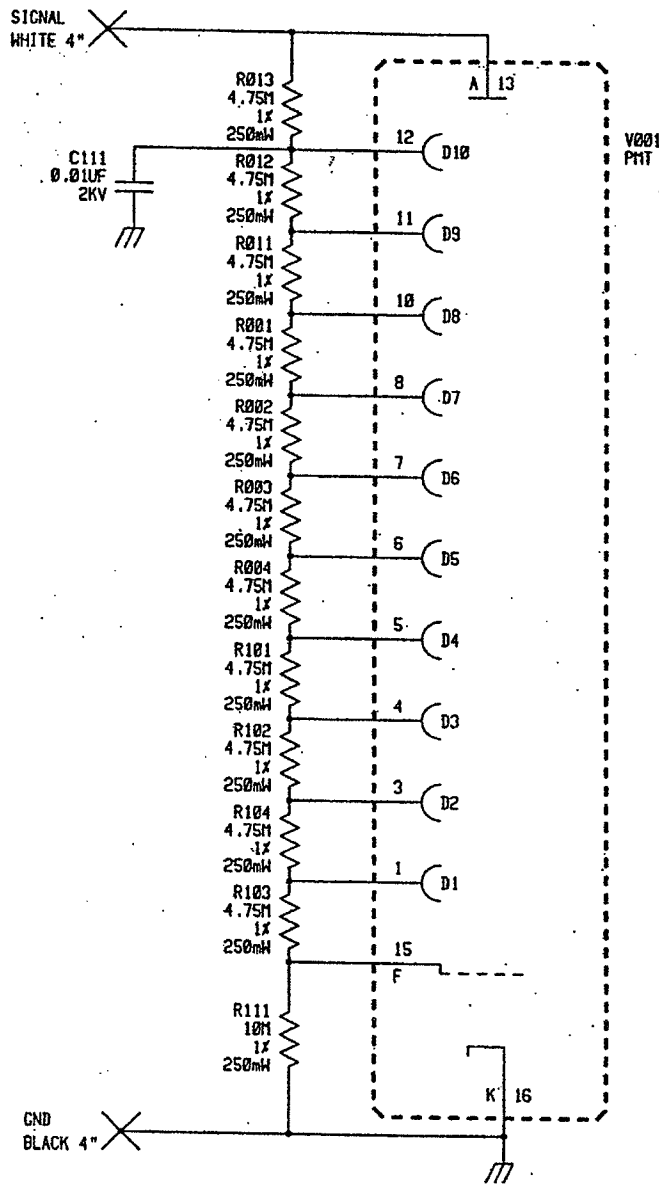
2" Voltage Divider Board

1EA	VOLTAGE DIVIDER	2002-357
1EA	CAP 0.01 μ F 2kv	04-5525
11 EA	RES 4.75 meg 1/8 W, 1%	12-7995
1 EA	RES 10 meg 1/8 W, 1%	12-7996



Model 44-10 Gamma Scintillator

2" Voltage Divider Board - Schematic



Energy Response for Ludlum Model 44-10

