

GAMMA & NEUTRON HIGH RANGE UNDERWATER PORTABLE MONITOR

Model Series ~ CP-MU-GN

FEATURES:

- USE IN REACTOR CORE & SPENT FUEL POOL
- FULLY SUBMERSIBLE, RUGGED PROBE
- FOUR LINEAR RANGES
 - DMU-1- UP TO 1,000,000 R/hr (GAMMA)
 - DMU-1000 FROM 100 mR/hr to 1,000 R/hr (GAMMA)
 - CP - MU -7 READS UP TO 10^7 R/hr (GAMMA)
 - CP-MU-GN - DMU-GN PROBE (GAMMA & NEUTRON DETECTOR)
- WATERPROOF DETECTOR SYSTEM
- WEIGHTED PROBES
- STABLE AND DEPENDABLE
- FAST RESPONSE
- LIGHTWEIGHT AND PORTABLE
- BATTERY OPERATED
- 2-WAY SERIAL PORT-STANDARD



DMU-1 Probe

CP-MU -
Electronics

APPLICATION:

Underwater monitoring (and in hot cell monitoring) of Reactor Spent Fuel Elements, Reactor components and dose rate measurements of irradiated objects is available in this extremely high range capability instrument and the waterproof construction of the ion chamber detection system.

Useful in determining the fuel burn up rate as well as security in detecting stolen fuel rods.

GENERAL DESCRIPTION:

- Model Series CP-MU Underwater Monitor System consists of an electronic package (**Model CP-MU**) coupled to a High Range **DMU-1** or Mid Range **DMU-1000** Detectors.
- The system includes 60 feet (optional 100 feet) of special low noise cable with a waterproof coupling to a 5" long x 1/2" diameter aluminum tube containing an ion chamber (**Model DMU-1**) or
- 7-1/2" long x 5-3/4" diameter aluminum ion chamber (**Model DMU-1000**).
- Model **CP-MU-GN** has dual in line detectors.

CP-MU-D1 (GAMMA)

CP-MU-D1000 (GAMMA)

CP-MU-7-D1 (GAMMA)

CP-MU-GN (GAMMA & NEUTRON)



**TECHNICAL ASSOCIATES
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Divisions of  US NUCLEAR CORP

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DESCRIPTION DETAILS:

- Calibration is fully adjustable.
- The instrument case is made of drawn aluminum with epoxy lettering for easy decontamination. Case openings are sealed by gasket or screw closure for protection of electronics.
- A reliable MOSFET electrometer circuit and improved solid state electronics assure long uninterrupted service. Mechanical switching of the high impedance circuit has been eliminated.
- Protection against influence by magnetic fields up to 60 gauss has been built into the instrument.
- A top handle and four rubber feet achieve a stable base with no loss of display visibility.

RANGES

CP-MU	PROBE MODEL	RANGE	RANGE Sv	DETECTOR SIZE	PROBE LENGTH	DETECT
CP-MU-D1	DMU-1	0.1KR/hr to 1000.0 KR/hr	1Sv/h to 10,000Sv/h	0.25" Dia. x 8" Long 1.0cc internal	5 feet or 8 inches	GAMMA
CP-MU-D1000	DMU-1000	0.1 R/hr to 1000.0 R/hr	10mSv/h to 10Sv/h	5.75" Dia x 8" Long 1000 cc internal	8 inches	GAMMA
CP-MU-GN	DMU-GN	0.1KR/hr to 1000.0 KR/hr	1Sv/h to 10,000Sv/h	0.385" x 12" long	5 feet or 12 inches	GAMMA NEUTRON
CP-MU-7-D1	DMU-1	1KR/hr to 10 ⁷ R/hr	10Sv/h to 100,000Sv/h	0.25" Dia. x 8" Long 1.0cc internal	5 feet or 8 inches	GAMMA
CP-MU-7-D1000	DMU-1000	1 R/hr to 10,000.0 R/hr	10mSv/h to 100Sv/h	5.75" Dia x 8" Long 1000 cc internal	8 inches	GAMMA

SPECIFICATIONS:

CP-MU SERIES MODELS:

- CP-MU:** ELECTRONIC PACKAGE FOR ALL MODELS IS THE SAME OR SIMILAR
- CP-MU-D1:** DMU-1 Probe with 60-foot cable. (GAMMA)
- CP-MU-D1000:** DMU-1000 Probe and 60-foot cable. (GAMMA)
- CP-MU-GN:** DMU-GN Probe with two channel version & two detectors (GAMMA & NEUTRON)



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Accuracy: $\pm 10\%$ (DECADE)
Calibration: Gamma - Cs-137 (Co-60 Optional)
Neutron - RaBe
Time Constant: 2 seconds fast, 12 seconds slow
Temperature Range: -30°C to +57°C
Drift: At room temperature - less than 0.5% per °C

ELECTRONICS

Readout: LCD 8 digits.
Indicator Lamp: **LED High Level:** Green; **Over-Range Indicator:** Red
Electrometer: Solid State MOSFET input
Range Adjusts: 1 (one) internal screwdriver adjustment
Zero Adjust: Knob
MOSFET Protection Circuit: Prevents damage to MOSFET when coupling or decoupling detector system.
Serial Port: 2 way RS-232 for data collection or remote computer readout.
Battery: 6 "AA" cells, carbon-zinc, alkaline, Li or Nimh type batteries can be interchanged without instrument adjustments. Use alkaline batteries below 0°C
Battery Check: Pushbutton with LED indicator
Electronics: A-D converter, LCD drivers

WEIGHT & DIMENSIONS:

Dimensions: 6-1/2" long x 3-1/2" x 9" tall including handle
Weight: Electronics 28 oz.
Detector System: DMU-1 - Sealed ion chamber 0.25" dia x 8" long. Internal 1.0 cc
Detector System: DMU-1000 - Sealed ion chamber 5.75" dia x 8" long. Internal 1000 cc
Detector System: DMU-GN - Sealed proportional chamber He3 or Bf-3

OPTIONAL:

~ Readout in Si units: Sv and Sv/h
~ WIN-W -- RS-232 Software
~ USB Port
~ Cable length 100ft (30 meters)
~ Alarm settable visual alarm LED
~ Lighter weight chamber **MODEL ~ DMU-1000LW**, non-submersible



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