LM 211 - 214

Off-line gamma liquid Monitor

• continuous monitoring and display of liquid volume activity • visual, audible and electrical signal alarms when threshold levels are exceeded

- **energy spectrum and temperature changes compensation**
- **available with or without display or local signaling**
- **seismically qualified**
- **the hinge mounted cover of the lead shielding makes maintenance easier on the detector**
- **available under 10 CFR 50 App.B, ASME NQA-1 and IEC 61226 Cat.B programs for safety related applications**

The LM 211-214 from the **RAMSYS** product line has been developed to sample liquid from a pipe, a tank or a pool. A 1 ¼"x1" NaI scintillation detector face a liquid sampler inside a 4 π lead shielding for the Gamma emitting isotope monitoring. A radioactive source built into the NaI crystal allows compensation of potential drift whenever temperature changes occur. The spectrometry capability, based on a 1024 channel spectrum analysis, will allow immediate and easy radio isotope identification in case of alarm.

MGP INSTRUMENTS

Version notation	Detector 1 1/4"x1"NaI(TI)	4π protection lead shield	LPU or LPDU	Assembly
LM 211-1	with ^{241}Am Source	5 cm (2")	LPU	On "light" skid
LM 211-2	with ^{241}Am Source	5 cm (2")	LPDU	On "light" skid
LM 211S-1	with ^{241}Am Source	5 cm (2")	LPU	On wall and floor
LM 211S-2	with ^{241}Am Source	5 cm (2")	LPDU	On wall and floor
LM 212-1	with ^{241}Am Source	10 cm (4")	LPU	On "light" skid
LM 212-2	with ^{241}Am Source	10 cm (4")	LPDU	On "light" skid
LM 212S-1	with ^{241}Am Source	10 cm (4")	LPU	On wall and floor
LM 212S-2	with ^{241}Am Source	10 cm (4")	LPDU	On wall and floor
LM 213-1	w/o 241Am Source	5 cm (2")	LPU	On "light" skid
LM 213-2	w/o 241Am Source	5 cm (2")	LPDU	On "light" skid
LM 213S-1	w/o 241Am Source	5 cm (2")	LPU	On wall and floor
LM 213S-2	w/o 241Am Source	5 cm (2")	LPDU	On wall and floor
LM 214-1	w/o 241Am Source	10 cm (4")	LPU	On "light" skid
LM 214-2	w/o 241Am Source	10 cm (4")	LPDU	On "light" skid
LM 214S-1	w/o 241Am Source	10 cm (4")	LPU	On wall and floor
LM 214S-2	w/o 241Am Source	10 cm (4")	LPDU	On wall and floor

Physical characteristics

- radiation detected: gamma
- detector : NaI scintillation detector 1 ¼ ''x 1'' (with or without source)
- 4.5 liter vessel
- lead shielding: 4π/5 cm or 4π/10 cm
- measurement range: up to 3.7 10^9 Bq/m^3
- energy range: 100 keV to 2.5 MeV
- temperature range: +0°C to +55°C (32°F to 131°F)

Electrical characteristics

- power supply: 120 V/60 Hz or 230 V/50 Hz
- interfaces
  - RS232 serial link for parameter configuration of the monitor through a computer and MASS application software
  - two 0/4 - 20mA analog outputs, one 0/4 - 20mA analog input, three programmable relays, two isolated RS485 serial links

Mechanical characteristics

- protection level: IP65 and IK07
- aluminium case: RAL 7030 grey colour decontaminable paint

Approx. Dimensions	LM211 & LM213 detection sub-assembly	LM211 & 213 skid*	LM212 & LM214 detection sub-assembly	LM212 & 214 skid*
height	1002 mm with its valves (39.44 in)	1305 mm (51.37 in)	1052 mm with its valves (41.41 in)	1305 mm (51.37 in)
width	ϕ : 478 mm (18.81 in)	750 mm (29.52 in)	ϕ : 514 mm (20.23 in)	750 mm (29.52 in)
depth	/	675 mm (26.57 in)	/	675 mm (26.57 in)
weight	300 kg (660 lb)	400 kg (880 lb)	725 kg (1598 lb)	800 kg (1764 lb)

* includes : detection sub-assembly, LPDU, EJB and flow meter.

Qualification

- EMI/RFI: EN 55022, IEC 61000-6-2, IEC 61000-6-4

Alarm signaling (applicable to LPDU only)

- audio indicators: buzzer sound alert rated at 90dBa at one meter
- visual indicators: programmable operation lights such as red for high alarm, yellow for alert alarm, green for normal operation

Accessories

- RAMSYS softwares
- set pump (pump and electrical Unit)
- flowmeter
- set of calibration (^{137}Cs source)
- check source (^{137}Cs source)
- set valves (insulation, purge or draining)

RAMSYS: Radiation Monitoring System

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