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POWER PLANTS



RESEARCH
CENTRES

LEMS-200

LIQUID EFFLUENT MONITORING AND SAMPLING SYSTEM



KEY FEATURES

- Continuous measurement of the volumetric activity of liquids and grab sampling of emergency samples
- Scintillation detector in a shielded measuring chamber
- Spectrometric evaluation

DESCRIPTION

The LEMS-200 system is designed for monitoring liquid discharges from nuclear facilities and for taking emergency samples for laboratory analysis when the set reference level is exceeded.

The monitor continuously measures the volume activity of the water flowing through the shielded measuring chamber. The inner surface of the chamber has a Teflon layer.

The GD-52 probe is inserted into the measuring chamber in a thin metal well. The GD-52 probe contains a NaI(Tl) scintillation crystal, which makes it possible to distinguish the energy of individual pulses. The pulses are evaluated in an MCA with 1024 channels. By default, windows (ROI) are set to full spectrum and to Cs-137.

The RPU-12 evaluation and display unit processes, archives, and presents data, and controls all technology. The integrated LED panel shows the status of the measuring channels, possible exceeding of the set limits, errors or testing.

For easier operation, the system is also equipped with a mechanical control panel.

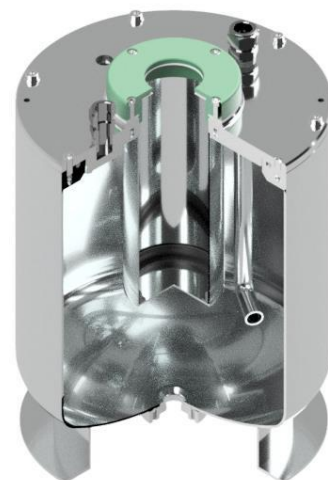
The measurement of liquid volume activity does not depend on the flowrate, because the volume of water around the detector does not change with the flowrate. However, the flowrate affects the reaction time. With a higher flowrate, the volume of the measuring chamber will change faster, and thus the response of the monitor to a change in volume activity will be faster.

If the set reference value is exceeded, an emergency sample is automatically taken into the sampling container. As standard, the device is equipped with one main container connected via a quick coupler and one spare container. Both containers are equipped with a handle for easy handling. The sample must be evaluated in the laboratory.

In the event of a significant change in the temperature of the measured liquid, the energy stabilization of the detector starts. This ensures compensation of the temperature drift of the NaI(Tl) crystal and the accuracy of the measurement even after the temperature change.

The function of the device is fully automated. At set intervals, it is possible to flush the measuring vessel and then compensate for the background. These activities can also be started manually.

The device is also equipped with an inlet and an outlet for the calibration solution with known reference activity.



Measuring chamber cross-section

LEMS-200

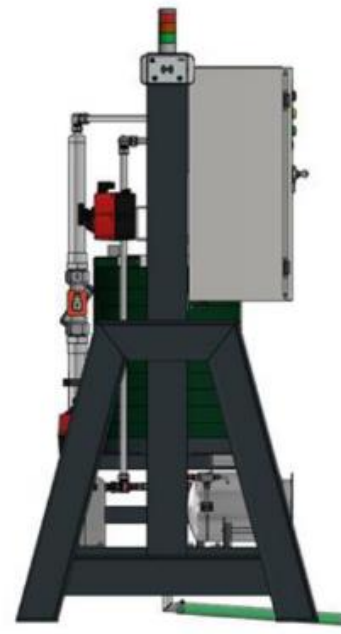
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SPECIFICATIONS

Detector type	Nal(Tl)
Measurement range (Cs-137)	(2,5E3 ÷ 3,2E8) Bq/m ³
Energy range	50 keV – 1,5 MeV
Activity measurement period	60 s
Measurement chamber volume	23,8 l
Measurement chamber shielding	50 mm
Flowrate	0 - 100 l/min
Sampling container volume	8 l
Amount of post-accident sample	4-5 l
Power supply	230 VAC / 50 Hz as standard
Ingress Protection	IP66
Liquid temperature	(5 ÷ 55)°C
Environment temperature	(5 ÷ 60)°C
Interfaces	RS-422/485, Ethernet (Modbus)
Dimensions (š x v x h)	(1 600 x 1 700 x 900) mm
Weight	1 000 kg

RELATED PRODUCTS

LEM-500	Liquid effluent monitor
LAM-561	Liquid Activity Monitor (high temperatures)
LAM-502	Liquid Activity Monitor (high activities)
GD-52	Gamma detector with Nal(Tl) crystal
MAK-201	Liquid Activity Monitor (retention tanks)



Mechanical design of the LEMS-200 system

