

## LAM-504

# LIQUID ACTIVITY MONITOR



## KEY FEATURES

- Measurement of the volumetric activity of gamma-emitting radionuclides in process liquids at nuclear facilities
- ATL monitor type: the detector is mounted directly onto the measured pipeline
- Built-in LED check source for automatic spectrum stabilization and functional testing
- Optional safety-classified function, Category C according to IEC 61226.

## DESCRIPTION

The monitor is designed to measure the volumetric activity of gamma-emitting radionuclides in liquids, steam, or steam-air mixtures in process circuits of nuclear facilities under routine operating conditions.

The monitor enables measurement of common fission and activation products as well as noble gases.

The LAM-504 monitor assembly consists of:

- LAD-04 detector assembly, comprising:
  - GD-52 gamma detector with a NaI(Tl) crystal,
  - lead collimator,
  - LED check and stabilization source.
- RPU-06 radiation processing unit equipped with a DIM-15 digital multichannel analyser configurable to 1K, 2K, 4K, or 8K channels.

The detector is installed at an appropriate distance from the pipeline through which the measured liquid flows.

If the temperature of the measured pipeline is high, a detector with a high-temperature-resistant YAP(Ce) crystal (instead of the NaI(Tl) crystal) may be used. Alternatively, a model equipped with a cooler can be used, provided that a cooling-water connection is available at the measurement point.

By default, the DIM-15 analyser determines the total volumetric gamma activity with respect to the selected reference radionuclide.

Optional spectrometric functionality enables the identification and quantification of up to sixteen gamma-emitting radionuclides.

The RPU-06 locally displays measurement results and operating states, stores measured values and other monitor parameters, and visually and audibly indicates when preset alarm levels are exceeded.

The delivery package includes the RadSpec software for configuration and calibration of the device's spectrometric parameters.

If local data display is not required, the RPU-06 can optionally be replaced by the RPU-04 unit, which does not feature an integrated display.



RPU-04

Remote indication of measurement results can be provided by:

- RDU-12 Remote Display Unit
- ASU-50 Alarm Signal Unit

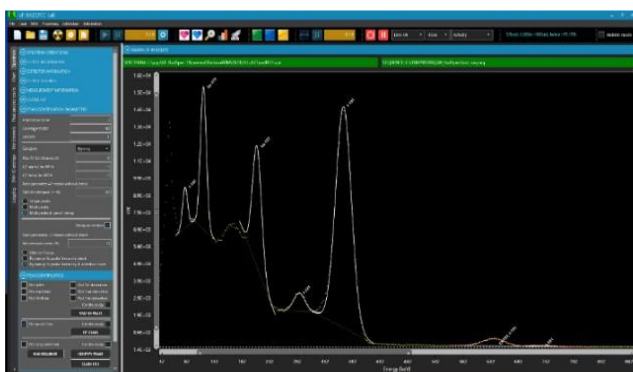
The monitor can communicate with one or two independent host systems via:

- RS-485 serial interface (ModBUS RTU)
- Ethernet 10 Mbit/s (ModBUS TCP)
- optional analogue inputs/outputs (4-20 mA)
- optional digital (relay) inputs/outputs

The monitor can transmit data simultaneously to both non-safety-classified and safety-classified host systems.

## SPECIFICATION

Detector	NaI(Tl) Ø2,5"×2,5" LED (alternatively YAP or CeBr <sub>3</sub> )	
Detector collimator	lead, thickness 5 to 8 cm	
Measurement range	depends on the measured pipeline for pipeline ø 43 cm, wall thickness 16 mm: Cs-137: 1,3E4 to 1,3E9 Bq/m <sup>3</sup> Kr-85: 3E06 to 3E11 Bq/m <sup>3</sup>	
Reference radionuclide	Cs-137 (total gamma activity) Up to 16 gamma radionuclides for spectrometric measurement	
Check source	LED	
Sample temperature	+5 to +40 °C	
Weight of detection assembly with shielding	approx. 150 kg	
Dimensions	<ul style="list-style-type: none"> <li>• detector (w × h × d) 410 × 360 × 390 mm</li> <li>• RPU-06 (w × h × d) 330 × 360 × 366 mm</li> </ul>	
Ingress protection		
Detector	IP 65	
RPU-06	IP 44	
Power supply	+ 24 V DC/ max. 2 A	
Communication Interfaces	Ethernet 10 Mbit/s (Modbus TCP) RS-485 (Modbus RTU)	



RadSpec spectroscopy software

## OPTIONAL ACCESSORIES

<b>GD-51</b> <b>Y1x1.5 HT</b>	Gamma detector with YAP(Ce) crystal
<b>RDU-12</b>	Radiation Display Unit
<b>ASU-50</b>	Alarm Signal Unit
<b>CIM-05</b>	RPU module: isolator between safety-classified and non-safety-classified systems
<b>ICIM-01</b>	RPU module: eight relay outputs and two current loop outputs (4–20 mA)
<b>ICIM-02</b>	RPU module: eight digital inputs and eight digital outputs
<b>ICIM-03</b>	RPU module: four current loop outputs (4-20 mA)
<b>ICIM-04</b>	RPU module: four current loop inputs (4-20 mA)

## RELATED PRODUCTS

<b>LAM-502</b>	Liquid gamma activity monitor for routine, emergency, and post-emergency conditions, medium range, ATL type
<b>LAM-503</b>	Gamma activity monitor for steam–air mixture from the vacuum pump sump; medium and high range; ATL type
<b>N16M-504</b>	N-16 activity monitor for primary-circuit leakage monitoring; ATL type
<b>MSLM-504</b>	Main-steam-line liquid activity monitor; ATL type
<b>LAM-544</b>	Liquid gamma activity monitor for normal operation; standard range; in-line type
<b>LAM-561</b>	Gamma activity monitor for high-temperature liquids under normal, emergency, and post-emergency conditions; medium and high range; off-line type
<b>LAM-564</b>	Liquid gamma activity monitor for normal operation; standard range; off-line type with shielded measurement chamber