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NUCLEAR POWER PLANTS

N16M-504

N-16 PRIMARY CIRCUIT LEAK MONITOR

KEY FEATURES

- Nuclide-specific measurement of N-16 activity and quantification of leaks from the primary to the secondary circuit.
- Measurement of the total volumetric activity of gamma-emitting radionuclides in the main steam line.
- Adjacent-to-line (ATL) geometry
- (1K/2K/4K/8K) MCA with the ability to identify up to ten gamma radionuclides and automatic stabilisation.
- Built-in LED check source for automatic functional testing.
- Data can be transmitted to two independent host systems via galvanically isolated interfaces.
- Available in a seismic-resistant design in accordance with IEEE/IEC 60980-344.
- Optionally can provide safety classified function, according to the EN 61226 standard for safety-related applications.

DESCRIPTION

The N16M-504 monitor is designed to measure the volumetric gamma activity of nitrogen-16 and quantify leaks from the primary to secondary circuits in the steam generators of nuclear power plants.

During reactor outages or operation at low thermal power levels, the total gamma activity of radionuclides in the main steam line is measured. Nuclide-specific activities can also be measured and displayed.

The monitor assembly comprises:

- GD-53 detector with a Ø 2“ x 3“ NaI(Tl) scintillator.
- 50–80 mm thick lead shielding and collimator.
- LED check source
- RPU-06 Radiation Processing Unit with a (1K/2K/4K/8K) MCA module featuring built-in isotope analysis and automatic spectrum stabilisation.

The RPU-06 unit determines the volumetric activity of the N-16 nuclide using the 6.13 and 7.11 MeV peaks, and quantifies leaks from the primary to the secondary circuit. It also measures the total gamma volumetric activity in the low-energy window (80–3000 keV). Spectroscopy of up to nine additional gamma radionuclides in the steam is available as an option. It displays results and statuses and archives values and other parameters of the monitor. It also visually and audibly indicates when the pre-set alarm levels have been exceeded.

The delivery includes the RadSpec software, which is used for device configuration, spectrometric analysis, and calibration.

An RPU-04 Radiation Processing Unit without a display can optionally be used.

Remote indication of measurement results can be provided by:

- RDU-12 remote display unit
- ASU-50 alarm signal unit

The monitor can communicate with two independent host systems via:

- RS-485 serial interface (ModBUS RTU)
- Ethernet 10 Mbit/s, (ModBUS TCP)
- Analogue outputs/inputs (0.4 – 20 mA)
- Digital (relay) outputs/inputs

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

RPU-04

RPU-06

N-16M-504

N-16 PRIMARY CIRCUIT LEAK MONITOR

SPECIFICATION

Measurement range	0.5 to 5000 l/h (Leaks) 3.7E+04 to 3.7E+09 Bq/m^3 (gamma)
Reference radionuclide	N-16 (leaks) Cs-137 (total gamma), max. 9 gamma radionuclides for spectrometric measurement
Environmental temperature	-5 to 60 °C
Weight with shielding	detector app. 150 kg RPU-06 app. 13 kg RPU-04 app. 8 kg
Dimensions	
· Detectors (w × h × d)	410 × 360 × 290 mm
· RPU-04 (w × h × d)	330 × 270 × 287 mm
· RPU-06 (w × h × d)	330 × 360 × 366 mm
Ingress protection	IP65
Power supply	+ 24 V DC/ max. 2 A
Communication interface	AI 4–20 mA, AO 4–20 mA DI, DO RS-485 Modbus RTU Ethernet Modbus TCP

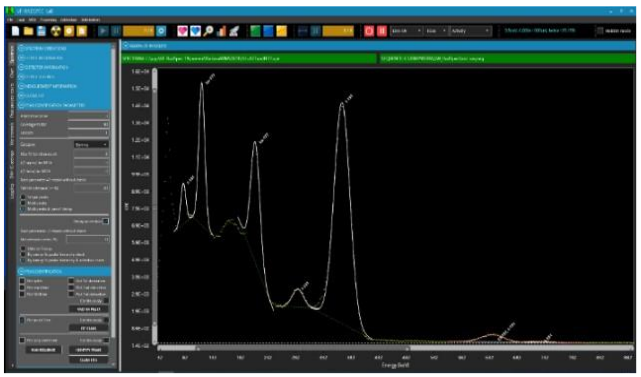
The LAD-04 detection unit with the GD-53 NaI(Tl) scintillation detector in a lead shielding and collimator

OPTIONAL ACCESORIES

RDU-12	Radiation Display Unit
ASU-50	Alarm Signal Unit
CIM-05	Ethernet interface
ICIM-02	Digital outputs 8x / inputs 8x
ICIM-03	Analogue outputs 4x
ICIM-04	Analogue inputs 4x

RELATED PRODUCTS

MSLM-504	Main Steam Line Monitor – measures the total and nuclide-specific volumetric activities of gamma-emitting radionuclides in the main steam line
LAD-07	Liquid Activity Detector – measures fuel cladding failures by detecting Kr-88 in the primary circuit
LAD-08	Liquid Activity Detector – measures fuel cladding failures by detecting I-132 in the primary circuit
LAD-64	Liquid Activity Detector – measurement of volumetric activity of gamma-emitting radionuclides in the process waters of nuclear facilities
LAD-66	Liquid Activity Detector – measurement of volumetric activity of gamma-emitting radionuclides in the process waters of nuclear facilities



RadSpec gamma spectroscopy software

bertin vf nuclear

VF, a.s. Czech Republic
T:+420 516 428 611
E: sales-vf@bertin.group

www.vfnuclear.com

Part of Bertin Technologies
https://www.bertin-technologies.com/

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