



VF NUCLEAR



NUCLEAR POWER PLANTS



WASTE MANAGEMENT



RESEARCH CENTRES



INDUSTRY & MANUFACTURING



NGM-300 series NOBLE GAS MONITORS

MAIN ADVANTAGES

- Measurement of noble gases volumetric activity under normal, accident and post-accident operational conditions
- Various communications interfaces
- Compliant with IEC 60761, IEC 62302, and IEC 60951
- Low maintenance requirements
- Optional seismic-resistant design

PURPOSE

The NGM-300 series monitors are designed for continuous monitoring of noble gases activity in air. Different types of NGM monitors provide different measuring ranges for different applications.

The air can be sampled directly from working environments, ventilation systems or the environment.

The main components of the monitor are as follows:

- NGD series Noble Gas Detector
- RPU-06 Radiation Processing Unit
- VP-30 Vacuum Pump
- GFM-10 Gas Flow Meter

The air is sampled through a measurement chamber. A NGD series Noble Gas Detector measures noble gas activity in the chamber using a scintillation or semiconductor detector. The measurement result is compensated for the current air temperature and pressure, including self-absorption correction. The correct functionality of the NGD detector can be checked using the built-in test LED.

By default, the NGD detector is calibrated using Monte Carlo simulation and a solid-state source. Optionally, calibration can be performed with various radioactive noble gases.

The RPU-06 Radiation Processing Unit provides power for the system, displays the results of activity measurements, archives measured values and displays the status and other measured parameters of the monitor. It also visually and audibly indicates when the pre-set alarm levels have been exceeded.

The VP-30 Vacuum Pump ensures the required air flow. Optionally, a monitor without the integrated pump can be supplied. In this case, a remote pump is required to ensure sample flow through the monitor.

If it is not necessary to display the results locally, the RPU-04 unit can be used instead of the RPU-06 unit. It performs the same functions but is not equipped with a local display.

The NGM-300 series monitors can be connected to the host system via the Ethernet and/or RS-485 interfaces.

Using the display and keyboard, you can check the values and statuses of the monitor and, after authorization of the operator, you can enter basic control commands.

VF-Setup service software is used to set all parameters and perform full diagnostics. The service laptop is connected via the service connector.

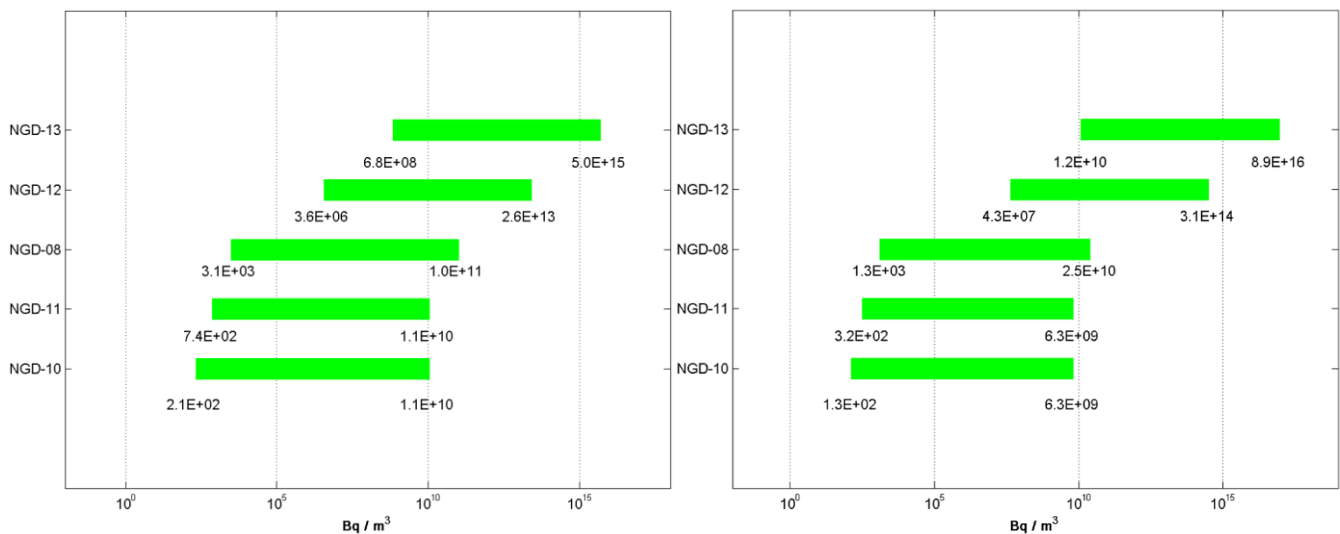
NGM SERIES MONITORS

Name	Detector	Standard use
NGM-310	NGD-10	Ventilation stacks, environment
NGM-311	NGD-11	Ventilation stacks, environment
NGM-308	NGD-08	Working environments
NGM-312	NGD-12	Ventilation stacks – post-accident monitoring
NGM-313	NGD-13	Ventilation stacks – post-accident monitoring

NGM-300 series NOBLE GAS MONITORS

METROLOGICAL PARAMETERS

Name	Detected radiation	Detector	Detector dimensions [mm]	Shielding [cm]	Measurement range for selected radionuclides [Bq/m ³]
NGM-310	beta	NGD-10 plastic scintillator	(w × h × d) 100 × 200 × 0,25 100 × 200 × 0,25	10	¹³³ Xe: 2,1E2 to 1,1E10 ⁸⁵ Kr: 1,3E2 to 6,3E9
NGM-311	beta	NGD-11 plastic scintillator	(w × h × d) 100 × 200 × 0,25	10	¹³³ Xe: 7,4E2 to 1,1E10 ⁸⁵ Kr: 3,2E2 to 5,2E9
NGM-308	beta	NGD-08 plastic scintillator	(∅ × h) 7,62 × 0,25	1	¹³³ Xe: 3,1E3 to 1,0E11 ⁸⁵ Kr: 1,3E3 to 2,5E10
NGM-312	gamma, beta	NGD-12 semiconductor CdTe	(w × h × d) 5 × 5 × 5	15	¹³³ Xe: 3,6E6 to 2,6E13 ⁸⁵ Kr: 4,3E7 to 3,1E14
NGM-313	gamma, beta	NGD-13 semiconductor CdTe	(w × h × d) 5 × 5 × 5	10	¹³³ Xe: 6,8E8 to 5,0E15 ⁸⁵ Kr: 1,2E10 to 8,9E16



Graphical interpretation of measurement ranges of the NGM monitors for Xe-133 (left) and Kr-85 (right)

Measurement ranges for other radionuclides can be provided on request.

The modular NGM concept allows the integration of two or three NGD detectors with different ranges in one monitor with a common frame (skid), radiation processing unit, pump and flow meter. In this way, it is possible to get an integrated wide-range noble gas monitor.



NGM-300 series NOBLE GAS MONITORS

SPECIFICATION

Power supply	230 VAC
Communication interface	Ethernet, RS-485, relay outputs
Service interface	UART
Operational temperatures	from -10° to 60 °C

OPTIONAL FEATURES

Dust filter
Aerosol and iodine sampler for normal and / or emergency conditions
Alternative radiation processing unit: RPU-04 or RPU-12
Intake and exhaust connections freely from the place / hose attached with a clip / pipe with a nut M30×1.5
Switching of inputs for sampling from various locations
Ports for air grab sampling and / or calibration with radioactive gases
Heating of detectors and sampling lines
Gamma detector for the measurement of the area gamma dose rate
115 VAC power supply or 24 VDC power supply (without the pump)
UPS for backup monitor power supply (without the pump)
Wireless communication with the host system
Displaying of the total activity discharged from the ventilation stack
Calibration with radioactive gas: Xe-133, Kr-85, Ar-41
Galvanically isolated analogue inputs and outputs 0/4-20 mA, digital outputs, RS-232, isolated connections to qualified and non-qualified host systems
5 cm shielding of the NGM-308 monitor for measurements in an environment with higher background.
Mobile version of the NGM-308 on a trolley with wheels
Qualification according to IEC 61226 and IEC/IEEE 60780-323, seismically resistant skid according to IEC/IEEE 60980-344

OPTIONAL ACCESORIES

Calibration jigs for individual detectors: solid-state radionuclide source in a storage container with the possibility of its traceability to the calibration gas.



Installed NGM-311 with a pump



Mobile NGM-308 on a trolley

