Continuous Iodine Monitor

The Mission Support model MS-CIM is designed for continuous measurement of the volumetric activity of radioactive iodine isotopes (I-131 and I-133) in both molecular and organic forms contained in the air of working areas, drawn from stacks and ventilation ducts. In addition, the MS-CIM evaluates the concentration of interfering isotopes and accurately differentiates them from the main measurement channel of radioactive iodine. Background changes are also compensated across a wide range of energies, including high energy nuclides.

The mechanical design of the device minimises the total weight and dimensions of the device. Given omnidirectional 4 cm lead shielding, the weight of the detection block is less than 50 kg. The MS-CIM is a single cartridge standard unit with manual cartridge replacement. The spectrometry capability is based on 1024 channel spectrum analysis, which allows radio-iodine isotope localisation. The monitor can be mounted on a horizontal surface, wall rack or wheel cart, which allows easy transport, especially over stairs and obstacles. As the required size and weight are very small, the Iodine Monitor can be deployed almost everywhere in a nuclear power plant.

The Mission Support MS-CIM monitor can be used for various applications in the field of air contamination monitoring as well as for workplace measurements and effluent releases monitoring.

ADVANTAGES

- Wide temperature range
- Proprietary algorithm providing low false alarm rate
- Wide range of isotopes and background compensation
- Simultaneous measurement of I-131 and I-133 volumetric activity
- IP65 housing ingress protection

FUNCTIONAL HIGHLIGHTS

- Small dimensions and weight, given omnidirectional 4 cm lead shielding
- Low cost proprietary charcoal cartridge
- Insensitive to mechanical impacts and cell phone radiation
- Adjustable counting time intervals for calculation of volumetric activity concentration and thresholds
- Support of Modbus-RTU communication protocol for ease of system integration
- Simple calibration procedure using disc check sources
- Effluent trapping of both molecular and organic forms of iodine

Specifications

Detection block — Radiological	
Measurement range — I-131 (for 24 hours)	from 0,01 to 1×10⁸ Bq/m³
Measurement range — I-133 (for 24 hours)	from 0,1 to 1×10⁸ Bq/m³
Relative measurement error — I-131	±30%
Relative measurement error — I-133	±30%
Energy range	from 50 keV to 3 MeV
Minimum detectable activity concentration (MDAC)	< 1 Bq/m³ for 1 hour measurement, 60 LPM rate

Electrical	
Power supply	AC 220/110V, DC 48V
Power consumption	20 W
Data interfaces	2 isolated RS-485; 1 RS-232
Discrete outputs	4 user programmable SPDT relays
Analog outputs	3 isolated analog outputs, 0/4..20 mA

Mechanical	
Inlet/outlet connection	G1/2"
Ingress protection	IP65
Dimensions, mm	400×190×290
Weight, kg	46

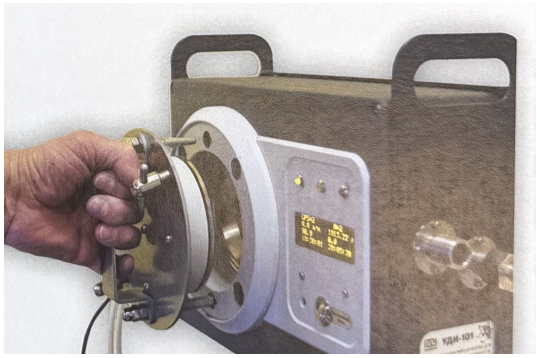
Pneumatic	
Flow rate	from 4 to 75 LPM
Measurement	pressure, temperature, pressure drop according to filter dust loading

Environmental	
Temperature range	from -20 to +50 °C
Pressure	from 84,0 to 106,7 kPa
Humidity	up to 95% at +35 °C

Pump module	
Pump type	oil-less rotary vane
Flow rate	up to 75 LPM
Power supply	220V AC (110V optional)
Power consumption	280 VA
Inlet/outlet connection	G1/2"
Dimensions, mm	400×210×210
Weight, kg	8,5

External alarm module	
Model	24V LED tower light
Type	3 lights: red, yellow, green; buzzer: 120 dBA at 1 meter
Dimensions, mm	500×90×50

Iodine cartridge	
Type	activated charcoal
Collection efficiency at 100 LPM, 75% humidity — methyl iodine	98%
Collection efficiency at 100 LPM, 75% humidity — molecular iodine	99,8%
Dimensions, mm	Ø57,7×26,8



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