

INNOVATION AT WORK

Connecting Visionaries in Radiation Safety, Science and Industry

Conrad Orlando Resort, FL – July 28th – August 1st



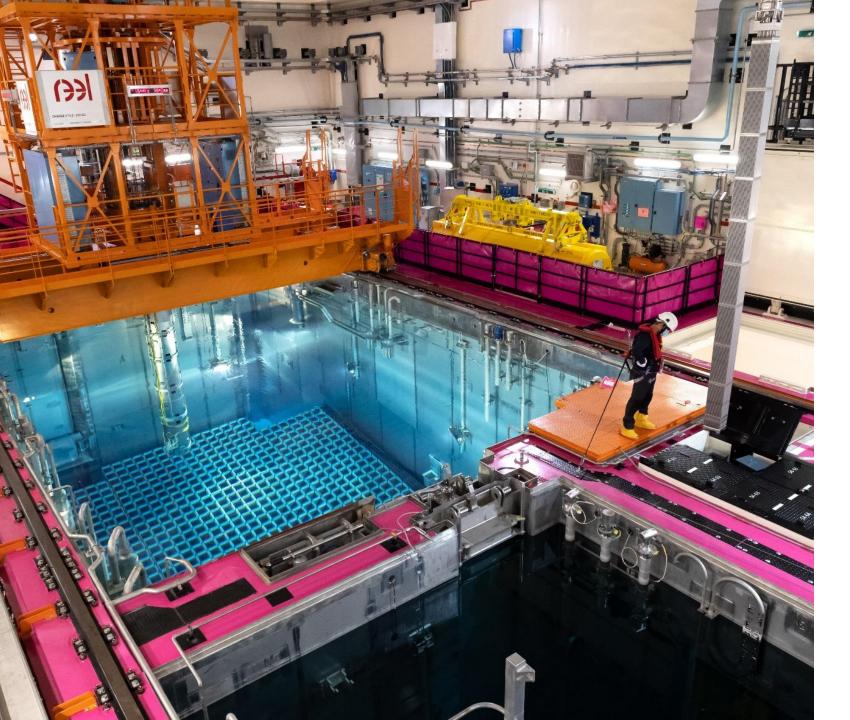
I&C Business Line PresentationFocus on RMS

Florian Bourdet

RMS Business Line director

Mirion Connect | Annual Users' Conference 2025
Orlando, Florida





OUR MISSION

"TO HARNESS OUR UNRIVALED KNOWLEDGE OF IONIZING RADIATION FOR THE GREATER GOOD OF HUMANITY."



Mirion Technologies at a glance

130 Patents – 700 products

World leader since 1970

~2,800 employees

18
Manufacturing sites globally

Group +\$500m revenue Strong financial stability

Nuclear Power
Large and Advanced reactors

Defense

Research & Medical



KEY PRODUCT CATEGORIES

Spectroscopy & Scientific Analysis Systems

(Gamma, and Alpha spectroscopy, specialty detectors...)













Instrumentation and control

Radiation monitoring systems
Neutron Flux Monitoring Systems
Tritium monitoring
Electrical penetrations assemblies
Neutron detectors and thermocouples
Security and cybersecurity packages
Installed Base Covers ~70% of Reactors Worldwide









Health Physics / defense and security

(Contamination and clearance, Dosimetry, handheld, research, defense...)













Characterization

(Waste assay monitors, decommissioning solution...)







Innovation at Work

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Summary of Mirion applications for reactors

Control and reactor protection

- In-core & out-of-core neutron flux channels
- Boron meters
- Steam generator leak rate monitors
- Radio chemistry, Gamma Spectroscopy (HPGe)
- Radiation tolerant cameras

Effluent release monitoring

- Online Tritium monitoring
- Alpha and Beta particles monitoring
- lodine monitoring
- Noble Gas monitoring
- Liquid monitoring

Area monitoring / Radioprotection

- Gamma dose rate measurement
- LOCA channels with electrical penetrations
- Contamination monitoring
- Dosimetry
- Hand held survey meters

Waste management

Waste assay monitors, Tomographic spectroscopy ...

Security

Security command-and-control platform and Cybersecurity packages







Product Line team

Instrumentation and Control

Lamanon, FR



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chasse@mirion.com Lamanon, FR



Ewald Liebhart

proTK Digital Neutron Flux Monitoring System eliebhart@mirion.com Munich, DE











Mirion track record

- 1. Leader in the supply of radiation monitoring instruments, in the nuclear industry since 1953.
- 2. Compliancy to IEC and IEEE standards for normal, harsh environments and accident conditions.
- 3. Mirion Technologies has deployed over **50,000 RMS monitors globally** and 750 Neutron flux channels.
- 4. Worldwide presence with local service teams or partners.
- 5. Unique compliance with nuclear regulatory requirements across major nuclear markets including:
 - ✓ United States
 - ✓ South Korea
 - √ China
 - ✓ France
 - ✓ Sweden
 - ✓ Czech republic
 - ✓ Canada
 - √ Finland
 - ✓ United Kingdom
 - ✓ Hungary
 - ✓ Russian Federation
 - ✓ Ect...

WORLDWIDE PRESENCE





Mirion track record

- 6. Market penetration statistics demonstrate confidence of global nuclear industry into Mirion solutions.
 - ✓ 70% of worldwide reactors rely on Mirion's complete RMS systems (~290 Reactors)
 - √ 98% of reactors worldwide incorporate Mirion safety solutions
- 7. RMS specific market presence by reactor type:
 - ✓ 80 % of AP1000 designed Westinghouse reactors 50 % of the WEC licensed fleet
 - √ 100 % of EDF reactors
 - √ 80 % of Chinese reactors
 - ✓ 70 % of KHNP reactors (South Korea)
 - ✓ 50 % of VVER 1200 export reactors
- 8. Experienced into SMR and GENIV reactors (in France, China and more recently in North America)





Example: Tianwan 7-8 and Xudapu 3-4 - China





Pictures of the Mirion Lamanon factory (south of France) – High range, wide range noble gases monitors and iodine monitors getting ready for customer factory acceptance test. Tianwan 7-8 and Xudapu 3-4 projects; VVER 1200 MW.

600 channels for the project.



Example: EPRs reactors 8* 1650 Mwe – 6*France – 2*United Kingdom





UK - Hinkley Point C (2*EPRs)

Complete engineering, supply and services for:

- Radiation Monitoring Systems
- ✓ Boron meters
- ✓ Neutron Flux Monitoring Detectors
- ✓ Electrical Penetrations assemblies
- ✓ Spectroscopy systems
- ✓ Active Dosimetry
- ✓ Hand-Held instrumentation
- ✓ Contamination and clearance

About to be awarded for 2 additional EPRs in UK. Sizewell C.



Example: PAKS 5&6 - 2 * VVER 1200 MW - Hungary





Similar VVER 1200 MW Leningrad II for Illustration

PAKS 5&6; VVER 1200 MW – Project located in Hungary

Mirion has been appointed to supply the full RMS scope

=> 300 channels

as well as the Upper Level design and supply



Example: AP1000 reactors designs



2*AP1000 Sanmen 1&2 (Finished)



2*CAP1000 Xudabao Units 1 & 2





2*AP1000 Haiyang Units 1&2 (Finished)



2*CAP1400 Shidaowan Units 1 & 2



Example: Kijang Research Reactor (South Korea)



Mirion is supplying the full Radiation Monitoring Systems as well and Neutron Flux Monitoring Systems

KJRR, 15 MWt open-tank-in-pool type reactor to produce molybdenum-99, iodine-131, iodine-125 and iridium-192



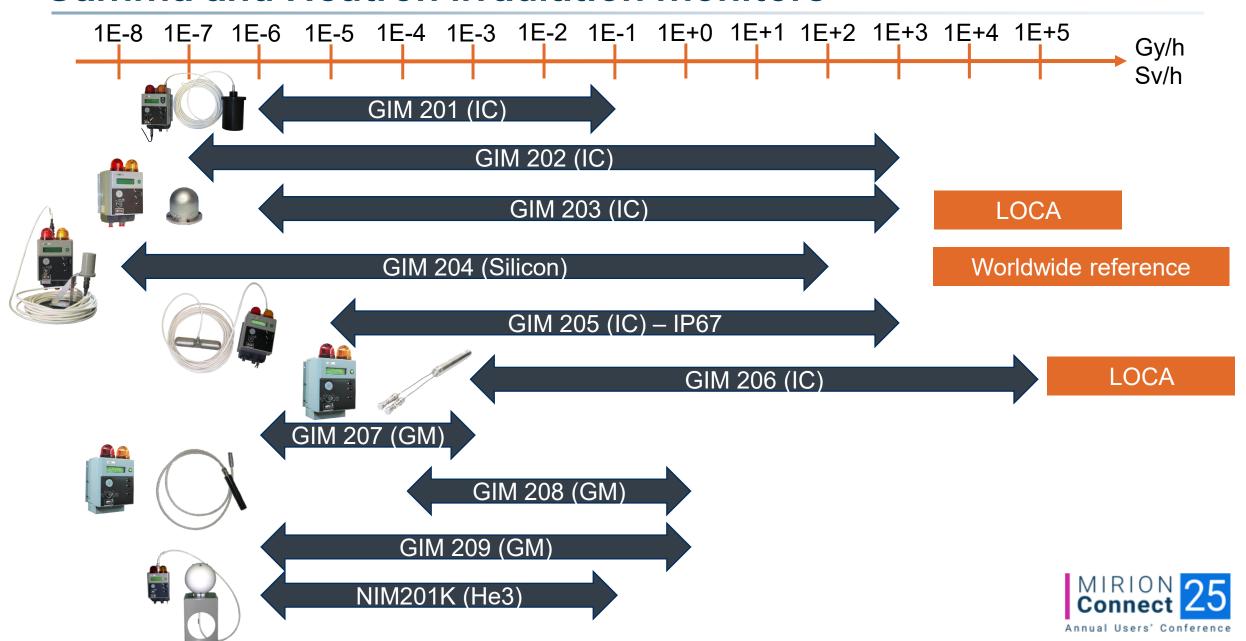


Area Monitoring





Gamma and Neutron irradiation monitors



Configuration types

Control Room

MASS2 software for set up and maintenance

RAMVISION software for supervision



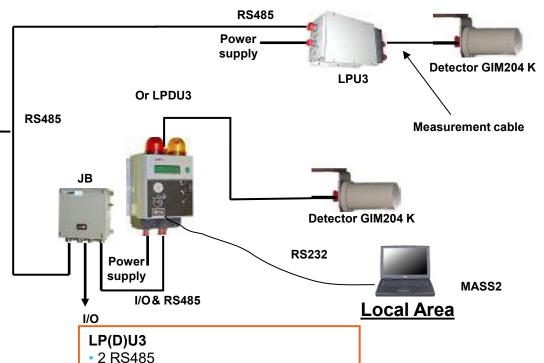
Acquisition Monitoring Maintenance

RDU3 or LDU3 (Optional)



- 3 RS485
- 1 RS232
- 5 relays (DPDT)
- 2 analog outputs
- 1 analog input
- 8 digital outputs
- 8 digital inputs
- The RAMSYS architecture (based on RS485 serial links) is extremely flexible.
- It can function as series of independent channels or as an integrated networked system.

LDU3 and RDU3 can manage up to 8 processing units.



- 2 analog outputs
 - 1 analog input

• 3 relays (SPDT)

- 1 RS232
- 1 optional Ethernet RJ45 (LPDU only)



Effluent release





Alpha and Beta Particles Monitoring

Mobiles

Installed

Light



Seismic

Plastic Scintillator











ABPM 201S

PM 205S



Innovation at Work

Noble Gases Monitoring

Mobile

Installed

Light

Seismic

PIPS

Ion Chambers



Plastic Scintillators















NGM 202L

Low range

NGM 204S

Wide range

NGM 203S

High range Accident conditions **NGM 216S**

Low range



NGM 209M

Wide range

Innovation at Work

lodines monitoring

Mobiles

Regular

Light

Seismic

Installed

 4π / 2 cm

Compact



IM 203M



IM 201M



IM 201L



IM 201S

Stack Monitoring (examples)

Particles, Iodine and Nobles Gases Completely configurable

Plastic Scintillators for Particles and Noble Gases

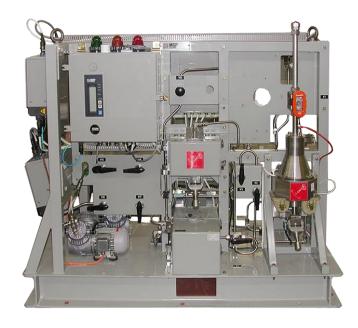


PINGM 207S



HTionix 22
Tritium and
Carbon 14
sampler option

PIPS detectors for Particles and Noble Gases



PING206S



Liquids Monitoring

Off Line



LM 211S and LM 212S

On Line

Available for various pipe sizes





SAM 201K and SAM 202K

Samplers

Particles and Iodine samplers Samplers

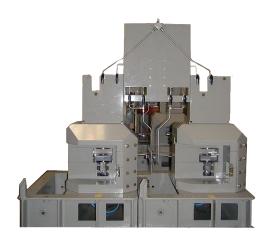
Tritium and Carbon 14

Normal operation

Accident Conditions









PIS 204L

PIS 205L

PIS 208S

PIS 203S

HTionix 20 and 22

Tritium Monitoring





Tritium Product line

Mobiles

Portables

Installed systems

Environnemental & Custom





Samplers









Barriers and process Monitoring





Barriers and Process Monitoring

Steam Generator Leak Rate Monitoring



SGLM 201K/202K

Boron Meters



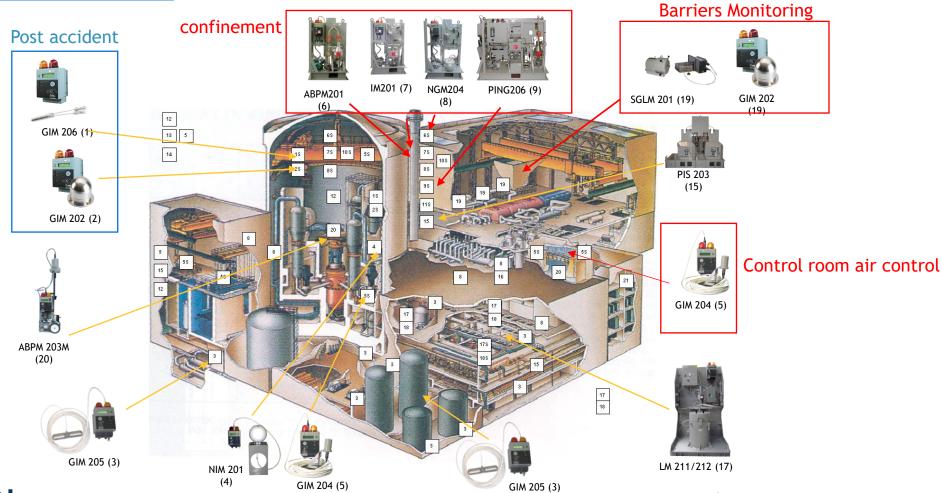
BM 501

Example for PWR





Mirion RMS In PWRs





Protect What's Next™

Software's solutions





Softwares

MASS2



RAMVISION



Vital 4



SIMS2



SET UP and Maintenance

Maintenance and set-up software, including the SAMS spectrum acquisition and manipulation software and RMSCalib application

Supervision

- RAMSYS- and all Mirion instruments data acquisition system
- SCADA supervision software

Digital Twin / Simulation

Simulation software

Thank you for your attention and your confidence





Appendix Detailed product presentation





4 MAIN PRODUCT FAMILIES

RAMSYS™



For monitoring of **barrier** and **effluent release**, radiation **protection of workers**, operational **process monitoring** and post-accident operations.

CAMSYS™



Compact monitors for continuous air and gamma area monitoring.

NFMS™



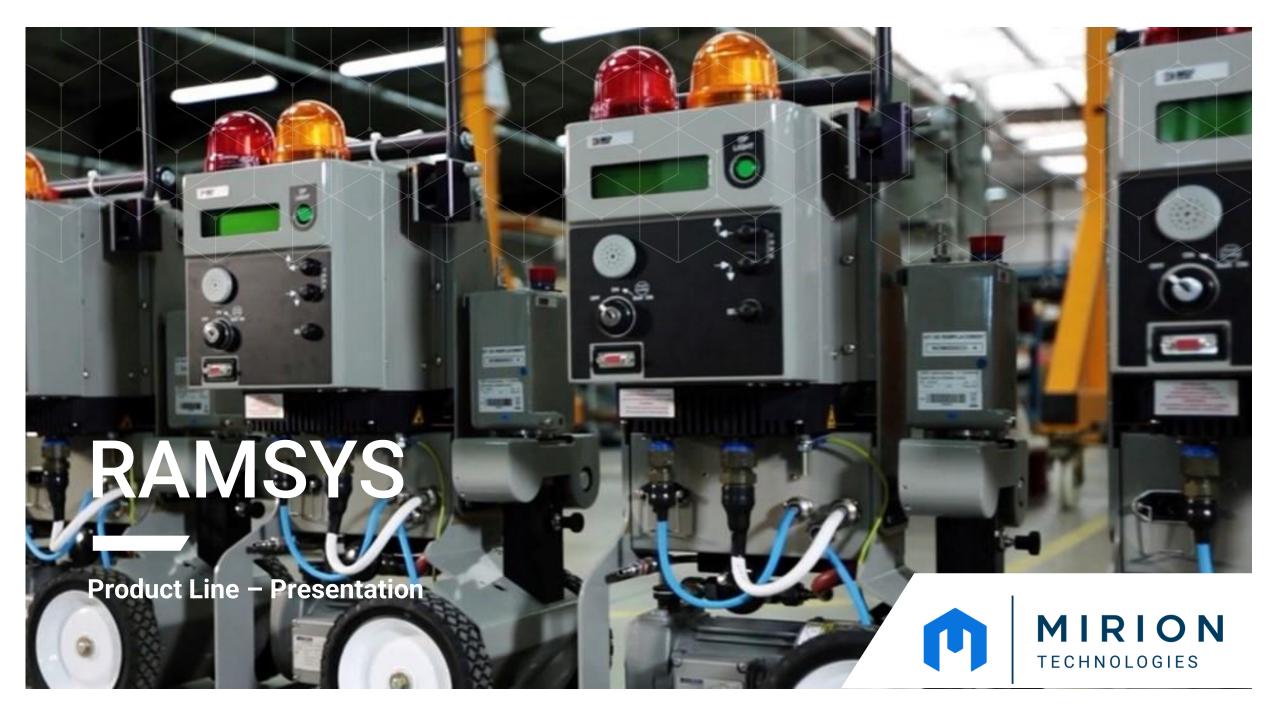
For monitoring of instantaneous nuclear power, power fluctuations, radial/axial power distribution and boron concentration.

PREMIUM ANALYSE™



For real-time tritium activity monitoring.





MAIN FUNCTIONS

RAMSYS product line is the RMS Product Family developed by Mirion Technologies under the MGP Instruments[™] brand name.

Reliable and robust systems designed for:

- Barrier leak control
- Effluent release monitoring
- Radioprotection of workers
- Operational process monitoring
- Post-accident operations in nuclear facilities

It doesn't include individual and/or handheld equipment such as dosimeters and survey meters.



MAIN ELEMENTS

RAMSYS product family consists of:

Modular, sophisticated and intelligent processing unit, (LPU, LPDU...) with easily accessible graphic display units (LDU, RDU, ADU).







RDU

Various detector assemblies, as ionization chambers, large area silicon, Geiger Mueller tubes, silicon (PIPS® detector), Nal scintillators, proportional counters... associated to powerful qualified algorithms (for alpha, beta, gamma, radon, neutron...).







Nal probe



Silicon probe



CD10 probe

LOCAL PROCESSING AND DISPLAY UNIT (LPDU)





Power supply:

- 120 or 230 Vac
- 24 Vdc

Upstream link 1 RAMSYS (RS485)

Upstream link 2 RAMSYS (RS485) Alphanumeric display: 2 lines x 16 characters

Visual alarm: AL1 and AL2 (LED lamps)

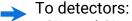
Audible alarm: buzzer (90 dBA / 1 m)

Keypad: 3 push buttons Local RS232 serial link

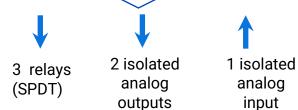
Options:

- Battery board (0.8 Ah) or battery block (8 Ah)
- Ethernet module

I/O, ESD version for monitor control

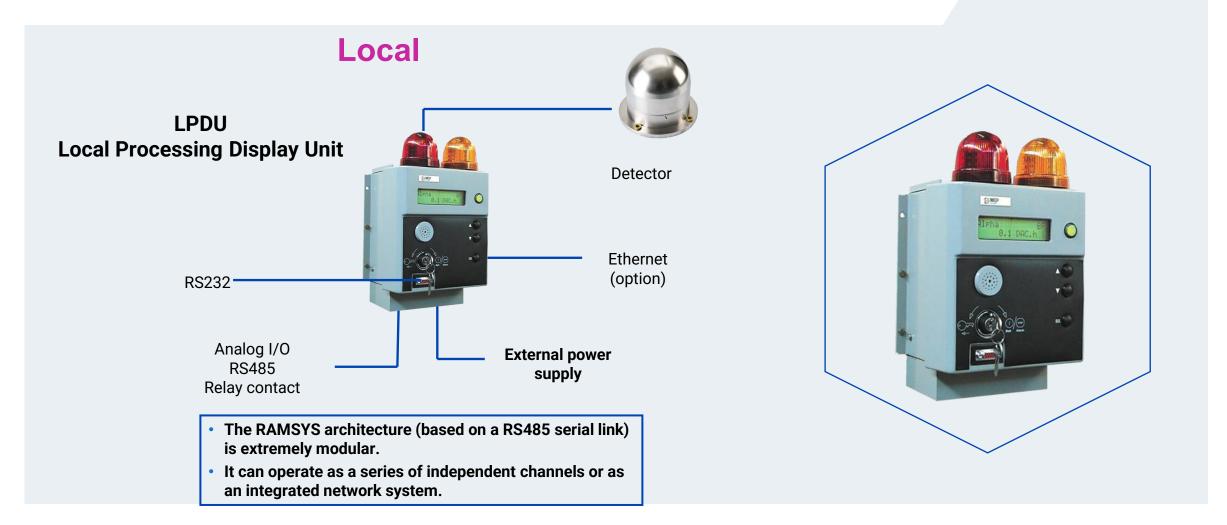


- SiR and Si
- PIPS® detector
- Nal
- PPC
- GM
- IC





STANDARD CONFIGURATION WITH AN LPDU



LOCAL DISPLAY UNIT (LDU)



Power Supply: 120 or 230 Vac **Graphic display: 240 x 64 dots** Visual alarm: 360° light (3 LED lamps) Upstream link 1 Downstream link RAMSYS **RAMSYS** 5 front LED (RS485) up to 8 units (RS485) Sound alarm: buzzer (90 dBA / 1 m) **Keypad: 3 push buttons** Control of pumps, Upstream link 2 Local RS232 serial link **RAMSYS** flow meters (RS485) 2 isolated 5 relay 1 isolated 16 isolated 16 isolated (4PDT) analog analog digital digital outputs input outputs inputs



STANDARD CONFIGURATION WITH AN LDU



REMOTE DISPLAY UNIT (RDU)



Power supply: 120 or 230 Vac Graphic display: 240 x 64 dots Visual alarm: 5 front LED Sound alarm: buzzer Upstream link 1 **Keypad: 3 push buttons** RAMSYS (RS485) Size: 5M x 5U Local RS232 serial link Upstream link 2 RAMSYS (RS485) isolated 8 isolated 8 isolated 5 relay 2 isolated (DPDT) digital analog analog digital

outputs

input

outputs

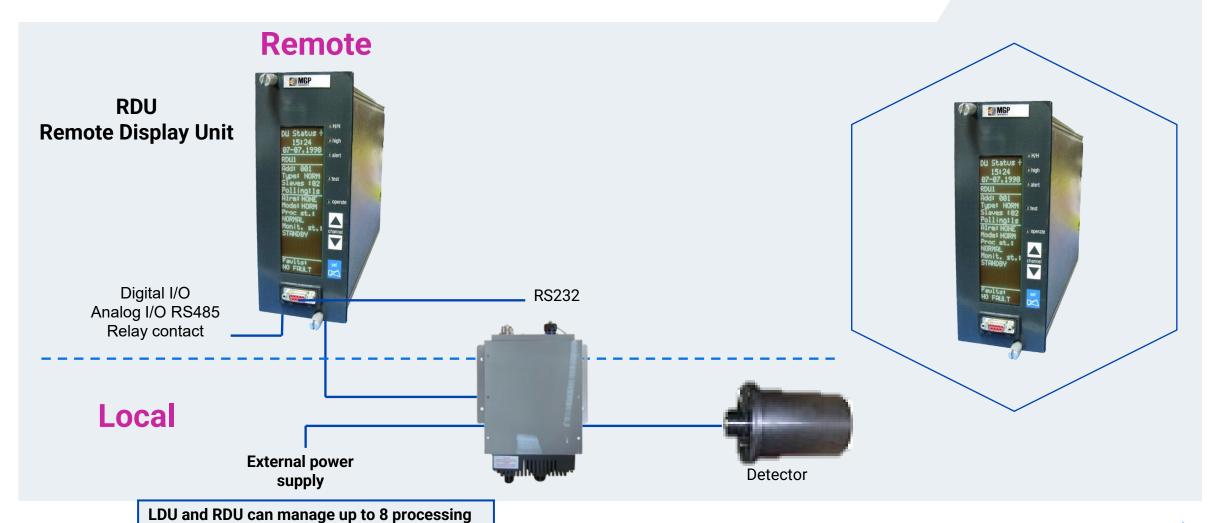
Downstream link RAMSYS (RS485) up

to 8 units



inputs

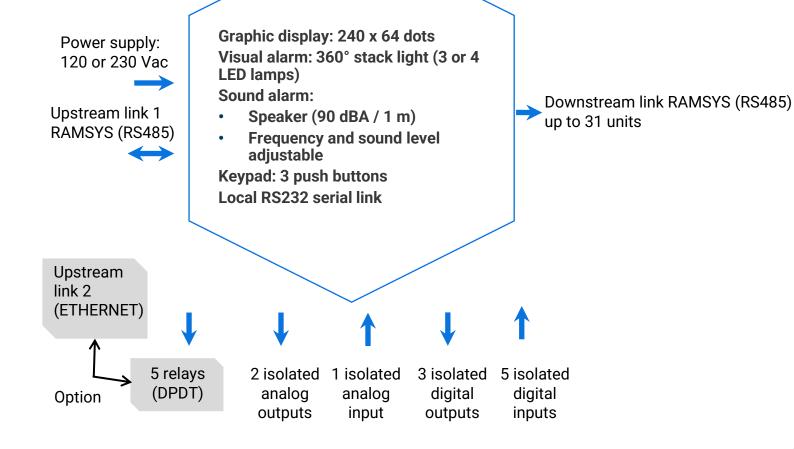
STANDARD CONFIGURATION WITH AN RDU



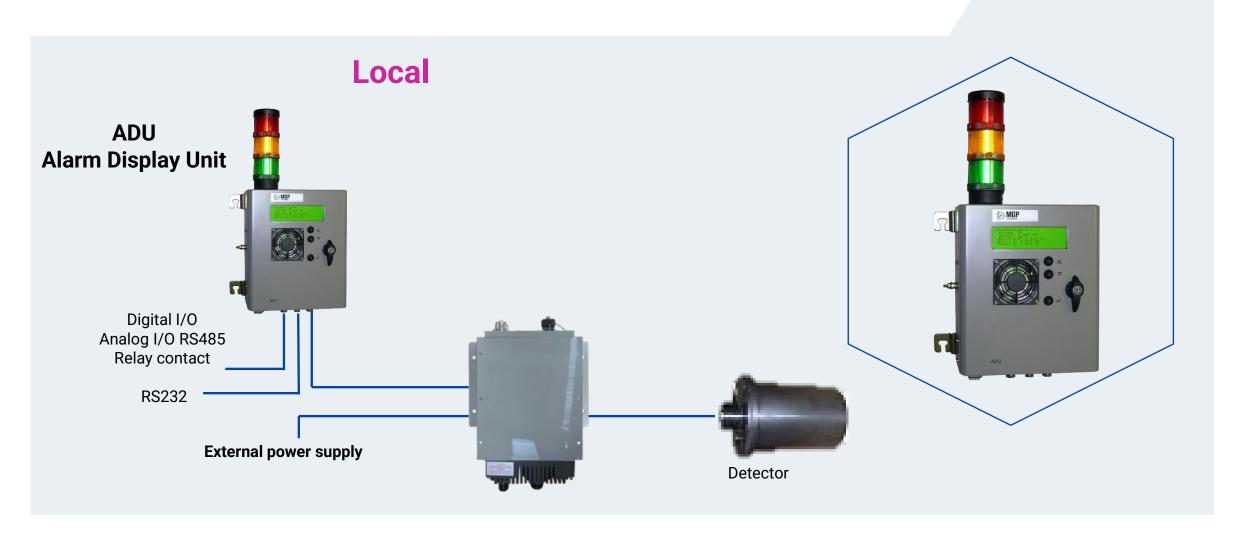
units.

ALARM DISPLAY UNIT (ADU)

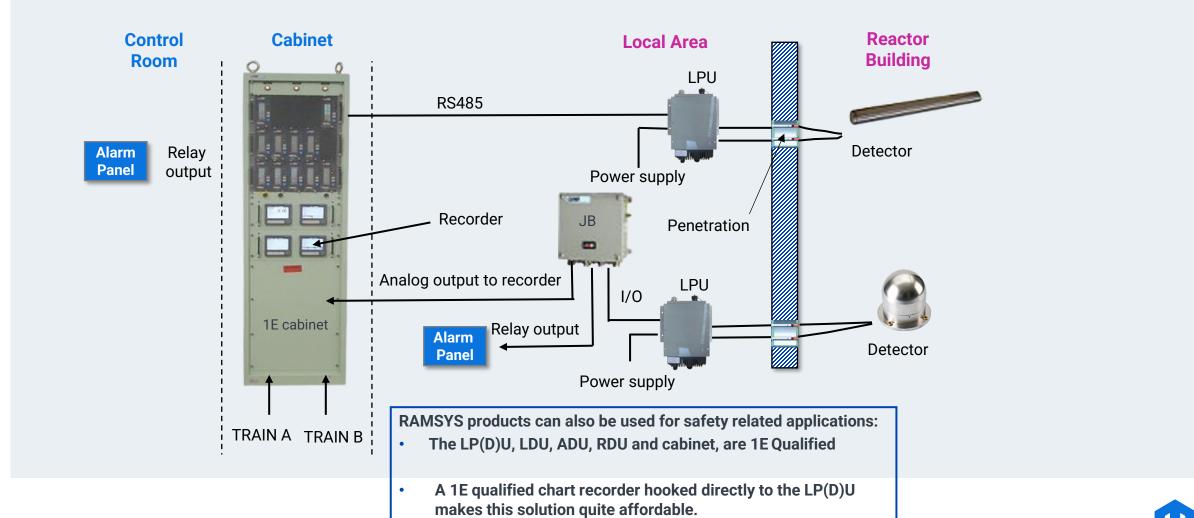




STANDARD CONFIGURATION WITH AN ADU



SYSTEM CONFIGURATION – 1E APPLICATION



Configuration types

Control Room

MASS2 software for set up and maintenance

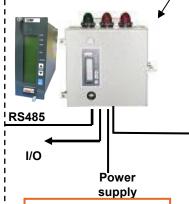
RAMVISION software for supervision



Acquisition Monitoring Maintenance RDU3 or LDU3

(Optional)

LDU3 and RDU3 can manage up to 8 processing units.



- 3 RS485
- 1 RS232
- 5 relays (DPDT)
- 2 analog outputs
- 1 analog input
- 8 digital outputs
- 8 digital inputs
- The RAMSYS architecture (based on RS485 serial links) is extremely flexible.
- It can function as series of independent channels or as an integrated networked system.

RS485 Power, supply **Detector GIM204 K** LPU3 Or LPDU3 RS485 Measurement cable JB **Detector GIM204 K RS232** Power supply MASS2 I/O& RS485 **Local Area** I/O LP(D)U3

• 2 RS485

• 1 RS232

3 relays (SPDT)2 analog outputs

1 analog input

1 optional Ethernet RJ45 (LPDU only)

GIM 201K™

Gamma Area Monitor – Low Range

Main Function:

Radioprotection of workers

Main Characteristics:

- Radiation detected: gamma
- Detector: plastic (HDPE) ionization chamber
- Measurement range: 10⁻⁶ at 10 Sv/h
- Energy range: 50 keV at 7 MeV
- Temperature limit:
 - Electronic: -5 °C at +55 °C
 - Detector: -40 °C at +55 °C
- 1E qualification mild conditions

Application:

Main control room dose rate.



GIM 202K™

Gamma Area Monitor – Wide Range

Main Function:

Operational process monitoring

Main Characteristics:

- Radiation detected: gamma
- Detector: stainless steel ionization chamber
- Measurement range: 10⁻⁷ at 10² Gy/h or Sv/h
- Energy range: 80 keV at 1.5 MeV
- Temperature limit:
 - Electronic: -5 °C at +55 °C
 - Detector: -30 °C at +120 °C
- 1E qualification mild conditions

Application:

58

Fuel pool dose rate.

Reactor building hatch dose rate.

Transfer tube dose rate.





GIM 203K™

Gamma Area Monitor – Wide Range

Main Function:

Accident and post-accident control

Main Characteristics:

- Radiation detected: gamma
- Detector: stainless steel ionization chamber
- Measurement range: 10⁻⁶ at 10³ Sy/h
- Energy range: 80 keV at 7 MeV
- Temperature limit:
 - Electronic: -5 °C at +55 °C
- LOCA profile (detector):
 - Temperature: +165 °C (329 °F) during 12 hours
 - Temperature: +225 °C (437 °F) during 2 seconds
 - Pressure: 7 bars abs. during 12 hours
 - Tested under saturated steam conditions
 - Resistant to chemical spray
- 1E qualification harsh conditions

⁵⁹Application:

Radwaste building high dose rate. Containment wide range dose rate.







GIM 204K™

Gamma Area Monitor – Very Wide Range

Main Function:

Radioprotection of workers

Main Characteristics:

• Detection type: **environment**

Radiation detected: gamma

• Detector: silicium

• Measurement range: 10⁻⁶ at 100 Gy/h or Sv/h

Energy range: 60 keV at 3 MeV

Temperature limit:

Electronic: -5 °C at +55 °C

• Detector: -20 °C at +55 °C

• 1E qualification – mild conditions

Application:

Dose rate or equivalent for personnel exposure as well as for process monitoring.





GIM 205K™

Gamma Area Monitor – Low Range

Main Function:

Operational process monitoring

Main Characteristics:

- Radiation detected: gamma
- Detector: stainless steel ionization chamber
- Measurement range: 10⁻⁵ at 10³ Gy/h
- Energy range: 87 keV at 7 MeV
- Temperature limit:
 - Electronic: -5 °C at +55 °C
 - Detector: -5 °C at +70 °C
- 1E qualification mild conditions

Application:

Dose rate for process control.





GIM 206K™

Gamma Area Monitor – Wide Range

Main Function:

Accident and post-accident control

Main Characteristics:

- Radiation detected: gamma
- Detector: stainless ionization chamber with embedded source
- Measurement range: 10⁻³ to 10⁵ Gy/h
- Energy range: 60 keV to 7 MeV
- Temperature limit:
 - Electronic: -5 °C to +55 °C
- LOCA profile (detector):
 - Temperature: +165 °C (329 °F) during 12 hours
 - Temperature: +225 °C (437 °F) during 2 seconds
 - Pressure: 7 bars abs. during 12 hours
 - · Tested under saturated steam conditions
 - Resistant to chemical spray
- 1E qualification harsh conditions

₆₂Application:

Dose rate in a severe or post-accident environment.





BIM 201K™

Beta Irradiation Monitor

Main Function:

Effluent release monitoring

Main Characteristics:

· Radiation detected: beta

• Detector: thin plastic scintillator + PMT + LED

• Measurement range: $3.7 \ 10^{+3} \ \text{to} \ 3.7 \ 10^{+9} \ \text{Bq/m}^3$

Energy range: >30 keV

Temperature limit:

• Electronic: -5 °C to +55 °C

Detector: 0 °C to +60 °C

• 1E qualification – mild conditions

Application:

In-line monitor.

Continuous measurement in autonomous way.

Detect beta radiations in nuclear power plant and nuclear facilities.





NIM 201K™

Neutron Irradiation Dose Rate Monitor

Main Function:

Radioprotection of workers

Main Characteristics:

- · Radiation detected: neutron
- Detector: ³He proportional counter
- Measurement range: 10⁻⁶ at 0.1 Sv/h
- Energy range: 2.5 10⁻⁸ (thermal) to 16 MeV
- Temperature limit:
 - Electronic: -5 °C to +55 °C
 - Detector: -20 °C to +70 °C
- 1E qualification mild conditions

Application:

Real-time monitoring of the ambient dose equivalent rate.





ABPM 201S™

Seismic Alpha Beta Particulate Monitor

Main Function:

Effluent release monitoring

Main Characteristics:

- · Radiation detected: alpha, beta and gamma
- Detector: silicon
- Filter FSLW:
 - Autonomous: up to 6 months
 - Efficiency: >99.99% for particles Ø 4 μm
- Measurement range:
 - Alpha: 10^{-2} to $3.7 \cdot 10^6$ Bq/m³
 - Beta: 1 to 3.7 10⁶ Bq/m³
- Energy range:
 - Alpha: 2 MeV to 10 MeV
 - Beta: 80 keV to 2.5 MeV
 - Gamma: 80 keV to 2.5 MeV
- Temperature limit: -5 °C to +55 °C
- Flow rate: 35 l/min
- 1E qualification mild conditions

_Application:

Particulate measurement in ventilation ducts or stacks.

Double silicon detector.





ABPM 203M™/204M™

Alpha Beta Particulate Monitor

Main Function:

Radioprotection of workers

Main Characteristics:

- Radiation detected: alpha, beta and gamma
- Detector: silicon
- Filter FSLW:
 - Autonomous: up to 6 months
 - Efficiency: >99.99% for particles \emptyset 4 μm
- Measurement range:
 - Alpha: 10^{-2} to $3.7 \ 10^{6}$ Bq/m³
 - Beta: 1 to 3.7 106 Bq/m³
- Energy range:
 - Alpha: 2 MeV to 10 MeV
 - Beta: 80 keV to 2.5 MeV
 - Gamma: 80 keV to 2.5 MeV
- Temperature limit: -5 °C to +55 °C
- Flow rate: 35 l/min
- Non 1E qualified

Application:

Functions locally next to the respiratory tract of workers.





ABPM 205L™/205M™

Alpha Beta Particulate Monitor

Main Function:

Effluent release monitoring

Main Characteristics:

- · Radiation detected: alpha, beta and gamma
- Detector: silicon
- Filter FSLW:
 - Autonomous: up to 6 months
 - Efficiency: >99.99% for particles Ø 4 μm
- Measurement range:
 - Alpha: 10⁻² to 3.7 10⁶ Bq/m³
 - Beta: 1 to 3.7 10⁶ Bq/m³
- Energy range:
 - Alpha: 2 MeV to 10 MeV
 - Beta: 80 keV to 2.5 MeV
 - Gamma: 80 keV to 2.5 MeV
- Temperature limit: -5 °C to +55 °C
- Flow rate: 35 l/min
- Non 1E qualified

Application:

Aerosol measurement in ventilation ducts or stacks.



PM 205S™

Beta Particulate Monitor

Main Function:

Effluent release monitoring

Main Characteristics:

- Radiation detected: beta
- Detector: thin plastic scintillator + PMT
- Lead shield: 7.5 cm / 4π
- Filter type: fiberglass
- Measurement range: 3.7 10⁻² to 3.7 10³ Bq/m³
- Energy range: >30 keV
- Temperature limit:
 - Electronic: -5 °C to +55 °C
 - Detector: 0 °C to +60 °C
- Flow rate: 28.3 l/min (1 scfm)
- 1E qualification mild conditions

Application:

Continuously measure the volumetric activity of a radioactive gaseous sample.







IM 201L™/201M™/201S™

Iodine Monitor

Main Function:

Effluent release monitoring - Radioprotection of workers

Main Characteristics:

- Radiation detected: gamma
- Detector: Nal (TI) scintillator + PM tube
- Lead shielding: $4\pi / 5$ cm
- Cartridge:
 - Type: activated charcoal
 - Efficiency:
 - Methyl iodine: 99.99%
 - Molecular iodine: 99.98%
- Measurement range: 3.7 to 3.7 10⁶ Bq/m³
- Energy range: 100 keV to 3 MeV
 - Window position: 314 to 414 keV
- Temperature limit: -5 °C to +55 °C
- 1E qualification mild conditions (only S version)

Application:

Measure gamma volumetric activity of radioactive iodine samples. Contained in air drawn from stacks, ventilation ducts or working area.







NGM 202L™

Noble Gas Monitor – Low Range

Main Function:

Effluent release monitoring

Main Characteristics:

- Radiation detected: alpha, beta, gamma
- Detector: dual large differential ionization chamber
- Measurement range: 10⁴ to 3.7 10⁹ Bq/m³
- Energy range: 5 keV to 8 MeV
- Temperature limit: -5 °C to +55 °C
- Non 1E qualified

Application:

Continuously sample the volumetric activity of noble gas in a radioactive effluent gaseous sample.

Standalone device or in conjunction.





NGM 203S™

Seismic High Range Noble Gas Monitor – Wide range

Main Function:

Effluent release monitoring - Post-accident operation

Main Characteristics:

- Radiation detected: alpha, beta and gamma
- Detector: flow-through ionization chamber
- Lead shielding: $4\pi / 5$ cm
- Measurement range:
 - $4 \cdot 10^6 \text{ to } 10^{16} \text{ Bq/m}^3 \text{ for } ^{85}\text{Kr}$
 - 10^6 to $3.7 \cdot 10^{15}$ Bg/m³ for 133 Xe
- Energy range: 5 keV to 3 MeV
- Temperature limit: -5 °C to +55 °C
- 1E qualification mild conditions

Application:

Sampling air in discharge stacks, ventilation ducts. Can withstand seismic conditions.





NGM 204L™/204S™

Noble Gas Monitor – Low Range

Main Function:

Effluent release monitoring

Main Characteristics:

- Radiation detected: beta and gamma
- Detector: dual large area silicon
- Lead shielding: $4\pi / 5$ cm
- Measurement range:
 - $3.7 \cdot 10^4 \text{ to } 3.7 \cdot 10^{14} \text{ Bg/m}^3 \text{ for } ^{85}\text{Kr}$
 - $3.7 \cdot 10^4 \text{ to } 1.8 \cdot 10^{13} \text{ Bg/m}^3 \text{ for } ^{133}\text{Xe}$
- Energy range: 80 keV to 2.5 MeV
- Temperature limit: -5 °C to +55 °C
- 1E qualification mild conditions (S version)

Application:

Sampling air in discharge stacks, ventilation ducts or working areas.





NGM 209M™

Mobile Noble Gas Monitor - Low Range

Main Function:

Radioprotection of workers

Main Characteristics:

- Radiation detected: **beta and gamma**
- Detector: dual large area silicon
- Sample volume: 76 ml
- Lead shielding: $4\pi / 3$ cm
- Measurement range:
 - 10^3 to $3.7 \cdot 10^9$ Bq/m³ for ⁸⁵Kr
 - 10³ to 10¹⁰ Bq/m³ for ¹³³Xe
- Energy range: 80 keV to 420 keV
- Temperature limit: -5 °C to +55 °C
- Non 1E qualified

Application:

Monitoring air in working areas, discharge stacks or ventilation ducts.

Dual silicon detector.





NGM 216S™

Beta Noble Gas Monitor - Low Range

Main Function:

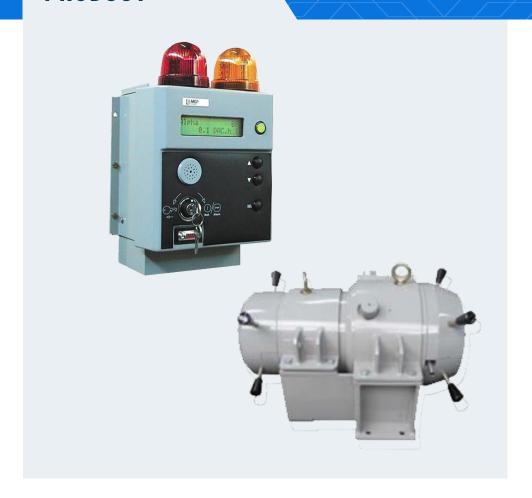
Effluent release monitoring

Main Characteristics:

- Radiation detected: **beta and gamma**
- Detector: thin plastic scintillator + PMT
- Lead shielding: $4\pi / 7.5$ cm
- Measurement range: 3.7 10³ at 3.7 10⁹ Bq/m³
- Energy range: >30 keV
- Temperature limit:
 - Electronic: -5 °C to +55 °C
 - Detector: 0 °C to +60 °C
- Flow rate: 28 l/min (1 scfm)
- 1E qualification mild conditions

Application:

Continuously measure beta volumetric activity of radioactive gaseous sample. 74 Can operate as a standalone device or in conjunction.





PING 206S™/PNG 206S™/PIM 206S™

Seismic Particulate, Iodine and Noble Gas Monitor

Main Function:

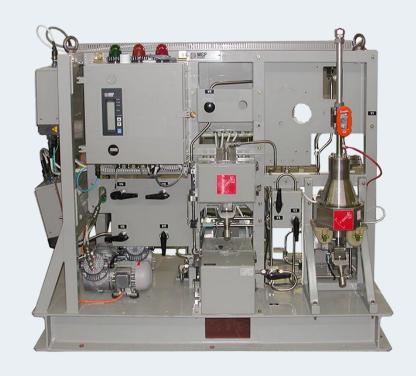
Effluent release monitoring

Main Characterisctics:

- Radiation detected: alpha, beta and gamma
- Detector: dual large area silicon (PIPS® detector)
- Measurement range:
 - Particulates:
 - Alpha: 10⁻² to 3.7 10⁶ Bg/m³
 - Beta: 1 to 3.7 10⁶ Bq/m³
 - Iodine: 3.7 to 3.7 10⁶ Bg/m³
 - Noble gas:
 - 3.7 10⁴ to 3.7 10¹⁴ Bg/m³ for ⁸⁵Kr
 - 3.7 10⁴ to 1.8 10¹³ Bg/m³ for ¹³³Xe
- Energy range:
 - Particulates:
 - Alpha: 2 MeV to 10 MeV
 - Beta: 80 keV to 2.5 MeV
 - Gamma: 80 keV to 2.5 MeV
 - Iodine: 100 keV to 3 MeV (Window position: 314 to 414 keV)
 - Noble gas: 80 keV to 2.5 MeV
- 1E qualification mild conditions

Application:

75 Continuously measure volumetric activities in stacks, ventilation ducts or working areas.





PINGM 207S™

Seismic Particulate, Iodine and Noble Gas Monitor

Main Function:

Effluent release monitoring

Main Characteristics:

- Radiation detected: beta
- Detector: 2" thin plastic scintillator + PMT + embedded LED (SB 70)
- Measurement range:
 - Particulates: 3.7 10⁻² to 3.7 10³ Bq/m³
 - Iodine: 3.7 to 3.7 10⁶ Bq/m³
 - Noble gas: 3.7 10³ to 3.7 10⁹ Bq/m³
- Energy range:
 - Particulates: >30 keV
 - Iodine: 100 keV to 3 MeV (Window position: 314 to 414 keV)
 - Noble gas: >30 keV
- 1E qualification mild conditions

Application:

Continuously measure particulate, iodine and noble gas volumetric activities.





PIS 203S™

Shielded Particulate and Iodine Sampler

Main Function:

Effluent release monitoring – accident and Post-accident

Main Characteristics:

- Filter:
 - Type: fiberglass
 - Efficiency: >99.95%
- Cartridge:
 - Type: silver zeolite
 - Efficiency (methyl iodine): 99.99%
- Lead shielding: $4\pi / 15$ cm
- Temperature limit: -5 °C to +55 °C
- 1E qualification mild conditions

Application:

Effluent gas sampling.
Sampled flow and volume are measured in real time.
Simple or continuous sampling.





PIS 204™/205L™

Particulate and/or Iodine Sampler

Main Function:

Effluent release monitoring

Main Characteristics:

- Filter:
 - Type: fiberglass
 - Efficiency: >99%
- Cartridge:
 - · Type: charcoal or silver zeolite
 - Efficiency (methyl iodine): 99%
- Temperature limit: 0 °C to +45 °C
- Version with dynamic flow rate control
- Non 1E qualified

Application:

Continuously sample draw of particulate and/or halogen.
The nominal flow rate for this sampler is adjusted via a manual valve.
Adapted for stack or duct when an isokinetic sampling is required.





LM 211S™/212S™

Off-line Gamma Liquid Monitor

Main Function:

Barrier leak control - Effluent release monitoring

Main Characteristics:

- Detection type: off-line
- Radiation detected: gamma
- Detector: 11/4"x1" Nal(TI) scintillator + PM tube
- Sample volume: 4.5 l
- Lead shielding: 4π / 5 cm or 4π / 10 cm
- Measurement range: 3.7 10³ to 3.7 10⁹ Bg/m³
- Energy range: 100 keV to 2.5 MeV
- Temperature limit: -5 °C to +55 °C
- 1E qualification mild conditions

Application:

Monitoring of liquid sampling. Can withstand seismic conditions. Version with 4π 2" shielding.



SGLM 201K[™]/202K[™]

Steam Generator Leak Rate Monitor

Main Function:

Barrier leak control

Main Characterisctics:

- Radiation detected: gamma
- Detector: Nal(TI) scintillator + PMT
- Measurement range: 0.1 to 5 000 l/h
- Lead shielding: $2\pi / 5$ cm (SGLM 202K version)
- Energy range:
 - N16: 4.5 MeV to 7 MeV
 - Gamma: 0.2 MeV to 2.2 MeV
- Temperature limit: -5 °C to +55 °C
- 1E qualification mild conditions

Application:

Monitoring steam generator leak rate in PWR nuclear power plants by measuring 16N activity.





SAM 201K[™]/202K[™]/203K[™]/204K[™]

Spectrum Analysis Monitor

Main Function:

Effluent release monitoring

Main Characteristics:

- Detection type: on-line
- Radiation detected: gamma
- Detector:
 - SAM 201K monitor: 11/4"x1" Nal(TI) scintillation + PMT
 - SAM 202K monitor: 3"x2" Nal(TI) scintillation + PMT
 - SAM 203K monitor: 2"x2" Nal(TI) scintillation + PMT
 - SAM 204K monitor: 3"x3" Nal(TI) scintillation + PMT
- Lead shielding: $2\pi / 5$ cm standard $(4\pi / 5$ cm option)
- Measurement range: 6 decades between 3.7 10² to 3.7 10¹² Bq/m³
- Spectrometry analysis: 1024 channels
- Energy range: 100 keV to 7 MeV
- Temperature limit: -5 °C to +55 °C
- 1E qualification mild conditions

81 Application:

Spectra analysis. Continuous and autonomous operation. Four sizes of detector are available.







BM 501[™]

Boron meter

Main Function:

Control of boron concentration

Main Characteristics:

- Detector: Boron-lined proportional counter
- Measurement range: up to 3500 ppm (Boron total)
- Neutron source: Am-Be
- Dose rate: <300 µSv/h
- Long-term temperature ranges:
 - Detection sub-assembly: +10 °C to +60 °C
 - Preamplifier: 0 °C to 55 °C
 - Processing unit: +10 °C to +40 °C
- Short-term maximum temperature range:
 - Processing unit: 0 °C to +45 °C
- 1E qualification mild conditions

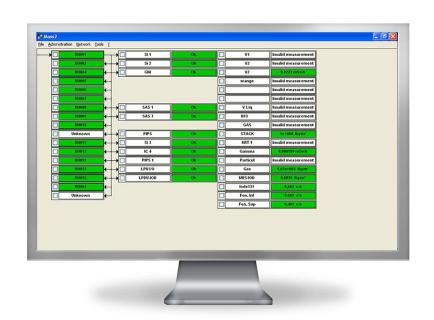
Application:

Continuously measure the boron concentration in water circulating in process of light water nuclear power plants.

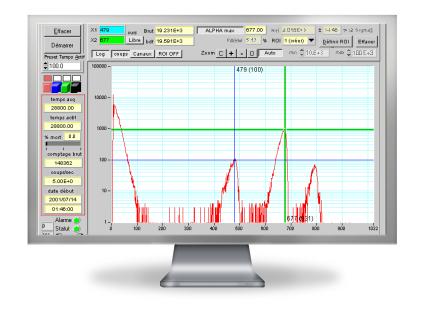




MASS2™ Software



- Set-up and configuration of the instruments belonging to the RAMSYS product line
- This includes: LPU, LPDU, RDU, LDU, ADU



SAMS™ Software

 SAMS (included in the MASS2) software reads and displays spectra memorized by SAS and SPIPS units.

The main functions are:

- Spectrum reading based on several criteria
- Graphical spectra display with markers and areas of interest
- Simple spectral operations
- Electronic energy calibration of the connected monitor



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RAMVISION™ Software

- Monitoring of RAMSYS channels
 - Acquisition and storage of measurements and statuses
 - Export of measurements and statuses
 - Visualization in real time and/or of historical values
 - Forwarding statuses of the monitors onto digital output card



Fig. Simulation. 7 | General Measurement units | Service | Management units | Service | Syrul | Model | Appartment units | Service | Syrul | Service | Syrul | Service | Servic

SIMS2™ Software

- Simulation of the evolution over time of the estimations that a RAMSYS monitor would provide when considering:
 - An algorithm
 - A given measurement channel under the influence of given physical quantities and events



GENERAL STANDARD REFERENCES

RAMSYS products are designed and compliant to the main stringent international standards. Most of them are « 1E » qualified and available in Safety Related versions:

- QA:
 - ISO 9001 as a bare minimum
 - 10 CFR 50 App. B for Safety Related applications, 10 CFR 21
 - ASME NQA1 as applicable
- System: IEC 61226, IEC 61513
- Software: IEC 61238 and applicable IEEEs
- Environmental qualification according to IEC 60780 and IEEE 323:
 - Nuclear qualification
 - Thermodynamics
 - EMI/RFI
 - Aging
 - TID



NUCLEAR STANDARD REFERENCES

For each RAMSYS monitor, nuclear tests are performed in specialized laboratories and according to the following international standards:

- **Gamma, X**: IEC 60532 or IEC 60846
- Neutron: IEC 61005 or IEC 61322
- Aerosols: IEC 60761-1 & 2, IEC 61171
- **Gas:** IEC 60761-1 & 3
- **lodine**: IEC 60761-1 & 4, IEC 61172
- **Tritium:** IEC 60761-1 & 5
- **Liquid**: IEC 60861
- Effluent: IEC 60768
- Accident and post-accident: IEC 60951 61508



QUALIFICATIONS

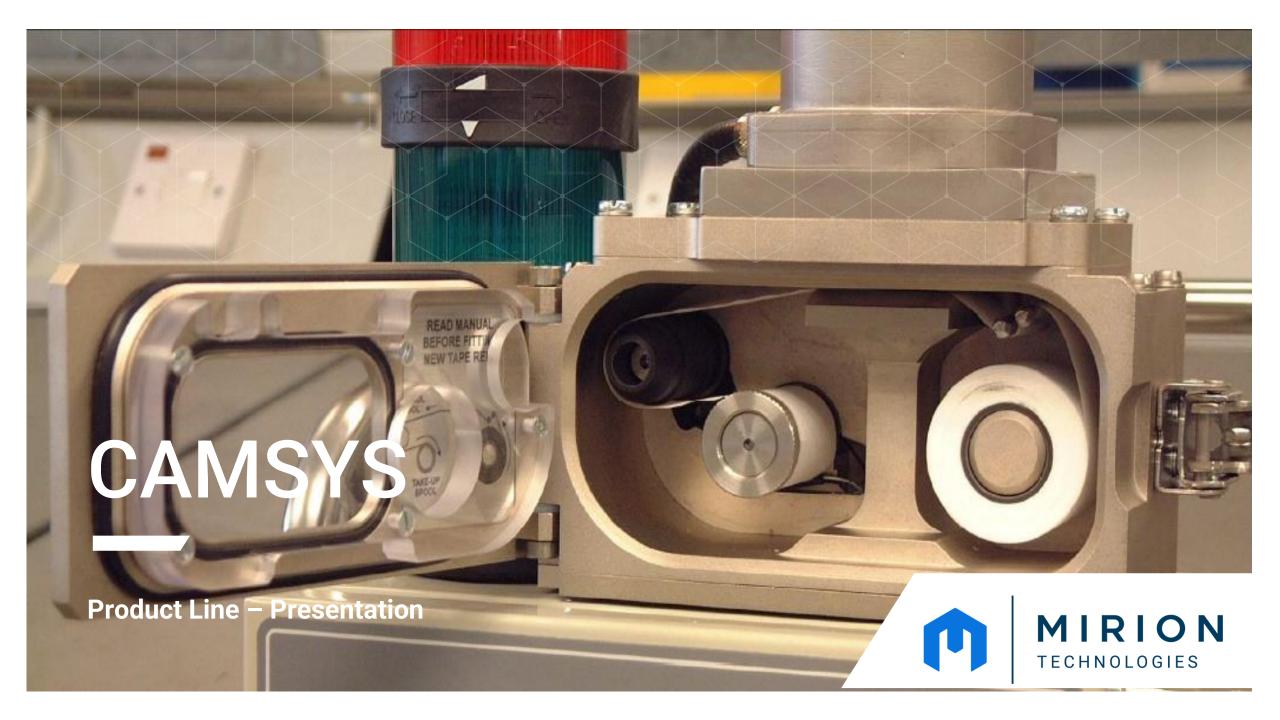
The RAMSYS system has been developed for normal and specific applications. It complies with most of the more stringent standards, such as those required for safety-related applications in nuclear power plants and in particular:

10CFR50B, 10CFR21, NQA-1, IEC 61513, IEC 61226, IEC 62138, ANSI/IEEE std 7-4.3.2, IEC 60987, HAF 604

The RAMSYS system has been qualified « 1E » according to IEEE323 and IEC 60780 standards, and in particular:

- EMI/RFI tests: IEC 61000-6-2, IEC 61000-6-4, EPRI TR 102323, RG1.180, MIL STD 461^E
- **Seismic testing:** IEEE 344 IEC 60980, IEC 60068-3-3
- Other tests: MTBF: MIL HDBK 217F / TID: IEC 60544-2





MAIN FUNCTIONS

CAMSYS product line is the RMS Product Family developed by Mirion Technologies under the Canberra™ brand name.

Reliable and robust systems designed for:

- Protection of workers
- Operational process monitoring

It doesn't include individual and/or handheld equipment such as dosimeters and survey meters.



MAIN ELEMENTS

CAMSYS product family consists of:

Intelligent and convivial processing unit (iCAM, G64 monitors) with man-machine interfaces that can be read from near or far.





Various detector assemblies, as large area silicon detectors (PIPS® detectors), Geiger Mueller tubes or ionization chambers, associated with powerful algorithms (for alpha, beta, gamma measurements).





Ionization chamber

iCAM™

Alpha Beta Particulate Monitor

Main Function:

Radioprotection of workers

Main Characteristics:

- Radiation detected: alpha, bata and gamma
- Detector: silicon
- Filter FSLW:
 - Autonomous: up to 6 months
 - Efficiency: >99.99% for particules Ø 4 μm
 - · Filter type: fixed or moving
- Measurement range:
 - Alpha: 1 10⁻³ to 9 10³ Bg/m^{3 (1 hour average)}
 - Beta: 1 to 3.6 10⁵ Bg/m³ (1 hour average)
- Detection efficiency:
 - Alpha: 24% for all alpha up to 5.7 MeV
 - Beta: 24% for ³⁶Cl, ⁹⁰Sr, 15% for ⁶⁰Co
- Energy range:
 - Alpha: 3 MeV to 10 MeV
 - Beta: 50 keV to 2.5 MeV
 - Gamma: 80 keV to 2.5 MeV
- Temperature limit: -5 °C to +50 °C
- Flow rate: 37 l/min
- Non 1E qualified

Application:

Reliable and safe monitoring of alpha, beta and particulates.

93 Operates as a simple alarm beacon.

G64 detection head for gamma measurement.





ICAM RH™

Remote Head

Main Function:

Radioprotection of workers

Main Characteristics:

- Radiation detected: alpha, beta and gamma
- Detector: silicon
- Filter FSLW:
 - Autonomous: up to 6 months
 - Efficiency: >99.99% for particules Ø 4 μm
 - Fixed or Mobile remote filter
- Measurement range:
 - Alpha: $4.6 ext{ } 10^{-3} ext{ to } 9 ext{ } 10^3 ext{ Bq/m}^3$
 - Beta: 1 to 3.6 10⁵ Bq/m³
- Detection efficiency:
 - · Alpha: 24% for all alpha up to 5.7 MeV
 - Beta: 24% for ³⁶Cl, ⁹⁰Sr, 15% for ⁶⁰Co
- Energy range:
 - Alpha: 3 MeV to 5.7 MeV
 - Beta: 50 keV to 2.5 MeV
 - Gamma: 80 keV to 2.5 MeV
- Temperature limit: -5 °C to +50 °C
- Flow rate: 37 l/min
- Non 1E qualified

Application:

Continuous air monitoring in stacks and ducts.

The optimum sampling point can be a longer distance from a conventional mounting location for the display and control unit.





G64™

Area Gamma Monitor

Main Function:

Radioprotection of workers

Main Characteristics:

- Radiation detected: gamma
- Detector: Semiconductor (2 versions)
 - · Integrated version
 - Remote version 10 m / 25 m / 100 m (33 ft, 82 ft, 330 ft)
- Response time: <6 seconds at 90% (Tr)
- Measurement range: 10⁻⁷ to 100 mSv/h
- Energy range: 70 keV to 7 MeV
- Temperature limit:
 - Electronic: 0 °C to +40 °C
- Protection index:
 - Electronic: IP54
 - Detector: IP65 (integrated), IP54 (remote)
- Non 1E qualified

Application:

Ambient Gamma dose rate measurement.

Dose rate main control area.

Dose rate for evacuation alarms.





G64IC™

Area Gamma Monitor

Main Function:

Radioprotection of workers

Main Characteristics:

- Radiation detected: gamma
- Detector: Ionization chamber with preamplifier
- Measurement range: 10⁻⁴ to 100 Sv/h
- Energy range: 70 keV to 7 MeV
- H* (10)
- Temperature limit:
 - Electronic: 0 °C to +40 °C
- Protection index:
 - Electronic: IP54
 - Detector: IP65
- Non 1E qualified
- Measuring cable 10 m (33 ft) MAX
- Shielded signal cable 10 m / 25 m / 50 m (33 ft, 82 ft or 164 ft)
- The detector can be equipped with an optional source ²⁴¹Am

Application:

Ambient Gamma dose rate measurement.

Dose rate main control area.

96 Dose rate for evacuation alarms.





G64SC™

Area Gamma Monitor

Main Function:

Radioprotection of workers

Main Characteristics:

- Radiation detected: gamma
- Detector: 1"x1" NaI(TI) crystal scintillator with remote preamplifier
- Measurement range: 0.1 cps 100 kcps
- Energy range: 70 keV to 7 MeV
- Temperature limit:
 - Electronic: 0 °C to +40 °C
- Protection index:
 - Electronic: IP54
 - Detector: IP65
- Non 1E qualified
- Measuring cable 15 m (50 ft) MAX
- Shielded signal cable 10 m / 25 m / 50 m (33 ft, 82 ft or 164 ft)
- Three versions 50 °C 100 °C 150 °C

Application:

Cooling water monitor.

Control of cooling water contamination in high-level active liquid waste tanks.

Dose rate main control area.

Dose rate for evacuation alarms.

Monitoring of pipe activity and valve closure (detector).





Linear Neutron Flux Channel for the Power Range

NY31.11 NA31.31 NA31.31 NA31.31 NK21.23 NZ21.22 NZ12.21 NK21.21 NB28.16 NL12.11 NS01.12 NS01.1



Product Line – Presentation

INP



MIRION TECHNOLOGIES

MAIN FUNCTIONS

NFMS product line is the RMS Product Family developed by Mirion Technologies GMBH under the MGPI-H&B™ brand name.

Neutron Flux Monitoring Systems combine **years of experience** in the design and **manufacturing** of electronics, detectors and signal processing.

This system is designed for:

 Highest level of built-in safety for exceptional reliability and performance.

Qualified according to various test reports and **excellent operational feedback.**





MAIN ELEMENTS

NFMS product family consists of:

Secure and reliable processing units (TK 250 system) and a communication interface.



Main detectors, Gamma-Ionization chambers for dose rate monitoring, Beta-Ionization chambers for noble gas monitoring, Neutron Ionization chambers for out-core monitoring, B10- and BF3-Counters for neutron detection, Gamma- and Beta-Scintillation counters for activity monitoring.





MAIN FUNCTIONS

The Mirion Technologies Premium Analyse™ brand is manufactured by French specialist in the measurement of Tritium and other beta emitters for over 22 years.

These reliable, accurate and user-friendly systems are designed for:

- Radioprotection
- Process control
- Environmental monitoring
- Improvement of existing installations



MAIN ELEMENTS

TRITIUM product line consists of:

Portable monitors, mobile monitors, installed systems and made to measure systems, all being equipped with a powerful and user-friendly Human-Machine Interface

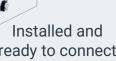






Mobile







Made to measure design

Unique detection technology, ionization chamber







A measurement channel is made of:

- An ionization chamber
- A preamplifier
- A Human-Machine Interface

SOFTWARE INTERFACE

Same interface for all monitors:

Interactive and intuitive:

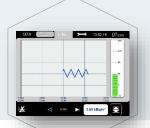
- Touchscreen
- Every alarm is signaled by a screen color change

Communication:

- Modbus Ethernet communication
- 4/20 mA outputs (except B IONIX 3[™] monitor)
- 32 days of recording, export via USB

Graphic Display

Alarm report via digital outputs (except B IONIX 3[™] monitor)
or remote beacon





















BIONIX 3 - MES

Portable Tritium Monitor

Main Function:

Radioprotection

Main Characteristics:

- **Measurement range**: 3 kBq/m³ to 3 TBq/m³ (6 kBq/m³ to 6 TBq/m³ for the CMP version)
- Limit of detection (2σ) : 12.5 kBq/m³ (30 kBq/m³ for the CMP version)
- Response time: <60 sec (<90 sec for the CMP version)
- Weight: 6 kg
- Autonomy: 6 h (recharged in 2 h)
- Volume: 660 cc (2x 300 cc for the CMP version)
- Internal data exportable via USB
- Modbus TCP/IP
- Possibility for dynamic gamma compensation (for the CMP version)
- Light and sound remote beacon available as an option

Application:

Protection of workers.

Environmental monitoring.





M IONIXTM

Mobile Tritium Detector

Main Function:

Radioprotection, decommissioning

Main Characteristics:

- Measurement range: 2.1 kBq/m³ to 2.1 GBq/m³
- Limit of detection (2σ): from 10 kBq/m³
- Response time: <3 min
- Weight: 60-80 kg on wheels
- Robust, low maintenance unit
- Easy mobility even on uneven surfaces
- Volume: 4200 cc (depending on version)
- Data extraction via USB stick
- Modbus TCP/IP
- HEPA filtration available
- Possibility for dynamic gamma compensation (differential measurement)
- Light and sound remote beacon available as an option

Application:

Decommissioning.

Radioprotection (workers and locations).





C IONIX 3TM

Installed Tritium Monitor

Main Function:

Radioprotection, decommissioning, process control

Main Characteristics:

- **Measurement range**: 3.2 kBq/m³ to 10 TBq/m³ (depending on the version)
- Limit of detection (2σ): from 10 kBq/m³
- Response time: from 75 sec (depending on the version)
- Rugged unit, safe and customizable
- Volume: 180 cc 4200 cc (depending on the version)
- Internal data export via USB
- Modbus TCP/IP
- Possibility to measure noble gases and/or HTO
- Possibility for dynamic gamma compensation (differential measurement)
- Light and sound remote beacon available as an option

Application:

Environmental monitoring. Radioprotection (workers and location).



C IONIX 3 - BMM

Installed Tritium Monitor

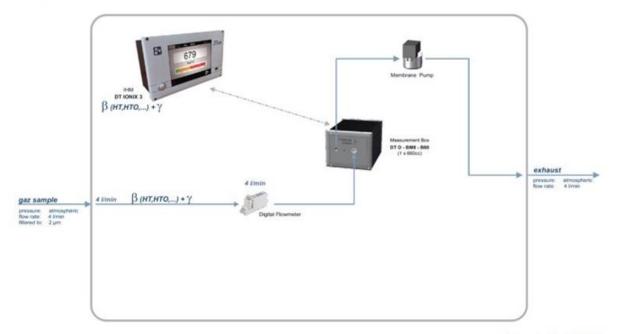
Main Function:

Radioprotection, decommissioning, process control

Application:

HT activity measurement





Intellectual Property of PREMIUM Analyse
UNDISCLOSED WITHOUT OUR WRITTEN AUTHORIZATION

C ionix 3 - BMM schematic



C IONIX 3 - BMC

Installed Tritium Monitor

Main Function:

Radioprotection, decommissioning, process control

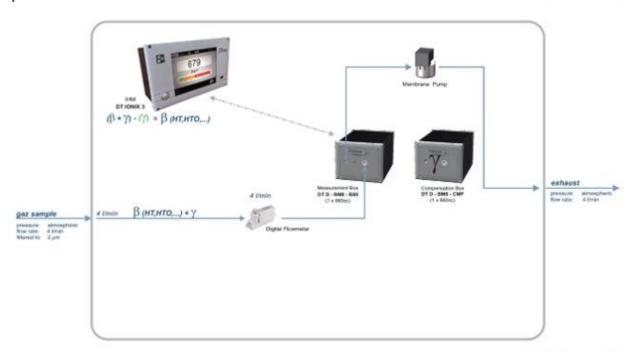
Application:

109

HT activity measurement with dynamic gamma compensation.



Cionix 3 - BMC







C IONIX 3 - BMH

Installed Tritium Monitor

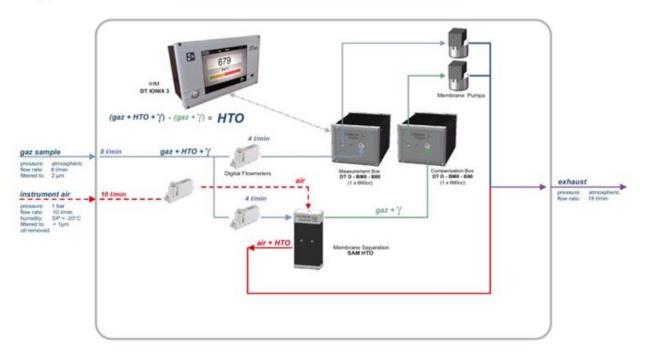
Main Function:

Radioprotection, decommissioning, process control

Application:

HTO activity measurement with dynamic gamma compensation.





PRODUCT



Test from 02/09/2020



C IONIX 3 - BMG

Installed Tritium Monitor

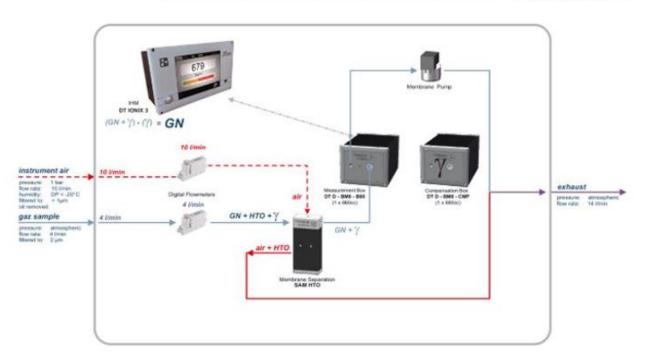
Main Function:

Radioprotection, decommissioning, process control

Application:

Noble gas activity measurement.









HT IONIX™

Tritium Bubblers

Main Function:

Monitor atmospheric tritium concentration levels in HTO (vapor) and HT (gas) form.

Main Characteristics:

- High trapping efficiency HT and HTO: >95%
- Limited and mastered condensation
- No condensation outside of the bubbler
- Real-time leak detection
- Stainless steel sampling circuit
- Reduced water losses for long-time sampling
- Lightweight (<15 kg for four bottles)
- Intuitive use with color touchscreen
- Display of work and sampling data (standard flow, sampling time...)
- Color identification of bottles to prevent any risk of inversion
- Permanent auto-surveillance with light and sound alarm
- Oxidation furnace with customizable temperature
- Relative Humidity Compensation System

Application:

Environmental sampling.



HTO Collectors

diagram of a tritium bubbles

HT Collectors

HC IONIX™

Carbon 14 Bubblers

Main Function:

Monitor atmospheric carbon-14 concentration levels in organic and gaseous form.

Main Characteristics:

- High trapping efficiency CO2: >95%
- Limited and mastered condensation
- No condensation outside of the bubbler
- Stainless steel sampling circuit
- Reduced water losses for long-time sampling
- Lightweight (<15 kg for four bottles)
- Intuitive use with color touchscreen
- Display of work and sampling data (standard flow, sampling time...)
- Color identification of bottles to prevent any risk of inversion
- Permanent auto-surveillance with light and sound alarm
- Oxidation furnace with customizable temperature
- Relative Humidity Compensation System

Application:

Environmental sampling.





IONIZATION CHAMBERS

Custom-built ionization chambers







<u>Tritium LOD:</u> 2 kBq/m³ <u>Volume:</u> 4/8 L

Application:
Radioprotection.
Stack measurement.
Environmental monitoring.

Wide range



Tritium LOD: 3.2 kBq/m³ Volume: 660/180 cc

Application:
Radioprotection.
Stack measurement.

High activities



Tritium LOD: 20 kBq/m³ Volume: 10/500 cc

Application:
Process control.
Glovebox monitoring.



DT D - MC10™

10 cc Tritium Detector

Main Function:

Process control

Product submitted for CEA license*

Main Characteristics:

- Measurement range: 200 kBq/m³ to 20 PBq/m³
- Limit of detection (2σ): from 1 MBq/m³
- Response time: <90 sec
- Volume: 10 cc
- Reduced memory effect
- Easy decontamination and low maintenance
- · Possibility to heat for decontamination

Application:

Process control.

^{*}Device manufactured under exploitation license for CEA patent - L26218

DT D − MLB[™]

Tritium Detector

Main Function:

Process control

Product submitted for CEA license*

Main Characteristics:

- Measurement range: 20 kBq/m³ to 20 TBq/m³
- Limit of detection(2σ): from 125 kBq/m³
- Response time: <60 sec
- Volume: 100 cc
- Various airproof connections
- Multidirectional feedthrough seals for glovebox
- Easy decontamination and low maintenance

Application:

Process control.





^{*} Device manufactured under exploitation license for CEA patent - L26218

DT D − IC500[™]

500 cc Tritium Detector

Main Function:

Process control

Main Characteristics:

- Measurement range: 4 kBq/m³ to 40 TBq/m³
- **Limit of detection (2σ)**: from 15 kBq/m³
- Response time: <60 sec
- Volume: 500 cc
- Various airproof connections
- Multidirectional feedthrough seals for glovebox
- Easy decontamination and low maintenance

Application:

Process control.





DT D - EXP40™

4 200 cc Tritium Detector

Main Function:

Radioprotection, environmental monitoring

Main Characteristics:

• Measurement Range: 2 kBq/m³ to 2 GBq/m³

• **Limit of detection (2σ)**: from 10 kBq/m³

Response time: <3 mins

Volume: 4 200 cc

Preamplifier included

Application:

Radioprotection.

Stack monitoring.

Environmental monitoring.







DT D - XPR80™

On-line Tritium Detector

Main Function:

Radioprotection, environmental monitoring

Main Characteristics:

- Measurement range: 2 kBq/m³ to 2 GBq/m³
- **Limit of detection (2σ)**: from 5 kBq/m³
- Response time: <90 sec
- Volume: 8000 cc
- Changeable inlet filter
- · Heating of gas to prevent condensation
- Easy decontamination and low maintenance

Application:

Stack monitoring.

Environmental monitoring.



DT D − AME[™]

Main Function:

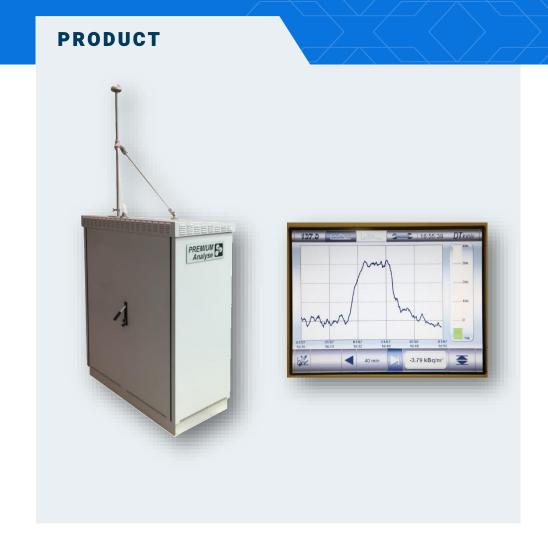
Environmental protection

Main Characteristics:

- Measurement range: 2 kBq/m³ to 2 GBq/m³
- **Limit of detection (2σ)**: from 5 kBq/m³
- Response time: <60 sec
- Volume: 8000 cc
- On-demand design
- Heating and/or ventilation if needed

Application:

Environmental monitoring.



CUSTOMER SUPPORT

Mirion Technologies can provide solutions to give operators key information to enable them to operate nuclear facilities safely and efficiently.

Customer support is very important to us. We have local and regional offices around the world to provide advice, **technical assistance**, on-site repairs, **product maintenance** and obsolescence management.



GLOBAL ASSISTANCE

Our teams are committed to providing exceptional customer care and excellence in all business services.

- **Installation:** Our service engineers ensure qualified installation of your instrument and software.
- Calibration services: Calibrations provided by certified experts.
- Product support and repairs: Technical support and repairs for your Mirion products.
- **Training:** Wide selection of training available for Mirion products.



MIRION AT YOUR SERVICE



Our customer service teams are committed to providing you support and excellence in everything you do.

- Nuclear measurement
- Analytical expertise
- On-site and in-plant calibrations
- Technical training programs
- System installation
- Product support and repairs
- Consulting service
- Real-time instrument monitoring



KNOW-HOW AND EXPERTISE



- Unique know-how on all types of nuclear power plants across different generations
- More than 2,800 employees working to create technological solutions and advance innovation into our domain. We are engaged to share our knowledge and expertise with our customers.

THANKS

