RSN 5120/5130

Remote Sensor Nodes

Integrated wide-area CBRN monitoring

Key Features

- Configurable design
- Networkable
- Fixed or mobile installation

Monitoring Capability

- Biological threats
- CWA & TIC threats
- Flammable explosive gases
- Nuclear threats

Application Areas

- Indoor or outdoor use
- Sports stadiums & arenas
- Subways & airports
- Military bases
- Government buildings

The RSN 5120/5130 CBRN Detector

The RSN 5120/5130 is a configurable, multi-threat monitoring system that is ideal for protecting high value buildings or for use in mobile laboratories. It integrates detection technologies from the world's leading detector suppliers to create a total CBRN monitoring solution. A modular design approach allows significant customizing of features for customers with differing needs.

The RSN 5120/5130 system shown with optional side-mounted thermal conditioning unit.

Networkable The individual CBRN detectors are internally bound together with custom embedded software. The unit is designed primarily for fixed installations, but it can also be easily mounted in a CBRN vehicle. Data can be stored internally or transmitted to a remote location in real-time by wire, wireless, or fiber optic link. RI's ASAP Sentry™ monitoring software can handle inputs from up to 62 remotely placed RSN 5120/5130 devices.

Flexible design The RSN 5120 CBRN system can be configured to include only those threats the customer wants to detect - for example, only chemical and biological, or only biological and radiological. The full-featured model RSN 5130 offers all four sensor sets.

Large-scale facility protection The RSN 5120/5130 is ideal for CBRN protection of internal facilities such as sports arenas, large buildings, and subways. It is designed to function over a wide range of environmental conditions, and can also be used to protect outdoor sports stadiums, military bases, airports, and other large-scale outdoor facilities. An optional side-mounted thermal conditioning unit provides heating and cooling for installations in locations that are environmentally hostile.

RSN 5120/5130 General Specifications

The RSN 5120 may be configured with up to three detection subsystems. The full-featured RSN 5130 comprises all four subsystems. Specifications of each subsystem are listed on the following pages.

Air sampling rate	2.2 liters/minute, typ.
Chemical detector[1,2]	Chemical warfare agents and toxic industrial gases identified using ion mobility or mass spectrometry. Multiple optional modules. Data upon request.
Bioaerosol detector[1,2]	Detects and alarms when there is an unusual change in ambient aerosols. User adjustable alarm levels. Capable of identifying the presence of a biological aerosol at a concentration of 30 bio-particles per liter of air at a 90% confidence level. 1-15 micron particle size range. Tested by U.S. Department of Homeland Security at the U.S. Army's Edgewood Chemical and Biological Center. Report upon NDA signing.
Radiation detection[2]	Gamma detection using a sensitive 1024 channel gamma ray spectrometer (CsI (Tl) scintillator) coupled with a GM tube. Detection down to 0.01uSv/hr. Maximum level = 1.0 Sv/Hr. Gamma photon range is 0.05-3.0 MeV.
Explosive gas detection[2]	Options include either pellistor or non-dispersive infrared (NDIR) sensor technology.
GPS sensor	As required.
Consumables	None.
Sensor data fusion	Embedded industrial process control computer collects and stores sensor data using the RSN custom software package. ASAP Sentry™ software is available for remote PC-based monitoring and display of data from multiple units. Software upgrades are provided at no additional charge.
Digital communication	RS-232, Ethernet, secure fiber optic serial data link.
Power	Custom to suit locally available power. Typical installation: 220VAC/0.5A or 220VAC/10A if supplied with thermal control module.
Physical dimensions	Natural convection unit: 86.4W x 67.6H x 22.9D cm Air conditioned unit: 77.7W x 67.6H x 22.9D cm
Weight	Natural convection unit: 32 kg Air conditioned unit: 39 kg
Operating temperature range	Units without air conditioning: -30 to 50 °C Units with air conditioning are operable to 52 °C air temperature with strong solar loading.
Operating profile	Multi-year continuous operation.
Maintenance	Inlet pre-filters require cleaning at approximately 3-6 month intervals, depending on environmental conditions. The chemical gas detector requires yearly filter replacement. The aerosol detector's light source requires replacement at 20,000-30,000 hours and the air pump at 30,000-40,000 hours.
Warranty	1 year parts and service. Other warranty and service options available.

1) May be export controlled.
2) This subsystem is available as an option. Not included with every configuration. See next page for comparison chart.

Detection Subsystem Configurations and Specifications

The following tables describe the configurations and features available with the RSN 5120. Customers may select up to three subsystems. If all four systems are required, we recommend the RSN 5130.

Series Designator	Chemical Detection	Biological Detection	Radiological Detection	Explosive Gas Detection
RSN 5120-1C	✓			
RSN 5120-1B		✓		
RSN 5120-1R			✓	
RSN 5120-1E				✓
RSN 5120-2CB	✓	✓		
RSN 5120-2CR	✓		✓	
RSN 5120-2CE	✓			✓
RSN 5120-2BR		✓	✓	
RSN 5120-2BE		✓		✓
RSN 5120-3CBR	✓	✓	✓	
RSN 5120-3CBE	✓	✓		✓
RSN 5120-3CRE	✓		✓	✓
RSN 5120-3BRE		✓	✓	✓
RSN 5130 **Full sensor set**	✓	✓	✓	✓

Chemical Detection: IMS Chemical Detector Specifications

Chemical warfare agent	Threshold Exposure Concentration (mg/m^3)	Response time (secs)	Relative humidity range (%RH)
VX & VXR	0.1	<= 10	0 to 100
GD, GF	0.1	<= 10	0 to 100
GA, GB	0.1	<= 10	0 to 100
HD	0.7	<= 10	0 to 100
L	2.0	<= 10	0 to 100
HN3	0.7	<= 10	0 to 100
AC	22	<= 10	0 to 100
CK	20	<= 10	0 to 100
CG	20	<= 10	0 to 100

Toxic Industrial Chemical	Threshold Exposure Concentration (mg/m3)	Response time (secs)	Relative humidity range (%RH)
Boron trichloride	73	<= 10	0 to 100
Formaldehyde	25	<= 10	0 to 100
Carbon disulphide	39	<= 10	0 to 100
Chlorine	15	<= 10	0 to 100
Diborane	9	<= 10	0 to 100
Fluorine	39	<= 10	0 to 100
Hydrogen chloride	15	<= 10	0 to 100
Hydrogen fluoride	25	<= 10	0 to 100
Hydrogen sulfide	10	<= 10	0 to 100
Methyl hydrazine	47	<= 10	0 to 100
Nitric acid	6	<= 10	0 to 100
Sulphur dioxide	40	<= 10	0 to 100
Hydrogen bromide	397	<= 10	0 to 100
Thionyl chloride	146	<= 10	0 to 100

Bioaerosol Detection Specifications

Operating principle	Monitoring of 280nm UV-stimulated particle scattering and biofluorescence using photon counting electro-optics. Alarm decisions are based on algorithms that consider bioaerosol statistical behavior, biofluorescence intensity and particle size.
Particle size and type	1 to 15 microns in four size ranges. Respirable aerosolized bacteria, spores, viruses, and toxins. Biofluorescence intensity in each size range is monitored and reported.
Interferents	Interferent resistant to diesel smoke, pollen, cement and silica dust.
Detection limit	100 ACPLA in most natural environments, 20-30 ACPLA under laboratory test conditions.
Sampling rate	1.2 liter per min of ambient air nominal.
Consumables	None.
Time to alarm	15 second average, 30 seconds maximum. 15-minute trailing history is used in alarm protocols.
Serial data output	Alarm, particles per liter of air in each size bin; percentage of particles that are biological; relative biofluorescence compared to scattering intensity for each size bin.
Operating life	Air pump: 30,000 - 40,000 hours. UV light source: greater than 20,000 hours.
Operating temp. range	-40°C to 50°C. Operation to 60°C is permitted up to a total time of 1000 hours.
Humidity	Non-condensing.
Start-up time	1 minute.
Data storage	Removable SD-type data card. Stores more than 5 years of aerosol data.

Radiological Detection: Gamma Monitor Specifications

Detector Types	**23 cm^3CsI (Tl) scintillator plus energy-compensated GM counter for measurements in the 50 µSv/hr to 1.0 Sv/hr range**
EDR measurement range, µSv/hr	0.01 – 10^6
Detected energy range, MeV	0.05 – 3.0
Energy dependence of sensitivity relative to 0.662 MeV (^{137}Cs)	±25%
Tolerable basic relative error of EDR measurement	±15%
Count rate for ^{137}Cs at 1.0 µSv/hr	480 cps
Spectrometric isotope identification	Yes, optional

Explosive Gas Detection

An infrared sensor uses the proven Non-Dispersive Infrared (NDIR) principle to detect and monitor the presence of gases. With an infrared source and specific filtering on the pyroelectric detectors mounted inside the optical/gas cavity, individual gases or types of gas can be identified and their concentrations determined. The sensor can monitor three ranges:

Gas	Range 1	Range 2	Range 3
Carbon Dioxide 5%	0%v.v - 1%v.v	1% - 4%v.v	4%v.v - 5%v.v
Methane 5%	0%v.v - 1%v.v	1% - 4%v.v	4%v.v - 5%v.v.
Methane 100%	0%v.v - 1%v.v	1% - 4%v.v	4%v.v - 100%v.v

Optional Accessory Kits

- Air conditioning kit (AC unit, filter, drain line)
- Ducting kit (duct booster, duct sample tube, gaskets, tubing, fasteners
- Floor mount kit (pre-cut Unistrut, brackets, and fasteners)
- Wall mount kit (pre-cut Unistrut, brackets, and fasteners)
- Pole mount kit (pre-cut Unistrut, brackets, and fasteners)
- Optical fiber kit (transmit and receive units, 2 patch cables)
- Laptop kit (laptop, lump-in cord power supply, 100 ft. ethernet cable, ASAP Sentry™ software)
- Alarm kit (USB alarm light and audible alarm)
- GPS kit (Garmin GPS, cable)

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