

Be sure, be safe.

COSMOS

Fixed gas detection systems and
portable gas detectors for

Automotive Industry





About New Cosmos Electric

1. New Cosmos Electric, succeeded in developing the world's first residential gas alarm, and has the largest market share in Japan. We also have large shares in the field of industrial gas detectors and alarm systems.
2. We offer total safety solutions for gas sensors, including gas sensors development, manufacturing, sales, and maintenance service for products that feature gas sensors.
3. In 2015, we set up COSMOS SENSOR CENTER, the world's largest gas sensor research and manufacturing facility.
4. With a broad network in Japan as well as in countries around the world, we have proven track record of widespread adoption of its products.



Our Products in the Automotive Industry

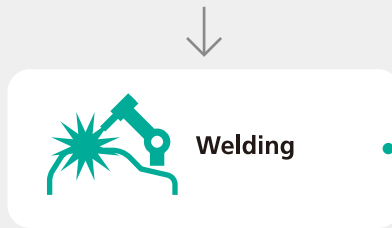
Various types of gases are used in many processes of automotive production, from development of engines through surface coating of bodies, and many gas detectors are used to ensure safety against the harms they may cause. In particular, coating drying ovens present a severe environment for gas sensors, as pipes may be clogged with drainage, dust or dirt generated inside the furnace or paint components. In this challenging field, we have offered optimal solutions based on our experience, and achieved many successful results.

New Cosmos Electric also offers unique products, such as steel dust meters that enable simple diagnosis of wear condition of transmissions in robot arms used in welding and coating processes, by simply collecting a small amount of grease or lubricating oil.

In anticipation of the evolution into a hydrogen energy-based society, we have been developing gas sensor modules for hydrogen fuel cell vehicles (FCV) and proposed a gas detector and alarm system solution for hydrogen-filling stations, and secured a share of more than 80% in the field in Japan.

Various types of gases are used in automotive production processes, so many gas detectors and alarm systems are installed to protect workers and ensure the safety of the facilities against potential harms.

Process Chart



A Welding Robot
 Detection Target :
 • Steel dust in transmission grease/lubricating oil

B Coating Drying Oven
 Detection Target :
 • Fuel gas for burner (Town gas/LPG)
 • Paint solvent

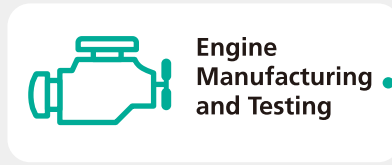
C Coating Robot
 Detection Target :
 • Steel dust in transmission grease/lubricating oil



D Aluminum Melting Furnace
 Detection Target :
 • Fuel gas (Town gas/LPG)

E Heat Treat Furnace
 Detection Target :
 • Carburizing gas

F Engine Bench
 Detection Target :
 • Engine fuel (Gasoline, Diesel oil, LNG, LPG)
 • Engine exhaust gas



G Fuel Filling Line
 Detection Target :
 • Engine fuel (Gasoline, Diesel oil, LNG, LPG)

H Coolant Filling Line
 Detection Target :
 • CFC for refrigerant
 • Oxygen



I Dynamometer Equipment
 Detection Target :
 • Engine exhaust gas

Potential Risks and Solutions



Welding

A Welding Robot

Many welding robots are installed in production lines for auto body spot welding. Maintenance of transmissions is critical, as failure of a single robot may result in a stop of the entire line. For this purpose, portable steel dust meters are useful for easily diagnosing the wear conditions of bearings by measuring the density of steel dust contained in grease or lubricating oil for rotating components.

Recommended Models

SDM-72 / SDM-73



Coating

B Coating Drying Oven

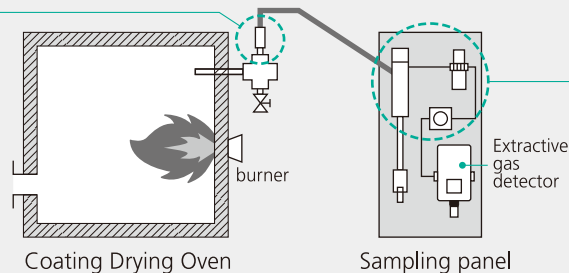
Layers of coatings are applied to the assembled body for a beautiful shiny finish. Combustible fuel gas may leak from the burner and if it accumulates in the furnace may touch off blasts of hot air and explode. Also there is a risk that a blast may touch off CO generated during combustion with reduced levels of oxygen, resulting in an explosion. Another risk is leakage of fuel gas due to seat leakage in the valve stand. To ensure safety against these hazards, combustible gas detection systems and detectors are used in this process. Further, long exposure to paint solvent vapor may have negative effects on the human body; therefore, toxic gas detection systems are used in this process to monitor hazards.

Recommended Models

V3	NV-500
NV-100	KD-12
PD-12	XP-3000

Features of New Cosmos Electric Gas Detectors Optimal for Coating Drying Ovens

Pre-filter: For direct ovens, use of a pre-filter is recommended to remove coating and tar components. Pre-filters can be installed by simply connecting a cross union fitting and ball valve to 20A-SUS pipes.



Sampling panel: Sampling panel with various filters helps prevent the suction pipe from being clogged with drainage generated in the oven and tar that cannot be removed with pre-filters, and to send only gasses to suction type gas detectors. It also helps prevent corrosion or deterioration of sensor elements due to coating components.

C Coating Robot

Many robots are installed in coating lines to apply coating to auto bodies. Maintenance of transmissions is critical, as failure of a single robot is highly likely to result in a stop of the entire line. For this purpose, portable steel dust checkers are useful for easily checking the wear conditions of bearings by measuring the density of steel dust contained in grease or lubricating oil for rotating components.

Recommended Models

SDM-72 / SDM-73





Engine Manufacturing and Testing

D Aluminum Melting Furnace

The main components of engines are manufactured through casting processes using melted aluminum. Town gas or LP gas is used as the fuel for melting aluminum. As unburned combustibles may explode in the furnace or fuel gas may leak due to seat leakage in the valve stand, fixed combustible gas detection systems and portable CO detectors are used to ensure the safety of workers.

Recommended Models

V3	NV-500
NV-100	KD-12
PD-12	XP-3000
XA-4400II	XX-2200

E Heat Treat Furnace

After the casting process, machine-processed components go through a process of high temperature quenching. In this carburizing process, the surface is hardened for improved durability using carbon. In the furnace, high concentrations of CO and H₂, the principal elements of carburizing gas may be generated, posing risks of CO poisoning or explosion of combustible gases; therefore, workers wear combustible gas/toxic gas detectors while performing their tasks.

Recommended Models

XP-3000	XA-4400II
XX-2200	



F Engine Bench

In this process, manufactured engines are started up for durability and performance testing. As CO contained in the emission gas from the engine may leak, fixed CO detection systems or portable CO detectors are used. Combustible gas detection systems and detectors are also used, as there are risks of explosion due to leakage of fuel vapor gas.

Recommended Models

V3	NV-500
NV-100	KD-12
PD-12	XP-3000



Assembly

G H Fuel & Coolant Filling Line

Prior to inspection of each vehicle, various fluid reservoirs must be filled, such as gasoline, diesel oil, or other fuels and refrigerant gases or other coolants used during the inspection. During this process, the fuel or coolant may leak from the filling equipment, causing explosion or fire. To ensure safety against this hazard, fixed combustible gas detection systems and portable combustible gas detectors are used. In addition, HCFC/HFC gas detectors are used, as exposure to high concentrations of CFCs or other refrigerant gases may have negative effects on the human body or cause oxygen deficiency.

Recommended Models

V3	NV-500
NV-100	KD-12
PD-12	XP-3000



Inspection

I Dynamometer Equipment

Before shipment of finished products, vehicles go through rigorous tests of brakes, lights, emission gases, and many other aspects. During this inspection, fixed CO detection systems and portable CO detectors are used because the exhaust pipe may accidentally become dislocated, resulting in the leak of CO contained in exhaust gases.

Recommended Models

V3	NV-100
KD-12	XA-4400II
XX-2200	

Fixed Gas Detection Systems

Indicators & Alarms

V3 series

Separate indicator, alarm and communication unit

Target gas (connectable gas detectors): Combustible Gas, Toxic Gas, Oxygen, HCFC

- It can be mounted to wall or panel (UV-810)
- Easy to notice the alarm status with 3-color LED display
- The cover for switches and PCB makes safe to use

Recommended Applications: **B D F G H I**



V3



UV-810

NV-500

Multi-point type gas alarm system

Target gas (connectable gas detectors): Methane or LPG

- 2·4·6·8·10·12 points type are available (2 points per unit)
- Battery provides backup power in case of a power failure, allowing continuous monitoring over 30 minutes after the failure, then intermittently monitors for 2 days (option)
- Earthquake-resistant design considering major earthquakes
- Simple operations for zero and span adjustment

Recommended Applications: **B D F G H**



NV-100 series

One-point type gas alarm system

Target gas (connectable gas detectors): Combustible Gas, Toxic Gas, Oxygen, HCFC

- Compact and lightweight
- Battery provides backup power in case of a power failure, allowing continuous monitoring over 60 minutes after the failure (option)
- Simple operations for zero and span adjustment

Recommended Applications: **B D F G H I**



Gas Detectors

KD-12 series

Diffusion type gas detector with digital display and alarm

Target gas: Combustible Gas, Toxic Gas, Carbon Dioxide, Oxygen

- Rugged, compact and lightweight
- Easy maintenance and sensor replacement
- Water and dust-proof construction (IP65)
- Explosion-proof (ATEX, IECEx and TIIS approved)
- Infrared sensor for long-term stability and less calibration needs (KD-12R)
- SIL2 certified model is available (KD-12B-SIL)
- HART communication model is available (KD-12AH/BH)

Recommended Applications: **B D F G H I**



PD-12 series

Extractive type gas detector with digital display and alarm

Target gas: Combustible gas, Toxic gas

- Rugged, compact and lightweight
- Easy maintenance and sensor replacement
- Water and dust-proof construction (IP65)
- Explosion-proof (ATEX* and TIIS approved) *Only selected types

Recommended Applications: **B D F G H**



Portable Gas Detectors

XP-3000 series Portable combustible gas detector

Target gas: Combustible Gas

- For measurement of wide range of combustible gas from ppm to vol%
- Digital display with a simulated analog scale
- 2 types of alarms: buzzer and flashing lamp
- Explosion-proof (ATEX, IECEx, UL and TIIS approved)
- Up to 5 correlation data can be installed (option)

Recommended Applications: **B D E F G H**



XA-4400II series Portable multi-gas detector

Target gas: Combustible Gas, Oxygen, Hydrogen sulfide and Carbon Monoxide (Selectable from 2-4 gas types)

- Up to 4 gases can be measured at once with simultaneous display
- 40 hours or more of continuous operation with an AAA Battery (when used in long-life mode)
- Compact and lightweight
- 3 type of alarm: loud buzzer, flashing lamps and vibration
- Water and dust-proof construction (IP67)
- Explosion-proof (ATEX, UL* IECEx and TIIS approved) *Pending

Recommended Applications: **D E I**



XX-2200 series Personal gas detector

Target gas: Carbon Monoxide, Oxygen (Selectable from 1 or 2 gas types)

- 5000 hours of continuous operation with an AAA Battery
- Very compact and lightweight
- 3 types of alarm: loud buzzer, flashing lamps and vibration
- Available with TWA (Time Weighted Average) concentration display, peak memory, and peak hold function

Recommended Applications: **D E I**



Steel Dust Meters

SDM-72/SDM-73 Steel dust meter for diagnosis the wearing condition of bearings

Substance measured: Steel Dust Concentration in Grease/Oil

- Enable the wear condition of bearings to be diagnosed before vibration increases by simply measuring the grease/oil steel dust
- Simple operation only inserting a tiny amount of grease/oil samples into the device

Recommended Applications: **A C**



Specifications

Models	V3 series	NV-500	NV-100 series
Alarm Set Value	Adjustable within the detection range for 1st and 2nd stage alarm	24%LEL	As per specifications
Alarm Delay	As per specifications	30s or less at 160% concentration of an Alarm Set Value(excluding sampling delay for extractive type)	As per specifications
Display	3-color LED bar graph (50 split)	LCD bar-graph meter with backlight	LCD bar-graph meter with backlight
Output	Contact Output: Dry NO-C-NC contact (100 VAC/1 A resistance load, 24 VDC, 1 A-resistance load), 1a for trouble contact Analog Output: 4-20mADC	Individual Alarm Contact/External Buzzer Contact: Dry NO contact (Contact capacity: 2A@100 VAC) Individual Voltage Output/Centralized Monitor Panel Output: 0-6-12 VDC (20mA or less) Collective Alarm Contact: Dry NO-C-NC contact (Contact capacity: 2A@100 VAC) External Buzzer Voltage Output: Intermittent voltage signal (12 VDC, 10mA or less)	Alarm output terminal: 1st alarm Dry NO-C-NC contact 2nd alarm Dry NO-C-NC contact Trouble alarm Dry NO-C-NC contact Buzzer Dry NO contact Analog output: 4-20mA; Contact capacity: 2A@100 VAC (resistance load)
Power Supply	24 VDC \pm 10%	85 to 264 VAC	100 to 240 VAC, 50/60Hz (standard), 24VDC (option)
Power Consumption/	Approx. 5.0W (excluding power consumption of gas detector)	Diffusion type: (15+3.5n)VA Extractive type: (15+7.5n)VA	Diffusion type: 12VA/17VA (with the backup power source) Extractive type: 4VA per unit to be added
Dimensions	W36 x H144 x D70 mm	Depends on the number of units	W113 x H204 x D71.5 mm (without backup power source) W113 x H234 x D110 mm (with backup power source)
Weight	Approx. 600g (including 450g single case)	Depends on the number of units	Approx. 1.5kg (without backup power source) Approx. 3kg (with backup power source)

Models	KD-12 series	PD-12 series
Gas Detected	As per specifications	
Sampling Method	Diffusion	Extractive
Alarm Accuracy	Combustible gas: \pm 25% of alarm set value Toxic gas: \pm 30% of alarm set value	
Alarm Delay	Combustible gas: within 30s at 1.6 times of alarm set value Toxic gas: within 60s at 1.6 times of alarm set value	
Alarms	Gas alarm: Red LED lamp flashes Trouble alarm: Yellow LED lamp flashes (sensor trouble, power voltage malfunction, etc.)	
Display	4-digit digital LED display	
Output	Gas concentration analog signal •4-20mADC (common to the negative side of power supply) Gas alarm contact (one stage only)*1 •Dry NO contact, Non-latching •Rated load: 0.5A at 250VAC or 0.5A at 30VDC (resistance load)	Gas concentration analog signal •4-20mADC (common to the negative side of power supply) Gas alarm contact or failure contact*2 (one stage only) •Dry NO contact, Non-latching •Rated load: 0.5A at 250VAC or 0.5A at 30VDC (resistance load)
Approvals	Ex d IIB T5 (TIIIS) II 2 G Ex db IIC T5 Gb (ATEX) Ex db IIC T5 Gb (IECEx)	Ex d IIB + H2 T4 X (TIIIS) II 2G Ex d IIB + H2 T4 Gb (ATEX)*3
Degree of Protection	IP65	
Applicable Cable	Cable out diameter: ϕ 10-13mm 5-conductor cable*1: CVV-S 1.25mm ² 3-conductor cable: CVV-S 2mm ² or 1.25mm ²	Cable out diameter: ϕ 11-15mm 6-conductor cable: CVV-S 1.25mm ² or 2.0mm ²
Operating Temperature /Humidity	-10 to +50 °C/10 to 90 %RH (0 to 50 °C)	
Power Supply	24 VDC (\pm 20%)	
Power Consumption/	3W max.	
Dimensions	W158 x H116 x D68 mm (excluding protrusion)*4	W133 x H260 x D132 mm (excluding protrusion)
Weight	Approx. 1.2kg	Approx. 5.2kg

*1 Screwless type only *2 Some are not ATEX approved. For further information, please ask *3 Gas alarm contact is a standard issue. Please specify if you wish a failure contact
*4 The size may differ slightly by each model. Please refer the datasheet or website

Models	XP-3000 series	XA-4400II series	XX-2200 series	SDM-72 / SDM-73
Detection Principle	As per specifications	Catalytic combustion, Galvanic cell and Electrochemical cell	Galvanic cell and Electrochemical cell	Magnetic balance type electromagnetic method
Gas Detected	Combustible gases (specify)	Combustible gases (Methane and Isobutane), Oxygen, Hydrogen sulfide and Carbon monoxide	Oxygen and Carbon monoxide	Steel dust concentration in grease/oil
Sampling Method	Extractive	Diffusion		—
Detection Range	As per specifications	Combustible gas: 0 to 100 %LEL Oxygen: 0 to 25.0 vol% Hydrogen Sulfide: 0 to 30.0 ppm Carbon Monoxide: 0 to 300 ppm	Oxygen: 0 to 25 vol% Carbon Monoxide: 0 to 300 ppm	SDM-72: 0 to 5,000 %Wt SDM-73: 0 to 19999wt ppm
Approvals	Ex ib d IIC T3 (TIIIS) II 2 G Ex dib IIB Td Gb (ATEX) Ex dib IIB T4 Gb (IECEx) Class I, Zone 1, AEx d ib IIB T4 Hazardous Locations. (UL)	Ex ibd IIC T3 (TIIIS) II 1 G Ex ia IIC T3 Ga (ATEX) Class I, Zone 0, AEx ia IIC T3 Hazardous Locations. (UL) *pending	Ex ib IIB T3 (TIIIS)	—
Degree of Protection	—	IP67	—	—
Operating Temperature /Humidity	0 to +40 °C	-20 to +50 °C/30 to 85 %RH (non condensing)	-10 to +40 °C/30 to 90 %RH (non-condensing)	0 to +40 °C
Power Supply	4 x AA alkaline batteries	1 x AAA alkaline battery		4 x AA alkaline batteries
Battery Life	Up to 20 hours	Approx. 40 hours (with a long-life mode)	Up to 5000 hours	Up to 30 hours
Dimensions	W82 x H162 x D36 mm	W70 x H72 x D26 mm (excluding protrusions)	W65 x H64 x D22 mm (excluding protrusions)	W84 x H190 x D40 mm
Weight	Approx. 450g (excluding batteries)	Approx. 130g (excluding battery)	Approx. 75g (including battery)	Approx. 500g (including batteries)



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SAFETY WARNING

Read the operating instructions thoroughly before use. Always operate in accordance with the instructions.

Be sure to choose the sensor designed to detect the required type of gas. Use of the wrong sensor type could cause an accident.