

COSMOS

Gas Detection & Alarm Systems

for Industrial Use

Product Guide



Multi-Point Type

System Configuration

Gas detection & alarm system V series/V2 series are compact systems which flexibly combine indicator units, alarm units, and various gas detector heads.

V series Indicator Unit/Alarm Unit



* Photo shows single case specification.

Type explanation for Indicator unit

V - -

Detection Principle Alarm Type

H	Hot wire semiconductor	1	1-stage alarm	0	Fixed in the standard case
C	Catalytic combustion	2	2-stage alarm	1	For panel instrumentation
A	Thin film semiconductor				
ZN	Semiconductor for NH ₃				
D	Electrochemical cell				
T	Thermal conductivity				
O	Galvanic cell				
G	Orgastor				
M	Analog input				

Type explanation for Alarm unit

VAL - -

Detection Principle

1	1-stage alarm	0	Fixed in the standard case
2	2-stage alarm	1	For panel instrumentation

Single case for panel instrumentation

Each single case incorporates an indicator unit and an alarm unit of the V series/V2 series. The case can be embedded in an existing instrumentation panel.



Floor type

This is a compact floor type system whose panel is equipped with single cases incorporating indicator units and an alarm unit.



V2 series Indicator Unit/Alarm Unit



Type explanation for Indicator unit

V2 - -

Detection Principle Alarm Type

H	Hot wire semiconductor	1	1-stage alarm	0	Fixed in the standard case
C	Catalytic combustion	2	2-stage alarm	1	For panel instrumentation
D	Electrochemical cell				
T	Thermal conductivity				
O	Galvanic cell				
M	Analog input				

Type explanation for Alarm unit

VAL - -

Alarm Type

















1	1-stage alarm	0	Fixed in the standard case
2	2-stage alarm	1	For panel instrumentation

Wall mount type

This system has a wall mount case incorporating indicator units and an alarm unit of the V series/V2 series.



V-810 (6-point type)

Indicator Unit Type	Applicable Detector Heads			
For combustible gas (high sensitive)	Applicable Model	Sampling Method	Detection Principle	Main Gas Detected
VH V2H	VH:KD-2A·KD-3A V2H:KD-5A·KD-5B	Diffusion Eductor	 Hot wire semiconductor sensor	 Combustible gas (LPG, CH ₄ , etc.)
	VH:PE-2CC·PE-2DC	Extractive		
For combustible gas (explosion-proof)	Applicable Model	Sampling Method	Detection Principle	Main Gas Detected
VC V2C	VC:KD-2A·KD-3A V2C:KD-5A·KD-5B	Diffusion	 Catalytic combustion sensor	 Combustible gas (LPG, CH ₄ , etc.)
	VC:PE-2CC·PE-2DC	Extractive		
For Cl ₂	Applicable Model	Sampling Method	Detection Principle	Main Gas Detected
VA	KD-2AB	Diffusion	 Thin film semiconductor sensor	 Cl ₂
	KD-2AA	Eductor		
For NH ₃	Applicable Model	Sampling Method	Detection Principle	Main Gas Detected
VZN	KD-2AS	Diffusion	 Semiconductor sensor for NH ₃	 NH ₃
	PE-2CZ	Extractive		
For toxic gas	Applicable Model	Sampling Method	Detection Principle	Main Gas Detected
VD V2D	VD:KS-2D·KCM-3A V2D:KS-2D·KD-5D	Diffusion	 Electrochemical cell sensor	 Specialty gases/ Various toxic gases
	VD:PS-2DP V2D:PS-2DP·PS-4DP	Extractive		
For inert gas/high concentration gas	Applicable Model	Sampling Method	Detection Principle	Main Gas Detected
VT V2T	VT:KD-2A·KD-3A V2T:KD-5B	Diffusion Eductor	 Thermal conductivity sensor	 H ₂ , He, Ar, CO ₂ , CH ₄
	VT:PE-2CC·PE-2DC	Extractive		
For O ₂	Applicable Model	Sampling Method	Detection Principle	Main Gas Detected
VO V2O	VO:KS-20 V2O:KS-20·KD-50	Diffusion	 Galvanic cell sensor	 O ₂
	VO:PS-20E V2O:PS-20E	Eductor		
	VO:PS-20P V2O:PS-20P	Extractive		
For oil/organic solvent	Applicable Model	Sampling Method	Detection Principle	Main Gas Detected
VG	OR-2A	Diffusion	 Orgastor sensor	 Oil, Organic solvent
For analog input	Applicable Model			
VM V2M	VM:For 4-20mA/DC input			
	V2M:For 4-20mA/DC input			

Indicator Unit/Alarm Unit

Outline

An indicator unit supplies power to a gas detector head and processes signals from it. The unit indicates gas concentration in a LCD bar-graph level meter, automatically gives an alarm at preset gas concentrations, and transmits signals to an alarm unit and

external devices (contact output/analog output). It is the center of the V series gas detection & alarm system. The alarm unit receives signals from V series indicator units (no contact output), gives an alarm (buzzer and lamp), and outputs control signals.

Exterior Features

V series



1-stage alarm type



















2-stage alarm type



V2 series



Indicator unit specifications

Item	Model	VH V2H	VC V2C	VA	VZN	VD V2D	VT V2T	VO V2O	VG	VM V2M
Detection Principle		 Hot wire semiconductor	 Catalytic combustion	 Thin film semiconductor	 Semiconductor for NH ₃	 Electrochemical cell	 Thermal conductivity	 Galvanic cell	 Orgastor	Analog
Gas Detected		 Combustible gas (LPG, CH ₄ , etc.)	 Combustible gas (LPG, CH ₄ , etc.)	 Cl ₂	 NH ₃	 Specialty gases/ Various toxic gases	 H ₂ , He, Ar, CO ₂ , CH ₄	 O ₂	 Oil, Organic solvent	4-20mA/DC input
Detection Range	Depends on the detector head specifications									
Gas Concentration Indication	LCD bar-graph level meter									
Alarm Set Value	Adjustable within the detection range								Alarm at 0.5ml of Hexane	Adjustable within the detection range
Alarm Accuracy	Combustible gas: ±25% of an Alarm Set Value Toxic gas: ±30% of an Alarm Set Value Oxygen: ±1.0vol% of an Alarm Set Value (Conforms to JIS T 8201)								—	—
Response Time	Combustible gas: 30s or less at 160% concentration of an Alarm Set Value Toxic gas: 60s or less at 160% concentration of an Alarm Set Value Oxygen: 5s or less at 10vol% (oxygen deficiency)								30s or less after the adhesion of an oil droplet	—
Alarm Power Lamp	Under normal conditions: Green lamp lights up, On trouble: Green lamp goes out, Upon energization: Green lamp flashes for 30s									
Indication Alarm Lamp	On alarm: Red lamp flashes, On reset: Red lamp lights up and holds the condition (Latching is standard, but non-latching is available upon request.)									
External Contact Output	1c no-voltage (1A@100V AC, resistance load), 1a for the trouble contact									
Recorder (Analog) Output	4-20mA (standard), 0-10mV, 1-5V (option *1), Digital output (option) <※V2HG : 0-6-12V only>									
Alarm Delay Circuit	Approx. 30s of delay is available (option)									
Operating Temperature Range	-10°C to 40°C									
Power Source	24V DC±10%									
Power Consumption	Approx. 5W									
Dimensions	W36×H144×D150mm									
Weight	Approx. 650g (including 450g single case)									

* The specifications above apply to the unit with the single case.

* V2 series have additional functions of indicator backlight, maintenance mode, and peak hold function as standard, though V series do not.

*1 V2 series are not capable of 0-10mV analog output.

Alarm unit specifications

Item	Model	VAL-1	VAL-2
Number of Alarm Stages		1 stage	2 stages
Connectable Indicator Unit		V series/V2 series (1-stage alarm type)	V series/V2 series (2-stage alarm type)
Alarm Indication	Alarm Lamp	Under normal conditions: Stays out, On gas alarm from one or more indicator units: Red lamp lights up	
	Trouble Lamp	Under normal conditions: Stays out, On trouble with one or more indicator units: Red lamp lights up	
	Buzzer	On gas alarm: Intermittent buzzer on gas alarm from one or more indicator units (Latching) On trouble: Continuous buzzer on trouble with one or more indicator units	
	(Reset)	(The buzzer stops by a reset operation, and automatically recovers.)	
External Alarm Contact		1c no-voltage (1A@100V AC, resistance load)	1c for both 1st and 2nd stage (1A@100V AC, resistance load)
Control Trouble Contact		1a no-voltage (1A@100V AC, resistance load)	
Contact Buzzer Contact		1a no-voltage (1A@100V AC, resistance load)	
Operating Temperature Range	-10°C to 40°C		
Power Source	24V DC±10%		
Power Consumption	Approx. 3W		
Dimensions	W36×H144×D150mm		
Weight	Approx. 610g (including 450g single case)		

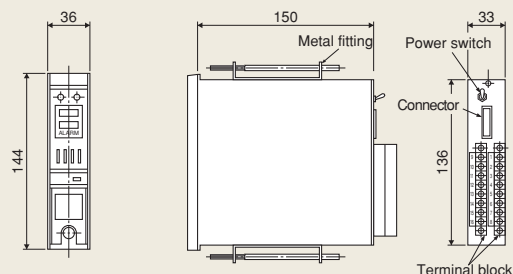
* The specifications above apply to the unit with the single case.

Multi-Point Type

For Panel Instrumentation

Single Case (Common to V series/V2 series)

Alarm unit dimensions



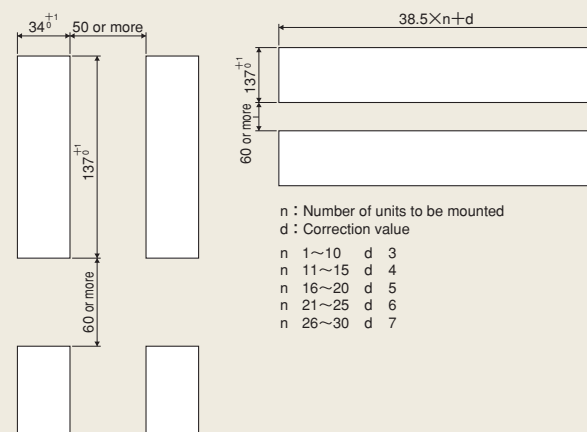
Terminal arrangements

1	P	Power source:
2	N	24V DC
3	TR	Trouble: 1a
4	TC	1A@100V AC
5	AS	External reset
6		
7	N	
8		
9	ZA2	Alarm 2:
10	ZC2	1c no-voltage
11	ZB2	1A@100V AC
12	ZA1	Alarm 1:
13	ZC1	1c no-voltage
14	ZB1	1A@100V AC
15	BZ	Buzzer contact:
16	BC	1a no-voltage
		1A@100V AC

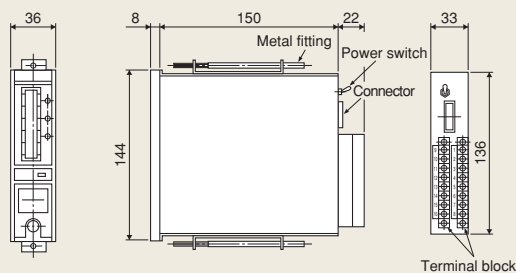
Panel cutout dimensions

For one-by-one instrumentation

For multi-point close instrumentation



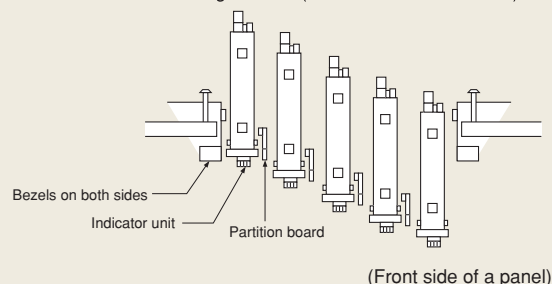
Indicator unit dimensions



Terminal arrangements

1	P	Power source:
2	N	24V DC
3	PA	
4	PB	
5	A	
6	B	Gas detector
7	C	head
8	D	
9	ZC	Common
10	ZA2	2nd alarm:
11	ZB2	1c
12	ZA1	1st alarm:
13	ZB1	1c
14	TZ	Trouble: 1a
15	G	Analog output
16	H	

Panel instrumentation of single cases (for close instrumentation)



Floor Type

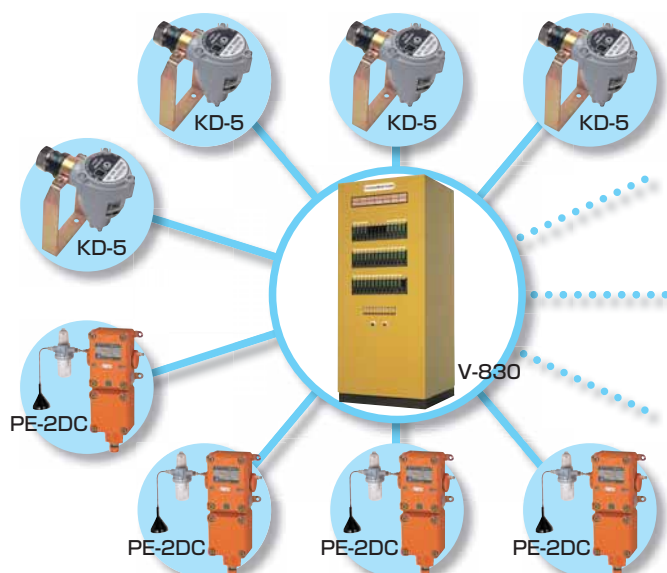
V-830

Outline

V-830 gas detector is a compact floor type system of which panel is equipped with single cases incorporating indicator units and an alarm unit, and is best suited for multi-point monitoring.



Use example



V-810・VB-810



VB-810 (incorporating a backup power supply unit)



Cases are for 3/6 points.

Outline

- V-810 gas detector is a compact system of wall (panel) mount type which combines indicator units, an alarm unit, and various gas detector heads of the V series.
- Detects combustible gases, toxic/specialty gases, and oxygen (oxygen deficiency) and gives an alarm signal when the gas concentration goes over a set value (or under a set value for oxygen deficiency), so as to prevent disasters such as gas explosion, poisoning, and oxygen deficiency.
- VB-810 incorporates a backup power supply unit.

Features

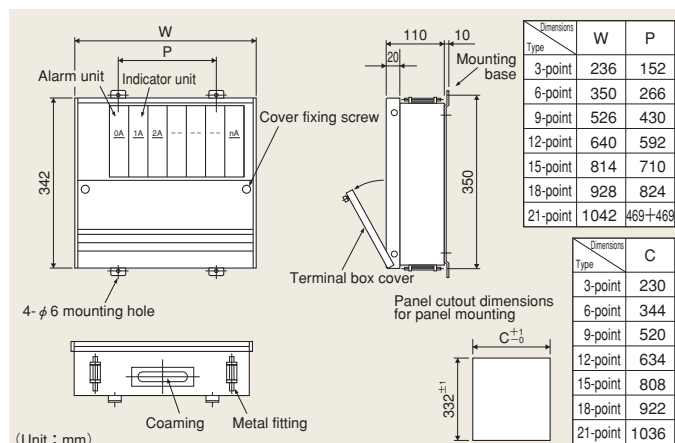
- Compact design.
- Standard cases for 3/6/9/12/15/18/21 points are available.
- Wide variety of input power sources.
- Can be equipped with a Zener barrier.
- 2-stage alarm is also available.
- Combination of the V series/V2 series units allows detection of and alarm for various gases.

Specifications

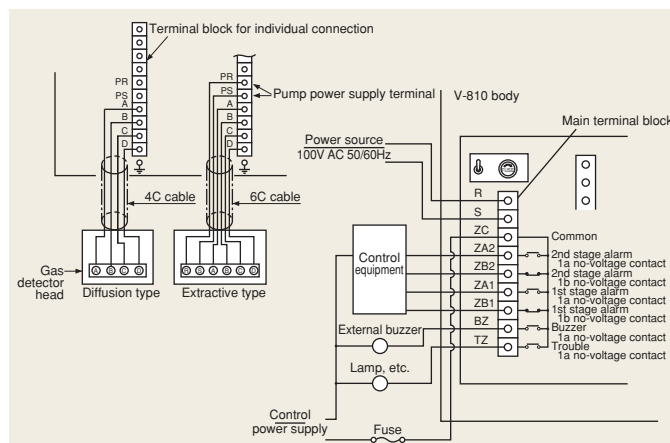
Item	Model	V-810
Gas Detected and Detection Range	As per specifications	
Gas Concentration Indication	LCD bar-graph level meter	
Alarm Set Value	Adjustable within the detection range (Except hexane for which 0.5ml is the Alarm Set Value)	
Alarm Accuracy	Combustible gas: $\pm 25\%$ of an Alarm Set Value Toxic gas: $\pm 30\%$ of an Alarm Set Value Oxygen: $\pm 1.0\text{vol}\%$ of an Alarm Set Value (Conforms to JIS T 8201)	
Alarm Indication		Indicator Unit
	Gas Leakage Alarm	Alarm lamp (red) flashes* (Lights up after Reset)
	Trouble Alarm	Power lamp (green) goes out (Non-latching)
		Alarm Unit
		Lights up red and buzzer sounds intermittently on alarm from at least one indicator unit (Buzzer stops after Reset)
		Lights up red and buzzer sounds continuously on trouble with at least one indicator unit (Buzzer stops after Reset)
* Latching is standard for the alarm indication of the indicator units and the alarm units. (Non-latching is also available.)		
Contact Output	Indicator unit (individual alarm): 1st stage (1a), 2nd stage (1a), 1A@100V AC (resistance load) Alarm unit (collective alarm): Alarm 1 (1c), Alarm 2 (1c), 1A@100V AC (resistance load), Trouble (1a), Buzzer (1a)	
External Output *1	4-20mA, 0-10mV, 1-5V (option), RS-232C output (option)	
Operating Temperature Range	-10°C to 40°C	
Power Source	100-110V AC $\pm 10\%$, 200/220V AC $\pm 10\%$, 24V DC $\pm 10\%$	
Power Consumption	Diffusion type: $(25+5n)\text{VA}$, Extractive type: $(25+10n)\text{VA}$ (n is the number of the detection points)	
Others	1.Green lamp flashes for 30s upon energization 2.Alarm delay (option) 3.Linearization (option) 4.Low flow alarm (option for V2 series)	

*1 V2 series are not capable of 0-10mV output.

Dimensions (V-810)



Terminal Arrangements (V-810)



NV Series

Features

- Monitors gas leakage even during a power failure or other lifeline failures. (on models with a built-in backup power supply)
Continuously monitors for 30 minutes after a power failure, then intermittently monitors for 2 days. The interval between observations depends on the number of detection points. (NV-500)
Continuously monitors for 30 minutes after a power failure. (NV-400/410/600HS/010)
- Operated normally in a seismic qualification test equal to intensity of 7 on the Japanese earthquake scale.
Earthquake-resistant design considering great earthquakes.
A plastic molded case which contains the electronic circuit is hard to break and has substantially improved insulation. The case structure has been refined to increase the strength.
- Gas concentration at the time of an alarm is shown at a glance.
NV-410 has a scale of 0 to 10. (No unit)
- Battery life can be measured by one-touch operation. (Battery life check function)
- Very easy to change the alarm set value. (▲▼ key)
- NV-500/010 has extremely easy zero adjustment and span adjustment. (One-touch calibration function)
- Wide operating voltage range of 85-264V.
- NV-500/010 comes with Zero suppression function.



▲ Indicator unit



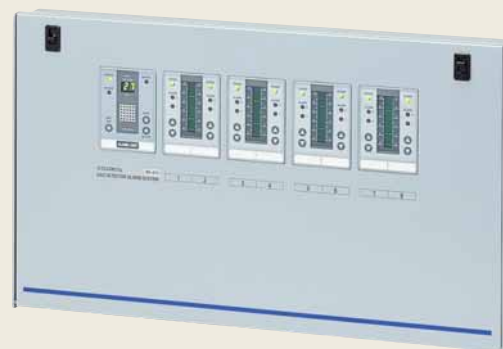
▲ Alarm unit

System Configuration

Indicator/Alarm Unit



LP gas detection & alarm system NV-500



Town gas, Industrial gases detection & alarm system NV-400 NV-410



For hydrogen filling stations NV-600HS



For Ammonia refrigerating facilities NV-010

Gas Detector Heads

■ Diffusion type



KD-5B-N
(Explosion-proof d2G4)

■ Diffusion type



KD-5A-N
(Explosion-proof d3aG4)

■ Extractive type



PE-2DC

■ Diffusion type



KD-7

Accessories/Options

■ Options (sold separately)



KW-22
Rainproof cap



KW-15
Rainproof cover



EB-5
External buzzer

■ Options (sold separately)



PW-51/KW-11,12
Rainproof cover



EB-5
External buzzer

■ Options (sold separately)



KW-71
Rainproof cover for KD-7



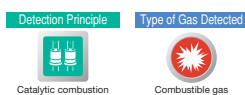
EB-5
External buzzer

Multi-Point Type

Gas Detection & Alarm System

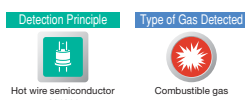
NV Series

LP Gas Detection & Alarm System NV-500 Specifications



Item	Model	NV-500
Detection Principle		Catalytic combustion
Gas Detected		LPG
Detection Points per Unit		Monitors 2 points per unit
Detection Range		0-100%LEL (isobutane)
Concentration Indicator		LCD bar-graph meter (53 dots×2 lines)
Alarm Set Value Indication		Direct reading scale
Backlight		Yes
Peak Hold Function (on alarm)		Holds a peak value on alarm, which is canceled by the Reset
Alarm Set Value(default value)/Change of the Set Value		24 or 16%LEL/ $\Delta \nabla$ key
Alarm Accuracy		±25% of an Alarm Set Value (under identical conditions)
Response Time		30s or less at 160% concentration of an Alarm Set Value (excluding sampling delay for extractive type)
Alarm Indication	Individual Alarm Lamp Latching	On alarm: Flashes red, lights up after the Buzzer Stop Complete lock (Turn off by the Reset after the level declined)
Alarm Sound	Standard Operation Voice Alarm	On alarm: Intermittent buzzer, stops after the Buzzer Stop On alarm: Intermittent buzzer
External Alarm Output	Individual Alarm Contact	1a no-voltage (Contact capacity: 2A@100V AC)
	Individual Voltage Output	0-6-12V DC (20mA or less)
	Collective Alarm Contact	1c no-voltage (Contact capacity: 2A@100V AC)
	Centralized Monitor Panel Output	0-6-12V DC (20mA or less)
	External Buzzer Contact	1a no-voltage (Contact capacity: 2A@100V AC)
Alarm Delay		Selectable by a DIP switch (10s constant)
	Main Power Source	85-264V AC
Power	When using KD-5	Diffusion type (15+3.5n)VA
Consumption	When using PE-2DC	Extractive type (15+7.5n)VA
Backup Power Source (only on models with a built-in backup power supply)	Battery Type	Sealed lead acid battery
	Overdischarge Prevention Function	Yes
	Battery Life Check Function	Yes
	Battery Voltage Indication	2-digit LED
Exterior Color		Munsell 2.5PB 7.0/1.0

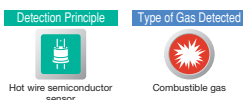
Town gas, Industrial gases Detection & Alarm System NV-400/NV-410 Specifications



Item	Model	NV-400/NV-410 *1
Detection Principle		Hot wire semiconductor
Gas Detected		NV-400:Town gas (Natural gas) NV-410:Town gas or Industrial gases
Detection Points per Unit		Monitors 2 points per unit
Detection Range		NV-400: 0-100%LEL NV-410: As per specifications
Concentration Indicator		LCD bar-graph meter (53 dots×2 lines)
Alarm Set Value Indication		Direct reading scale(except NV-410)
Backlight		Yes
Peak Hold Function (on alarm)		Holds a peak value on alarm, which is canceled by the Reset
Alarm Set Value (default value)		NV-400: 10%LEL for 1st stage, 24%LEL for 2nd stage NV-410: As per specifications
Alarm Accuracy		±25% of an Alarm Set Value (under identical conditions)
Response Time		NV-400/410: 30s or less at 160% concentration of an Alarm Set Value (excluding sampling delay for extractive type)
Alarm Indication	Individual Alarm Lamp Latching	On alarm: Flashes red, lights up after the Buzzer Stop Complete lock (Turn off by the Reset after the level declined)
Alarm Sound		On alarm: Intermittent buzzer, stops after the Buzzer Stop
External Alarm Output	Individual Alarm Contact	1a no-voltage (Contact capacity: 2A@100V AC)
	Individual Voltage Output	0-6-12V DC (20mA or less)
	Collective Alarm Contact	1c no-voltage (Contact capacity: 2A@100V AC)
	Centralized Monitor Panel Output	0-6-12V DC (20mA or less)
	External Buzzer Contact	1a no-voltage (Contact capacity: 2A@100V AC)
Alarm Delay		Selectable by a DIP switch (10s constant)
	Main Power Source	85-264V AC
Power	When using KD-5	Diffusion type (15+3.5n)VA
Consumption	When using PE-2DC	Extractive type (15+8n)VA
Backup Power Source (only on models with a built-in backup power supply)	Battery Type	Sealed lead acid battery
	Overdischarge Prevention Function	Yes
	Battery Life Check Function	Yes
	Battery Voltage Indication	2-digit LED
Exterior Color		Munsell 2.5PB 7.0/1.0

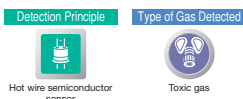
* 1 Also usable for other gases.

For Hydrogen filling stations NV600HS Specifications



Model		NV-600HS
Item		
Detection Principle		Hot wire semiconductor
Gas Detected		Hydrogen and other combustible gases
Detection Points per Unit		Monitors 2 points per unit
Detection Range		As per specifications
Concentration Indicator		LCD bar-graph meter (53 dots×2 lines)
Alarm Set Value Indication		Direct reading scale
Backlight		Yes
Peak Hold Function (on alarm)		Holds a peak value on alarm, which is canceled by the Reset
Alarm Set Value		Adjustable with the detection range
Alarm Accuracy		±25% of an Alarm Set Value (under identical conditions)
Response Time		30s or less at 160% concentration of an Alarm Set Value (excluding sampling delay for extractive type)
Alarm Indication	Individual Alarm Lamp	On alarm: Flashes red, lights up after the Buzzer Stop
	Latching	Complete lock (Turn off by the Reset after the level declined)
Alarm Sound		On alarm: Intermittent buzzer, stops after the Buzzer Stop
External Alarm Output	Individual Alarm Contact	1a no-voltage (Contact capacity: 2A@100V AC)
	Individual Voltage Output	0-6-12V DC (20mA or less)
	Collective Alarm Contact	1c no-voltage (Contact capacity: 2A@100V AC)
	Centralized Monitor Panel Output	0-6-12V DC (20mA or less)
	External Buzzer Contact	1a no-voltage (Contact capacity: 2A@100V AC)
	External Buzzer Voltage Output	Intermittent voltage signal (12V DC, 10mA or less)
Alarm Delay		Selectable by a DIP switch (10s constant)
Main Power Source		85-264V AC
Power	When using KD-5	Diffusion type (15+3.5n)VA
Consumption	When using PE-2DC	Extractive type (15+8n)VA
Backup Power Source (only on models with a built-in backup power supply)	Battery Type	Sealed lead acid battery
	Overdischarge Prevention Function	Yes
	Battery Life Check Function	Yes
	Battery Voltage Indication	2-digit LED
Exterior Color		Munsell 2.5PB 7.0/1.0

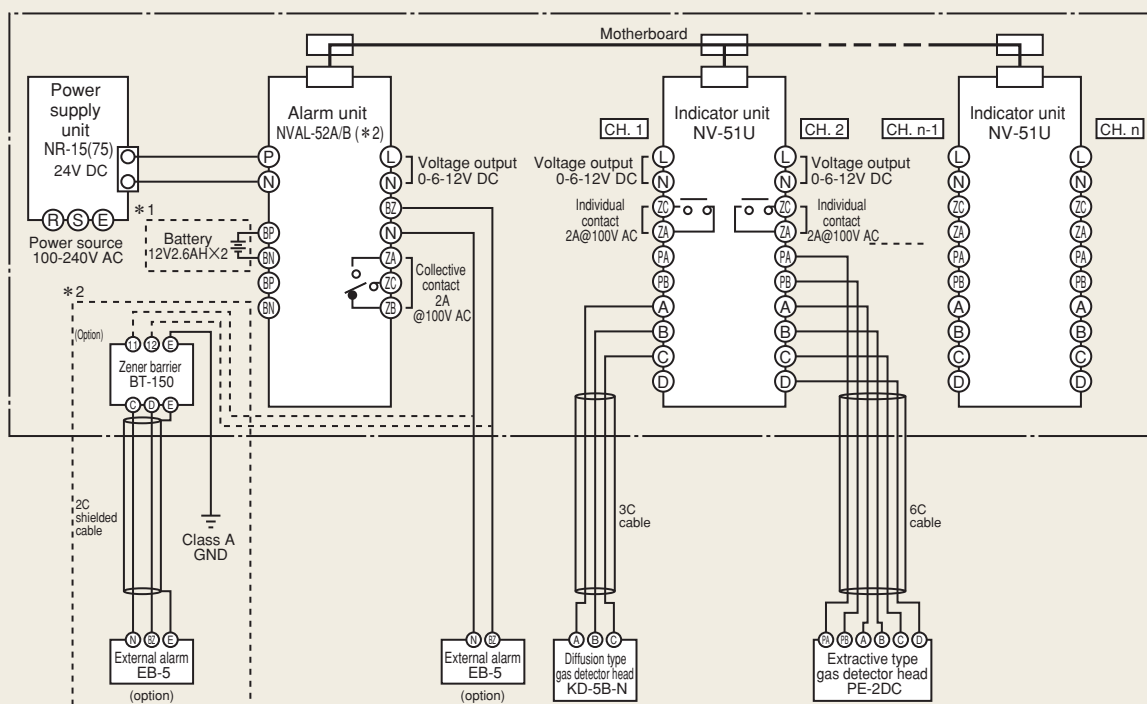
For Ammonia Refrigerating Facilities NV-010



Model		NV-010
Item		
Detection Principle		Hot wire semiconductor
Gas Detected		Ammonia leaked into the air
Detection Points per Unit		Monitors 2 points per unit
Detection Range		0-400ppm
Concentration Indicator		LCD bar-graph meter (53 dots×2 lines)
Alarm Set Value Indication		Direct reading scale
Backlight		Yes
Peak Hold Function (on alarm)		Holds a peak value on alarm, which is canceled by a reset operation
Alarm Set Value(default value)		50 or 100ppm/ △▽ key
Change of the Set Value		
Alarm Accuracy		±30% of an Alarm Set Value (under identical conditions)
Response Time		60s or less at 160% concentration of an Alarm Set Value
Alarm Indication	Individual Alarm Lamp	On alarm: Flashes red, lights up after the Buzzer Stop
	Latching	Complete lock (Turn off by the Reset after the level declined)
Alarm Sound		On alarm: Intermittent buzzer, stops after the Buzzer Stop
External Alarm Output	Individual Alarm Contact	1a no-voltage (Contact capacity: 2A@100V AC)
	Individual Voltage Output	0-6-12V DC (20mA or less)
	Collective Alarm Contact	1c no-voltage (Contact capacity: 2A@100V AC)
	Centralized Monitor Panel Output	0-6-12V DC (20mA or less)
	External Buzzer Contact	1a no-voltage (Contact capacity: 2A@100V AC)
	External Buzzer Voltage Output	Intermittent voltage signal (12V DC, 10mA or less)
Alarm Delay		Selectable by a DIP switch (10s constant)
Main Power Source		85-264V AC
Power Consumption		(15+3.5n)VA
Backup Power Source (only on models with a built-in backup power supply)	Battery Type	Sealed lead acid battery
	Overdischarge Prevention Function	Yes
	Battery Life Check Function	Yes
	Battery Voltage Indication	2-digit LED
Exterior Color		Munsell 2.5PB 7.0/1.0

NV Series

NV-500/NV-400/NV-410/NV-010 Terminal Arrangements

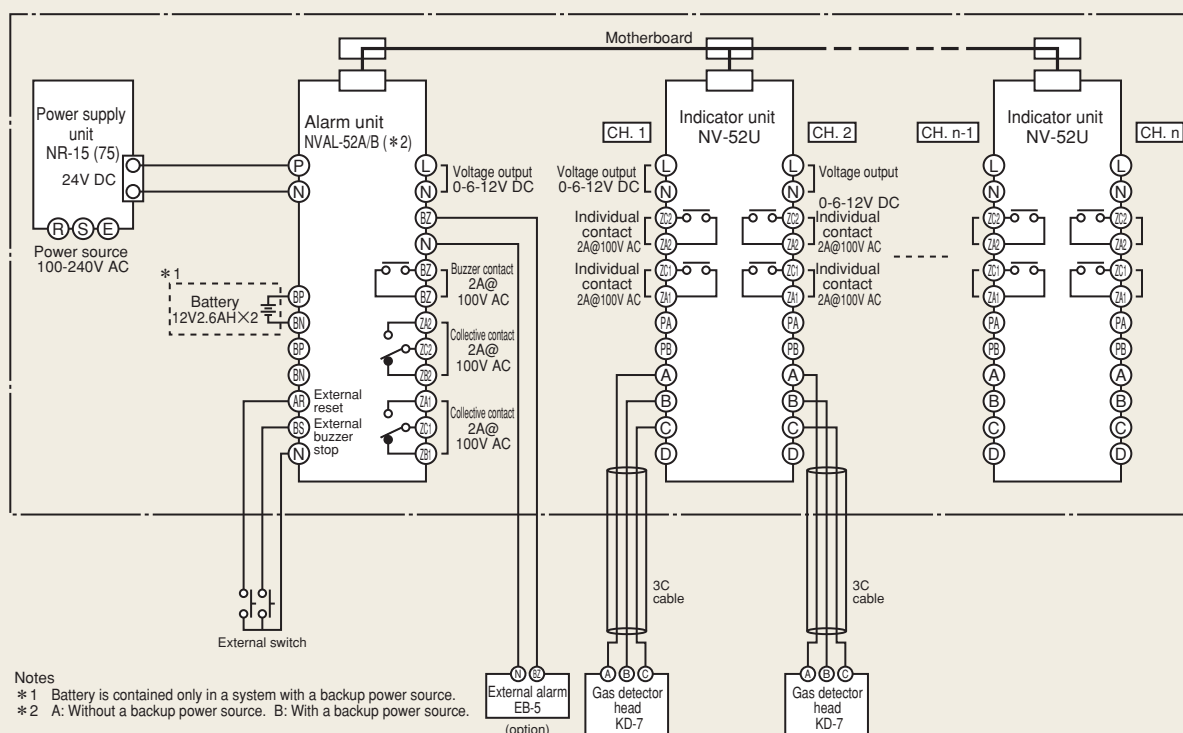


Notes

*1 Battery is contained only in a system with a backup power source.

*2 For intrinsically safe explosion-proof work.

NV-010 Terminal Arrangements

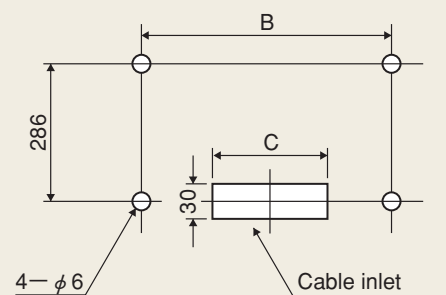
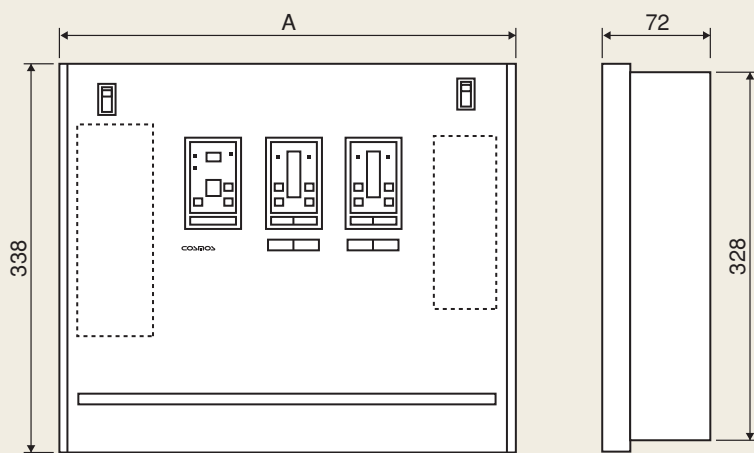


Notes

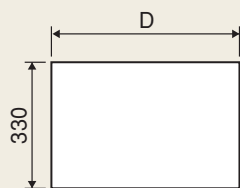
*1 Battery is contained only in a system with a backup power source.

*2 A: Without a backup power source. B: With a backup power source.

NV Series Dimensions



Mounting hole dimensions for wall mounting



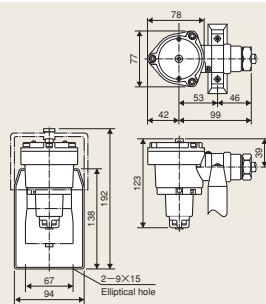
Panel cutout dimensions for panel mounting

Dimensions table

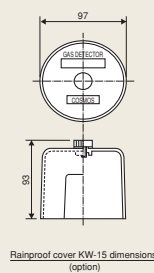
(Unit : mm)

Number of points	A	B	C	D	Remarks
2-point	220	152	100	214	Without a backup power source
2-point	298	230	100	292	With a backup power source
4-point	421	343	240	415	With or without a backup power source (common dimensions)
6-point	495	417	240	489	
8-point	569	491	240	563	
10-point	643	565	360	637	
12-point	717	639	360	711	

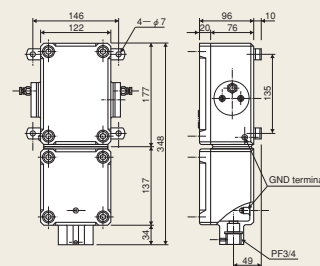
KD-5 Dimensions



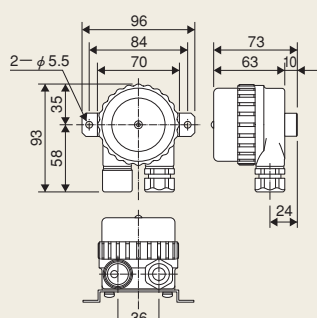
KW-15 Dimensions



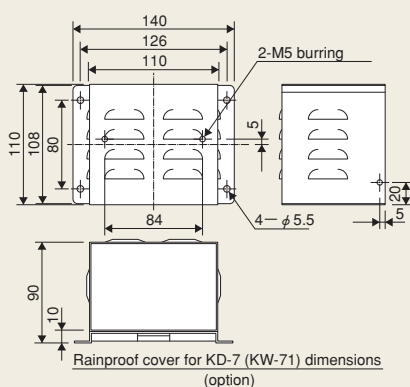
PE-2DC Dimensions



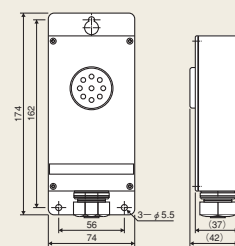
KD-7/KW-71 Dimensions



Gas detector head (KD-7) dimensions



EB-5 Dimensions



NV-100 Series



Features

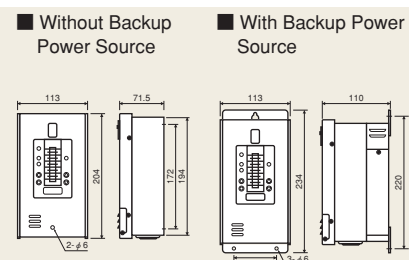
- Full maintenance functions with very easy zero and span adjustment.
- Proven reliability with years of experience - COSMOS gas sensors have a small zero drift, a small sensitivity decrease, and a long life.
- Zero suppression function cancels slight fluctuations of the reading due to environmental change.
- Compact Indicator/Alarm unit - W113×H204×D71.5mm, approx. 1.5kg.
- Battery provides backup power in case of a power failure, allowing continuous monitoring over 60 minutes after the failure. (option)

Type Explanation

NV-100

C	For combustible gas
H	For combustible gas (High sensitive)
D	For toxic gas/specialty gas
S	For oxygen

Dimensions (Indicator/Alarm Unit)



Panel Mount Type

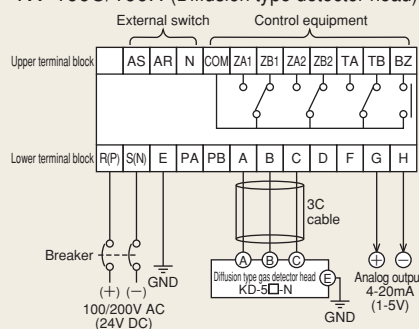
Attach the mounting bracket to the back of the body with attachment screws, and then fix it to a panel with fixing screws. The body can be attached to a panel 1.6-6mm thick.

Indicator/Alarm Unit Specifications

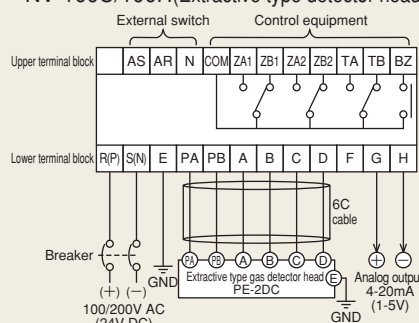
Model	NV-100C	NV-100H	NV-100D	NV-100S
Detection Principle	Catalytic combustion	Hot wire semiconductor	Electrochemical cell	Galvanic cell
Gas Detected	Combustible gas (LPG, Methane, etc.)	Toxic gas/ Specialty gas	Oxygen (deficiency/leakage)	
Detection Range	0-100%LEL	As per specifications	As per specifications	0-25vol% (deficiency) 0-50vol% (leakage)
Concentration Indicator	LCD bar-graph meter with backlight			
Alarm Accuracy	±25% of an Alarm Set Value		±30% of an Alarm Set Value	±1.0vol% of an Alarm Set Value (Conforms to JIS T 8201)
Operating Temperature Range	0°C to 40°C			
Power Source/Power Consumption	100-240V AC, 50/60Hz (standard), 24V DC (option); Diffusion type: 12VA/17VA (with the backup power source), Extractive type: 4VA per unit to be added			
Alarm Indication	1st stage: Red lamp for 1st stage alarm flashing 2nd stage: Red lamps for 1st and 2nd stage alarms flashing			
Trouble Indication	Power source lamp lights up in orange			
External Output	Alarm output terminal: 1st alarm (1c no-voltage contact), 2nd alarm (1c no-voltage contact), Trouble alarm (1c no-voltage contact); Buzzer (1a no-voltage contact); Analog output: 4-20mA; Contact capacity: 2A@100V AC (resistance load)			
Dimensions	Without backup power source: W113×H204×D71.5mm, Approx. 1.5kg With backup power source: W113×H234×D110mm, Approx. 3kg			

Terminal Arrangements

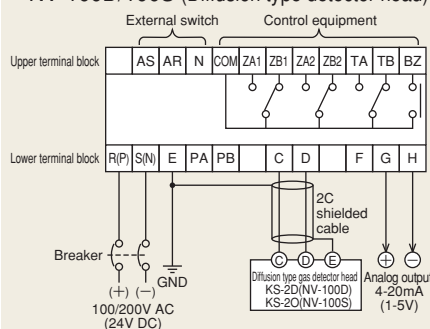
NV-100C/100H (Diffusion type detector head)



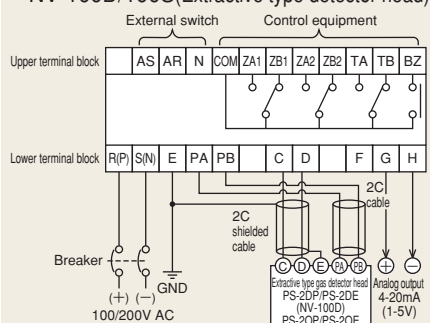
NV-100C/100H(Extractive type detector head)



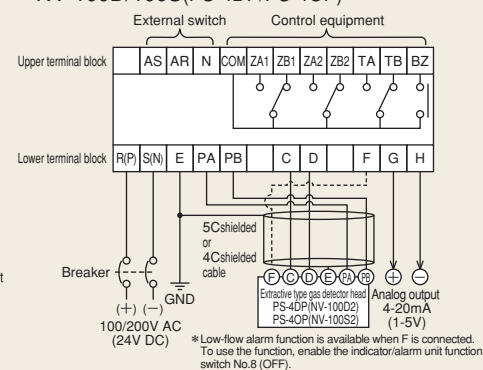
NV-100D/100S (Diffusion type detector head)



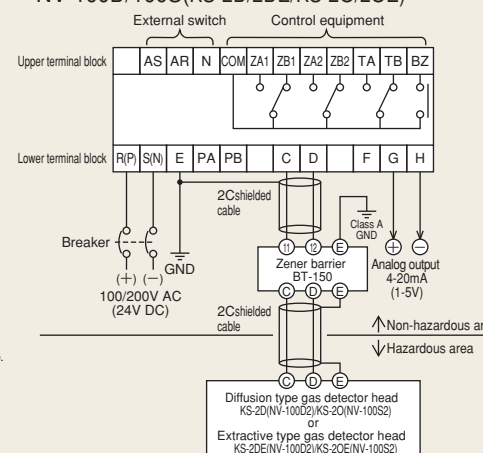
NV-100D/100S(Extractive type detector head)



NV-100D/100S(PS-4DP/PS-4OP)



NV-100D/100S(KS-2D/2DE/KS-2O/2OE)



Indicator/Alarm Unit

■ For combustible gas



NV-100C

■ For combustible gas (high sensitive)



NV-100H

■ For toxic gas/specialty gas









NV-100D







■ For oxygen









NV-100S







Gas Detector Head

Model	Sampling Method	Explosion-Proof Structure	Cable	Detection Principle	Gas Detected
 KD-5A-N	Diffusion	d3aG4	CVV-3C	 Catalytic combustion sensor	 Combustible gas
KD-5B-N		d2G4			
 PE-2DC	Extractive	d2G4	CVV-6C	 Catalytic combustion sensor	 Combustible gas

Model	Sampling Method	Explosion-Proof Structure	Cable	Detection Principle	Gas Detected
 KD-5A-N	Diffusion	d3aG4	CVV-3C	 Hot wire semiconductor sensor	 Combustible gas
KD-5B-N		d2G4			
 PE-2DC	Extractive	d2G4	CVV-6C	 Hot wire semiconductor sensor	 Combustible gas

Model	Sampling Method	Explosion-Proof Structure	Cable	Detection Principle	Gas Detected
 KS-2D	Diffusion	i3nG5 *	CVVS-2C	 Electrochemical cell sensor	 Toxic gas/ Specialty gas
 PS-2DP PS-4DP	Extractive/ Eductor	—	CVV-2C for Pump CVVS-2C for Signal	 Electrochemical cell sensor	 Toxic gas/ Specialty gas
			5C shielded		



* With a Zener barrier

Model	Sampling Method	Explosion-Proof Structure	Cable	Detection Principle	Gas Detected
 KS-2O	Diffusion	i3nG5 *	CVVS-2C	 Galvanic cell sensor	 Oxygen concentration
 PS-20P PS-40P	Extractive/ Eductor	—	CVV-2C for Pump CVVS-2C for Signal	 Galvanic cell sensor	 Oxygen concentration
			5C shielded		

* With a Zener barrier

One-Point Type Oxygen Indicator & Alarm

KS-60

Type of Gas Detected	Detection Principle
 Oxygen concentration	 Galvanic cell sensor



Features

- Small and lightweight, one-piece design of an alarm and sensor unit.
- A sensor can be installed separately. (option)
- Battery unit allows use in a site under construction. (option)
- Equipped with a low battery alarm.
- 2-stage alarm to manage oxygen deficiency stepwise.
- Peak hold function to check both the highest and the lowest oxygen concentrations.

Applications

- Clean rooms for semiconductor factory
- Various test rooms



Also suitable for use in oxygen deficiency hazard area for continuous monitoring of oxygen concentration and for safety ensuring during construction.

Specifications

Model	KS-60
Gas Detected	Oxygen
Detection Range	0-25.0vol%, or 0-50.0vol%
Gas Concentration Indication	LCD digital (0.1vol% resolution)
Alarm Set Value	1st stage: 19.0vol%, 2nd stage: 18.0vol% (factory defaults)
Alarm Indication	Gas alarm (1st/2nd stage): Red LED flashing (AL1/AL2) Intermittent buzzer (when the buzzer is on)
External Output	Gas concentration analog output: 4-20mA DC Gas alarm contact (for 1st/2nd stage): 1a
Operating Temperature/Humidity	0°C to 40°C, 30-85%RH
Power Source	24V DC±10%
Power Consumption	Approx. 2W
Dimensions	W82×H154×D30mm (excluding protrusions)
Weight	Approx. 500g
Installation	Wall mount
Exterior Color	Munsell N7.0
Other functions	Peak hold, Maintenance mode, Low battery alarm (when using the battery unit)

Shipboard Combustible Gas Alarm

B-4SH

Type of Gas Detected	Detection Principle
 Combustible gas	 Catalytic combustion sensor



Outline

- Installed in ships handling combustible gases to detect and alarm gas leakage or residual gas.
- The Ship Equipment Inspection Society of Japan (HK) approved product. (Designation required)

Specifications



Model	B-4SH
Detection Principle	Catalytic combustion
Gas Detected	LPG, Gasoline, Other combustible gases (atmospheric)
Detection Range	0-100%LEL
Gas Concentration Indication	Meter indication
Alarm Set Value	20%LEL (adjustable)
Alarm Accuracy	±25% of an Alarm Set Value
Alarm Indication	Lamp lighting and buzzer sound
External Output	Contact output: 1a no-voltage (1A@120V AC, resistance load)
Power Source	100V AC±15%, 24V DC±15%
Power Consumption	10VA or less
Dimensions	W110×H200×D78mm

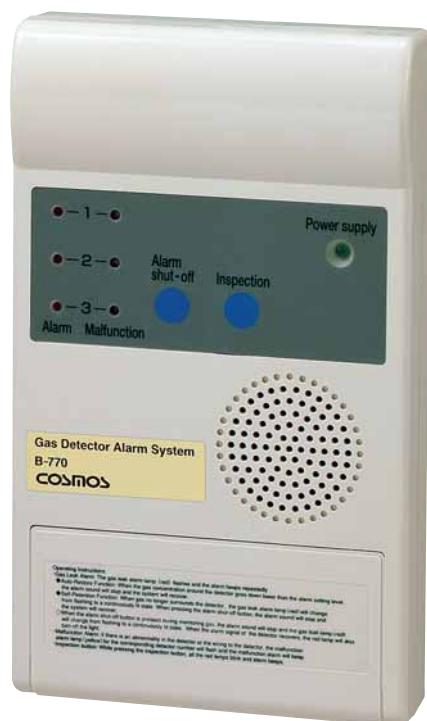
Gas Detector Heads

Diffusion type: KD-2A, KD-3A
Extractive type: PE-2DC
Please refer to P.23.

Three-Point Simplified Type Gas Alarm for Industrial Use

B-770

Type of Gas Detected	Detection Principle
 Combustible gas	 Hot wire semiconductor sensor
	 Catalytic combustion sensor



Features

- Affordable, feature-rich gas detector alarm for industrial use
- Reliable, pre-calibrated smart sensor for immediate installation
- Superior performance, eliminating false alarm
- Selectable gas detector head to match your installation site
- Variety of signals outputs to meet customers needs
- Compact body and simple to operate
- Easy installation and low maintenance
- Built-in self-diagnostic function
- A wide range of options

Specifications

Detected gas	LP gas	Natural gas
No. of connectable detectors	KD-5G, KD-5T, GD-1B	KD-5M
Alarm type	Flashing red lamp (illuminated after alarm shut-off), alarm sound, non-latching (can be set to latching using DIP switch)	
Alarm volume	70 dB/m min.	
Alarm shut-off	By pressing a button	
Malfun display	Flashing yellow lamp	
Display of alarm unit operation	Illuminated green lamp	
Power source	100V AC to 220V AC, 50/60Hz (Terminal block type)	
Power consumption	Approx. 5W when monitoring (maximum) Approx. 10W during alarm (maximum)	
External output	1) 2-stage voltage (6V DC when monitoring, 12V DC during alarm, 0V during error) 2) 100V AC to 220V AC during alarm, 1A max. output (35-second output delay, can be changed to immediate output with DIP switch) 3) 1a, 1b contacts 220V AC, 1A max, or 24V DC, 1A max (35-second output delay, can be changed to immediate output with DIP switch)	
Operating Temperature Range	-10°C to 40°C	
Dimensions / Weight	W138×H230×D45 mm / Approx. 480 g	
Accessories	Inspection gas, Mounting plate, Wood screws, Crimp terminals, Hex wrench	

Detector head

For storage facilities

Explosion-proof type



KD-5G

For consumption facilities

Weatherproof type



KD-5T/KD-5M

Indoor type



GD-1B

Options



Drip-proof cover for GD-1B (OU-18)



External buzzer EB-8



Rotating beacon light

Specifications

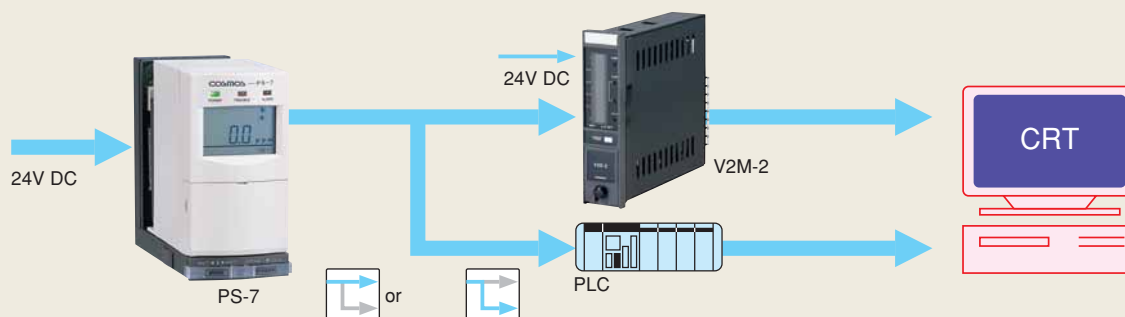
Model	KD-5G	KD-5T	KD-5M	GD-1B
Detection Principle	Catalytic combustion type (energy-saving type)		Hot-wire semiconductor type	Catalytic combustion type (energy-saving type)
Gas Detected	LPG		Town gas (Natural gas)	LPG
Gas concentration for alarm	1/100 to 1/4 of LEL (1%LEL to 25%LEL)			
Response time	1 minute max.			30 seconds max.
Power source	24V DC ±20% (Supplied from the B-770)			
Power consumption	30mA max. @ 24V DC			
Structure	Explosion-proof structure (d2G4)	Weatherproof		Drip-proof
Output signal	2-stage voltage (6V DC when monitoring, 12V DC during alarm, 0V during error)			
Maximum Loop Length	500m max. (CVV 1.25mm ² , 3-conductor cable)			200m max. (using 0.5mm ² , 3-conductor cable)
Operating Temperature Range	-10°C to 60°C		-10°C to 50°C	-10°C to 45°C
Dimensions	W94×H141×D123mm (excluding protrusions)			W43×H116×D37mm (excluding protrusions)
Weight	Approx. 1.5kg			Approx. 220g
Mounting method	Screws			Mounting plate and bands
Accessories	Stand, Rain Cap, Rain cover, Screws, Curled plugs, Crimp terminals			Mounting plate, Wood screws, Bands, Connectors, Curled plugs, Crimp terminals

Gas Detection System for Semiconductor Manufacturing Plants

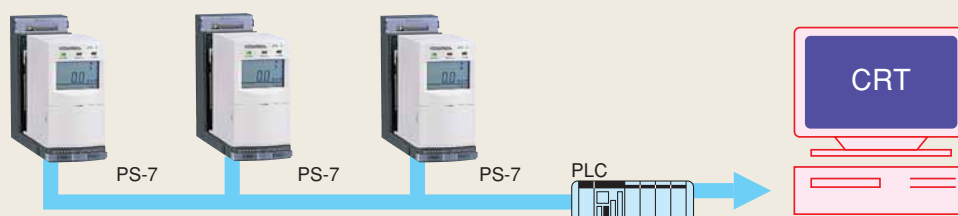
COSMOS Gas Detector Head

PS-7

Analog Transmission Type



DeviceNet-Connected Type



Features

- **Smaller and lighter**
Became smaller and lighter, about half of the previous COSMOS gas detector heads.
This compact head does not take up large space for installation.
- **At-a-glance LCD status display**
An LCD simply shows gas concentration, alarm status, error messages, etc.
You can see the device status at a glance.
- **Prevents incorrect insertion of a sensor unit**
Quickly lets you know when a sensor unit of incorrect gas type is inserted.
- **Automatic sampling flow rate control**
No need to check the flow rate during daily inspections.
- **Easy to replace a sensor unit and sampling unit**
- **Electrochemical cell sensor detects NF3 when combined with a pyrolyzer**
- **Meets the necessary standards**
CE standards, SEMI standards.
- **Many different maintenance mode settings**
You can select the analog output type according to the purpose of maintenance.

Options



Pyrolyzer

Electrochemical cell sensor detects NF3 etc. when combined with a pyrolyzer.

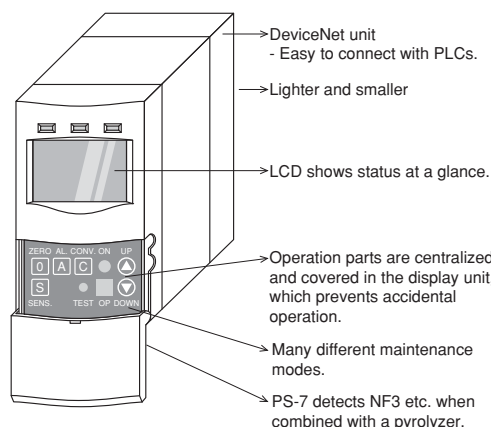


DeviceNet unit

Using DeviceNet as a protocol to communicate with higher level systems, it is easy to connect with PLCs (when combined with a DeviceNet unit).

COSMOS Gas Detector Head Features

1. Sensor units are factory calibrated and delivered to the site ready for use.
When replaced, they will be ready to monitor only by performing zero adjustment and operation checks.
You do not need to bring in calibration gas which makes a clean room dirty.
2. We take sensor units as trade-ins and use them in our recycling process, which reduces your costs as compared with conventional methods.
3. Sensor units and sampling units need periodic replacement, which requires no tools.
4. Each of the functional components is formed into a unit, which takes little time to replace.
5. No need to worry about replacement periods of sensor units and sampling units. We will support you with our reliable management system.



Model	PS-7	
	Standard Type	With a Pyrolyzer
Detection Principle	Electrochemical cell, Hot wire semiconductor, Galvanic cell	
Sampling Method	Extractive type (Sample flow rate: 0.5L/min, automatic control)	
Sampling Tubing *1	Teflon - External diameter: 6mm, Internal diameter: 4mm, Tubing length: 20m or less	
Gas Concentration Indication	4-digit LCD (with measuring unit), 20-step bar graph	
Alarm Indication	<ul style="list-style-type: none"> ● Gas alarm (1st and 2nd stage) <ul style="list-style-type: none"> • Alarm: Red LED lamp flashing LCD - ALARM1 for 1st stage, ALARM1 and ALARM2 for 2nd stage ● Low flow alarm <ul style="list-style-type: none"> • Clogging indication: LCD - Flow sign rotates slowly • Alarm: Yellow LED lamp flashing LCD - FLOW indication, Flow sign stops rotating ● Sensor trouble alarm/Incorrect sensor insertion alarm <ul style="list-style-type: none"> • Alarm: Yellow LED lamp flashing LCD - SENS. indication ● Pyrolyzer wire break alarm *2 <ul style="list-style-type: none"> • Alarm: Yellow LED lamp flashing LCD - CONV. indication 	
External Output	<ul style="list-style-type: none"> • Gas concentration analog output: 4-20mA DC (shared with the power source negative terminal) • Gas alarm contact (1st and 2nd stage): 1a no-voltage contact/Non-latching • Trouble alarm contact (Open collector/Non-latching) 	
Applicable Cable	3C or 4C shielded control cable (φ 8-11mm)×2	
Operating Temperature/Humidity Range	0°C to 40°C (No sudden change), 30-85%RH (No condensation)	
Power Source	24V DC±10%	
Power Consumption	Approx. 7W	
Dimensions	W62×H124×D143mm (excluding options and protrusions)	
Weight	Approx. 1.0kg	
Installation	Wall mount	

* 1 Teflon is recommended. But it depends on operating conditions when the gas adsorption capacity is high, so contact us for more information. The specifications above are subject to change without prior notice.

* 2 Only for the model with a pyrolyzer

Desktop Type Gas Detection

PGD-120



Features

- Easy to monitor over 20 gases simply by changing a plug and play sensor.
- Maintenance free
- Portable and flexible

Specifications

Model	PGD-120	
Detection principle	Electrochemical, Hot wire semiconductor, Galvanic cell	
Sampling method	Extractive type	
Detection range	As per specifications	
Gas concentration display	4-digit digital LCD display (incl. units) 20-segment bar graph	
Alarm set point	2 stage alarm type (adjustable)	
Alarm display	Alarm lamp, Buzzer (no buzzer selectable)	
External output	Analog	4-20mA
	Alarm 1	1c voltage contact
	Alarm 2	1c voltage contact
	Trouble alarm	1c voltage contact
Contact capacity	125V AC, under 5A	
Power supply	100V AC to 220V AC	
Dimensions	164 (W) x 210 (H) x 220 (D) mm	
Weight	Approx. 5kg	
Options	Battery, Pyrolyzer for NF3	

1. Pull back the detector

2. Insert the sensor

3. Turn ON the power



Environmental Monitoring Equipment

Wall (Panel) Mount Type Odor Monitor

V-819

Detection Principle	Type of Gas Detected
Hot wire semiconductor sensor	Odor
Thin film semiconductor sensor	



Detector head



Indicator/Alarm unit
(photo: 3-point type)

* Refer to P.6 (V-810) for dimensions.

Features

- Our original metal oxide odor sensors detect target odors with high sensitivity.
- Achieved continuous monitoring, which was impossible with sensory evaluation or instrumental analysis.
- You can freely create a monitoring system according to the number of detector heads you need.
- Equipped with an external output terminal which allows continuous recording.
- Equipped with a 50-dot bar-graph meter which indicates the odor level in real time.

Uses

- Odor monitoring at site boundaries of various factories
- Indoor environmental monitoring
- Inside-equipment odor monitoring
- Odor control at exhaust ports of various factories
- Performance control of deodorizing equipment and air cleaners

Specifications

Model	V-819 (3-point type to 12-point type)	
Gas Detected	Various fragrance/odor component	Mainly hydrogen sulfide odor
Detection Principle	High sensitive tin oxide hot wire sintered semiconductor sensor	Supersensitive zinc oxide substrate thin film semiconductor sensor
Indicator	LCD bar graph (0-10 scale, no unit, 50 dots) with backlight	
Sampling Method	Diffusion type (Non-explosion-proof)	
Alarm Set Value	Adjustable	
Alarm Indication	Odor level alarm	Alarm Unit Lights up red and buzzer sounds intermittently on alarm from at least one indicator unit (Buzzer stops after Reset)
	Trouble alarm	Alarm Unit Power lamp (green) goes out (Non-latching) Lights up red and buzzer sounds continuously on trouble with at least one indicator unit (Buzzer stops after Reset)
* Non-latching is standard for the alarm indication of the indicator units and alarm units.		
Contact Output	Indicator unit (individual alarm):	Alarm (1a) 1A@100V AC (resistance load)
	Alarm unit (collective alarm):	Alarm (1c) 1A@100V AC (resistance load) Trouble (1a), Buzzer (1a)
External Output	4-20mA (Input resistance: 500Ω or lower)	
Operating Temperature Range	-10°C to 40°C	
Power Source	110V AC±10%, 200/220V AC, 50/60Hz, 24V DC±10%	
Power Consumption	(25+5×n)VA (n is the number of the detection points)	
Installation	Wall mount (or Panel mount)	
Applicable Cable	CVVS of 1.25-2.00mm ² , 3C (Cable resistance: one way resistance of 10Ω or lower)	
Exterior Color	Munsell N8.0 (Indicator/Alarm unit)	Munsell N7.0 (Detector head)
Options	Rainproof cover (KW-14A)	

Abnormal Temperature Detection System Using Odor Sensor

CAN-NETSU-KUN



Odor detector



Odor capsules

Features

- An odor detector immediately detects the odor caused by overheated insulating materials.
- An odor capsule senses overheating and emits odor, which is detected by the odor detector.

Specifications

■ Odor detector	
Model	ESM-100
Power Source	100-240V AC, 50/60Hz
Power Consumption	3W
Alarm System	Alarm delay system (with 30s timer)
Alarm Indication	Red LED lights up, Buzzer sounds
External Output	No-voltage(1a) contact, Contact capacity: 1A@30V DC or 1A@240V AC
Dimensions/Weight	W96×D96×H41mm/Approx. 150g
Detectable Volume	Approx. 13m ³ (with one odor capsule, regardless of whether there's a ventilation fan or not)
Recommended Replacement Period	5 years

■ Odor capsule

Model	NC-80 (80°C level) green, NC-100 (100°C level) yellow, NC-120 (120°C level) red
Designed Action Temperature	80, 100, 120°C
Dimensions/Weight	φ 15×H7mm/Approx. 5g
Recommended Replacement Period	3 years
Setting Method	Double side adhesive tape or exclusive holder
Feature of Odor Liquid	Harmless to humans, no hazard of fire

Outline

Detects slight signs of fire immediately.
Prevents electrical fire from occurring.

Diffusion Type with LED Concentration Display

KD-12



Features

- Simpler, smarter and reliable gas detector with digital display
- Simple and cost effective installation
- Rugged, compact and lightweight design
- Environmental friendly product
- NDIR (non-dispersive infrared sensor) mounted type
- Approvals:
 - Ex d IIC T5 (KD-12A/B/C)
 - Ex d IIB T5 (KD-12D/R/O)
 - ATEX standard (KD-12A/B/C)
 - CE Marking (EMC Directive)



Specifications

Model	KD-12A	KD-12B	KD-12C	KD-12R	KD-12D		KD-12O
Detection Principle	Hot wire semiconductor	Catalytic combustion	Thermal conductivity	Non-dispersive infrared	Electrochemical cell		Galvanic cel
Target Gas	Combustible / Toxic gas		Hydrogen, Helium, Carbon dioxide	Methane, Carbon dioxide	Carbon monoxide	Hydrogen sulfide	Oxygen
Sampling Method	Diffusion type						
Detection Range	As per specifications				0-100ppm, 0-150ppm, or 0-250ppm *1	0-30ppm or 0-50ppm *1	0-25.0vol%
Alarm Set Value	As per specifications				FS100ppm: 25ppm (recommendation) FS150/250ppm: 50ppm (recommendation)	10ppm	18.0vol%
Alarm Accuracy	Combustible gas: ±25% of alarm set value Toxic gas: ±30% of alarm set value			±25% of alarm set value	±30% of alarm set value		±1.0vol% 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			Within 30s at 1.6 times of alarm set value	Within 60s at 1.6 times of alarm set value		Within 5s to reach 18vol% under condition of 10vol% *2
Warning Display	Gas alarm: Red LED lamp flashes Trouble alarm: Yellow LED lamp flashes (sensor trouble, power voltage malfunction, etc.)						
Display	Four-digit digital LED display						
Operation	At 4 points of magnetic switches						
Approvals	EX d IIC T5 (ATEX)			EX d IIB T5			
Degree of Protection	IP65						
CE marked	Complied with CE Directive 2004/108/EC						
Applicable Cable	Cable out diameter: 10 to 13 mm 5-conductor cable *: CVV-S 1.25mm ² , 3-conductor cable: CVV-S 2mm ² or 1.25mm ²						
Operating Temperature and Humidity *4	Temperature: -10 to 50°C Humidity: 10 to 90%RH (0 to 50°C)				Temperature: -10 to 40°C Humidity: 30 to 85%RH		Temp: 0 to 40°C Hum: 30 to 85%RH
Power Supply	24V DC (18 to 30V DC)						
Power Consumption	3W max.			2.2W max.	1.2W max.		
Dimensions	158 (W) x 116 (H) x 68 (D) mm (excl. protrusion)			158 (W) x 120 (H) x 68 (D) mm (excl. protrusion)			
Weight	Approx. 1.2kg			Approx. 1.3kg			

*1 Specify when purchasing. *2 Under the condition of 20 \pm 2 degrees C. *3 Screwless type only. *4 No radical temperature or humidity changes and no condensing.

Gas Detector Head

Extractive Type with LED Concentration Display

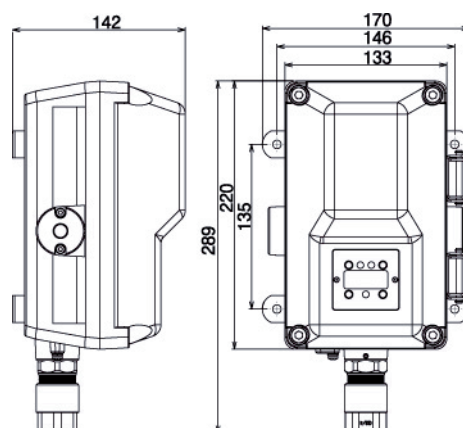
PD-12



Features

- Small and lightweight with concentration and alarm display.
- Extractive type with hydrogen explosion proof.
- Detecting decreased flow rate function (option).
- Environmentally friendly product.
- Approvals:
 - ATEX
 - Ex d IIB + H₂T4X
 - CE Marking (EMC Directive)

External Dimensions (mm)



Specifications

Model	PD-12A	PD-12B	PD-12C
Detection Principle	Hot wire semiconductor	Catalytic combustion	Thermal conductivity
Target Gas	As per specifications		
Sampling Method	As per specifications		
Suction Flow	Over 0.5L/min		
Detection Range	As per specifications		
Alarm Set Value	As per specifications		
Alarm Accuracy	Combustible gas: $\pm 25\%$ of alarm set value under identical conditions Toxic gas: $\pm 30\%$ of alarm set value under identical conditions		
Alarm Delay	Combustible gas: Within 30 seconds with 1.6 times of alarm set concentration Toxic gas: Within 60 seconds with 1.6 times of alarm set concentration		
Warning Display	Gas alarm: Red LED lamp flashes Trouble alarm: Yellow LED lamp flashes (sensor disconnection, sensor zero drop, power supply voltage error, etc.)		
Display	Four-digit digital LED display		
Operation	At 4 points of magnetic switches		
Approvals	EX d IIB + H ₂ T4X		
Degree of Protection	IP65		
Applicable Cable	Cable outer diameter: 10.5 to 14.5mm 6-conductor shielded cable: CVV-S 1.25mm ² or 2.0mm ²		
Operating Temperature and Humidity	Temperature: -10 to 50°C Humidity: 10 to 90%RH (0 to 50°C) No radical temperature or humidity changes and no condensation		
Power Supply	24V DC (18 to 30V DC)		
Power Consumption	7.5W max.		
Dimensions	133 (W) x 260 (H) x 132 (D) mm (excluding protrusion)		
Weight	Approx. 5.2kg		

Diffusion Type

KD-14



Features

- Compact designed diffusion type gas detector
- Easy to replace unit type sensor
- Water and dust-proof construction
(Degree of protection: IP65)
- Approvals: Ex d IIC T5

Specifications

Model	KD-14A	KD-14B
Sampling Method	Diffusion type	
Detection Principle	Hot wire semiconductor	Catalytic combustion
Target Gas	Hydrogen	
Detection Range	0-2000ppm	0-100%LEL
Explosion-proof	Ex d IIC T5	
Degree of Protection	IP65	
Applicable Cable	Cable diameter: 10-13mm 4-core shield cable: CVV-S 0.75mm ² , 1.25mm ² or 2.0mm ²	
Operating Temperature and Humidity	Temperature: -10 to 50°C Humidity: 10 to 90%RH (0-50°C)	
Power supply	Supplied by indicator unit	
Dimensions	158 (W) x 158 (H) x 68 (D) mm	
Weight	Approx. 1.2kg	

Extractive Type

PD-14



Features

- Hydrogen explosion-proof extractive gas detector
- Easy to replace unit type sensor
- Water and dust-proof construction
(Degree of protection: IP65)
- Approvals: Ex d IIB + H2T4

Specifications

Model	PD-14A-D	PD-14B-D
Sampling Method	Extractive type	
Detection Principle	Hot wire semiconductor	Catalytic combustion
Target Gas	Hydrogen	
Detection Range	0-2000ppm	0-100%LEL
Explosion-proof	Ex d IIB + H2T4	
Degree of Protection	IP65	
Applicable Cable	Cable diameter: 10-14.5mm 6-core shield cable: CVV-S 0.75mm ² , 1.25mm ² or 2.0mm ²	
Operating Temperature and Humidity	Temperature: -10 to 50°C Humidity: 10 to 90%RH (0-50°C)	
Power supply	Supplied by indicator unit	
Pump power source	24V DC ±10%	
Dimensions	133 (W) x 260 (H) x 132 (D) mm	
Weight	Approx. 5.2kg	

Gas Detector Head Lineup (for Combustible Gas/Toxic Gas/Oxygen)

Diffusion Type - for Combustible Gas

KD-2A・KD-3A

Detection Principle	Type of Gas Detected
Hot wire semiconductor sensor	Combustible gas
Catalytic combustion sensor	
Thermal conductivity sensor	



Model	KD-2A	KD-3A
Detection Principle	Hot wire semiconductor, Catalytic combustion, or Thermal conductivity	
Gas Detected	Combustible gas	
Detection Range	As per specifications	
Power Source for Sensor	Supplied from the indicator unit	
Maximum Loop Length	1km (with 2mm ² cable)	
Sampling Method	Diffusion type	
Explosion-Proof Structure	d2G4	d3aG4/d3cG4
Operating Temperature Range	-10°C to 40°C	
Applicable Cable	4C	
Dimensions	W144×H180×D100mm	
Weight	Approx. 1.2kg	

Diffusion Type - for Combustible Gas

KD-5A・KD-5B

Detection Principle	Type of Gas Detected
Hot wire semiconductor sensor	Combustible gas
Catalytic combustion sensor	
Thermal conductivity sensor	



Model	KD-5A	KD-5B
Detection Principle	Hot wire semiconductor, Catalytic combustion, or Thermal conductivity	
Gas Detected	Combustible gas	
Detection Range	As per specifications	
Power Source for Sensor	Supplied from the indicator unit	
Maximum Loop Length	1km (with 2mm ² cable)	
Sampling Method	Diffusion type	
Explosion-Proof Structure	d3aG4	d2G4
Operating Temperature Range	-10°C to 60°C	
Applicable Cable	3C shielded	
Dimensions	W141×H192×D94mm	
Weight	Approx. 1kg	

Diffusion Type - for Combustible Gas

OR-2A

Detection Principle	Type of Gas Detected
Orgastor sensor	Oil



Model	OR-2A
Detection Principle	Orgastor
Gas Detected	Oil, Organic solvent
Power Source for Sensor	Supplied from the indicator unit
Maximum Loop Length	1km (500m when using a Zener barrier; with 2mm ² cable)
Sampling Method	Diffusion type
Explosion-Proof Structure	Intrinsically safe explosion-proof 3nG5 when combined with a Zener barrier
Operating Temperature Range	-10°C to 40°C
Applicable Cable	2C shielded
Dimensions	W40×H35×D87mm

Diffusion Type - for Toxic Gas/Oxygen

KD-5D・KD-5O

Detection Principle	Type of Gas Detected
Electrochemical cell sensor	Toxic gas
Galvanic cell sensor	Oxygen concentration



Model	KD-5D	KD-5O
Detection Principle	Electrochemical cell	Galvanic cell
Gas Detected	Carbon monoxide	Oxygen
Detection Range	As per specifications	
Power Source for Sensor	Supplied from the indicator unit	
Maximum Loop Length	1km (with 2mm ² cable)	
Sampling Method	Diffusion type	
Explosion-Proof Structure	d2G4	
Operating Temperature Range	0°C to 40°C	
Applicable Cable	2C shielded	
Dimensions	W141×H192×D94mm	
Weight	Approx. 1kg	

Diffusion Type - for Toxic Gas/Oxygen

KS-2D・KS-2O

Detection Principle	Type of Gas Detected
Electrochemical cell sensor	Toxic gas
Galvanic cell sensor	Oxygen concentration



Model	KS-2D	KS-2O
Detection Principle	Electrochemical cell	Galvanic cell
Gas Detected	Toxic gas	Oxygen
Detection Range	As per specifications	
Power Source for Sensor	Supplied from the indicator unit	
Maximum Loop Length	1km (500m when using a Zener barrier; with 2mm ² cable)	
Sampling Method	Diffusion type	
Explosion-Proof Structure	Intrinsically safe explosion-proof 3nG5 when combined with a Zener barrier	
Operating Temperature Range	0°C to 40°C	
Applicable Cable	2C shielded	
Dimensions	W102×H200×D75mm(excluding protrusions)	
Weight	Approx. 1.5kg	

Diffusion Type - for Toxic Gas

KD-2AA・KD-2AB

Detection Principle	Type of Gas Detected
Thin film semiconductor sensor	Toxic gas



Model	KD-2AA	KD-2AB
Detection Principle	Thin film semiconductor	
Gas Detected	Cl ₂	
Detection Range	As per specifications	
Power Source for Sensor	Supplied from the indicator unit	
Maximum Loop Length	1km (with 2mm ² cable)	
Sampling Method	Eductor *1	Diffusion type
Explosion-Proof Structure	d2G4	Non-explosion-proof
Operating Temperature Range	-10°C to 40°C	
Applicable Cable	4C shielded	
Dimensions	W144×H180×D100mm	
Weight	Approx. 1.2kg	

*1 Separately equipped on a sampling panel

Diffusion Type - for Toxic Gas

KD-2AS-NH₃



Model	KD-2AS-NH3
Detection Principle	Semiconductor
Gas Detected	NH ₃
Detection Range	As per specifications
Power Source for Sensor	Supplied from the indicator unit
Maximum Loop Length	1km (with 2mm ² cable)
Sampling Method	Diffusion type
Explosion-Proof Structure	d2G4
Operating Temperature Range	-10°C to 40°C
Applicable Cable	4C shielded
Dimensions	W144×H180×D100mm
Weight	Approx. 1.2kg

Diffusion Type - for Toxic Gas

KCM-3A



Model	KCM-3A
Detection Principle	Electrolysis sensor with gel electrolyte
Gas Detected	COCl ₂ , HCN, others
Detection Range	As per specifications
Power Source for Sensor	Supplied from the indicator unit
Maximum Loop Length	1km (500m when using a Zener barrier; with 2mm ² cable)
Sampling Method	Diffusion type
Explosion-Proof Structure	Intrinsically safe explosion-proof 3nG5 when combined with a Zener barrier
Operating Temperature Range	0°C to 40°C
Applicable Cable	2C shielded
Dimensions	W152×H190×D120mm
Weight	Approx. 1.3kg

Extractive Type - for Combustible Gas

PE-2CC·PE-2DC



Model	PE-2CC	PE-2DC
Detection Principle	Hot wire semiconductor, Catalytic combustion, or Thermal conductivity	
Gas Detected	Combustible gas	
Detection Range	As per specifications	
Power Source for Sensor	Supplied from the indicator unit	
Power Source for Pump	100V AC±10%	24V DC±10%
Maximum Loop Length	1km (with 2mm ² cable)	
Sampling Method	Extractive	
Explosion-Proof Structure	d2G4	
Operating Temperature Range	-10°C to 40°C	
Applicable Cable	6C	
Dimensions	W122×H390×D96mm(excluding accessories)	
Weight	Approx. 6.2kg	

Extractive Type - for Toxic Gas

PS-2DPS



Model	PS-2DPS
Detection Principle	Pyrolysis+Electrochemical cell
Gas Detected	Toxic gas (NF ₃ , CCl ₄)
Detection Range	As per specifications
Power Source for Sensor	Supplied from the indicator unit
Power Source for Pump	100V AC±10% or 24V DC±10%
Maximum Loop Length	1km (with 2mm ² cable)
Sampling Method	Extractive
Explosion-Proof Structure	Non-explosion-proof
Operating Temperature Range	0°C to 40°C
Applicable Cable	2C+2C shielded
Dimensions	W300×H350×D100mm(excluding protrusions)
Weight	Approx. 5.6kg

Extractive Type - for Toxic Gas

PS-2DP·PS-2DE



Model	PS-2DP	PS-2DE
Detection Principle	Electrochemical cell	
Gas Detected	Toxic gas	
Detection Range	As per specifications	
Power Source for Sensor	Supplied from the indicator unit	
Power Source for Pump	100V AC±10% or 24V DC±10%	
Air Supply		Instrumentation air 0.3-0.7MPa
Maximum Loop Length	1km (with 2mm ² cable)	1km (500m when using a Zener barrier; with 2mm ² cable)
Sampling Method	Extractive	Eductor
Explosion-Proof Structure	Non-explosion-proof	Intrinsically safe explosion-proof 3nG5 when combined with a Zener barrier
Operating Temperature Range	0°C to 40°C	
Applicable Cable	2C+2C shielded	2C shielded
Dimensions	W300×H350×D100mm(excluding protrusions)	
Weight	Approx. 5.6kg	

Extractive Type - for Oxygen

PS-2OP·PS-2OE



Model	PS-2OP	PS-2OE
Detection Principle	Galvanic cell	
Gas Detected	Oxygen	
Detection Range	As per specifications	
Power Source for Sensor	Supplied from the indicator unit	
Power Source for Pump	100V AC±10% or 24V DC±10%	
Air Supply		Instrumentation air 0.3-0.7MPa
Maximum Loop Length	1km (with 2mm ² cable)	1km (500m when using a Zener barrier; with 2mm ² cable)
Sampling Method	Extractive	Eductor
Explosion-Proof Structure	Non-explosion-proof	Intrinsically safe explosion-proof 3nG5 when combined with a Zener barrier
Operating Temperature Range	0°C to 40°C	
Applicable Cable	2C+2C shielded	2C shielded
Dimensions	W300×H350×D100mm(excluding protrusions)	
Weight	Approx. 5.6kg	

Gas Detector Head Lineup (for Toxic Gas/Oxygen)

Extractive Type - for Toxic Gas

PE-2CZ-NH₃・PE-2DZ-NH₃



Model	PE-2CZ-NH ₃	PE-2DZ-NH ₃
Detection Principle	Semiconductor	
Gas Detected	NH ₃	
Detection Range	As per specifications	
Power Source for Sensor	Supplied from the indicator unit	
Power Source for Pump	100V AC±10% 24V DC±10%	
Maximum Loop Length	1km (with 2mm ² cable)	
Sampling Method	Extractive	
Explosion-Proof Structure	d2G4	
Operating Temperature Range	-10°C to 40°C	
Applicable Cable	6C	
Dimensions	W122×H390×D96mm(excluding accessories)	
Weight	Approx. 6.2kg	

Extractive Type - for Toxic Gas

PS-2DKP



Model	PS-2DKP
Detection Principle	Electrochemical cell+Light scattering
Gas Detected	SiH ₄ (SiO ₂)
Detection Range	SiH ₄ : 25ppm, SiO ₂ : 10mg/cm ³
Power Source for Sensor	Supplied from the indicator unit
Power Source for Pump	24V DC±10%
Maximum Loop Length	1km (with 2mm ² cable)
Sampling Method	Extractive
Explosion-Proof Structure	Non-explosion-proof
Operating Temperature Range	0°C to 40°C
Applicable Cable	2C+2C shielded
Dimensions	W300×H350×D100mm(excluding protrusions)
Weight	Approx. 6.2kg

Extractive Type - for Toxic Gas

PS-2CK Ⅲ



Model	PS-2CK Ⅲ
Detection Principle	Pyrolysis ionization
Gas Detected	TEOS and other alkoxide vapors
Detection Range	As per specifications
Power Source for Sensor	Supplied from the indicator unit
Power Source for Pump	100V AC±10%
Maximum Loop Length	1km (with 2mm ² cable)
Sampling Method	Extractive
Explosion-Proof Structure	Non-explosion-proof
Operating Temperature Range	0°C to 40°C
Applicable Cable	2C+4C shielded
Dimensions	W300×H350×D100mm(excluding protrusions)
Weight	Approx. 9.3kg

Extractive Type - for Toxic Gas

PS-6DKP



Model	PS-6DKP
Detection Principle	Electrochemical cell+Light scattering
Gas Detected	SiH ₄ (SiO ₂)
Detection Range	SiH ₄ : 25ppm, SiO ₂ : 10mg/cm ³
Power Source for Sensor	Supplied from the indicator unit
Power Source for Pump	24V DC±10%
Maximum Loop Length	1km (with 2mm ² cable)
Sampling Method	Extractive
Explosion-Proof Structure	Non-explosion-proof
Operating Temperature Range	0°C to 40°C
Applicable Cable	2C+2C shielded
Dimensions	W152×H198×D145mm(excluding protrusions)
Weight	Approx. 6.2kg

Peripherals



Programmer MST-1

Use this programmer (master) to adjust function settings, the zero point, and the span of each gas detector head (slave).



Programmer SST-1

Use this device to calibrate the zero point and the span of a KD-5S gas detector head.



Loader SST-3

Use this loader to adjust settings of an S-500J Receiving unit, including an alarm level and alarm delay time, or to check gas concentration.

Power Supply Units

VPW



Model	Type(diffusion)	Dimensions(mm)
VPW-40	6-Point type	W90×H210×D110
VPW-80	12-Point type	W120×H280×D110
VPW-160	24-Point type	W200×H300×D120

Zener barrier

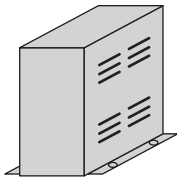
BT-150



Explosion-proof structure	3nG5
Safety related rated capacity	250V AC-DC
Rated load	13V DC

Rainproof Covers etc.

External View

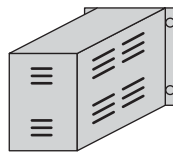


* 1

Floor mount

Model	KW-11
Applicable detector head	KD-2A(S), KD-3A(S)
Dimensions	W110×H197×D170mm

External View

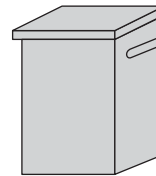


* 1

Wall mount (2B stanchion)

Model	KW-12(U)
Applicable detector head	KD-2A(S), KD-3A(S)
Dimensions	W110×H170×D197mm

External View

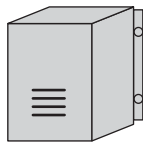


* 1

Wall mount (2B stanchion)

Model	PW-51(U)
Applicable detector head	PE-2CC, CZ, DC, DZ
Dimensions	W228×H434×D155mm

External View

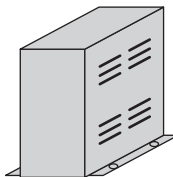


* 1

Wall mount (2B stanchion)

Model	KW-31(U)
Applicable detector head	KS-2D, KS-2O
Dimensions	W140×H300×D120mm

External View

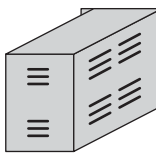


* 1

Floor mount

Model	KW-51
Applicable detector head	KD-5A, 5B
Dimensions	W110×H197×D170mm

External View

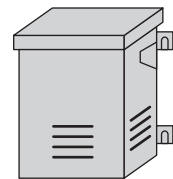


* 1

Wall mount (2B stanchion)

Model	KW-52(U)
Applicable detector head	KD-5A, 5B
Dimensions	W110×H170×D197mm

External View

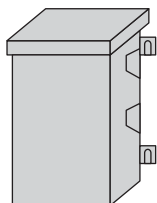


* 1

Wall mount (2B stanchion)

Model	KW-81(U)
Applicable detector head	KBL-8, KD-8
Dimensions	W260×H370×D220mm

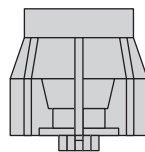
External View



* 1

Model	KW-82(U)
Applicable detector head	KBL-8C
Dimensions	W260×H486×D220mm

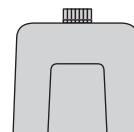
External View



* 1

Model	KW-22
Applicable detector head	KD-2A(S), KD-3A(S), KD-5
Dimensions	φ 64×H65mm

External View



* 1

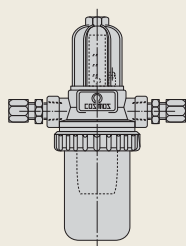
Model	KW-15
Applicable detector head	KD-5
Dimensions	φ 97×H93mm

* 1 Consult us for the material (SPCC or SUS).

Sampling Unit Parts

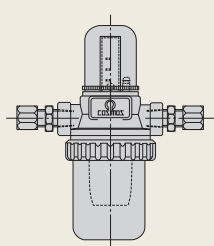
Flow Checkers

External View



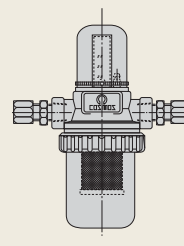
Model	FC-32A
Cup Material	Acrylic
Filter Material	Double layer filter
Dimensions	W68×H155mm

External View



Model	FC-32B
Cup Material	Pyrex
Filter Material	Double layer filter
Dimensions	W68×H140mm

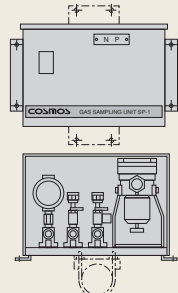
External View



Model	FC-32C
Cup Material	Pyrex
Filter Material	SUS
Dimensions	W68×H140mm

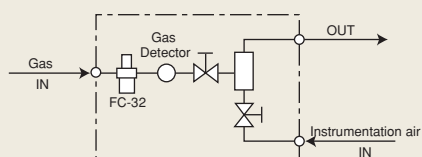
Sampling panel (Gas Sampling Units)

External View

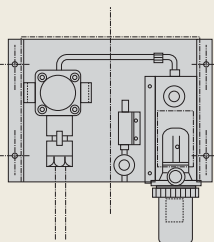


Model	Eductor type (SP-1)
Installation	Wall mount/2B hole
Dimensions	W280×H200×D200mm (Excluding protrusions)

Sampling flow example

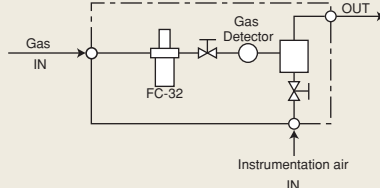


External View

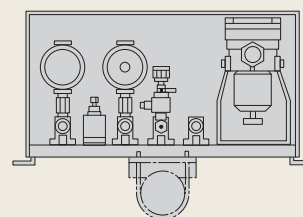


Model	Eductor type (P-4382)
Installation	Wall mount/2B hole
Dimensions	W240×H200×D200mm (Excluding protrusions)

Sampling flow example

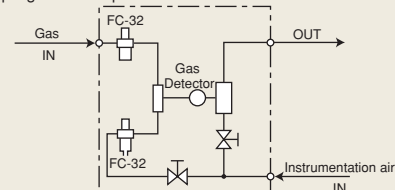


External View



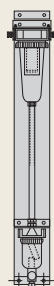
Model	Eductor type (Air mixing)
Installation	Wall mount/2B hole
Dimensions	W360×H200×D200mm (Excluding protrusions)

Sampling flow example



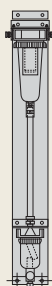
Auto-Drain Filters

External View



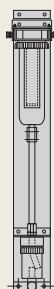
Model	AD-40
Use	Removes moisture from a sampling gas to reduce its influence on a detector head.
Dimensions	W90×H700×D105mm

External View



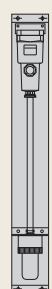
Model	AD-40G
Use	Useful when a target gas is an organic solvent etc.
Dimensions	W90×H700×D105mm

External View



Model	AM-15-10
Use	Removes dust and mist from sampling gas.
Dimensions	W90×H920×D195mm

External View



Model	AM-150-10
Use	Removes dust and mist from sampling gas.
Dimensions	W90×H700×D90mm

COSMOS Gas Sensors

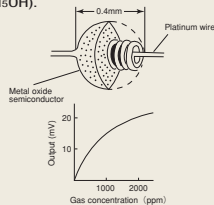
Hot Wire Semiconductor Sensor (CH)



Detects resistance change across both edges of platinum wire as a result of variation in thermal and electrical conductivity due to a gas absorbed on the surface of a semiconductor.

■ Features

- ① Sensitive and large variation in output at low gas concentration.
- ② Less initial stabilization time, more compact, more energy saving as compared with a semiconductor sensor.
- ③ Long service life, high stability, and high durability.
- ④ Selective sensitivity to gases (H_2 , CH_4 , C_2H_5OH).



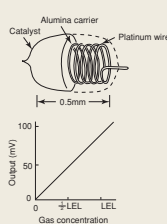
Catalytic Combustion Sensor (CS)



Detects the temperature rise (change in resistance) of the platinum coil by oxidizing a gas in contact with the surface of a catalyst.

■ Features

- ① Output - gas concentration is linear to LEL.
- ② High accuracy, superior repeatability.
- ③ Immune to surrounding temperature and humidity.
- ④ Power saving type (CSS) consumes only 1/4 of our conventional contact combustion sensor.



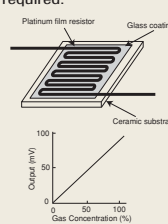
Thermal Conductivity Sensor (CT)



Detects temperature variation of the heat source (platinum coil) by the gas heat conduction differential.

■ Features

- ① Output - gas concentration is linear up to 100vol%, suitable for high concentration gas measurements.
- ② Employment of thermal conductivity, a physical property of a gas, makes measurement free from catalyst deterioration or poison, and ensures economy.
- ③ O_2 not required.



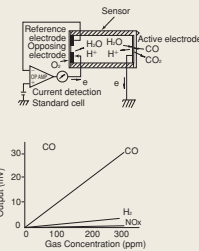
Electrochemical cell Sensor (COS)



Detects gas concentrations through electrolytic current which results from gas electrolysis.

■ Features

- ① Extremely sensitive - 1ppm of CO detectable.
- ② Selective sensitivity to gases, most suited to detection of toxic gas.
- ③ Superior linearity at low concentration, suitable to analytical applications.
- ④ High immunity to interfering gas.



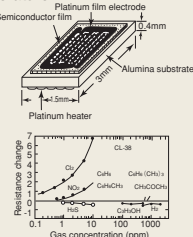
Thin Film Semiconductor Sensor (AET)



Detects electric conductivity variation due to a gas absorbed on a thin film semiconductor having the thickness of 100nm.

■ Features

- ① More sensitive than the semiconductor sensor.
- ② Selective to gases (Cl_2 , H_2S , EO , etc.)
- ③ Self-cleaning effect on the surface ensuring high repeatability and long-term stability due to high working temperature.



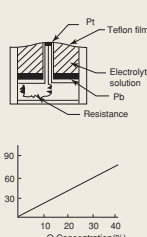
Galvanic Cell Sensor (OS)



Detects reactive current resulting from using oxygen as an active material for the battery cell which consists of electrodes Pt-Pb, diaphragm, and electrolytic solution.

■ Features

- ① Requires no external power supply.
- ② Easy to use, inexpensive, wide marketability.
- ③ Output is proportional to oxygen concentration linear up to 40vol%.



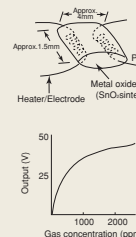
Semiconductor Sensor (CZ)



Detects variation in electric conductivity caused by a gas absorbed on the surface of a metal oxide semiconductor.

■ Features

- ① High sensitivity, large output variation at low concentration.
- ② Long service life, long-term stability.
- ③ Superior to catalytic combustion sensors in toxic gas or severe atmospheric conditions.



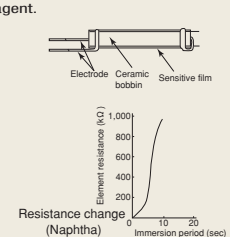
Orgastor Sensor (OR)



Detects variation in resistance representing swelling property of a carbon resistor, especially binding polymer, with respect to oil or organic solvent vapor.

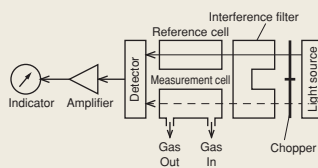
■ Features

- ① Works at normal temperatures with high response speed.
- ② Compact, lightweight, excellent to withstand mechanical shocks.
- ③ Selective detection for oil or organic solvent vapor by choosing binding agent.



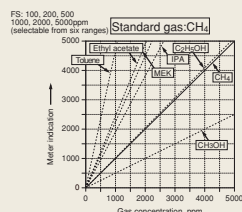
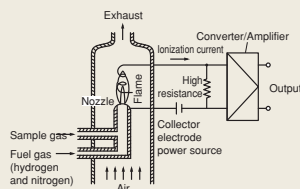
Infrared Absorption Sensor (Non-Dispersive)

Detects gas types and concentration by the infrared absorption spectrum of the gas and the amount of absorption respectively.



Flame Ionization Detector (FID)

Detects the concentration of hydrocarbon gases by a phenomenon in which they ionize and the electric conductivity increases when they are brought into a hydrogen flame.



Pyrolysis Ionization Sensor

Fine particles decomposed in pyrolysis chamber are detected by an ionization smoke detector and converted to electrical signals.

The ionization smoke detector has an external ionization chamber (IO1) and internal ionization chamber (IO2), both of which are equipped with Americium-241.

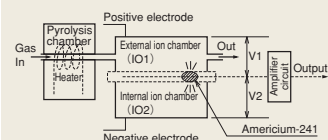
Americium-241 ionizes air.

Normally, ionization currents flow through IO1 and IO2 in equal proportions, so the two voltages V1 and V2 are the same and the output of an amplifier circuit is 0 volt.

When fine particles decomposed in pyrolysis chamber go through IO1 of the smoke detector, the ionization current in IO1 decreases.

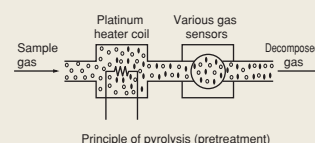
This reduction in the ionization current causes difference between two voltages V1 and V2, and the output of the amplifier circuit becomes positive, which is outputted as a signal to an indicator unit.

The internal ionization chamber (IO2) is also used to compensate for changes in temperature and atmospheric pressure.



Pyrolysis (Pretreatment)

When halogenated hydrocarbons or other halides come into contact with a Platinum heater coil, they decompose into halogen molecules or hydrogen halides. A sample gas is detected by measuring these decomposed gases with a Electrochemical cell sensor, a Galvanic cell sensor, or other gas sensors or with detector tubes.



Classification of Explosive Gases and Explosion-Proof Structure

Classification of Explosive Gases

■ Classification Based on Japanese Standards on Explosion-Protected Electrical Apparatus

● Explosion Classes and Ignition Groups of Typical Explosive Gases

Explosion Class	Ignition Group	G1	G2	G3	G4	G5
1		Acetone Ammonia Carbon monoxide Ethane Acetic acid Ethyl acetate Toluene Propane Benzene Methanol Methane	Ethanol Isopentyl acetate 1-Butanol Butane Acetic anhydride	Gasoline Hexane	Acetaldehyde Ethyl ether	
2		Coal gas	Ethylene Ethylene oxide			
3		Water gas Hydrogen	Acetylene			Carbon disulfide

● Classification of Explosion Classes

Explosion Class	Minimum gap with a 25mm length of patch which permits the flame propagation
1	Over 0.6mm
2	Over 0.4mm up to 0.6mm
3	Up to 0.4mm

● Explosion classes are classified into three classes as shown in the table above according to the value of flame propagation limit of explosive gas using a standard container.

● Classification of Ignition Groups

Ignition Group	Ignition Temperature
G1	Over 450°C
G2	Over 300°C up to 450°C
G3	Over 200°C up to 300°C
G4	Over 135°C up to 200°C
G5	Over 100°C up to 135°C
G6	Over 85°C up to 100°C

● Ignition groups are classified into six groups as shown in the table above according to the ignition temperature of explosive gases.

■ Classification Based on International Standards of the International Electrotechnical Commission (IEC)

● Groups and Temperature Classes of Typical Explosive Gases

Temperature Class	T1	T2	T3	T4	T5
IIA	Acetone Ammonia Carbon monoxide Ethyl acetate Toluene Propane Benzene Methanol Methane LP gas Ethane Acetic acid	Ethanol Isobutane 1-Butanol Isopentyl acetate Acetic anhydride	Gasoline n-Hexane	Acetaldehyde	
IIB	Town gas	Ethylene Ethylene oxide		Ethyl ether	
IIC	Hydrogen	Acetylene			Carbon disulfide

● Classification of Groups

Flameproof

Group	Range of Maximum Safety Gap of Gases or Vapors (mm)
IIA	0.9mm or more
IIB	0.5-0.9mm
IIC	0.5mm or less

Intrinsic Safety

Group	Range of Minimum Ignition Current Ratio of Gases or Vapors
IIA	Over 0.8
IIB	0.45-0.8
IIC	Less than 0.45

● Classification of Temperature Classes

Temperature Class	Range of Maximum Surface Temperature (°C)
T1	Over 300 up to 450
T2	Over 200 up to 300
T3	Over 135 up to 200
T4	Over 100 up to 135
T5	Over 85 up to 100
T6	85 or less

About Explosion-Proof Structure

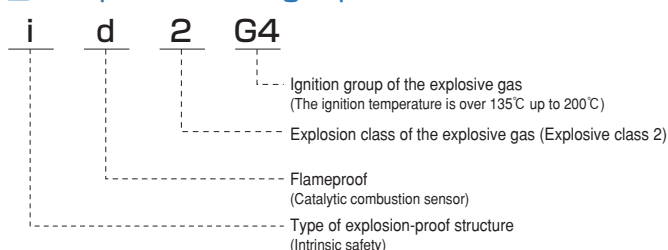
■ Symbols Based on Japanese Standards on Explosion-Protected Electrical Apparatus

● Symbols

Item to be Indicated	Symbol	Meaning of Symbol
Type of Explosion-Proof Structure	d o f e i s	Flameproof Oil immersion Pressurization Increased safety Intrinsic safety Special
Explosion Class of Explosive Gas	1 2 3a 3b 3c 3n	Applicable to gases or vapors of explosion class 1 Applicable to gases or vapors of explosion class 1, 2 Applicable to explosion class 1, 2, water gas, and hydrogen Applicable to explosion class 1, 2, and carbon disulfide Applicable to explosion class 1, 2, and acetylene Applicable to all gases
Ignition Group of Explosive Gas	G1 G2 G3 G4 G5 G6	Ignition temperature is over 450°C Ignition temperature is over 300°C up to 450°C Ignition temperature is over 200°C up to 300°C Ignition temperature is over 135°C up to 200°C Ignition temperature is over 100°C up to 135°C Ignition temperature is over 85°C up to 100°C

*Using apparatus in Zone 0 is limited to intrinsically safe one.

■ Example of Indicating Explosion-Proof Structure

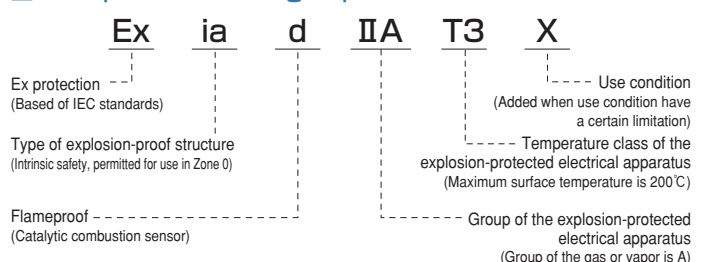


■ Symbols Based on International Standards of the International Electrotechnical Commission (IEC)

● Symbols

Item to be Indicated	Symbol	Meaning of Symbol
Explosion-Proof Structure	Ex	Explosion-proof structure in conformity to the IEC-harmonized standards
Type of Explosion-Proof Structure	d o p e ia ib s	Flameproof Oil immersion Pressurization Increased safety Intrinsic safety (Use permitted in zone 0) Intrinsic safety (Use not permitted in zone 0) Special
Group of Explosion-Protected Electrical Apparatus	II IIA IIB IIC	For factory and place of business Applicable to gases or vapors of class A Applicable to gases or vapors of class B Applicable to gases or vapors of class C
Temperature Class of Explosion-Protected Electrical Apparatus	T1 T2 T3 T4 T5 T6	Maximum surface temperature is up to 450°C Maximum surface temperature is up to 300°C Maximum surface temperature is up to 200°C Maximum surface temperature is up to 135°C Maximum surface temperature is up to 100°C Maximum surface temperature is up to 85°C

■ Example of Indicating Explosion-Proof Structure



Danger of Combustible Gases, Toxic Gases, and Vapors

Gas/Vapor	Molecular Formula (Chemical Formula)	Flammable (Explosive) Range (vol%)	Explosion Class	Ignition Group*	Ignition Temperature (C)*	Threshold Limit Value (ppm)	Specific Gravity of Gas (air=1)
Hydrogen	H ₂	4.0 — 75.6	3	G1	(gas)	—	0.07
Methane	CH ₄	5.0 — 15.0	1	G1	(gas)	—	0.55
Propane	C ₃ H ₈	2.1 — 9.5	1	G1	(gas)	—	1.56
n-Butane	C ₄ H ₁₀	1.5 — 8.5	1	G2	(gas)	800	2.01
Isobutane	C ₄ H ₁₀	1.8 — 8.4 K	1	G2	(gas)	—	2.01
n-Pentane	C ₅ H ₁₂	1.4 — 7.8	1	G3	< -40	600	2.48
Ethylene	C ₂ H ₄	2.7 — 34	2	G2	(gas)	—	0.97
Propylene	C ₃ H ₆	2.0 — 11.7	1	G2	(gas)	—	1.49
Butylene (cis-2-Butene)	C ₄ H ₈	1.7 — 9.0 K	1	G2	(gas)	—	1.93
Acetylene	C ₂ H ₂	1.5 —100	3	G2	(gas)	—	0.90
Toluene	C ₆ H ₅ CH ₃	1.2 — 7.0	1	G1	6	50	3.18
o-Xylene	C ₆ H ₄ (CH ₃) ₂	1.0 — 7.6	1	G1	30	100	3.66
Methanol	CH ₃ OH	5.5 — 44	1	G1	11	200	1.10
Ethanol	C ₂ H ₅ OH	3.5 — 19	1	G2	12	1000	1.59
Acetone	(CH ₃) ₂ CO	2.5 — 13	1	G1	< -20	500	—
Methyl ethyl ketone	CH ₃ COC ₂ H ₅	1.8 — 11.5	1	G1	-1	200	2.48
Ethyl acetate	CH ₃ COOC ₂ H ₅	2.1 — 11.5	1	G1	-4	400	3.04
Butyl acetate	CH ₃ COO(CH ₂) ₃ CH ₃	1.2 — 7.5	1	G2	22	150	4.01
Town gas	—	(5.0—)	2	G1	(gas)	—	0.2—0.4
LPG	—	(2.0 — 12.0)	1	G1	(gas)	1000	1.5—2.0
Gasoline	—	1.0 — 7.0	1	G3	< -20	300	3—4
Kerosene	—	(0.7—) K	1	G3	35—50	—	5—
n-Hexane	CH ₃ (CH ₂) ₄ CH ₃	1.2 — 7.4	1	G3	-21.7	50	2.98
Butadiene	CH ₂ =CHCH=CH ₂	1.1 — 12.5	2	G2	(gas)	2	1.87
Acetaldehyde	CH ₃ CHO	4.0 — 57	1	G4	-37.8	C25	1.52
Polyvinyl chloride	CH ₂ =CHCl	3.8 — 29.3	1	G2	(gas)	1	2.16
Carbon monoxide	CO	12.5 — 74	1	G1	(gas)	25	0.97
Ammonia	NH ₃	15.0 — 28	1	G1	(gas)	25	0.59
Hydrogen sulfide	H ₂ S	4.3 — 45.5	2	G3	(gas)	5	1.19
Chlorine	Cl ₂	— —	—	—	Incombustible	0.5	2.5
Sulfur dioxide	SO ₂	— —	—	—	—	2	—
Benzene	C ₆ H ₆	1.2 — 8.0	1	G1	-11	0.5	2.70
Acrylonitrile	CH ₂ =CHCN	2.8 — 28	1	G1	-5	2	1.83
Methyl bromide	CH ₃ Br	10.0 — 16.0 H	1	G1	Practically incombustible	1	3.28
Ethylene oxide	CH ₂ CH ₂ O	3.0 —100	2	G2	(gas)	1	1.52
Hydrogen cyanide	HCN	5.4 — 46.6	1	G1	< -20	C4.7	0.93
Phosgene	COCl ₂	— —	—	—	Incombustible	0.1	3.41
Hydrogen chloride	HCl	— —	—	—	—	C2	1.27
Arsine	AsH ₃	5.1 — 78 K	—	—	—	0.05	2.70
Phosphine	PH ₃	1.32 — H	—	—	—	0.3	1.18
Silane	SiH ₄	0.8 — 98 H	—	—	—	5	1.11
Diborane	B ₂ H ₆	0.8 — 88 H	—	—	—	0.1	0.96
Germane	GeH ₄	0.8 — 98 H	—	—	—	0.2	2.66
Dichlorosilane	SiH ₂ Cl ₂	4.1 — 99 H	—	—	—	—	3.51
Hydrogen selenide	H ₂ Se	12.5 — 63 K	—	—	—	0.05	2.81
Fluorine	F ₂	— —	—	—	—	1	1.3
Nitrogen dioxide	NO ₂	— —	—	—	—	3	1.6
Chlorine trifluoride	ClF ₃	— —	—	—	—	C0.1	3.2
Hydrogen fluoride	HF	— —	—	—	—	C3	0.7
Hydrogen bromide	HBr	— —	—	—	—	C3	3.6

Notes: ● Range of inflammability/explosion is based on "Recommended Practice for Explosion-Protected Electrical Installations in General Industries 1979" (the Technology Institution of Industrial Safety, Apr.20 2001) and "USER'S GUIDELINES for Electrical Installations for Explosive Gas Atmospheres in General Industry 1994" (National Institute of Industrial Safety, Ministry of Labour), where the value with "H" is based on Hazardous Chemical Substances Manual (1999) (Japan Industrial Safety and Health Association), and the values with "K" are based on "Kagaku Bousai Shishin shusei (1996)" (The Chemical Society of Japan).
The values in parentheses () are reference data.

● Threshold Limit Values are based on the TLV-TWA (Threshold Limit Value-Time Weighted Average) of the TLV table (ACGIH, 2003). The values with "C" indicate TLV-C (Threshold Limit Value-Ceiling).

* Based on classification according to Japanese standards on explosion-protected electrical apparatus.

Flammable (Explosive) Range: When combustible gas is mixed with air or oxygen, the concentration of the mixed gas within a certain range will cause an explosion phenomenon on contact with an ignition source. This range of concentration is called Explosive Range. The minimum concentration of the range is called Lower Explosive Limit or LEL, and the maximum is called Upper Explosive Limit or UEL.

Threshold Limit Value (TLV): Airborne concentrations of substances, such as toxic gases, to which workers can work consistently for eight hours a day, day after day, with no harmful effects. Established as guidelines by the ACGIH and the Technology Institution of Industrial Safety.





















We received ISO 9001 certification for our design, manufacturing, sales, and service operations at our head office, branches and factories.



Registered No. : JQ 064C

We obtained the ISO 14001 International Environmental Management System certification at head office.



Type of Gas Detected	Detection Principle
 Combustible gas	 Hot wire semiconductor sensor
 Toxic gas	 Catalytic combustion sensor
 Oxygen concentration	 Thin film semiconductor sensor
 CFC	 Semiconductor sensor
 Ozone	 Thermal conductivity sensor
 Oil	 Electrochemical cell sensor
 Odor	 Galvanic cell sensor
 Steel dust concentration	 Orgastor sensor
 Indoor air pollutant	 Electrolysis sensor with gel electrolyte
 Others	 Infrared sensor



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.



NEW COSMOS ELECTRIC CO.,LTD.

Head Office :

2-5-4, Mitsuya-naka, Yodogawa-ku, Osaka 532-0036, JAPAN
TEL. 81-6-6309-1505 FAX. 81-6-6308-0371

Tokyo Office :

2-6-2 Hamamatsu-cho,minato-ku, Tokyo 105-0013, JAPAN
TEL. 81-3-5403-2715 FAX. 81-3-5403-2710

URL : <http://www.new-cosmos.co.jp/en/index.html>



* The information contained in this catalog is subject to change.

12062K-01 Printed in Japan